Managerial Finance

Seventh Edition

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Preface

We find ourselves in a financial world that is in turmoil today. The c mplexity of the modern business environment is imposing an ever-growing demand on management, which requires a scientific approach to business decisions. Consequently, managerial financing principles are used to an increasing extent to assist in the process of decision-making. The managerial finance field continues to experience exciting change and growth, while the future promises to be an even more exciting ti e for finance professionals.

There is a vast amount of knowledge required in the field of financial anagement. This textbook is aimed at students undertaking an introductory or intermediate course in corporate finance looking for a single book that will assist them from second year until their Qualifying Exam (QE). The primary objective of the book is to provide one "digestible", affordable, South African textbook which can be used for more than one year by students with limited time at their disposal.

The subject of Managerial Finance is fundamental to understanding and running a company. The subjects dealt with in this textbook include strategy, the time value of money; risk; cost of capital; portfolio management and the Capital Asset Pricing Model; the investment and financing decision; financial analysis; valuations; takeovers, mergers, acquisitions and restructuring; working capital management; foreign exchange markets and currency risk; money and capital markets; and interest rates and interest rate risk.

These topics form an integrated whole. Time value of money concepts, the analysis of financial statements and failure prediction are essential pre-requisites for the valuation of business enterprises, while liquidations and restructuring are the result of prolonged financial distress. These topics should be considered within the context of the risk involved, working capital requirements and global and international developments in money and capital markets.

The needs of South African universities have been taken into account in the compilation of this book. The textbook has been updated to include sections on all the topics set out in SAICA's syllabus and Competency Framework. We wish to thank the various academics who have prescribed Managerial Finance for their valuable input and sugg stions. The book could however also serve as a valuable reference aid to practicing finance professionals.

The assistance of Robe t Skae and Lynette van den Heever in researching and compiling certain information is acknowledged.

The Authors
Pretoria 2014

Contents

Page

Chapter 1 The meaning of financial manage ent

1.1 Financial management 1
1.2 Goal of an entity 2
1.2.1 Shareholder wealth maximisation 2
1.2.2 Stakeholder theory 3
1.3 Business model or value creation model of an entity 4
1.4 Stakeholders of an entity 5
1.4.1 Key stakeholder groups 6
1.4.2 Governance principles of stakeholder relations 6
1.4.3 Stakeholder engagement 7
1.4.4 Reporting to stakeholders 8
1.5 Risk and return of investors 9
1.5.1 Business risk 9
1.5.2 Financial risk 10
1.6 Overview of financial management 11
1.6.1 The investment decision 12
1.6.2 The finance decision 14
1.6.3 The management decision 17
1.7 Capital markets 17
1.7.1 Raising quity finance on the Johannesburg Securities Exchange 17
1.7.2 Sustainability and responsible investment in the capital markets 18
1.8 Valuation of a ompany 20
Practice Questions 23

Chapter 2 Strategy and risk

2.1 Strategy and the business environment 28
2.2 The external environment 29
2.2.1 The political environment 29
2.2.2 The economic environment 30
2.2.3 The social environment 30
2.2.4 The technological environment 30
2.2.5 The regulatory environment 30
2.2.6 The market for the product or service 31
2.2.7 The competitive environment 31
2.2.8 Understanding the market and customer needs 32
2.2.9 The natural environment 32

Page

2.3 Internal environment ... 32
2.3.1 Value chain analysis ... 33
2.3.2 Product life cycle analysis ... 34
2.3.3 BCG Matrix ... 34
2.3.4 Resource audit ... 35
2.4 SWOT and gap analysis ... 35
2.5 Selecting appropriate strategies ... 36
2.5.1 Product-market strategies ... 37
2.5.2 Competitive strategies ... 37
2.5.3 Growth strategies ... 38
2.6 Implementing the strategies ... 38
2.6.1 Aligning organisational performance with strategy ... 38
2.6.2 Measurement of performance and reporting against strategic objectives ... 39
2.7 Risk and the business environment ... 41
2.7.1 Risk management ... 41
2.7.2 Risk appetite ... 41
2.7.3 Risk management strategy ... 42
2.8 Governance principles relating to risk management ... 42
2.9 Risk identification ... 44
2.10 Risk assessment and evaluation ... 45
2.11 Risk responses ... 45
2.11.1 Risk avoidance ... 45
2.11.2 Risk acceptance ... 45
2.11.3 Risk mitigation ... 45
2.12 Monitoring and reporting on risks ... 46
2.13 Enterprise risk management (ER) ... 46
Practice questions ... 47

Chapter 3 Present and future value of money

3.1 Time value of money ... 61
3.2 Future value ... 62
3.2.1 Compound interest formula ... 63
3.2.2 Solving for interest rate (i) and number of periods (n) ... 64
3.2.3 Introducing periods of time compared to years ... 65
3.2.4 Future value of an annuity ... 66
3.3 Present value ... 68
3.3.1 Pr s nt value of a perpetuity ... 73
3.3.2 Periodic payment of a loan ... 75
3.3.3 Present value of a perpetuity ... 76
3.4 Present value of shares ... 77
3.5 Present value of debt ... 81
Practice q estions ... 85

Chapter 4 Capital structure and the cost of capital

4.1 Debt advantage ... 92
4.2 Debt disadvantage ... 93
4.3 Financial gearing ... 95
4.4 Debt as part of the capital structure ... 97
4.5 Compensating providers of capital ... 97
4.6 Traditional capital structure theory ... 98
4.7 The Miller and Modigliani theory ... 101
4.8 The arbitrage process ... 102

Page

4.9 Optimal capital structure – traditional world 106
4.10 The cost of capital 107
4.10.1 Ordinary equity 108
4.10.2 Retained earnings 109
4.10.3 Preference shares 109
4.10.4 Debt 110
4.11 The Weighted Average Cost of Capital 110
4.12 Calculating the growth rate 113
4.13 Cost of capital for foreign investments 115
4.13.1 Discount rate for a foreign investment 115
Practice questions 116

Chapter 5 Portfolio management and the Capital Asset Pricing Model

5.1 Background to portfolio theory 143
5.2 The concept of risk and return 144
5.2.1 Investors' attitudes to risk 145
5.2.2 Probabilities and expected values 145
5.2.3 Single-asset risk measures 146
5.2.4 Comparing the risk of two stand-alone assets/projects 149
5.3 Portfolio risk and return 150
5.3.1 Two-asset portfolio risk and return 150
5.3.2 The efficient frontier 153
5.4 Diversification 154
5.4.1 Systematic versus unsystematic risk 154
5.5 The securities market line (SML) 155
5.6 The capital asset pricing model (CAP) 155
5.7 CAPM applications 159
5.7.1 CAPM and weighted average cost of capital (WACC) 160
5.7.2 CAPM and the investment appraisal decision 161
5.7.3 Limitations in using CAPM in investment appraisal decisions 164
Practice questions 164

Chapter 6 The investment decision

6.1 Capital budgeting 182
6.2 Correct WACC to be us d 182
6.3 Traditional m thods of inv stment appraisal 184
6.3.1 Payba k period method 184
6.3.2 Dis ounted payback period 185
6.3.3 Net p esent value method (NPV) 186
6.3.4 Net p esent value index method (NPVI) 189
6.3.5 Different project life cycles 190
6.3.6 Internal rate of return (IRR) 192
6.3.7 Comparative example of NPV and IRR 193
6.3.8 Modified internal rate of return (MIRR) 194
6.4 The investment decision 196
6.4.1 Inflation 196
6.4.2 Relevant costs and revenues 198
6.4.3 Opportunity costs and revenues 200
6.4.4 Discount rate (cost of capital) 200
6.4.5 Changes in working capital requirements 201
6.4.6 The financing of the project 201
6.4.7 Tax losses 201
6.4.8 Recoupment/scrapping allowances 201

Page

6.4.9 Taxation time lags ... 201
6.4.10 Tax allowances ... 201
6.5 The keep versus replacement investment decision ... 205
6.6 Investing in an asset via an operating lease ... 213
6.7 Uncertainty and risk ... 215
6.7.1 Investment decision under conditions of uncertainty ... 216
6.7.2 Probability theory ... 216
6.7.3 Decision trees ... 217
6.8 Qualitative (non-financial) factors ... 217
6.9 International capital budgeting ... 218
6.9.1 Foreign direct investment ... 218
6.9.2 Direct and indirect quotes of exchange rates ... 218
6.9.3 Purchasing power parity and the impact on future currency exchange rates ... 218
6.9.4 International capital budgeting ... 219
Practice questions ... 220

Chapter 7 The financing decision

7.1 Finance the lifeblood ... 249
7.2 Which form of finance? ... 250
7.3 Classification of different forms of finance ... 250
7.3.1 Tailor-made finance ... 250
7.3.2 Sources of finance ... 251
7.4 Equity as a source of finance ... 251
7.4.1 Obtaining equity funds ... 251
7.4.2 Stock market listing ... 251
7.4.3 Rights issues ... 252
7.5 Preference shares ... 254
7.6 ... 254
7.6.1 Bank loans ... 254
7.6.2 Loan capital ... 255
7.6.3 Advantages and disadvantages of debt compared to equity ... 255
7.7 Convertible securities ... 255
7.8 Criteria applied by providers of finance/investors ... 256
7.9 Overview of sources and forms of finance ... 256
7.10 Deciding on the b st financing option ... 257
7.11 Interaction b tw n the finance and investment decisions ... 258
7.11.1 Differen es between the investment decision and the financing decision ... 258
7.11.2 General prin iples ... 259
7.12 Dete mining the most cost-effective form of finance ... 259
7.13 Impact of section 24J of the Income Tax Act on the financing decision ... 260
7.14 The lease or b y decision ... 266
7.14.1 Types of leases ... 266
7.14.2 The financing decision for leases ... 267
7.15 Cheap finance ... 270
7.16 Foreign finance ... 270
Appendix 1 ... 271
Practice questions ... 275

Ch pter 8 Analysis of financial and non-financial information

8.1 Financial reports ... 279
8.2 Objectives and users of financial and non-financial analysis ... 280
8.2.1 Users of financial information ... 280

Page

8.3 Techniques used for financial and non-financial analysis 281
8.3.1 Comparative financial statements 282
8.3.2 Indexed financial statements 282
8.3.3 Common size statements 282
8.3.4 Financial analysis 282
8.3.5 Non-financial analysis 314
8.3.6 The balanced scorecard 315
8.4 Limitations of accounting data 315
8.5 Limitations of ratio analysis 316
Practice questions 317

Chapter 9 Working capital management

9.1 Levels of working capital 333
9.1.1 Permanent working capital 333
9.1.2 Temporary working capital 334
9.1.3 Net working capital 334
9.2 Hedging or matching finance 334
9.2.1 Perfect hedge 335
9.2.2 Conservative hedge 335
9.2.3 Appropriate forms of finance 336
9.2.4 The effects of conservative and aggr ssive financing 336
9.3 Cash management 337
9.3.1 Liquidity preference 337
9.3.2 Cash operating cycle/business cycle 337
9.3.3 Forecasting – asset requirements 338
9.3.4 Strategies to reduce the duration of cash cycles 340
9.3.5 The Baumol model for cash management 340
9.3.6 The Miller-Orr model 342
9.4 Debtors' management 343
9.4.1 Credit policies 343
9.4.2 Credit decisions and trade-offs 344
9.4.3 Collection policy 346
9.4.4 Evaluating credit on a Net Present Value (NPV) approach 346
9.4.5 Debtor factoring 348
9.5 Inventory management 348
9.5.1 The Economic Order Quantity (EOQ) 350
9.5.2 Re-order point and safety inventory 352
9.5.3 Just in Time (JIT) inventory and manufacturing 353
Practice questions 356

Chapter 10 Valuations of preference shares and debt

10.1 Reasons for unde taking valuations of preference shares or debt 383
10.2 The disco nted cashflow method 384
10.2.1 Drivers of value when using the discounted cashflow method 384
10.2.2 Riskiness and the required rates of return on debt and preference shares. 385
10.3 Valuati n of preference shares 386
10.3.1 Drivers of value 386
10.3.2 Types of preference shares, rights and attributes 386
10.3.3 Tax treatment and valuation inputs 387
10.3.4 Valuing non-redeemable (perpetual) preference shares 388
10.3.5 Valuing redeemable preference shares 389
10.3.6 Valuing cumulative non-redeemable preference shares 389
10.3.7 Valuing non-cumulative redeemable preference shares 391
10.4 Valuation of debt 392
10.4.1 Drivers of value 392
10.4.2 Forms of debt and their characteristics 392

Page

10.4.3 Tax treatment and valuation inputs 393
10.4.4 Valuing bonds 397
10.4.5 Valuing convertible debt 400
Practice question 402

Chapter 11 Business and equity valuations

11.1 Some of the intricacies of value 408
11.2 Reasons for undertaking business and equity valuations 409
11.3 Underlying valuation theory 409
11.3.1 Different definitions of value 409
11.3.2 Principles of financial reporting vs business valuation principles 412
11.3.3 Valuation approaches, methodologies, methods and models 415
11.4 Factors affecting the value of a business or equity interest 416
11.4.1 The relationship between value, risk and return 416
11.4.2 The business model 417
11.4.3 The going concern 417
11.4.4 Growth and the return that is derived from the assets 418
11.4.5 The business vehicle 418
11.4.6 Investment in equity or net assets of a business (Inter ediate) 420
11.4.7 Level of control (Intermediate) 421
11.4.8 Shares publicly traded on a securiti s xchange 422
11.4.9 Hidden factors 422
11.5 Other valuation matters 423
11.5.1 Valuation premiums and discounts 423
11.5.2 Generally accepted valuation standards 424
11.5.3 Valuation report 425
11.6 Discussion of certain valuation methodologies, methods and models 425
11.6.1 Price of recent investment 426
11.6.2 Earnings multiples 428
11.6.3 Market price multiples 444
11.6.4 The Gordon Dividend Growth Model 445
11.6.5 Models based on Free Cashflow 448
11.6.6 Model based on EVA®/MVA 457
11.6.7 Net assets 462
Appendix 1 464
Appendix 2 472
Practice questions 473

Chapter 12 Mergers and acquisitions

12.1 Strategic ontext 499
12.1.1 Fo ms of mergers and acquisitions 499
12.1.2 Reasons for takeovers and mergers 501
12.1.3 Why mergers sometimes fail 503
12.1.4 Legal implications 504
12.1.5 Behavioural implications 504
12.2 Valuati n considerations 505
12.2.1 Difference between 'normal' valuations and 'merger/takeover' valuations 505
12.2.2 Minimum share value 506
12.2.3 Maximum share valuation 506
12.2.4 Fair share valuation 506
12.2.5 Various forms of synergy benefits (financial and operational) 507
12.2.6 Dividend valuation versus earnings valuation 507
12.3 Financial effects of acquisition 507
12.3.1 Earnings growth 508
12.3.2 The smart argument 509

Page

12.4 Funding for mergers and acquisitions 511
12.4.1 Impact on capital structure 511
12.4.2 Methods of payment: cash versus share exchange 511
12.4.3 Management buy-outs 513
Practice questions 515

Chapter 13 Financial distress

13.1 Companies Act 71 of 2008 537
13.1.1 Business Rescue 538
13.2 Reorganisations (business rescue proceedings) 542
13.2.1 Conditions for a reorganisation scheme 543
13.2.2 Structure of a reorganisation scheme 546
13.2.3 Accounting entries 548
13.3 Liquidations 551
13.3.1 Types of liquidations 551
13.3.2 Rights of shareholders 551
13.3.3 Accounting entries 552
13.3.4 Simultaneous liquidation of crossholding co panies (Advanced) 555
Practice questions 557

Chapter 14 The dividend decision

14.1 Dividend payment methods 567
14.1.1 Constant dividend/earnings method 568
14.1.2 Stable dividend payment method 568
14.1.3 Bonus issues/share splits and dividend reinvestment plans 569
14.2 Dividend policy as "irrelevant in a perfect capital market" 570
14.3 Dividend decisions in an imperfect market 573
14.3.1 Statutory requirements 573
14.3.2 Clientèle requirements 574
14.3.3 Dividend stability and information content 577
14.4 Alternative forms of dividend payment 577
14.4.1 Special dividend 577
14.4.2 Capitalisation issues 578
14.4.3 Share repurchases 578
14.5 Dividend policy in practice 579
Practice questions 580

Chapter 15 The functioning of the foreign exchange markets and currency risk

15.1 Currency risk defined 584
15.1.1 Catego ies of currency risk 584
15.1.2 T ansaction risk 584
15.1.3 Translation risk 585
15.1.4 Economic risk 585
15.1.5 Other risks related to foreign currency transactions 586
15.2 Different currency quotes in the currency market 586
15.2.1 Spot rates 586
15.2.2 Forward rates 589
15.3 Theories for determining forward exchange rates 592
15.3.1 Interest rate parity theory 592
15.3.2 Purchasing power parity theory 594
15.3.3 International Fisher Effect 595
15.3.4 Expectations theory 595
15.4 Factors influencing exchange rates 595
15.5 Hedging of currency risk 597

Page

15.6 Money market hedges 598
15.6.1 Money market hedges: hedging a foreign payment 599
15.6.2 Money market hedges: hedging a foreign receipt 601
15.7 Using forward exchange contracts (FECs) to hedge currency risk 602
15.8 Using foreign exchange futures contracts to hedge currency risk 605
15.8.1 The mechanics of a forex future 605
15.8.2 Forex futures – market data 607
15.9 Using foreign exchange option contracts to hedge currency risk 610
15.9.1 Over-the-counter (OTC) options versus traded options 610
15.9.2 Forex options trading in the JSE Currency Derivatives m rket 610
15.10 Using currency swaps to hedge currency risk 613
15.10.1 Long-term currency swaps 613
15.10.2 Short-term currency swaps 614
15.11 Valuing forward exchange contracts (FECs) 615
Practice questions 617

Chapter 16 Interest rates and interest rate risk

16.1 Interest rate risk defined 627
16.1.1 Interest bearing debt and interest rate risk 628
16.1.2 Interest bearing investments and int r st rate risk 628
16.1.3 Listed interest bearing debt and int r st b aring investments 629
16.2 The interest rate mechanism and the different interest rate base rates 629
16.2.1 Repo rate 629
16.2.2 JIBAR 629
16.2.3 Prime rate 629
16.3 The capital, debt and money markets 630
16.3.1 Money market 630
16.3.2 Debt market 630
16.3.3 Capital market 630
16.4 The level of interest rates in the financial markets 630
16.4.1 Key general factors impacting on interest rates 630
16.4.2 The term structure of interest rates and other factors impacting on interest rates 631
16.4.3 The interest yield curve 632
16.4.4 Managing interest rate risk 632
16.4.5 The inter-relatedness between interest rate risk and other risks 633
16.4.6 Derivative instruments which can be used to hedge interest rate risk 633
16.5 Treasury Bills 633
16.5.1 The t nd r 634
16.5.2 Trading in Treasury Bills 634
16.5.3 Trading when interest rates are declining 634
16.6 Banke s' Acceptances 635
16.6.1 T ading in Bankers' Acceptances 636
16.6.2 Trading when interest rates are declining under a normal yield curve 636
16.6.3 Trading when interest rates are declining under an inverse yield curve 637
16.7 Neg tiable Certificates of Deposit 637
16.7.1 Trading in Negotiable Certificates of Deposit 638
16.7.2 Calculating the selling price 638
16.8 Forward rate agreements 639
16.9 Interest rate futures contracts 641
16.9.1 Short-term interest rate (STIR) futures contracts 642
16.9.2 Bond futures contracts 644
16.10 Using interest rate options to hedge interest rate risk 645
16.10.1 Options terminology 646
16.10.2 Interest rate options 646
16.10.3 Interest rate put options – payoff diagram 651

Page

16.10.4 Traded interest rate options 652
16.10.5 Advantages and disadvantages of interest rate options 653
16.10.6 Valuation of interest rate options 654
16.11 Interest rate swap agreements 654
16.12 Valuing interest rate swaps 657
Practice Questions 660

Chapter 17 Business plans

17.1 Purpose and sources of financing 667
17.2 Intended audiences and their information needs 668
17.3 Role players and components of the business plan 669
17.3.1 Executive summary 669
17.3.2 Business description 669
17.3.3 Ownership and management team 670
17.3.4 Product/service offered 670
17.3.5 Market/industry analysis and sales strategy 670
17.3.6 Facilities and resources 671
17.3.7 Business model 671
17.3.8 Capital required and milestones 672
17.3.9 Financial data and forecasts 672
17.3.10 Stakeholders and sustainability 673
17.3.11 Risks and risk management 674
17.3.12 Appendices 674
17.4 Conclusion 674
Appendix A 675
Practice questions 675

Appendix 1: Selected concepts, acronyms and terminology 683

Appendix 2: PV and FV tables 687

Bibliography 691

Table of statutes 695

Index 697

Chapter 1

The meaning of financial man gement

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

explain the meaning of 'financial management' and the role of the financial manager;
describe the goal of entities;
explain how stakeholder theory as well as sustainability aspects influence the goal of an entity;
explain the meaning of the business model or value creation model of an entity;
outline the focus of the financing and investment decision;
identify key stakeholders of both private and public sector non-profit entities;
describe the role of stakeholders and the relationship of the entity to its stakeholders;
explain the governance principles pertaining to stakeholder relations;
describe the concepts of stakeholder engagement as well as the benefits of such engagement;
identify stakeholder needs, interests and expectations in relation to these respective entities;
describe the relationship of investment risk to return;
describe the concepts of business and financial risk; and
explain the overall functioning of the capital markets.

The purpose of this chapter is to give the student an overview of what finance is about and provide him or her with a point of ref r nce as the subject is studied, topic by topic. In so doing, the student is shown the entire **financial managem nt** puzzle b fore actually building it, chapter by chapter. The student is not expected to fully understand the fundamental principles of financial management after studying this chapter; however, the student should have a good idea of the aims of the subject, and the route that will be followed in exploring the relevant issues. This chapter gives the student an overview of financial management, and indicates how all its parts fit together.

The textbook is largely written from the premise of the profit seeking entity, but at times it highlights financial management decisions that pertain to a non-profit entity as well.

1.1 Financial management

Financial management as a discipline seeks to optimise the financial resources (of) and returns (to) the entity, by optimi ing two primary activities, namely –

financing activities, by deciding which sources of funding (debt or equity) should be used by the entity nd what the optimal proportion is for the various sources used; and

investing activities, by deciding which investments should be undertaken by the entity within the limitations of available funds and the identified feasible (can it be done?) and viable (does it derive a positive return?) investment projects.

If both funding and investing activities are optimised, the value of the entity will increase, and hence shareholder's wealth optimised over the long-term, which is an important outcome of financial management. However, value is also created by the entity in a variety of ways for *stakeholders* other than just the *shareholders* . It is therefore also important to understand the needs, interests and expectations of stakeholders in relation to the entity, as well as how value for each stakeholder group is derived and measured.

1.2 Goal of an entity

The key goal of any entity is to create long-term sustainable value for its stakeho ders. In the private sector, this involves the objectives of optimising long-term shareholder or owner returns on a sustainable basis, whilst tak-ing cognisance of the responsibility of the entity to create value for all m jor st keholders, as well as the responsibility of minimising or avoiding negative impacts on the natural environment s well as society (the so-called triple bottom line of people, profit and planet).

In a non-profit or government entity, the key goal remains to create alue for stakeholders by achieving the objectives of *economic*, *efficient* and *effective* (the so-called three or 3Es) utilisation of resources under the control of the non-profit entity. 'Economic' refers to the acquisiti n f res urces at the lowest possible cost; 'efficiency' refers to how well the resources have been utilised (d ing things correctly), while 'effectiveness' refers to how well resources have been deployed to achieve the set goals (doing the correct things).

Shareholder wealth maximisation

In the 1990s, business entities often cited their main goal as maximising of shareholder wealth, and it became common for company boards to focus on sharehold r valu , th reby maximising returns to shareholders. The shareholder wealth theory assumes the following:

> The purpose of business is to maximise shareholder wealth by generating profit thus creating capital, this profit and capital being the property right of shareholders or owners of the business.
>
> Business is subject to contractual relations, as well as legal and moral boundaries within society which allows it to operate.
>
> People and the natural environment are seen instrumentally as resources to be used for the generation of profits for shareholders.

The justification for the shareholder wealth maximisation objective in the context of the interests of society at large is mainly that through the workings of efficient markets, wealth maximisation will benefit not only shareholders, but society as well due to a 'trickle down' or 'spill -over effect'. However, global events in the past decade have resulted in debate and fundamental questioning of the shareholder wealth maximisation paradigm as the prime goal or objective of business entities. Critics of shareholder wealth maximisation cite this paradigm as morally deficient and a key contributor to contemporary corporate ethics scandals, since it encourages short-term thinking and a bias towards certain stakeholder groupings at the expense of others. The net effect is that externalities are d ni d or avoided (such as engaging with the impact the entity has on the natural environment) with long run negative consequences for the firm and society.

However, business entities today face a global environment with challenges of rapidly declining natural resources (wate , bio-dive sity, minerals, marine life) and an ever increasing population competing for these resources whe e social inequality and poverty still prevail for many. It has therefore become evident that it is appropriate and necessary that entities today pursue goals that result in the long-term sustainability of the entity, instead of foc ssing on short-term business gains/profits that are gained at the expense of harm being done to people and the planet. This argument also puts forward the idea that there are more business opportunities to be had by considering new ways of doing business, rather than carrying on business as usual.

Any entity can be described as being *sustainable* if its activities can be continued for the long-term without exhau ting natural resources or causing ecological damage to the environment, thus creating sustainable prosperity for ociety at large. Sustainability can be achieved by an entity if awareness exists of its impact on society and the natural environment, by active engagement of the entity with its key stakeholders and exercising responsible business practices that do no harm. The notion is that entities recognize that stakeholders are the ultim te compliance officer and it is these stakeholders who give the firm the licence to operate.

In conclusion, the appropriate goal of a business entity in the modern environment is therefore creating sustainable long-term shareholder wealth, taking into account the impact on stakeholders, including society and the environment. This perspective to the goal of any entity is consistent with the principles of the stakeholder theory.

Stakeholder theory

The stakeholder theory, which had its origins in R. Edward Freeman's 1984 book, *Strategic Management: A Stakeholder Approach* can be described as a key rival to the traditional shareholder wealth maximisation paradigm. Stakeholders can be described as any group or individual that can affect or is affected by the achievement of an entity's objectives. According to Freeman, firms should identify their stakeholders, and perform a value analysis as part of the process. The requirements of legitimate m jor st keholders are taken into account in the strategic choices that an entity makes, and therefore in the objective(s) th t it pursues.

Although not widely regarded as a theory, but rather a framework or approach, the stakeholder theory has laid the foundation for explaining the relationships between business and its stakeholders other than shareholders, and for explaining that an entity may choose to satisfy objectives ther than economic objectives. For example, an entity may choose to voluntarily invest in social spending such as an employee housing scheme, which may reduce profitability and shareholder wealth in the short-term, but which may improve productivity and employee morale and attract higher level of skills to the business in the longer term, resulting in improved longer term sustainability of the entity.

Other emerging perspectives on the purpose and goal of a business entity in modern society include the stewardship model, and conscious capitalism. The stewardship mod l aligns the goal of an entity with the 8 UN Millennium Development Goals (UNMDG) (which are, radicating xtreme poverty and hunger; achieving univer-sal primary education; promoting gender equality and empowering women; reducing child mortality; improving maternal health; combatting HIV/Aids, malaria and other diseases; ensuring environmental sustainability and having a global partnership for development) and with the sustainability movement's emphasis on people and planet. According to the stewardship model, the purpose and role of business is to serve by contributing to the advancement of humankind. Profit is not identified as a purpose but as an outcome and there is a strong emphasis on corporate responsibility and business ethics centred on doing business virtuously by acting as stewards. Conscious capitalism embodies the idea that profit and prosperity go hand in hand with social justice and environmental stewardship, and entities that practise conscious capitalism have a higher purpose than maximisation of shareholder returns. Society is seen as the ultimate stakeholder, and profit is viewed as a natural outcome flowing from doing the right things.

From the above it can be seen that entities may vary in the main objective and goal that are pursued. However, regardless of the goal that an entity pursues, all entities, whether a profit seeking or non -profit entity, should strive to operate according to the values of good corporate citizenship. This entails sound governance; making responsible strategic choices and ensuring accountable stewardship of the resources it has at its disposal.

Entities have a responsibility to make ethically sound strategic choices, since they have social, cultural and environmental responsibiliti s towards the community in which they operate, as well as economic and financial responsibilities towards its shar holders.

Practical example

A practical example of short-term emphasis on profit maximisation which had undesirable consequences for an entity, occurred on 20 April 2010, when the largest offshore oil spill in US history occurred in the Gulf of Mexico, with devastating environmental and economic consequences for thousands of people. The investigation revealed that in spite f the British energy company having had excellent governance mechanisms in place, the accident ultimately ccurred due to the fact that short-term profit objectives, (increasing profit and therefore shareholder wealth and the share price), t ok precedence over implementing environmental safety precautions. These precautions were recommended but not undertaken in order to save costs and meet profit targets, resulting in the accident. The cost to the company in terms of reputational loss as well as cost to clean up the environment subsequent to the spill was by far, more than it would have been to undertake the environmental safety precautions, however, emphasis on the pursuit of short-term profits and maximising shareholder wealth in the management decisions of the company significantly contributed to this ecological and economic disaster. Four years later, the company is still dealing with the neg tive effects of this.

1.3 Business model or value creation model of an entity

Entities can describe the manner in which value is created for shareholders and major stakeholders by their business model, or value creation model. Value can only be created for stakeholders if the entity has a clear strategy that takes the external and internal business environment as well as the role and needs of each of the stakeholder groups of the entity into consideration. The business model or value creation model therefore provides a design or brief description, which explains the company's overall organisational activities and process which is undertaken in order to achieve sustainable value for shareholders and major stakeholders.

Although value is created within an entity, the ability of any entity to create va ue is argely dependent on the following factors –

the external environment within which the entity operates;

the relationships with stakeholders, which includes, employees, p rtners, networks, suppliers, customers; and

the availability, affordability, quality and management of various resources, or 'capitals'.

These 'capitals' or resources that entities depend on to create value, and that the entity influences in the process of creating such value, have been defined by the Internati nal Integrated Reporting Council (IIRC, 2013: 11-12) and can be categorised as:

Financial capital – the pool of funds that is available to the entity through debt and equity sources.

Manufactured capital – buildings, equipment, infrastructure, plant and machinery and other tangible assets.

- *Human capital* – the competencies, capabiliti s and xp ri nce of the management and staff available to the entity. This would include *inter alia* people's skills, experience, leadership and other abilities, motiva-tions to innovate and their ethical value systems.

Intellectual capital – the knowledge based intangibles available to the entity that provide a competitive advantage such as intellectual property (patents, copyrights, software, licences and rights), organizational knowledge (systems, processes, procedures and protocols) and other accumulated intangible investments and resources (brands, goodwill and technological advances).

Natural capital – the renewable and non-renewable environmental resources and processes that provide goods and services that support the value creation of the entity. This would include *inter alia* air, water, land, minerals, biodiversity and eco-system health.

Social and relationship capital – the relationships established within and between institutions, communities, group of stakeholders and other networks which enhance individual and collective wellbeing. This includes relationships with customers, suppliers and partners.

These are referred to as the 'six capitals'.

The business mod l or value cr ation model explains ***how*** these capitals are ***used*** to create sustainable value for stakeholders, and also xplains the ***influence*** of the entity on these capitals.

Business models are ontinuously evolving in a fast changing economy and it can launch a new entrepreneur's idea or readjust an existing business model based on this changing environment. Existing businesses need to reassess their business models especially following a decision to make greater use of underutilised assets, new products or se vices to customers, a change in customers or services, or general changes expected in the market or c stomer needs. Osterwalder and Pigneur (2010) suggest a framework to capture the nine essential components of a b siness model. This "Business Model Canvas" describes the nine building blocks of a business as the f ll wing:

Value pr p sitions – the grouping or bundles of benefits that can be offered to customers by the entity.

Cu tomer segments – the grouping of the types of customers the business seeks to service. *Cu tomer relationships* – the different ways to serve distinct market segments.

Channels – the best ways to communicate value propositions to customers and to market, sell and deliver products and services.

Key activities – critical tasks that engage customers and result in value creation.

Key resources – the key resources, which includes financial, manufactured (whether owned, leased or rented), human, intellectual, natural or social & relationship capitals that are available to the entity.

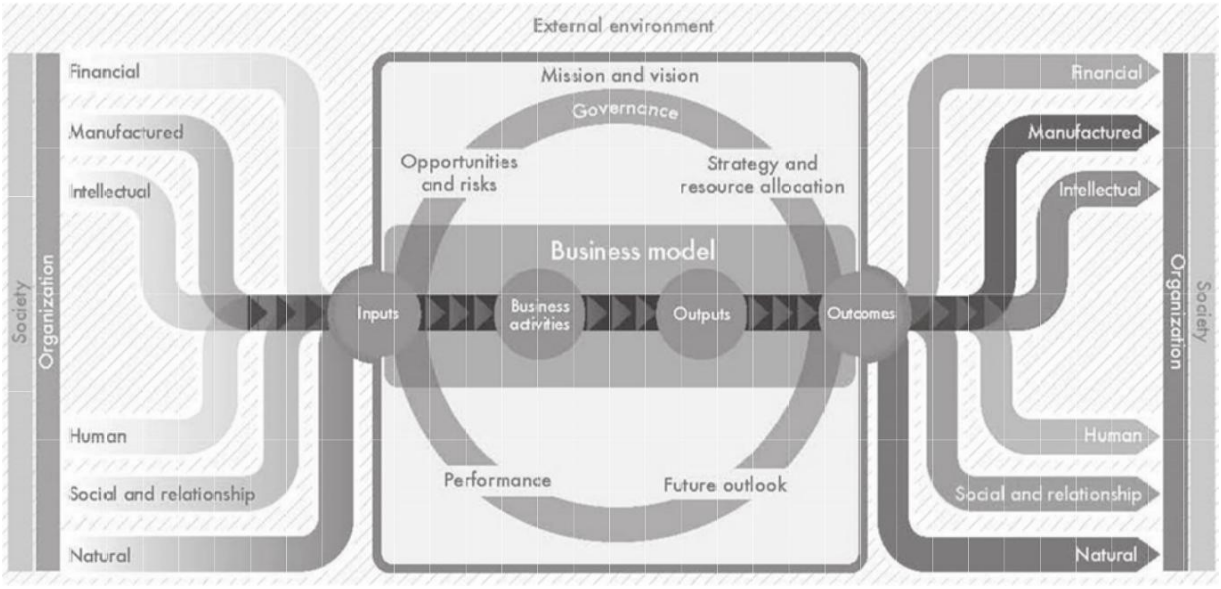
- *Key partn ership ips* – the key su pplier link, joint v en ture s and stra teg ic a lliances th at can ex pand and or p rotec t m ark et share, espe cially in a co mpe titive indu stry.
- *Revenu e stre ams* – the key typ es of inco me strea ms, which ma y require d iffe ren t pricing mec ha nism s.
- *Cost struc tur* – cos t str ucture is det erm ined by th e n atu re of t he bus ines s as either a cos t drive n b usin ess (co ntain cost s to drive valu e) or a value driv en bu sine ss (spe nd what i s ne ces sary to get va lue).

According to O ster walde r & Pigneu r (2010) busine ss mod els ten d to fi nd certai n co nc ept ual styl es, ex amp les ar e th e f ollowing:

- The *fre e* busi nes s mode l ce ntres on givi ng p ro ducts and ser vice s to customers i n or der to att ract ot hers. A goo d exa mpl e of this is the fre e G oo gle search en gine w her e p id advertisin g is dis pla ed .
- The *lo ng tail* business mod el pro vid s f or the sale of a vari ety of pers on liz ed pro ducts to a ma ss market of small-quan tity buyers.

  The *open* business m odel c ent res on pa rtne rsh ips tha t e xpand producti ity a nd red uce costs.

The IIRC has also describ ed a nd de f ine d a busin e ss model as “the c hosen syst em of inputs, bu siness act ivities, outpu ts and outcome s that aims to cr eat e va lue over the sho rt, medium a nd lon g term ”. IIR C, 201 3:1) and is pr esented visua lly as follo ws :



Source: C op yright© Ma rch 2013 by t he Int ern ational Integr ated R eportin g Coun cil.

Fig ur 1. 1: The IIRC ’s usines s M odel

1.4 S tak eh ol de rs of an en tity

The operati ons of the entity m ay affect ma y d iffere t stak eho lders directly or ind irectly. ‘Stakeho lders’ are entiti es o r in dividuals tha t can a ffect o r ar e affected by the ac ivities and actio ns o f th e entit y.

The following diagram illustrates the key stakeholders of a private sector entity:

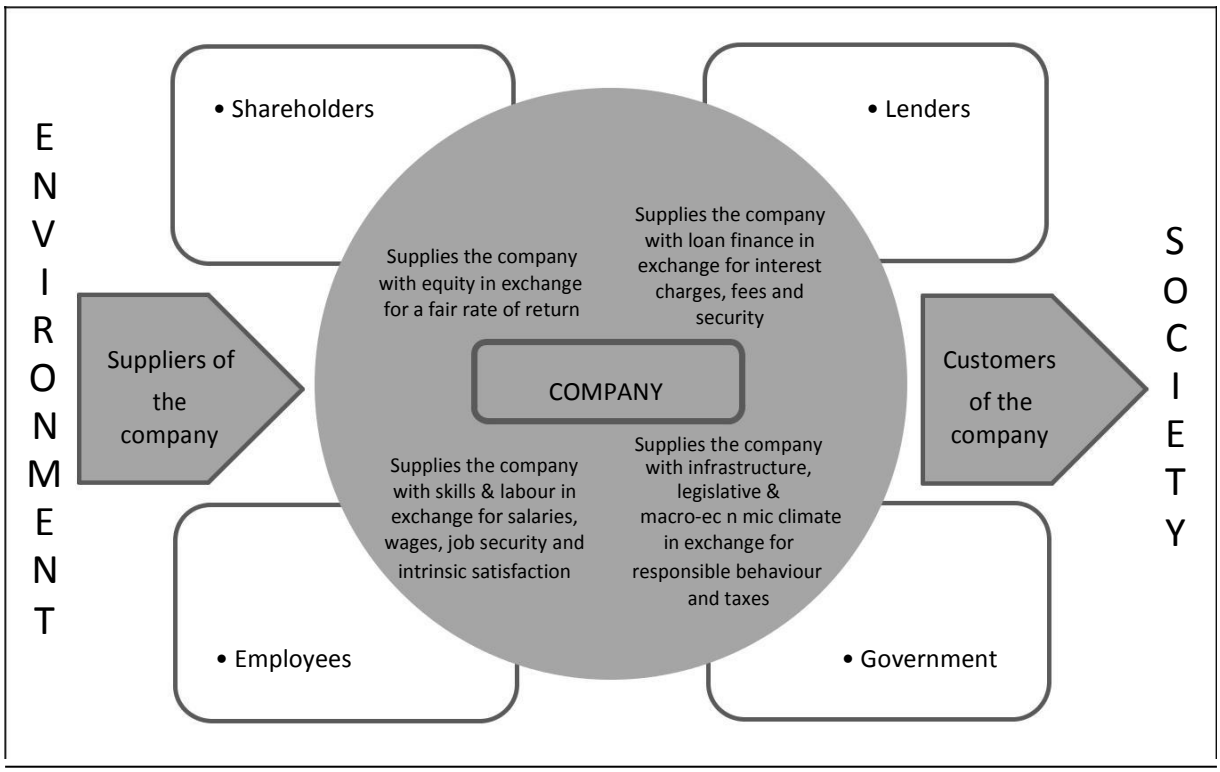


Figure 1.2: The key stakeholders of a private sector entity

Key stakeholder groups

Stakeholders can be grouped into the following main groups –

shareholders or owners of the entity;

lenders and suppliers of borrowings;

employees, including directors, managers;

government;

society; and

the natural environment.

In the case of shar hold rs, l nd rs and employees, customers and suppliers, the relationship with the entity will be mostly based on a legal contractual obligation. However, in the case of government, and the natural environment, legislation, or industry standards, for example environmental compliance standards and tax legislation will dete mine the framework and obligations of the entity and therefore govern the stakeholder relations with the entity.

Although an entity does not have a legal contract with society, an entity relies on the on-going approval within the local comm nity that it operates and where main activities take place and impact on the community. This broad social acceptance is most frequently referred to as the entity's social 'license to operate'.

Governance principles of stakeholder relations

The Integrated Reporting Committee of South Africa (IRC) views a company's ability to create and sustain value as dependent on the quality of its leadership, and how the entity is governed. In terms of good governance practice, and consistent with *'The King Code of Governance Principles for South Africa of 2009'* (King III), the foundation of good corporate governance is seen to be 'intellectual honesty', with its supporting pillars being 'responsibility', 'accountability', 'fairness' and 'transparency' (RAFT). Consequently, ethical leadership is paramount. Leaders and managers employed by the entity are required to formulate and implement strategies based on their reflections of the social, environmental, economic and financial impacts of the entity. This is undertaken by engaging with the entity's stakeholders and communicating their strategic choices and impact.

The company's board of directors is accountable to the company and through the company to the shareholders. The board is also responsible and responsive to the stakeholders, who represent the ultimate compliance officer. The governance principles relating to stakeholder relations of companies found in the King III Report can be summarised as follows:

The company conducts it affairs on a 'apply or explain' basis.

The board of directors should take account of the legitimate interests of stakeholders in its decisions.

The company should proactively manage the relationships with its stakeholders.

The company should identify mechanisms and processes that promote enhanced levels of constructive stakeholder engagement.

The board of directors should strive to achieve the correct bal nce between its various stakeholder groupings, in order to advance the interests of the company.

Companies should ensure transparent and effective communication with stakeholders to build trust and improve the reputation of the company.

The above sound governance principles, although intended for c mpanies, can be applied to any entity, including public sector and non-profit entities.

Stakeholder engagement

A strategic dimension to corporate social responsibility not only includes corporate social responsibility aspects as an essential element of company strategy, but also ncompasses the building of relations with stakeholders and the creation of effective channels for communication and innovation, as well as continuous management of stakeholder relations (Mallin 2009:99). The aim of stakeholder dialogue is to investigate interests and issues concerning the company and the stakeholders, exchange opinions, clarify expectations, enhance mutual understanding and, find innovative solutions (Pohl & Tolhurst 2010:17).

Stakeholder engagement can therefore be described as the process used by an entity to engage relevant stakeholders for a clear purpose to achieve accepted outcomes. Stakeholder engagement is recognised as a fundamental accountability mechanism since it obliges entities to involve stakeholders in identifying, understanding and responding to sustainability issues and concerns, and to report, explain and be answerable to stakeholders for decisions, actions and performance of the entity. Stakeholder engagement is an on -going process and the information gathered from stakeholders will be an important aspect in forming strategic choices of the entity.

Practical example

Stakeholder engagement and its success often rely on creating appropriate feedback and communication channels with stakeholders. In South Africa, a large platinum producer, recently found that a particularly effective means for allowing the public to r port conc rns or complaints relating to the operations of the entity – especially with regard to *environmental*, health and saf ty, community, and security issues – has been a toll-free telephone hotline established by the company. A r gist r is k pt of the complaints and any responses provided. In addition, regular meetings are arranged with spe ific sub-groupings of affected stakeholders to discuss particular problem areas, for example, noise and vibration asso iated with new open-cast mining operations. Stakeholders are also invited to raise more general concerns in egular stakeholder forum meetings involving management and key stakeholder groups. This is an example of a consultative level of engagement with the broader stakeholder groups that may be affected by the surroundings and environment of the operations of the entity.

Stakeh lder engagement is important because it enables –

the entity to better understand the operating environment and requirements of stakeholders;

more effective management of risk and reputation of the

entity; equitable social investment and development;

product, service and process improvements by information gained from stakeholders.

Entities should therefore engage responsibly with their stakeholders and communicate and report on activities and performance, and be responsive to the views and interests of their stakeholders. In terms of sound governance principles the benefits more than outweigh the costs.

Reporting to stakeholders

Sustainability reporting

Historically, corporate reporting in the form of annual financial statements focused mainly on financial performance, and reports were prepared mostly for the information needs of investors and shareholders. However, along with the movement of business towards more stakeholder-oriented approaches, reporting on sustainability performance, and reporting to stakeholders has become more prominent. The relevance and importance of corporate sustainability reporting in advancing sustainable development was elevated globally by the inclusion of Global Reporting Initiative's (GRI) sustainability version G4 guidelines, reporting as a key priority at the United Nations Conference on Sustainable Development (Rio+20). The United Nations acknowledges the importance of corporate sustainability reporting, and encourages entities to consider integrating sustainability information into their reporting, and encourages governments to develop best pr ctice models and facilitate action for the integration of sustainability reporting.

The GRI, which issues internationally accepted guidelines on sustainability reporting (most recent of which is the G4 guidelines), recognises that transparency about economic, en ironmental and social impacts is a fundamental component of effective stakeholder relations. The GRI was f rmally launched in 1997, and was soon aligned with the International Accounting Standards Board (IASB) and the Financial Standards Board (FASB).The GRI Reporting Framework, the latest version of which provides a generally accepted framework for reporting on an entity's economic, environmental and social perfor ance. The Reporting Framework sets out the principles and performance indicators that entities can use to easure and report economic, environmental and social performance. The GRI Reporting Framework mandates a clear stakeholder orientation both in the process required for stakeholder engagement in order to pr pare the sustainability report, and in addressing the information needs of stakeholders in the report cont nt. The framework describes sustainability reporting as the practice of measuring and disclosing performance and being accountable to internal and external stakeholders for performance towards the goal of sustainable development.

The number of companies worldwide that publish sustainability reports disclosing their impact and initiatives with regard to societal and environmental issues has grown substantially in the past decade. This provides evidence of the relevance and imperatives of corporate responsibility in the society in which they operate. There is therefore a growing appreciation of the fact that while protecting and enhancing shareholders' wealth remain an important objective, the aspirations of other stakeholder groups need to be factored in.

Integrated reporting

Integrated reporting is an evolving concept which, in the South African context, has its origin in the governance principles relating to integrated thinking in King III. Following the incorporation of King III requirements into the Johannesburg Securities Exchange (JSE) Listings Requirements, listed companies are required to issue an integrated report for financial years commencing on or after 1 March 2010 on a 'apply or explain' basis (as opposed to a 'comply or explain' basis, which was the basis of King II).

Integrated reporting combin s the different strands of reporting (financial, management commentary, governance and remuneration and sustainability reporting) into a coherent whole that explains an entity's ability to create and sustain value. The information that is expected to be included in the integrated report should enable a meaningful assessment of the long-term viability of the entity's business model and strategy. The integrated repo t included eporting on the strategy, performance and activities of the company in a manner that enables stakeholde s to assess the ability of the company to create and sustain value, based on financial, social, economic and environmental factors over the short-, medium-, and long-term.

Integrated reporting includes the requirement to communicate the future strategy choices of the entity in the rep rt, as well as disclosing the key performance indicators (KPIs) that the entity will measure in future periods.

Furtherm re, integrated reporting requires the disclosure of economic, environmental and social impacts of companies. This is included in the international framework on integrated reporting of the International Integrated Reporting Committee (IIRC) which requires performance information, including a description of the entity's view of its major external economic, environmental and social impacts and risks up and down the value chain, a ong with material quantitative information. The final version of the International Integrated Reporting Fr mework was published in December 2013. On 18 March 2014, the Integrated Reporting Committee of South Africa (IRC) announced its endorsement of the recently published International Integrated Reporting Framework of the IIRC. Thus South Africa now subscribes to the international framework.

It is stated in this International Integrated Reporting Framework, that integrated reporting aims to enhance accountability and stewardship for the resources or capitals that entities control, as well as to advance

integrated thinking, decision-making and actions that focus on creating value over the short, medium and long term (IIRC 2013:1). Furthermore, one of the key objectives of integrated reporting is stated as reporting that focusses on the ability of the entity to create value in the short, medium and long term, and, in doing so, emphasises the importance of integrated thinking within the entity.

Integrated thinking is described in the framework as the active consideration by an entity of the relationships between its various operating and functional units and the six capitals that the entity uses or affects (IIRC 2013:11-12). These six capitals were described earlier in section 1.3.

The guiding principles which underpin the preparation and presentation of the integrated report are listed below:

Strategic focus and future orientation – providing insight into the entity's strategy, and how the capitals listed above are affected by its use in the long, medium and short term.

Connectivity of information – the report should present a holistic overview of the entity and how it creates value over time, explaining the interdependencies between factors that affect the entity's ability to create value.

Stakeholder relationships – the report should provide insight into the nature and quality of the entity's key stakeholder relationships.

Materiality – the integrated report should disclose infor ation about matters that substantively affect the entity's ability to create value over the short, edium and long term.

Conciseness.

Reliability and completeness.

Consistency and comparability.

The Chief Financial Officer (CFO) is not only integral both in directing, selecting and overseeing the execution and performance measurement of strategy in the business with the other board members, but also in the integrated reporting process. CFO's are informed by the corporate governance rules King III, which holds the board and audit committee accountable for the integrity of the integrated report and overseeing the compilation process. As the management representative on the audit committee, this accountability lies with the CFO.

1.5 Risk and return of investors

When shareholders take up shares in a company, they are exposed to risk. Shareholders do not necessarily earn a fixed dividend, and capital growth of the share is not certain. To explain the concept of investment risk, assume that Mr A has recently inherited R500 000 and has decided to start a business manufacturing and supplying security fencing. He invests his entire inheritance in the business and does not use any form of debt finance. By investing in the business, what kind of risk (if any) is Mr A subject to?

Business risk

By investing in a business, Mr A has exposed himself to business risk. Business risk is the risk that relates to the operating activities of a ompany.

The following could go w ong with his new business –

there co ld be no demand for the product;

competitors co ld under-cut his prices;

he might be unable to secure supplies of raw material;

the machinery in use could be inefficient;

he could experience employee problems;

or debtors could fail to pay on time.

Assume now that, as an alternative to investing his money in a business, Mr A had invested it on call with a b nk, at a return of 10% with little or no risk. The business that he might have started has a greater **business risk** than investing his money in a bank call account would have had. Mr A would therefore require, and indeed expect, to make a return on his R500 000 business investment far in excess of that on a 10% no-risk investment. The return required by an investor for investing in a business is known as 'business risk' and is dependent on the level of risk directly related to that business.

Companies can be classified in terms of their level of business risk:

High risk	Medium risk	Low risk
Mining	Restaurant	Supermarket
Chemical	Security	Household products
Speciality products	Building	Residential housing

The return required from a company (investment) will depend on the level of business risk.

For the sake of simplicity, ignore any tax implications and assume that Mr A requires a minimum return of 20% from his company. The return required commensurate with the level of business risk is known as 'k_e' or the 'shareholder's required return'. At the present moment, his required return of 20% is for business risk only.

1.5.2 Financial risk

One year has now passed. Mr A has made a profit of R100 000 on his R500 000 investment (i.e. a 20% return), which has been paid out as a dividend. He now wants to expand and has approached a bank for a R500 000 loan, which has been approved. The loan will cost Mr A 10%. His financial position and expected return will now be as follows:

Investment

Own investment	R500 000
Loan	R500 000
	R1 000 000

Return from the business

Profit before interest (20% × R1 000 000)	=	R200 000
Less interest (10% × R500 000)	=	R50 000
Net profit		R150 000

Return on the investment: R150 000 / R500 000 = 30%

By increasing his investment base through borrowing, Mr A has been able to increase his return on a personal investment of R500 000 from R100 000 (20% return) to R150 000 (30% return) without putting in additional funds of his own.

Is debt (gearing) a good idea?

Advantages	Disadvantages
Creates wealth	Fixed annual interest
Promotes growth in company	Repayment of capital
Higher net return	Financial risk
Interest is tax d ductible	Lose knee-caps if debt is not repaid!
Cheaper than quity finance	

From the above example, it would appear that debt is a wonderful way of increasing one's wealth, because the cost of debt is lower than the return offered by the business. One could conclude that gearing (taking on debt) in the above example gives an additional return of R50 000 without increasing the level of business risk.

Note However, there is a down-side that could (and often does) lead to business failure.

If a pers n invests his own money, or even money from other shareholders, he expects to receive 'interest' or its equivalent in the form of a dividend, as well as an increase in the value of the shareholder contribution over a peri d f time. If, however, he **borrows** money, he **has to pay** interest every year, regardless of how well or poorly the business is performing. On top of that, he may also have to make an annual capital repayment. If he cannot, the bank will foreclose on the loan and repossess the assets that have been given as security for the oan in the event that that debt cannot be repaid. In short:

Debt = Financial risk

It is often said that debt is good because it is an expense that is allowed as a tax deduction, and as such its rela-ive cost is low. That may be true, but so is the other side of the coin; by taking on debt, one takes on financial risk, which is often forgotten. In essence, if an entity has no debt, it has no financial risk. Consequently a debt free entity is only faced with business risk.

Therefore, in the above example, it is incorrect to assume that the shareholders' return of 20% will not be affected by the debt finance. The fact is that the shareholders' return will increase to 20% plus **financial risk**. The businessman (Mr A) or his shareholders may therefore end up with the following required return, or k_e:

Business risk	20%
Plus Financial risk	5%
Required return	25%

k_e now equals 25%.

So, in this example, if the shareholders' required return is 25% **because of financial risk**, is debt finance still a good idea?

Solution:

Investment	R1 000 000
Net profit, or return (after charging interest)	R150 000

Required return is 25% or
R500 000 (shareholders' investment) × 25% = R125 000

Conclusion:

Debt is worthwhile in this example, as the sharehold rs are making a return equal to R150 000 / R500 000, that is 30%, which is higher than the 25% required return.
Chapter 4 (*Capital structure and the cost of capital*) demonstrates that taking on debt does, in fact, increase the shareholders' required return. The question that needs to be answered though is: To what extent does debt finance increase the shareholders' required return?

If one accepts that taking on debt increases the shareholders' required return, is there any advantage in taking on debt? In the above example, if k_e increases to 25% it is still advantageous to take on debt.

One school of thought suggests, however, that financial risk is never advantageous, as the financial benefit will be equal to the risk disadvantage. In the above example, it would be suggested that k_e would increase to 30%, and that there is therefore no benefit from taking on debt. We tend to agree with this view, as the advantage of debt is almost always nullified by the risk disadvantage.

Important: ***Every time k_e (shareholders' required return) is given in an exam question, if the company has any form of debt, then:***

k_e = Business risk + Financial risk

If there is no debt in the financial structure, then k_e equals business risk only.

1.6 Overview of financial management

The following diag am illustrates the key aspects of financial management that are dealt with in this book. The key objective of financial management is the creation of responsibly derived shareholder value whilst managing and mitigating the risks faced by the entity. The value of shares in a company as an investment is measured by three key components, namely –

an increase in the value of the company shares held by the shareholder (*capital growth*);

and dividends received by the shareholder (*dividend yield*); and

the attitude towards *risk* and how the company mitigates the *possible downside* risk factors that could have a detrimental impact on value creation (for example, increased competition, thereby reducing market share) and takes advantage of the *upside* risk factors, which have a positive impact on value creation (for example, investment into new products that increase market share). In short, if investors believe that the entity is managing its risks appropriately relative to its peers, then the value of the company is likely to increase, which will manifest itself in higher capital growth or dividend yield or a combination of the two.

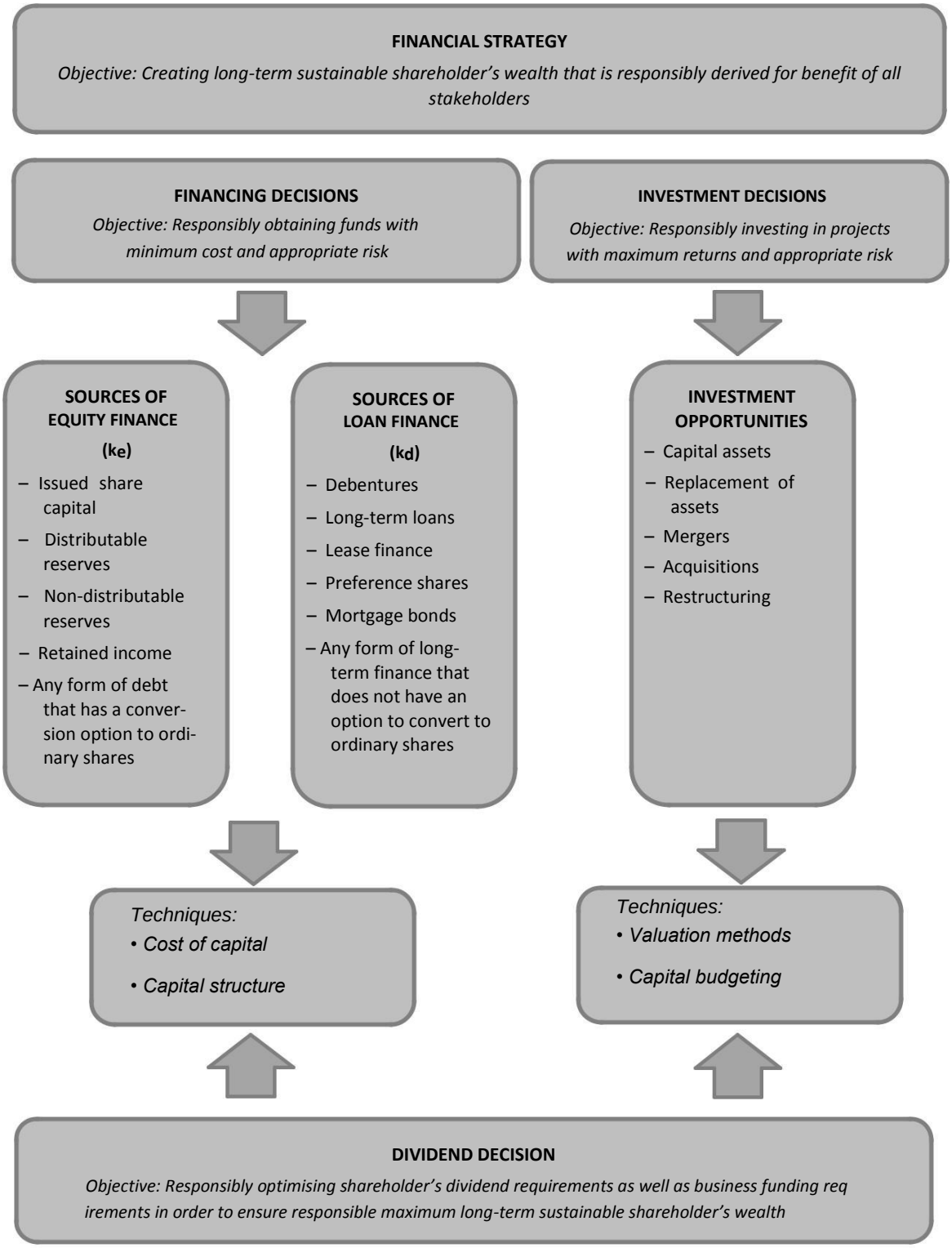


Figure 1.3: Key aspects of financial management

The investment decision

The inve tment decision looks at the investment in an asset that yields future cash flows. If the cash flows are equal to, or greater than, the company's required return, then the investment should be accepted, as it will increase shareholders' wealth. The investment decision is also referred to as 'capital budgeting'. The required inputs are future cash flows and the Weighted Average Cost of Capital (WACC) or 'discount rate'. The derivation of WACC is discussed in chapter 4 (*Capital structure and the cost of capital*), while the investment decision is discussed in chapter 6 (*The investment decision*).

As investing in a company is done with the sole purpose of responsibly increasing shareholder wealth, and as the increase in shareholder wealth is derived from the payment of dividends, as well as from the increased

value of a share, it is necessary to derive a model that values a company. Share valuation of a company, as with the investment decision, is dependent on future cash flows to the shareholders and the return required by the shareholders. This is discussed in chapter 10 (*Valuations of preference shares and debt*) and chapter 11 (*Business and equity valuations*), while aspects unique to mergers and acquisitions are discussed in chapter 12 (*Mergers and acquisitions*).

Example: The investment decision

Company A is contemplating investing in a machine to manufacture product X. The details are as follows:

Investment required (I_0) – R1 million

Life of the project – 3 years

At the end of 3 years, the asset will be sold for R500 000 (disposal value)

Year 1 cash flow after tax will equal R300 000
Year 2 cash flow after tax will equal R250 000
Year 3 cash flow after tax will equal R200 000

The company is currently financed equally (50:50) by debt and equity

k_e (cost of equity)	20%
k_d (cost of debt)	10% after tax.

Required:

Evaluate whether the company should invest in the ass t.

This illustrative example opens up many issues that must be fully understood before attempting to answer the question. These issues are explored more comprehensively as we move through this textbook.

Required knowledge

The discount rate/target Weighted Average Cost of Capital (WACC)

In order to evaluate an investment, one needs to know the company's required return. This is the optimal rate required by the company that uses both debt and equity to finance its operations. The company above is currently financed half by debt and half by equity (50% D: 50% E). This is not necessarily the correct target weighting to use in the evaluation of the investment decision, but assume for the purpose of this illustration that it is.

Note: In the next example, WACC can be calculated according to market value, book value and target value. The financing component has two main sources, namely debt and equity. Refer to the example of Company Z below for an explanation.

Relevant cash flows including tax payments

When evaluating an investment, one needs to know the relevant cash flows over the period of the investment after tax, in o der to ascertain whether the cash flows that result from the investment are sufficient to cover the dividends paid to the providers of equity and the interest paid to the providers of debt.

How the project will be financed

A project will be financed using debt finance or equity finance. The WACC discount rate will ***not*** be affected if the c mpany chooses either one of the two options available or a mix of both. The finance methods chosen will, h wever, affect future sources funding of other projects.

Pre ent value

The value of any investment, or valuation of a company, is always the present value (PV) of future cash flows. Comparing the sum of PV future cash flows to the initial investment (I_0) results in the derivation of the net present value (NPV). If the NPV is positive, then the project should be accepted. If it is negative, then it should be rejected.

Solution:

Discount rate (20% [k_e] × 50%) + (10% [k_d] × 50%) = 15% WACC

				*PV factor 15%	R
Year 0	Investment		R1 000 000	1	(1 000 000)
Year 1	Cash flow	+	R300 000	0,8696	260 880
Year 2	Cash flow	+	R250 000	0,7561	189 025
Year 3	Cash flow	+	R200 000	0,6575	131 500
Year 3	Sale of asset	+	R500 000	0,6575	328 750
Net present value					(89 845)

The time value of money and calculating present values and future v lues, which is the basis of net present value calculations, are discussed in chapter 3.

Conclusion:

The investment does ***not*** yield a sufficient return to cover the debt repayment as well as the dividend payments required, and should therefore not be accepted. This is clear since the NPV is negative.

How do we know that the cash flows will not cover the required pay ent of debt interest + dividends? We know because the discount rate of 15% incorporates the pay ent of interest + dividends (i.e. the returns re-quired by the providers of capital). As the net present cash flows are negative, we know that the return offered by the project is lower than that required to cover d bt and quity commitments.

The finance decision

The other side of the coin to the investment decision is the analysis of how a company should be financed and how the method of finance affects the calculations of investment and value. There are two types of finance –

equity finance, which is provided by the owners of the company; and

debt finance, which is provided by lenders who do not and cannot make decisions on how the company should be run.

Figure 1.3 shows the different types of debt finance and the elements that constitute equity finance. This is discussed in chapter 2 (*Strategy and risk*) and chapter 4 (*Capital structure and the cost of capital*), while the financing aspects of capital budgeting are discussed in chapter 7 (*The financing decision*). Chapter 17 (*Business plans*) elaborates on the purpose and components of a business plan.

Example: Capital structure, the finance decision

Company Z has the following capital structure:

	R
Ordinary share apital – 100 000 shares	500 000
Retained in ome	500 000
Long-te m debt	1 000 000
Capital employed	2 000 000

The shareholders' required return, k_e, is 20%. Annual dividends are R400 000.

The interest on long-term debt is 10% per annum (i.e. R100 000) and the capital amount of the loan (R1 000 000) is repayable in four years' time. Similar debt is currently available from the banks at 14% per annum. The directors are of the opinion that the debt to equity (D:E) ratio should be a target of 40:60 (i.e. 40% of the firm's total capital structure should be debt and 60% should be equity).

Required:

( ) Calculate the appropriate discount rate (WACC) of Company Z to be used in the evaluation of new investments. Ignore tax considerations. Base the calculations on the book value of capital.

Discuss how new investments should be financed.

What is the purpose of determining the WACC?

The WACC represents the company's required return for investments and incorporates finance from shareholders (equity) and debt providers (debt) . The WACC means that a company has taken the decision to finance the business operations using both equity and debt. (Whether debt finance is a good idea or not is dealt with in chapter 4: *Capital structure and the cost of capital*). Having taken this decision, the company now needs to determine the appropriate WACC that will be used to discount future cash flows when evaluating a new investment. As both debt and equity will be used in the finance formula, the cost to the company will be the weighted average of the two (referred to as the WACC).

Solution:

(a) Options available

1 Book value method

Cost of equity = 20%
Book value of equity = 500 000 + 500 000 = R1 000 000

Note: ***Retained income belongs to the shareholders and is theref re part of equity. Any form of retention, such as non-distributable reserves, distributable reserves and share issue expenses, are also part of equity.***

Cost of debt = 10%
Book value of debt = R1 000 000
WACC = (20% × 1/2) + (10% × 1/2) = 15%

In other words, the company is financed equally by d bt and equity; consequently, the required return is 15%. As will be seen in future chapters, this method is totally inappropriate, because one cannot simply take book values to determine the D:E ratio.

2 Market value method

The market value method recognises that the true value of equity and debt is based on current market values, not on historical values. It further recognises that the appropriate discount rates are current market rates, not the historical cost of equity or of debt.

Current market value of equity = 20%
Current market value of debt = 14%

Market value of equity

Present value of future cash flows $= \frac{\text{R400 000}}{0{,}2}$ (Dividends) / (k_e)

= R2 000 000

Market value of d bt

Present value of future ash flows of debt interest at a discount rate of 14%

$$= \frac{100\,000}{(1+0{,}14)} + \frac{100\,000}{(1+0{,}14)^2} + \frac{100\,000}{(1+0{,}14)^3} + \frac{100\,000}{(1+0{,}14)^4} + \frac{1\,000\,000}{(1+0{,}14)^4}$$

$$= 87\,719 + 76\,947 + 67\,497 + 59\,208 + 592\,080$$

R883 450

Market value (MV) of company

$MV_E + MV_D$
R2 000 000 + R883 451
R2 883 450

Weighted Average Cost of Capital (WACC)

$$= \left(20\% \times \frac{2\,000\,000}{2\,883\,450}\right) + \left(14\% \times \frac{883\,450}{2\,883\,450}\right)$$

$$= 13{,}87\% + 4{,}29\% = 18{,}16\%$$

Target WACC method

The target WACC recognises that, as a company takes on more debt, the cost of equity increases, due to financial risk. This means that every time a company takes on debt, the D:E ratio changes and as a result, the shareholders' required return also increases. The cost of debt also increases if the lender perceives that the risk of loan repayment has increased. A company therefore needs to assess the different mixes of D:E and determine the appropriate mix that will have the lowest WACC.

In this example, WACC is given as:

40% debt : 60% equity

The target WACC = (14% × 40/100) + (20% × 60/100)
= 5,6% + 12% = 17,6%

This is, in fact, the appropriate rate to use in all investment decisions.

How should the investment be financed?

When a company takes on a new investment, it will finance the in estment through equity funding or by borrowing. How it finances a project will have an impact n the financial risk of the company, which will increase as debt finance increases or decreases as equity finance is used.

Does the method of finance have an impact on the WACC? The short answer is: 'No!' If one accepts that there is a target D:E ratio and that a company will at all ti es attempt to move towards that target, then how a company is financed is not an issue.

In deciding on how to finance a project, all calculations must be done at market values. In fact, in finance one must ***always*** look at the market values of d bt (k_d) and quity (k_e), and ***never*** at book values.

Current market value of equity = R2 000 000

Current market value of debt = R883 451

Target D:E ratio = 40:60

At the present moment the ratio is 883 450 to 2 000 000, or 30:70. In other words, the company can take on more debt in order to move closer to the target ratio.

Now, assuming that the company needed R500 000 to finance a new project, what kind of finance should it use?

Answer:

	R
Current market value of equity	2 000 000
Current market value of debt	883 450
Required new funds	500 000
Total	3 383 450

Target 40:60

Therefore Debt = 40% of R3 383 450 =1 353 380 (maximum allowed)
Equity = 60% or R3 383 450 =2 030 070 (maximum allowed)

	Debt	Equity
Target available	1 353 380	2 030 070
Current funding	883 450	2 000 000
New finance	469 930	30 070

The company has sufficient debt capacity to finance the entire project through debt. If the project is accepted, the R500 000 required should be financed using debt.

Note: ***A company tends to finance a project entirely by debt or by equity. The logic here is that new projects are normally for a small amount relative to the total value of debt and equity, and the method of finance will not have a major effect on financial risk. There are also cost implications in using a variety of sources. The intention is to try to reduce the possibility of incurring double flotation costs by using one source of finance only.***

The management decision

Financial managers have to plan, monitor and control. It is important, therefore, that the outcomes of the financing and investment decisions are effectively and efficiently managed.

Strategy and risk is covered in chapter 2. Managing risk according to specific financial management skills is discussed in chapter 5 (*Portfolio management and the Capital Asset Pricing Model*) and chapter 8 (*Analysis of financial statements*). Chapter 9 (*Working capital management*) covers key aspects of day-to-day operating requirements. Chapter 13 (*Financial distress*) considers the implication of firms facing financial difficulties. Chapter 14 (*The dividend decision*) highlights the basis on which the dividend decision should be applied. Chapter 15 (*The functioning of the foreign exchange markets and currency risk*) considers specific financial management areas when operating in an international context and lastly chapter 16 (*Interest rates and interest rate risks*) addresses different sources of finance and highlights key risk aspects in rel tion to these sources.

1.7 Capital markets

The *capital markets* are the markets which trade in long-term finance. In S uth Africa, the Johannesburg Securities Exchange (the JSE) provides the marketplace for *primary finance (the primary market)*, in other words companies wishing to list on the stock exchange or issue new capital may raise primary finance from investors through the JSE. The JSE also provide a trading forum for the *secondary markets*, where existing investors (shareholders) can sell their shares. This secondary trade in shares takes place between investors, and the company whose shares are traded do not share in the proceeds of this trade. The secondary market simply serves the purpose of making listed shares as an inv stm nt a fairly liquid asset to investors by providing a trading place where the supply and demand for shar s by inv stors can be met.

The advantages of raising finance on a stock exchange include access to a wider pool of finance, enhanced reputation of the company, access to growth opportunities by having more capital, and the owners of the original shares realising profits on their share value once listed. However, the obligation of a public listing is greater regulation, accountability and scrutiny, as well as cost implications including:

Underwriting costs – the direct fees paid by the issuing company to the underwriters (brokers, merchant banks, etc.) which may be up to 2,5% of the amount of capital raised.

Other direct expenses – these do not form part of the fees of the underwriters and can include listing fees, documentation fees, fees of professional advisors, printing fees and creation of share-capital fees.

Indirect expenses – these include cost of management time spent working on the new issue of shares.

Underpricing – determining the correct offering price is extremely difficult, and losses frequently arise from underpricing, that is, selling/offering the shares at below the correct, true market price.

Investors in stock markets range from individuals, to banks, insurance companies, pension funds as well as unit trust and investment trusts. The stock exchange is also the market for dealing in government bonds and securities.

A stock exchange can th r fore be described as a capital market in which securities can be freely traded in a regulated environment. However, before shares can trade on the JSE, a company needs to be listed on the JSE and comply with the minimum listing requirements, and, thereafter, the shares must be issued to the public.

Raising equity finance on the Johannesburg Securities Exchange

The JSE has three main markets where public companies may be listed, namely the JSE Main Board, the Africa Board which attracts listings from the rest of the African continent, and the Alternative Exchange (AltX) or devel pment capital market, which is aimed at smaller businesses which do not yet comply with the listing requirements f the JSE Main Board. The most important requirements, which apply in most instances, for a listing on the Main Board of the JSE at present are:

Sub cribed capital of at least R25 million in the form of at least 25 million issued shares.

Satisfactory profit history for the last three years, with reported and audited profits of at least R8 million before tax in the year prior to the application for a listing.

The public should hold at least 20% of each class of shares.

There must be at least 300 public ordinary equity shareholders.

It is compulsory to publish financial results in the press.

The purpose of the AltX Board or development capital market is to facilitate the trading of shares of companies that do not meet the minimum criteria for a primary listing on the JSE. The AltX Board enables the public to invest in younger, smaller companies and the criteria for listing on the AltX Board, which is done though an appointed Designated Advisor (DA), are:

- Subscribed capital of at least R2 000 000 (including reserves but excluding minority interests).
- Need not have a profit history, but its analysis of future earnings should indicate above average returns on capital.
- The public should hold at least 10% of each class of shares.
- There must be a minimum of 100 shareholders.
- Directors are required to complete the ALTX Directors Induction Programme and at least 3 directors, or 25% of directors must be non-executive directors.
- There must be a suitably qualified and experienced executive fin nci l director appointed and approved by the audit committee of the entity.
- 50% of the shareholding of each director and the DA must be held in trust by the applicant's auditors or attorneys to prevent these shares from being traded publicly.

An *initial public issue of shares* (called an initial public offering r IPO) is usually sold directly to the public, often with the help of underwriters. However, if the new issue of shares is to be sold to the existing shareholders only, it is called a *rights offer*. With the approval of the existing shareholders, the company can also make a general cash offer of shares, whereby the company raises capital from investors who are not existing shareholders. In the case of a rights offer in which existing shareholders are invited to subscribe for new shares, the existing shareholders may waive their rights, and th n the company may seek the additional capital outside of its shareholders through an issue of shares for cash to the public.

The *book value of equity* is the share capital on the statement of financial position plus shareholder's reserves. This must be contrasted with the *market value of shares,* which are largely determined by the expectations of investors in respect of future earnings of the company, and represents the price at which a share trades on the stock exchange at any given point in time. In theory, a realistic price for a share will be the discounted value at the shareholder's cost of capital (based on a required rate of return), of the future dividends and expected capital growth which is expected to be received by the shareholder.

Sustainability and responsible investment in the capital markets

Most entities rely on shareholder or equity funds as a source of capital in order to operate the business and expand. Shareholders or institutional investors, for example fund managers of unit trusts or pension funds that invest a portion of their assets and income on behalf of their members, are becoming more selective and circumspect towards investing funds in entities that sufficiently address environmental, social and governance (ESG) considerations into the strategy and business model or value creation model of the entity.

This is due to increased awareness of the importance of sustainability and the prominence of global initiatives such as the United Nations' backed Principles for Responsible Investment (UNPRI). These are guidelines for investors in selecting ntiti s that are ethical and responsible in its business practices. Many international banks are also restri ted to provide borrowings to projects in terms of the Equator Principles on Financial Insti-tutions (EPFIs) to proje ts where the borrower will not or is unable to comply with their respective social and environmental policies and procedures.

On 19 July 2011, South Africa became the second country after the UK to launch its own voluntary code for institutional investors, the Code for Responsible Investing in South Africa (CRISA) issued by the Institute of Directors in So th Africa (IoDSA) . Its principles are aligned with those of the UN Principles for Responsible Investing (UNPRI), as well as King III. CRISA is specifically targeted at institutional investors providing a framework for integrating ESG issues into investment and ownership decisions. One of its core principles is the consideration of material ESG risks and opportunities in investment decisions. This approach differs from ethical, targeted or ocially re ponsible investing, which aligns the investment decision to desired ethical or social outcomes. For examp e, investors with a particular ethical or moral standpoint would choose companies that are seen to have a positive social agenda (building affordable housing) as opposed to those that are involved in alcohol, cigarettes or gambling which are seen to contribute to social ills.

The five key principles are that an institutional investor should adhere to in terms of the CRISA code, are described as:

- *Incorporate sustainability considerations*, including ESG, into its investment analysis and investment activities.

Demonstrate its acceptance of ownership responsibilities in its investment arrangements and investment activities.

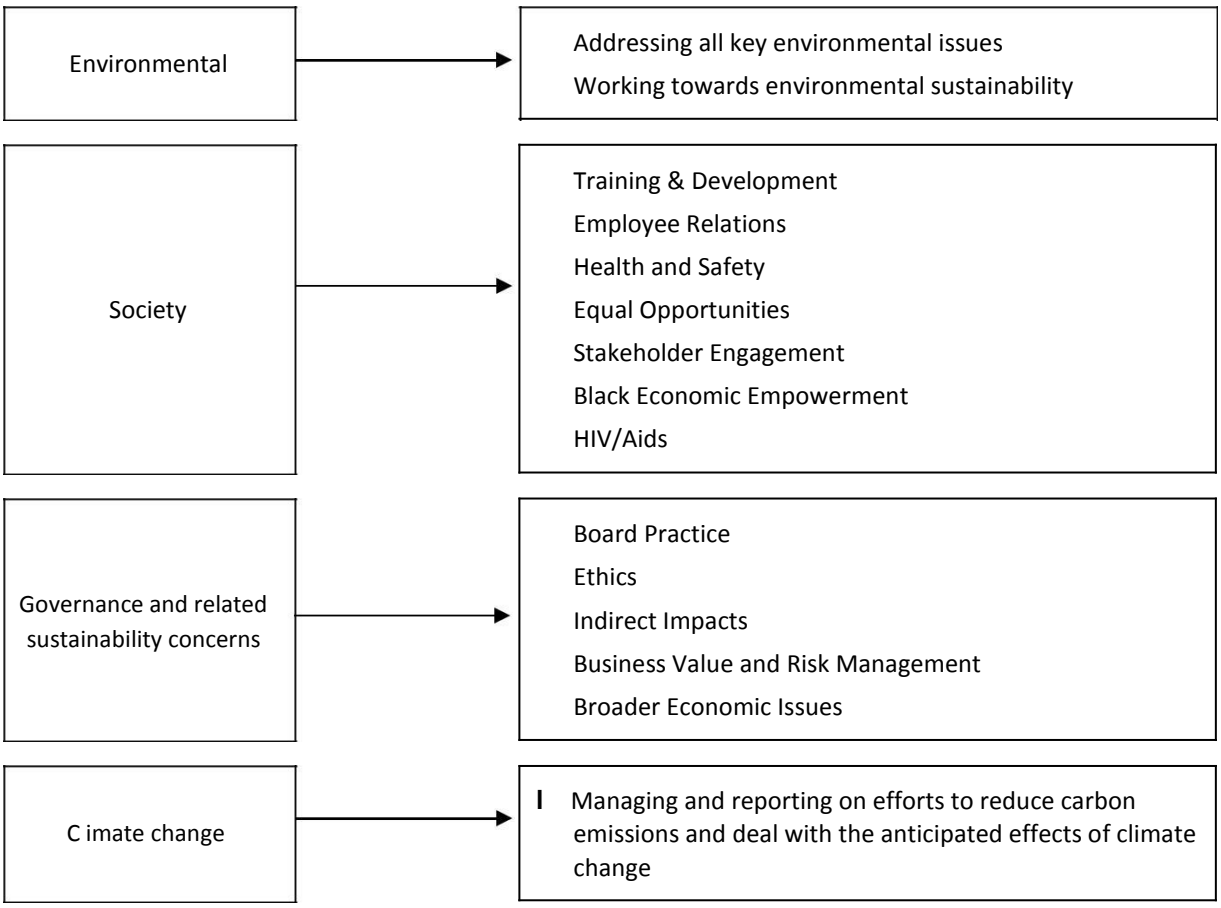
Introduce controls to enhance a collaborative approach to promote acceptance and implementation of the sound governance principles.

Recognise the circumstances and relationships that hold a potential for conflicts of interest and should pro-actively manage these when they occur, including the prevention of insider trading as defined by the Security Services Act.

Be transparent about the content of their policies, how the policies are imp emented and how CRISA is applied to enable stakeholders to make informed assessments.

In addition, the South African Pension Funds Act was amended during 2011 to include a fiduciary duty of pension funds, representing a substantial component of institutional investors in South Africa, to giving appropriate consideration to any factor which may materially affect the sustainable long-term performance of a fund's assets, including environmental, social and governance factors. Globally, institutional investors are increasingly becoming signatories to initiatives such as the Carbon Disclosure Project (CDP), which includes evidence and insight into companies' practices around natural capitals (Deegan 2010). C nsequently, investor needs are increasingly dictating the adequate disclosure of ESG informati n as well as key strategies, risks and opportunities for investor decision-making purposes, which ties in with the report content of the integrated report.

Many of the worlds leading stock exchanges also rate and rank listed companies on their ability to incorporate social, environmental and governance aspects into the entities strategy and activities. Examples are the Dow Jones Sustainability Index, the FTSE4Good Index, and in South Africa the JSE SRI Index. The JSE SRI Index aims to contribute towards the development of responsible busin ss practice by identifying the listed companies that integrate good governance as well as social and environm ntal aspects into their business practices. The following diagram (Figure 1.4) lists the main areas of measurement on which these companies are measured and assessed for rating on the JSE SRI Index.



Source: Johannesburg Stock Exchange: Background and Selection Criteria 2011

Figure 1.4: Measurement aspects of the JSE SRI Index

1.8 Valuation of a company

Every company will at some stage ask: What is the company worth? The valuation of companies for whatever reason is very important in business. Many students have a problem in understanding the concept of value, but simply stated

Value = Present value of future cash flows

The valuation of a company refers in most cases to the value of the ordinary shares. After all, it is the shareholders who want to know what the shares are worth. One could, however, say that the value of ordinary shares equals

Value of company – Value of debt = Value of shares (or equity)

The valuation of equity shares is therefore dependent on the payment of dividends. Now we have another problem:

Should a company pay dividends and (if not) does the non-payment affect the alue of the company?

The payment of dividends is covered in chapter 14. This issue is n t discussed at this point, except to say that if one purchases shares in a company, one would expect to either –

receive a dividend (dividend yield); or

the market value of the shares should increase (capital growth).

Return on an investment comes from the receipt of a dividend and/or from the increase in the market value of the shares.

If the company invested in does not pay a dividend, is the inv stor worse off, compared to investing in a company that does pay a dividend? No, he is not, as his reward will come from an increase in the share value; thus, whether he receives a dividend or not, he is no better or worse off.

Example: Share value

Shareholder X purchased shares in Company A at a price of R78 per share two years ago. At the end of the current financial year, he received a dividend of R12 per share.

The company's annual financial statements stated that dividends have increased at a rate of 5% per annum and that future dividends are expected to continue to grow at the same rate.

Shareholder X has a required rate of return (k_e) of 20%.

Required:

Determine the value per share of Company A at the present time.

Solution:

Value = Present value of future cash flows

The future cash flows will be dividends. We need to determine the dividend in one year's time (D_1) as well as all future dividends to infinity.

Dividend today (D_0) = R12

F t re dividend in one year's time (D_1) = R12 × 1,05 = R12,60

The dividend rate or required return = 20%

The f rmula f present value of future dividends to infinity, based on the dividend valuation model, is:

$$\frac{D_1}{k_e - g}$$

Where:

D_1 = Dividend in 1 year's time
k_e = Shareholder's required return
g = growth to infinity

$$\text{Value} = \frac{12{,}60}{(0{,}20 - 0{,}05)} = R84$$

Conclusion:

The value per share in company A is R84. Should shareholder X wish to sell his shares today, he should sell at a price of R84.

Example: Incorporating the fundamental aspects of finance

Company X has the following statement of financial position at 30 September 20X1:

STATEMENT OF FINANCIAL POSITION AT 30 SEPTEMBER 20X1

		R'000
Ordinary share capital	100 000 shares	1 000
Non-distributable reserves		500
Distributable reserves		500
Preference shares	1 000 shares	500
Debentures	1 000	500
Long-term loan		500
Capital employed		R 3 500
Employment of capital		
Fixed assets		3 000
Current assets		500
		R 3 500

The following additional information is provided:

1 Shareholders' required return (k_e) = 20%.

2 Shareholders have recently been paid a dividend of 5 per share. Dividends are expected to increase by 4% annually.

Preference shares do not have an option to convert to ordinary shares. Preference dividends are R60 per share. Similar preference shares are trading at 9% per share.

Debentures are indefinite. Annual interest is R66,67. Similar debentures are trading at 12,5%.

Long-term loans mature in three years' time. Annual interest is 15% per annum. Appropriate long-term rate is 12,5%.

Tax rate is 28%.

Target D:E ratio is 30:70.

Required:

Determine the value of the ordinary shares.

Calculate the WACC for investment decisions.

Assuming that the company intends to take on a new project for R500 000 that has a positive NPV, determine how the p oject should be financed.

Solution:

(a) Value f shares based on the dividend valuation model

$$= \frac{D_1}{k_e - g}$$

$$= \frac{5(1,04)}{0,20 - 0,04} \times 100\,000$$

$$= 32,5 \times 100\,000 = \text{R}3\,250\,000$$

(b) Target D:E ratio 30:70

k_e		=	20%
k_p	Preference shares*	=	9%
k_d	Debentures	=	12,5% × (1 – 0,28) = 9%
k_d	Long-term loans	=	12,5% × (1 – 0,28) = 9%

Preference shares are debt as they have no conversion option to ordinary shares. Cost of debt is always after tax. As interest on debt and long-term loans is tax deductible, the appropriate cost is calculated after tax. Hence, the calculation is k_d before tax x (1 minus tax rate) = k_p

WACC = (9% × 30/100) + (20% × 70/100)
= 2,7 + 14 = 16,7%

How financed?

Value of equity shares = R3 250 000

Value of preference shares

Dividend = R60 (after tax)

$k_d = k_p$ = 9%

Value = 1 000 × 60/0,09 = R666 666

Value of debentures

Interest after tax R66,67 × (1 – 0,28) = R48

Current cost after tax 12,5% × (1 – 0,28) = 9%

Value = 1 000 × 48/0,09 = R533 333

Value of long-term loan

Interest after tax = R500 000 × 15% × (1 – 0,28) = R54 000

$$\text{Value} = \frac{54\,000}{(1+0{,}09)} + \frac{54\,000}{(1+0{,}09)^2} + \frac{54\,000}{(1+0{,}09)^3} + \frac{500\,000}{(1+0{,}09)^3}$$

= 49 541 + 45 451 + 41 698 + 386 092 = R522 782

Market value of equity	3 250 000
Market value of preference shares	666 666
Market value of debentures	533 333
Market value of long-t rm loans	522 782
New investm nt	500 000
	5 472 781

70% equity 5 472 781 × 70% = R3 830 947
30% debt 5 472 781 × 30% = R1 641 834

Finance

	Equity	**Debt**
Optimal	3 830 947	1 641 834
Current	– 3 250 000	1 722 781
Finance	580 947	– 80 947

Conc usion:

The company should finance the new investment via equity. It should not use debt, as it already has more than he optimal level.

Practice questions

Question 1–1: Responsibilities of the Chief Financial Officer (CFO) *(Fundamental)*

Required:

Discuss the main responsibilities of the Chief Financial Officer (CFO) in the entity.

Solution:

The Chief Financial Officer is responsible for all aspects of financial strategy (financing, investment) in the entity, as well as managing all financial functions within the entity, which includes:

financial accounting functions;

management accounting functions;

cost accounting functions; and

tax functions.

The CFO is also responsible for managing the following risks:

debt risks (level and repayment);

all controls, procedures and systems which have a financial i plication (for example, payment to creditors, payments from debtors);

interest rate risks; and

foreign exchange risks.

The CFO is furthermore responsible for managing the following assets:

working capital;

cash resources; and

short, medium and long term investments.

In addition, the CFO is responsible for making recommendations to the board in respect of various funding and capital raising options, investment decisions as well as dividend and capital retention decisions.

The CFO will also be the management representative on the audit committee as described in King III. The audit committee is accountable for the integrity of the integrated report, overseeing the process of compiling the integrated report, and for recommending the integrated report to the board of the entity for approval. In this regard the CFO will have specific responsibilities in relation to both the internal and external auditors regarding the discharge of their duties.

Question 1–2: Stak hold r ngagement *(Intermediate)*

The International Integrated Reporting Framework describes stakeholder relationships as a guiding principle of integrated epo ting. The nature and quality of the key stakeholder's relationships and the responsiveness to the legitimate needs, interest and expectations of the stakeholders by the entity must furthermore be disclosed in the integrated report.

Required:

Describe the three underlying principles of effective stakeholder engagement.

List the five levels of stakeholder engagement and list a method for each level of engagement.

So ution:

( ) The recent AA1000 Stakeholder Engagement Standard (AA1000SES), which was also developed and is-sued in 2011, provides a standard principles-based framework for quality stakeholder engagement. The three key principles in stakeholder engagement are inclusivity, materiality and responsiveness, as follows:

Inclusivity – Participation of stakeholders in developing and achieving an accountable and strategic response to sustainability.

Materiality – The materiality process determines the most relevant and significant issues for an organisation and its stakeholders, recognising that materiality may be stakeholder specific.

Responsiveness – This includes the decisions, actions, performance and communications related to those material issues.

The stakeholder engagement levels can be described as:

Consult – Limited two way engagement between stakeholders and the entity. Examples include surveys, focus groups, public meetings, online feedback facilities.

Negotiate – Collective bargaining, for example workers with trade union bargaining.

Involve – Two-way or multi -way engagement, including multi-stakeho der forums, consensus building processes, advisory panels.

Collaborate – Joint learning, decision making by both stakeholders nd the entity, for example joint projects, partnerships or multi-stakeholder initiatives.

Empower – Delegating decision making to stakeholders and allowing stakeholders to actively participate in governance by integrating stakeholders into g vernance, strategy and operations management.

Question 1–3: Share valuation *(Intermediate)*

Cessa Ltd currently pay a dividend of R0.36 per share. The earnings of the company is expected to grow at a rate of 14% per annum over the next 5 years. After this period, the growth will reduce to a constant rate of 10% per annum.

Required:

Calculate the value of a share in Cessa Limited from the perspective of a shareholder who requires a 16% per annum return.

Solution:

Year	**1**	**2**	**3**	**4**	**5**	
Cash flows	0,410	0,467	0,533	0,608	0,693	+ 10% growth to infinity

Value of investment growth as at Year 5 (i.e. P5 = D6 / (ke – g))

$$\frac{0{,}693(1{,}10)}{0{,}16 - 0{,}10}$$

12,708 [Formula $D_1 / K_e - g$]

$$\text{Present value} = \frac{0{,}410}{(1+0{,}16)} + \frac{0{,}467}{(1+0{,}16)^2} + \frac{0{,}533}{(1+0{,}16)^3} + \frac{0{,}608}{(1+0{,}16)^4} + \frac{0{,}693}{(1+0{,}16)^5} + \frac{12{,}708}{(1+0{,}16)^5}$$

$$= 0{,}353 + 0{,}347 + 0{,}341 + 0{,}336 + 0{,}330 + 6{,}051$$

= R7,58

Financial calculator instructions:		
CFj_0	=	0
CFj_1	=	0,410
CFj_2	=	0,467
CFj_3	=	0,533
CFj_4	=	0,608
CFj_5	=	0,693 + 12,708
I/YR	=	16
NPV	=	7,758

Question 1–4: Disclosure of the business model *(Intermediate)*

Stakeholders of any entity need to assess the ability of the entity to create value over the short, medium as well as long term. Key to such assessment for stakeholders is considering the business model of the entity and the environment in which the entity functions. The Integrated Reporting Framework of the IIRC (2013) describes the content elements that should be contained in the integrated report, which includes the content element of the business model of the entity.

Required:

Describe the concept of the business model as defined by the framework.

Explain how the business model as content element of the integr ted report should be disclosed in the integrated report.

Explain how an entity with multiple business models should disclose these in the integrated report.

Solution:

The entity's business model is described in the framework as the system of transforming inputs through its business activities into outputs that aims to fulfil the entity's strategic purposes and create value over the short, medium and long term.

The description of the entity's business model should include the key factors of inputs, business activities as well as outputs and outcomes, as follows:

Inputs relate to explaining how the mat rial k y inputs (resources) relate to the capitals that the entity depends on. The capitals include the six capitals of financial capital, manufactured capital, intellectual capital, human capital, social and relationship capital and natural capital.

Business activities relate to explaining how the inputs are transformed to outputs (key products and services). This can include a description of how the entity differentiates itself in the market by unique products, services, distribution networks and marketing.

Outputs relate to explaining the key products and services offered by the entity.

Outcomes relate to describing the internal outcomes (revenues generated, employee satisfaction) as well as external outcomes (customer satisfaction, social and environmental impacts). It also includes describing positive and negative outcomes in respect of the capitals. Examples of a positive outcome can include increased skills following staff training initiatives (value of the human capital increased), and a reduction in natural resources (e.g. water used or contaminated) is an example of a negative outcome (the quantity and quality of available natural capital decreased.)

It is important to explain the different business models separately in the integrated report by disaggregating the entity into its k y components where an entity has multiple operations that function independently. The int grat d report should also explain the connection between these various business models or functional units, where there is a connection between these.

Chapter 2

Strategy and risk

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- describe the key strategic management concepts of 'strategy', ' ission', 'vision', 'goals', 'objectives', 'action plans' and 'key performance indicators';
- explain the strategic planning process within an entity;
- explain the relationship between the entity's mission, vision and strategies and its external and internal environment, as well as the opportunities and risks to which it is exposed;
- identify and describe the external (opportunities and threats) and internal (strengths and weaknesses) influences on the operations of an entity;
- evaluate the competitive environment of the industry in which the entity operates and briefly describe appropriate competitive positioning strategies that may be applied;
- evaluate the internal environment of an entity by applying value chain analysis, product life cycle analysis, BCG matrix and resource audits;
- perform a SWOT analysis and a gap analysis for an entity based on the information gathered from the external and internal analysis;
- recommend appropriate strategic choices (including product market strategies, competitive strategies, growth strategies as well as sustainability strategies) to an entity given the risks and opportunities identified from analysis of the internal and external environment within which the entity operates;
- evaluate the implementation of strategy, the appropriateness of performance measures and key performance indicators (KPI's) selected, as well as the effectiveness of performance measurement and reporting syst m of an ntity;
- explain the conc pts of 'financial risk' and 'business risk' in the context of the overall risk to which an equity investor (shareholder) of a company is exposed;
- explain the on epts of risk, risk appetite, management and risk management strategy;
- describe the isk management process, including risk identification, risk assessment and risk responses;
- explain the governance principles relating to the risk management process;
- describe the responsibilities of the various role players in the risk management process;
- evaluate the adequacy of the risk identification process, the appropriateness of the risk responses, risk mitigati n, and risk monitoring and reporting processes; and
- explain the fundamental principles of enterprise risk management (ERM).

Understanding the competitive and changing nature of the business environment, as well as a solid ppreciation of appropriate business and strategic responses to risks and opportunities faced by business, is essential to finance students and business leaders today. A clear grasp of the strategic planning process as well s enterprise risk management (ERM) is necessary to determine the role of the finance function and its contribution to the entity within the latter's broader operating context. In this chapter, the environment in which entities function, the role of strategy and strategic planning, and how the strategy of the entity interacts with the decision-making process are considered. This chapter also addresses theories on strategy, the

strategic planning process, governance aspects of risk management, as well as the risk management process and ERM.

2.1 Strategy and the business environment

Entities function in an increasingly challenging and rapidly changing environment. Globalisation and the reduction in trade barriers have dramatically increased competition, and fast changing technology has not only changed the way in which businesses operate, but has created business opportunities in markets for technologically driven products and services that did not exist until fairly recent y. The global financial crisis, the persistence of socio-economic challenges, inequities and inequalities in achieving sustainable human development in the midst of environmental upheaval such as clim te ch nge, ever-diminishing natural resources and so-called 'ecological overshoot' have added to the complexity of business environment that is without precedent. Without a clear strategy, mission, vision and a good underst nding of the external and internal business environment, a company is not likely to succeed in creating alue on a sustainable basis for shareholders and major stakeholders.

Value can only be created for shareholders and stakeholders if the entity has a clear strategy that takes the external and internal business environment as well as the role and needs f each of the stakeholder groups of the entity into consideration. Furthermore, shareholder value in a company can only be created if the strategies of the company aim to achieve a return on the capital e ployed that exceeds the cost of the capital employed. Strategy therefore provides a unified and consistent approach, which details the company's organisational decisions and activities in order to achieve sustainable value creation for shareholders and major stakeholders. Strategic management, and the sel ction of appropriate strategies and supporting plans, are therefore fundamental to the success of any entity, r gardl ss of whether it is a public or private sector entity, a non-profit company or a non-governmental entity (NGO).

Strategy can be described as a process by which an entity deploys its resources and capabilities within its business environment to achieve its goals and meet stakeholder needs, interests and expectations. *Corporate strategy* is concerned with *where* a company competes (e.g. products and markets), whilst *business strategy* is concerned with *how* a company competes (e.g. differentiation or cost).

Strategic planning is the business enterprise's long-term plan, which includes the specific plans, actions and policies to be followed in order to achieve enterprise's specific goals. Strategic planning is a continual process and strategy may change if external factors change. For example, if a new competitor enters the market and the enterprise's profit margins begin shrinking due to the change in the market, an evaluation of alternative strategies or plans of action will be necessary in order to maintain profits and create long-term sustainable value for shareholders and stakeholders.

The strategic planning process takes place in four phases, namely –

- strategic analysis;
- selecting appropriate strat gies;
- implementation of the strategies; and
- measurement of performance against strategic objectives.

Strategic analysis entails the formulation of a mission and vision for the entity, the setting of goals and objectives, and analysing the external and internal environment. In short, once the strategic analysis has been completed and the strategy outlined, it informs stakeholders ***how*** the company intends to fulfil its mission and achieve its vision.

The *missi n* r *purpose* of the entity describes the reason for the existence of the enterprise and the key values that it subscribes to. It tells the stakeholders ***why*** the entity exists.

The *vi ion* of the enterprise is a future-orientated statement of the position that the entity is planning to take in the future, in other words, ***what*** it intends to be in the long-term.

Goa s are derived from the mission and vision of the business enterprise and relate the mission and vision to e ch stakeholder group. This requires a stakeholder analysis and a clear understanding of each stakeholder group and the needs and requirements of each group. These articulate ***where*** the entity intends to be in the long-term.

Objectives provide clarity in specific, measurable, attainable, realistic and timely (SMART) terms, in respect of ***when*** specific activities which lead to the achievement of the goals will be undertaken.

Action plans detail ***who*** will be responsible for achieving these objectives.

Key Performance Indicators (KPIs) are quantifiable measurements, indicating ***which*** data and information is required to assess progress towards the achievement of the stated goals and objectives. Therefore clearly articulated intended outcomes based on these goals and objectives to be achieved must be monitored and evaluated on an on-going basis to ensure proper strategy implementation.

Strategic analysis must be done in the context of the external as well as the internal environment in which the entity functions. The external and internal environment can be assessed and evaluated by undertaking a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, which identifies the strengths and weaknesses of the entity (its internal environment), as well as the opportunities and threats it faces (its external environment). This evaluation will enable the enterprise to identify strategies which wi build on its strengths, improve its weaknesses or shortcomings, exploit the opportunities avail ble, nd counter the threats that may exist in the external environment. A SWOT analysis requires a thorough n lysis of the political and economic environment, market, products and services offered, distribution channels, financial situation, human resources and skills, raw materials and assets (to name but a few).

2.2 The external environment

Companies function in a globally challenging and fast changing environment where opportunities have to be identified quickly and acted upon in a responsible anner for the enterprise to remain competitive, profitable and sustainable on a long-term basis. An entity can only succeed if it is able to understand and suitably respond to the political, economic, social, t chnological, legal, environmental, global and ethical (PESTLEGE) environment within which it functions.

Entities exist within an environment which influences what they do and whether they are able to survive and prosper on a sustainable business in the long-term. Globalisation and technology has resulted in markets for products and goods that constantly change. Customers develop new needs and wants, and new competitors enter the market and introduce new technologies and products. Consequently, entities that have an competitive advantage and are able to create sustainable wealth on a long-term basis, are most often those entities that are able to understand the impact of these changes and trends on the entity and are able to select and effectively pursue strategies that are appropriate to their changing environment.

The key issues confronting the current external business environment that may influence strategic choices therefore include:

Globalisation results in products and services increasingly being distributed across continents, which increases competition and necessitates product innovation and creative and innovative strategies.

Technological advances results in the life cycle of products becoming shorter.

Knowledge and information is increasingly accessible and freely available to everybody and hence the management and utilisation of information is becoming a key aspect of organisational success.

Sustainability asp cts of business entities on an environmental, social and governance (ESG) basis added to which is economic priorities and incorporating these sustainability aspects into strategy choices and business pra ti es is fast becoming the norm in business, as a result of the global challenges faced in respect of the natu al and social environment.

Innovation and finding new ways of thinking and adapting business processes to meet the future demands to increase productivity and new product development has become increasingly prominent in a competitive b siness environment.

These issues create both risks and opportunities in the business environment. Understanding the external envir nment in which the entity operates, and how these factors impact on the entity and its future strategy ch ices, may therefore require an analysis of some or all of the following factors, which may be general factors affecting all entities, or industry specific factors in the external environment.

The political environment

The political environment, degree of political stability and expected future changes to this environment will influence strategy choices. For example, political instability in a region may affect the ability of an entity to conduct activities in that region. Political risk includes war, corruption and potential nationalisation. Governments are responsible for creating a stable business environment by implementing suitable economic and other policies and creating and maintaining infrastructure.

The political environment and its expected future stability, as well as government policies, for example government policy on B-BBEE (Broad-Based Black Economic Empowerment) that may influence the industry within which the entity functions, is a key aspect to be considered in the strategy choices of an entity.

The economic environment

The economic environment in a country as well as the global economy, and anticipated changes must be considered. This will include the following –

exchange rates, and expected fluctuations in the exchange rate. This wi determine the cost of imports and the revenue earned from exports;

interest rates and expected cycle of the interest rate. The interest r te me sures the cost of borrowing, and influences the return that shareholders expect on their investment;

inflation and expected inflation rates, which will influence cost of production and selling prices;

economic growth rate per region, country as well as globally and expected business cycles;

government incentives applicable to the industry, for example incentives offered to the automotive industry in South Africa; and

access to capital markets.

The social environment

The social environment has a bearing on the custom r base of the entity, as well as on employment and skills retention. This includes, for example, the demographic composition of society (age, geographic location, economic status, ethnicity, employment rate, household and family structures and gender), which may influence the type of products and services that will be important to consumers in the future. Changes to demographics of society may also influence the recruitment and human resource policies of the entity, for example if the average population age increases, it might be necessary to consider increasing the retirement age and retaining the skills of experienced workers.

Social trends, for example consumers that are increasingly conscious of environmental conservation matters, will influence the type of products and service that consumers choose to buy in future and that will be in demand. Analysing social trends will provide significant insights into current and expected trends in both products and markets which will be important considerations for future strategy choices.

The technological environment

The technological environment and possible impact of technological advancement to products, markets and the operating environment will impact on the strategy choices of an entity. Business entities in the technology industry are reliant on innovation and new technological advancement in order to remain competitive, which will influence strat gic choic s and the resources allocated to research and new product design.

Technological advan es an also impact on the cost and efficiency of products and services of an entity. Technological advan es may include communications, data and information processes which impact on the overall productivity of the entity as well as the ways in which products are made, services are rendered, entities are managed as well as the way in which markets are identified.

The reg latory environment

The legislative and regulatory environment has an important bearing on entities and the strategic choices that they make. These regulations attempt to promote an equitable economic environment and responsible behaviour in the business environment. It can also levy penalties or fees to ensure entities act ethically or properly re pond to consumer issues in the business environment.

Regu ations can include the following:

Tax regulations such as legislation governing income tax, value-added tax (VAT), import duties, rates and the like. Income tax rates, and the introduction of new tax provisions and tax incentives, for example tax incentives to attract businesses to certain areas or development zones may influence the entities choice of where it chooses to locate activities. Another example is the carbon emission tax on new passenger vehicles introduced by government, which may have significant cost implications for entities that operate large motor vehicle fleets.

Competition regulations such as the Competition Act 89 of 1998, regulates restrictive business practices, abuse of dominant positions and mergers in order to achieve equity and efficiency in our economy. This prevents monopolistic enterprises and encourages socio-economic equity and development.

Exchange control regulations of the Reserve Bank govern the flow of funds and investments to other countries.

Environmental regulations, for example allowable standards of environmental atmospheric pollution and protection of sensitive bio-diverse systems are governed by legislation such as the National Environmental Management Act 107 of 1998.

Health and safety regulations govern minimum standards that entities have to comply with in ensuring the health and safety of employees, such as the Occupational Health and Safety Act 85 of 1993.

Employment law governs minimum wages and working conditions, for ex mple the Skills Development Act 97 of 1998 aims to improve skills and increase productivity in order for South African companies to effectively compete in the global economy.

Consumer protection regulation such as the Consumer Pr tecti n Act 68 of 2008 promotes a fair, accessible and sustainable marketplace for consumer products and services.

The market for the product or service

The market comprises the customers or potential custo ers who have needs or wants which is satisfied by a product or service. The market for the product or service, the size of the market share, the proportion of the market share gained or lost by the entity, as well as and curr nt market trends and expected trends in the market in which the business functions will have to be analys d.

Market segmentation recognises that every market comprises potential buyers with different needs and different buying behavior. Each market segment can become a target market for an entity. Segmentation can take place according to demographic aspects or behavioral aspects of consumers. Identifying market segments can result in better satisfaction of customer needs, higher customer retention, as well as targeted communication and marketing unique to each market segment.

Undifferentiated marketing aims to produce a single product for the entire market and therefore disregards segmentation.

Concentrated marketing aims to produce the ideal product for a specific segment of the market. This increases the business risk since reliance is placed on a single segment of the market.

Differentiated marketing aims to produce several versions of the product or service, each aimed at a different segment of the market. This increases product cost as well as marketing costs.

The competitive environment

The *competitive position* of the ntity can be described as the market share, costs, prices, quality as well as accumulated experien e of the entity in producing a product compared to its competitors. Analysing competitors and the ompetitive environment therefore includes an analysis and identification of key competitors and their competitive strategies, including potential new entrants to the market. It will also include identifying, potential substitutes for products or services, and analysing the bargaining power of customers. The competitor can be analysed in the following areas –

prod cts and services offered;

research and innovation;

techn l gy employed (manufacturing and business systems);

di tribution methods and channels;

financial performance and financial structure;

organisational structure and organisational flow chart;

leadership style and abilities; and

abilities for expanding or increasing market share.

This information can be obtained by financial statement analysis, information from customers and suppliers, and product inspection.

Understanding the market and customer needs

Understanding customer needs and future requirements from customers is vital to business success and it is therefore necessary to determine what innovation and future research and development would be required for the business enterprise to satisfy customer needs and maintain or increase market share. It is therefore important to determine the needs, wants and values of a target market and to respond to these needs and wants on an ongoing basis in order to deliver products and services that meet the needs and wants of customers more economically, effectively and efficiently than its competitors.

Marketing and marketing strategy entails the following possible actions in respect of the demand for the products and services that the entity supplies –

create a demand;

develop a latent demand;

revitalise a sagging demand; and

sustain a buoyant demand.

Consideration should be given to the target markets to be devel ped, and how to maintain a competitive advantage in the product and service offering of the entity compared to that f its competitors.

Customer analysis can be used where a relatively small nu ber of customers allow analysis on a per customer basis. This will entail accumulation of data per customer, including customer history, the relationship of the customer to the product, as well as financial performance of the custo er.

Customer profitability analysis entails the analysis of profit p r customer (revenue per customer or customer groups less costs per customer or customer group) in ord r to identify the relative profitability of customers, taking into account volume discounts, customer specific costs, agreed selling prices. This can be useful in understanding the relationship between customers or customer groups and overall profitability, and may therefore influence strategy choices.

The natural environment

This entails analysing the impact of changes in the natural environment on the entity. Expected changes in climate patterns and the quality of air and water may have significant impact on the ability of an entity to conduct business activities.

An example of the impact of the natural environment on business is detailed in South Africa's first Water Disclosure Report, which was issued in 2011. The report reveals that 85% of water-intensive users among the JSE Top 100 companies are exposed to water-related risk, and that 70% of companies could face risks to their direct operations due to uncertainty of expected future water ***quality*** *and* ***supply*** *within the next five years.*

2.3 Internal environment

The internal envi onment can be described as the current resources of the entity. These resources include the enterprise's human resources, customers, structures and systems. Understanding the internal environment in which the enterprise operates may require an analysis of some or all of the following factors –

leadership style and capability of senior management, whether the Chairman, Board, CEO and other Executive managers are seen to be a visionary, strategic, participative and inclusive leaders as opposed to auth ritarian and task oriented;

management capabilities, skills and recruitment and the suitability of the management style to the bu ine s enterprise;

corporate culture of the enterprise, the key values of the entity and whether it fosters innovation, flexibility and creativity or is more conservative and work-to-rule based;

governance regime, whether it is perceived to be more quantitative in its commitment to how it is directed and controlled (i.e. a so-called 'tick-box' mentality) or more qualitative, which implies an inclusive and integrated approach;

the products or services that it supplies, including an analysis of sales, product margins, product quality;

the life cycle of the products and services, and the price elasticity of demand for products and services;

marketing and the use of advertising, potential market growth for products and services, customer satisfaction levels, potential new products and services;

distribution facilities and the efficiency thereof;

financial resources available for future investments and expansion;

labour force and skills requirements;

business management including the organisational structure, information systems and technology; assets, plant, equipment and production capacities; and

suppliers, raw materials, and inventory holding policies.

There are various tools available that can assist with the analysis of the internal environment. These include –

value chain analysis;

product life cycle analysis;

BCG Matrix; and

resource audit.

The application of these methods as analytical tools is considered below.

Value chain analysis

The value chain model of activities, developed by Michael Porter, describe the key activities of the entity and how it creates value. According to this model, competitive advantage arises from the way in which the entity organises and performs various activities to create value.

An example of Porter's value chain analysis for a business can be set out as follows:

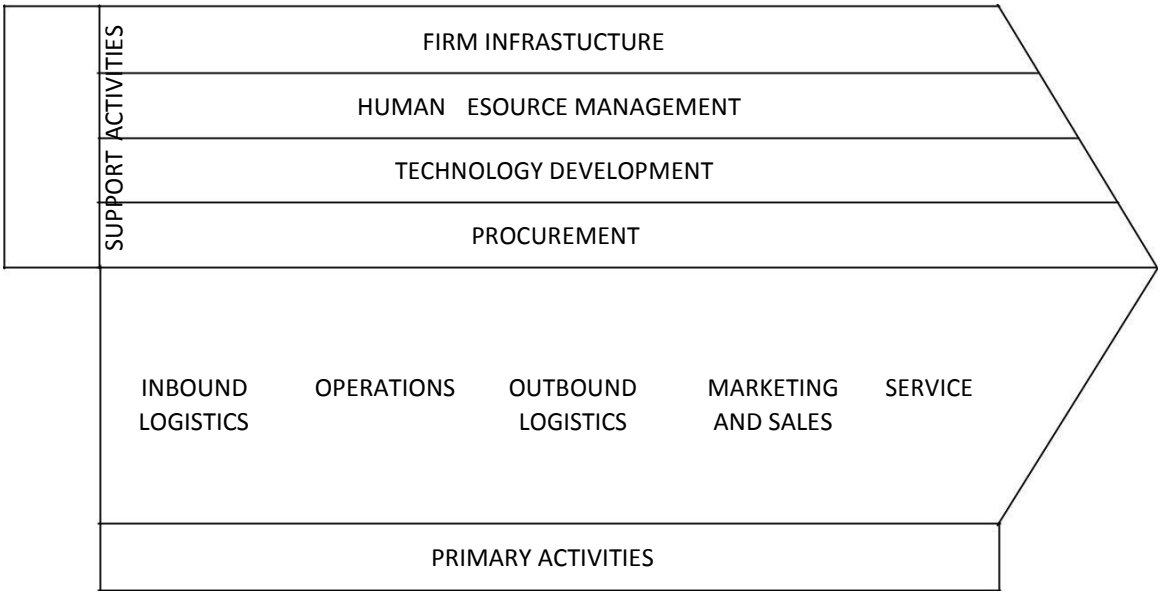


Figure 2.1: P rter's Value Chain

Performing a value chain analysis for an entity serves to:

Identify the interdependencies between various activities and the potential for structuring activities more efficiently.

Identify the interdependencies between various activities and the potential for structuring activities more efficiently.

Product life cycle analysis

Innovation in new products, product design and features and in services, adds to the competitive advantage of any entity. However, as newer versions of the same product, or new products or services become available, products and services that have an established customer base may become less popular as customers start switching to these new products or services. It therefore follows that each product has a 'lifetime', starting with development of the product phase, through to the decline in sales phase (Figure 2.2 below). The duration of the product life cycle will depend on factors such as how many competitors are in the market, the type of product and consumer, and the frequency of new innovations. Typically technology items such as cell phones, televisions and computers have a very short product life cycle due to the rapid advancement in technology, which constantly improves on the features of new products, rendering the o der version of the same products almost redundant.

It is important to understand the market requirements and the role of technology nd competitors, in order to establish the expected life cycle of a product. Where a product is expected to ha e a short product life cycle, it is paramount that the research and development cost of the product is reco ered by profits from sale of this product in the shortest possible time span, since the risk exists that competitors may launch new improved products before sufficient quantities of the product has been s ld by the entity to recover such costs.

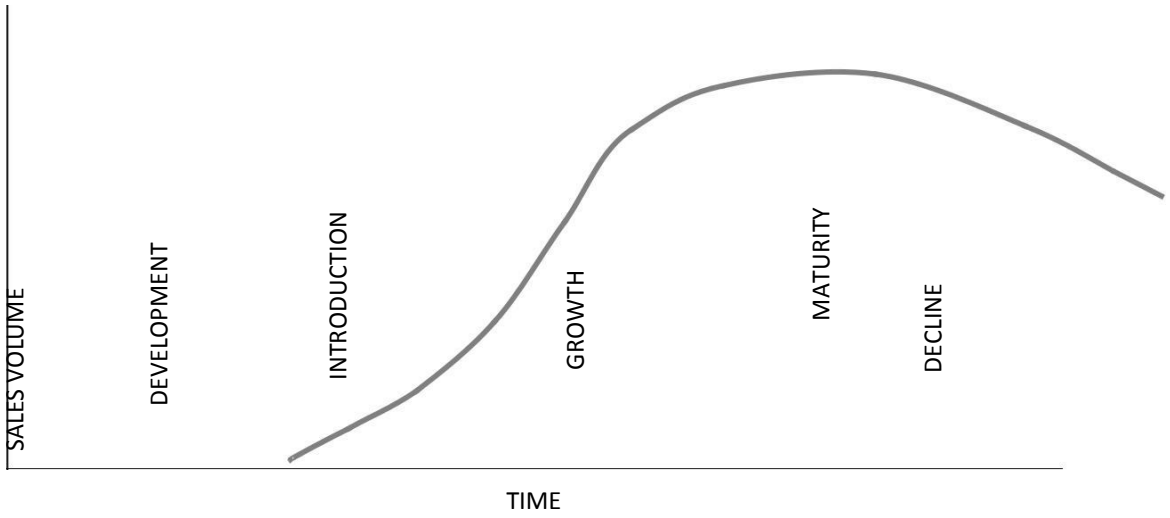


Figure 2.2: Product life cycle analysis

BCG Matrix

The Boston Consulting Group (BCG) developed a matrix which classifies an entity's products in terms of potential profitability (cash g n rated less cash expenditure). This enables the entity to identify products that are not actively contributing towards profit and that should possibly be rationalised. Products can be classified in the following ategories:

Stars a e p odu ts that require high capital expenditure in excess of the cash generated, but have the potential to become cash cows (generating high cash income). As market growth slows down, they then descend into the cash cow quadrant.

Cash cows are products that require little capital expenditure and generate high levels of cash. Their excess f nds should possibly be invested into 'question marks'.

Questi n marks are products that may potentially justify additional capital expenditure (from cash cows) in pursuit f additional market share, or may potentially be nearing the maturing phase in the product life cycle.

Dogs are products that may have been cash cows but are no longer contributing towards cash generation anymore. They should probably be terminated.

This can be illustrated as follows:

		MARKET SHARE	
		HIGH	LOW
MARKET GROWTH	HIGH	STARS	QUESTION MARKS
	LOW	CASH COWS	DOGS

Figure 2.3: Boston Consulting Group (BCG) Matrix

Resource audit

This entails analysing the resources required, availability of suppliers and the future availability of raw materials and other resources or capitals (natural, human, financial, social, anufactured and intellectual capital) necessary for the entity to produce products and services. This is an internal view. The M's model is often used to describe the various resources that have to be consid r d.

Resource	**Aspects to be considered**
Machinery	Age, technological advancement, utilisation, replacement schedules
Make-up	Culture of the entity and organisational structure
Management	Structure, compensation structure, loyalty, skills
Management innovation	Information systems and technology
Markets	Products and customers, value of relationships with customers
Materials	Availability, cost, sources and suppliers, relationships with suppliers
Methods	Activities and relationships
Money	Gearing levels, profit levels
Men	Labour force, skills, efficiency, relationship with trade unions

A resource audit allows the entity to consider the effective utilisation of resources, in addition to the quality and timeliness of information as well as the quality of the relationships with labourers, management, suppliers and customers.

2.4 SWOT and gap analysis

Once the analysis of the external environment as well as the internal environment has been completed, it is possible to do a SWOT and gap analysis.

SWOT analysis entails an assessment of the ***strengths***, ***weaknesses*** (internal environment) as well as the ***opport nities*** and ***threats*** (external environment) of the entity.

N te Risk assessment is a critical component of the SWOT analysis. It is also important to bear in mind that risk management does not always have negative connotations from the perspective of weaknesses and threats only, but it can provide a positive platform to consider opportunities and the potential for the entity to capitalise on its strengths as well.

The next tep is to analyse the extent to which new strategy choices are required for the entity to achieve its objectives.

G p nalysis is a comparison between the objectives of the entity, and the expected performance of the entity given the information gained by the SWOT analysis.

The benefits of performing a gap analysis is that it allows for the entity to consider to what extent current strategies and business activities will result in the objectives of the entity being met, and to identify the need for strategy choices that will enhance the achievement of these objectives.

2.5 Selecting appropriate strategies

After considering the external and internal environment, strategic options must be identified and the most appropriate strategic options selected. Strategic options can include –

product and market strategies;

competitive strategies; and

growth strategies.

Various strategies could be under consideration and assessment by the company. Ensuring shareholder's long-term sustainable returns requires that the company creates, evaluates and se ects strategies that will increase the value of the company. It is therefore important that the financial implic tion of e ch strategy as well as the impact on all stakeholders is evaluated before selecting appropriate str tegies.

The strategies that are selected therefore have to be acceptable from a *feasibility* (can it be done?), *viability* (does it generate positive cash flows?) and *sustainability* (does it endure o er the long-term?) perspective. The financial perspective will question if the strategy results in the achievement of financial objectives such as an acceptable Return on Capital Employed (ROCE) and a positive Net Present Value (NPV). The latter, takes into consideration Discounted Cash Flows (DCF), which means that the future cash flows generated by the entity are discounted at the required rate of return and when added together, should exceed the cost of the investment today. Other considerations that need to be taken into account are –

- impact on existing or potentially acquired resources of the fir ;

impact on stakeholders and stakeholder relations;

how competitors are likely to respond;

risk associated with the strategy; and

impact of the strategy on environmental and social measures and KPIs.

It is becoming increasingly important for entities to incorporate sustainability aspects of ESG into strategy and business activities for various reasons. In a world where business often face public scrutiny for its actions, and where consumers are increasingly becoming better informed of product content and how products are made, it has become essential to address sustainability aspects of ESG in strategy choices. The effects of climate change, pollution and environmentally damaging greenhouse gasses as well as the decline in natural resources, necessitate responsible stewardship in business practices, and entities risk losing their good reputation and their customer base if business practices or activities are considered potentially harmful to people (social welfare) or the planet (natural environment). The advent of social media, for example Facebook and twitter, has provided a basis for easy dissemination of information and conversations between stakeholders, which can easily highlight firms who do not operate as responsible corporate citizens.

Furthermore, this is essential in order to attract funding in the form of equity as well as loans for any entity, for profit seeking and non-profit entities alike. The question often arises how much should be invested in stakeholder manag m nt in the pursuit of shareholder maximisation, since quite often a trade-off must be made between profits and the interests of stakeholders, society, or the natural environment.

Laszlo's Sustainable Value Matrix (Figure 2.4) attempts to explain that increasing shareholder value at the expense of dest oying stakeholder value (upper-left quadrant of the sustainable value matrix) is unsustainable, since it is likely to esult in reputational damage, customer loss, or penalties in a regulated environment. In contrast, increasing stakeholder value at the expense of shareholder value (bottom right quadrant of the matrix) is ns stainable since it decreases company resources and competitiveness, threatening the overall existence and profitability of the company. Laszlo therefore proposes that companies strive to operate in the sustainable value quadrant (top right quadrant of the matrix) by actively incorporating and selecting strategies that benefit b th stakeholders and shareholders in a win-win approach. This will improve corporate reputation, increase cost efficiency, lead to new product innovation, and increase the number of loyal customers and engaged employees, while improving constructive relations with stakeholders.

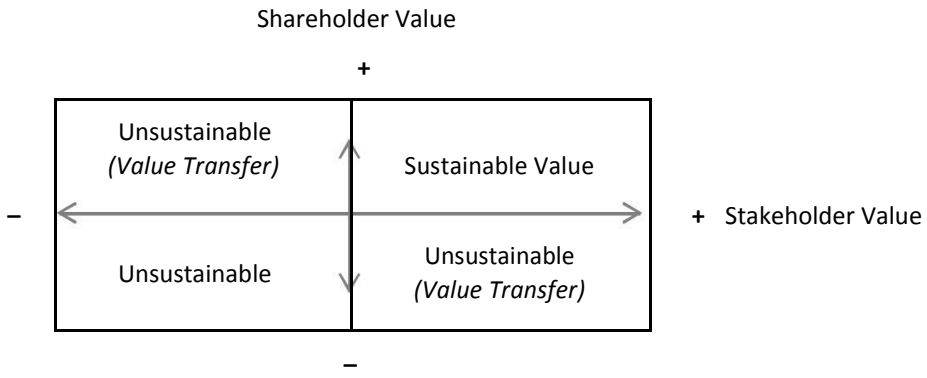


Figure 2.4: Laszlo's Sustainable Value Matrix

Laszlo's matrix highlights the need for entities today to derive inno ati e solutions and make strategy choices that benefit both shareholders and other stakeholders in order to achieve long-term sustainability, by striving to operate in the top right quadrant of the matrix.

Product-market strategies

These strategies will determine which products and services the business enterprise sells, and the markets to which it is aiming to sell the products or services. At the broadest level, these are often translated into the so-called 'corporate' strategy efforts of the firm, as th y indicate the firm's preference for whether it should concentrate on specific products or markets, wheth r it should embark on backward or forward integration (taking over suppliers or buyers) or which geographies it should focus on. It will also have an impact on how the firm structures itself, for example by function, division or Strategic Business Units (SBUs).

The Ansoff's Growth Vector Matrix is a tool that can be useful in strategy selection for market growth and products. Ansoff's product/market growth matrix suggests that a business' attempts to grow depend on whether it markets existing or new products in existing or new markets (see Figure 2.5).

		Product	
		Existing	**New**
Market	**Existing**	l Market penetration (for growth); or l Consolidation (to maintain position); or l Withdrawal	Product development
	New	Market development	Diversification into: l Related product markets; or l Unrelated product market areas

Figure 2.5: Igor Ansoff's Growth Vector Matrix

Competitive strategies

Michael P rter f the Harvard Business School is recognised as having developed the so-called 'generic' business strategies, which determine how the business enterprise will compete. Competitive advantage is anything which gives a company a real advantage over its competitors. Business strategies seeking competitive advantage may include –

cost leadership, by aiming to be the lowest-cost producer of the products or services in the industry;

differentiation, by aiming to provide a unique product or service; or

focus strategy, by aiming to concentrate on a specific segment of the market, which can be achieved by aiming to be a cost leader for a chosen segment or aiming to pursue differentiation for a chosen segment.

Porter also developed a framework for industry analysis and business strategy development referred to as the 'Five Forces Framework'. These forces are the external and internal influences of an industry, which impact on profitability and for which a strategy must be selected in order to increase and maintain shareholder value. The five forces are –

the threat of new entrants to the industry;

the threat of substitute products or services;

the bargaining power of customers;

the bargaining power of suppliers; and

the rivalry amongst current competitors in the industry.

Pricing strategies for products and services must also be considered. Pricing str tegies will not only affect profitability, but can be an important competitive tool for differenti ting product and a company, and utilising opportunities in the market. Pricing strategies will depend on the type of product or service as well as the market for the product or services. Possible pricing strategies may include –

price skimming, that is, setting a high selling price for a unique pr duct to maximise short-term profits;

- *predatory pricing,* that is, setting a low selling price for the pr duct r service in order to gain market share;

selective or discriminatory pricing, that is, setting different selling prices for the same product or service in different markets; or

market pricing, that is, setting a selling price for the product or service based on the perceived value to the customer.

Growth strategies

Growth strategies will include how the business will grow, for example by acquisition of a competitor; by strategic alliances, or by expanding products into new markets and growing the company internally.

A strategy of *organic growth* seeks to grow the company internally with the existing resources and expertise, by increasing market share or entering new markets and optimising product and service ranges.

A strategy of *acquisition* seeks to acquire existing businesses.

A strategy of *alliances* may include working together in a variety of ways, for example joint ventures and strategic alliances.

2.6 Implementing the strategies

The selected strategi s will have different implications for various divisions of the entity, and will have to be translated into obj ctiv s or k y performance areas for each level of the operational goals. For example, a cost reduction strategy will r sult in activities and objectives such as more efficient processes resulting from an investment in new plant and machinery in the manufacturing plant, in contrast to a reduction in headcount in the administ ative fun tion of the company.

Communication and quantification of the strategies where possible, and translating them into clear objectives is a key aspect of implementing the selected strategies. Critical success factors (CSFs) can be set by identifying objectives and goals, based on the strategy selected, and determining which factors are critical for accomplishing each objective. These factors can be measured by performance indicators.

The c st and benefit of establishing performance indicators must be weighed up (so-called 'cost/benefit analysis') and the performance indicators must be relevant to the way the company operates.

Aligning organisational performance with strategy

Performance measurement can be described as communicating the selected objectives and strategies throughout the entity, and monitoring the progress of each business or functional unit on an ongoing basis owards these objectives. Strategy choices should translate into clearly defined objectives, which are then quantified as measurable key performance indicators (KPIs). These KPIs should be aligned with the strategy and objectives of the entity, and will be measured and reported on at regular intervals in order to assess the progress of the entity towards the stated objectives. The benefit of measuring a specific dimension of

performance of the entity by defining a KPI should, however, always exceed the cost of measurement. The KPIs selected for measurement should also reflect a balance between financial and non-financial measures, and should ideally be focused on measures that are aimed at achieving long-term sustainability of the entity.

The measures selected should reflect the key strategy choices of the entity, in order to ensure that collective and individual responses and decisions taken throughout the entity are aimed at or aligned with achieving the desired outcomes for the entity. There are various mechanisms that may be employed to encourage managerial behaviour and decision making that corresponds with and leads to the objectives of the entity being achieved, such as linking the remuneration of managers with specific KPIs. Although incentivising managers to achieve the objectives of the entity by monetary reward is a powerful mechanism to achieve a desired outcome, it is important that the emphasis of remuneration-based performance schemes should be on balanced, long-term performance measures of the entity, which includes measures of social and environmental measures in addition to financial measures. Remuneration-based perform nce incentive schemes are often criticised for incentivising managers to take short- term decisions that benefit m n gers, but which may be harmful to the entity in the long-term. This is a risk where managers are measured mostly on financial measures (e.g. divisional profits) which may lead to managers optimising short-term monetary gains which may not be conducive to the long-term sustainability of the entity.

Measurement of performance and reporting against strategic objectives

The objective of strategic control, or measuring perfor ance, is to review the long-term indicators of achievement of the selected strategies. Performance measure ent is the process of measuring the proficiency with which a company succeeds in achieving its financial and non-financial objectives.

Examples of financial measures include –

- profit;
- return on capital employed (ROCE);
- costs;
- share price; and
- cash flow.

Non-financial measures are often more challenging to develop since measurement of these may be subjective (e.g. customer satisfaction) or it may be very costly to accumulate data for measurement (carbon footprint or water footprint for an entity). It has however become increasingly important to incorporate non-financial measures into performance management systems for entities to achieve long-term sustainability.

Objectives and performance targets should be linked to the strategy choices of the entity as well as the risks and opportunities faced by the entity. A practical example of a non-financial objective which relates to risks identified is where water scarcity is an external risk factor for a beverage manufacturer. In this case, a strategic choice of reduction of the amount of water per final product manufactured may be appropriate. This can be converted into an obj ctive of improving water utilisation efficiency during the manufacturing process by a certain percentage in a sp cifi d number of years, which in its turn can be measured by a KPI, such as litres of water consumed per litre beverage manufactured. This KPI can then be measured on an on-going basis to determine the progress of the entity towards the objectives set.

The following ext act was made from the website of SABMiller, a South African based brewery, which has identified water scarcity as a significant risk to the long-term viability of the entity:

> *'Water scarcity represents a potentially significant risk to parts of our business. Water is vital not only in the brewing pr cess but also in growing the crops used to make our beer and even in generating electricity to p wer ur breweries. We aim to use water as efficiently as possible and have set ourselves the demanding target of reducing our water use per hectolitre of lager by 25% between 2008 and 2015. During the la t year we used four litres of water to produce one litre of lager.'*

Examples of non-financial areas that an entity may select to assess, and measurable dimensions, which will be based on the strategy choices and objectives set, include:

Area assessed	Examples of measurable dimension
Production performance	l Set up times l Output per hour l Output per employee l Percentage downtime l Percentage of products requiring rework l Material yield percentage
Customer satisfaction	l Percentage of returning customers l Customer wait time l Number of complaints l Customer satisfaction indicator (customer survey)
Marketing effectiveness	l Trend in market share l Number of customers l Number of units sold
Personnel satisfaction	l Staff turnover l Number of days training attended l Days abs nt ism l Numb r of staff complaints

The selection of KPIs will vary from entity to entity, depending on the industry, objectives of the entity, and its ability to select appropriate and cost-effective measures that will enable the management of the entity to track the performance of the entity towards set long -term objectives. Communicating the KPIs throughout the entity and incorporating these into the performance measurement system is necessary for the entity to achieve its objectives. The most important KPIs of the entity, as well as the progress of the entity in achieving these, is also communicated to the stakeholders in the Integrated Report to enable stakeholders to assess whether the strategy choices of the entity, and the dimensions measured in its selected KPIs, sufficiently reflects the risks and opportunities faced by the entity, including social, environmental and economic matters. Although performance measurement may be considerably more challenging in non-profit entities and public sector enterprises, it is equally important in these entities. The lack of a predominant profit motive, complicated delivery chains and multiple stakeholders, unclear cause and effect relationships, as well as delayed impacts of achievements towards public sector objectives, often result in difficulty not only in identifying suitable measurable KPI's, but also in accurately measuring these. For example, it may be simple to measure the number of students that complete secondary schooling (school leaver output rates) however, to measure the relevance and applicability of the knowledge gained (outcomes of the schooling system) to be prepared to study in a university is far more challenging.

David Norton and Robert Kaplan's Balanced Scorecard (BSC) is an approach which attempts to ensure that an entity pays attention to all of the measures outlined above. It does so by considering four perspectives, namely –

the financial perspective (profit, returns etc.);

the c stomer perspective (customer satisfaction etc.);

the internal process perspective (systems, logistics, production processes etc.); and

the learning and growth perspective (leadership and human capital development).

Their e ential argument is that 'You can't manage what you can't measure and you can't measure what you can't de cribe'. Further, they stress that there are the so-called intangible factors (such as leadership and human capital development) which ultimately determine the tangible success measures of the firm (such as profitability and cashflow).

2.7 Risk and the business environment

Risk can be described as the potential to have a possible deviation from a planned outcome. The greater the magnitude of the possible deviation, the higher the risk. As entities operate in a world that does not remain static, uncertain future events that could potentially influence the achievement of the goals and objectives of an entity (negatively and/or positively) are a reality. Hence, any activity of the entity will to some degree expose the entity to consequential risks, and it is inevitable that risks flow from the pursuit of value creation for stakeholders. Risk may be incurred in order to gain a competitive advantage and to increase profits of the entity.

Risk management

Risk is inherent to the operating environment within any entity functions, since the outcome of events cannot always be predicted with accuracy, and a certain degree of uncertainty in the en ironment with regards to the future in respect of economy, markets, products, consumer trends, to name but a few, is inevitable. Furthermore, entities are exposed to risk arising from unexpected events such as fraud, errors, natural disasters, and accidents. The greater the degree of uncertainty, the greater the extent of the risk will be. Risk and uncertainty is therefore interrelated. This uncertainty is in respect f ***whether*** an outcome will occur, (the likelihood of the loss) and if it does, ***what the extent*** will be of the loss (impact of the loss), financial and otherwise.

Risk management essentially entails minimising the possibility that adverse or loss producing events will occur, as well as minimising the adverse effects, should the event occur. It also entails, measuring the impact that these events could have on the firm. This is done by a syst matic approach that aligns strategy, processes, people, technology and knowledge with the purpose of ass ssing, evaluating and managing the risks in order to create value for stakeholders. Risk management seeks to firstly control (prevent, mitigate or limit) unforeseen events, and secondly to address the financial consequences of these events (insurance cover, hedging, diversification).

Risk appetite

Entities may vary in the degree of risks that it is willing to accept in the pursuit of value. This degree of risk is referred to as *risk appetite.* An entity may have one of the following attitudes towards risk:

Risk averse describes an attitude towards risk that seeks to avoid risk.

Risk neutral describe an attitude towards risk that is balanced, in other words a moderate amount of risk is assumed by the entity.

Risk seeking describes an attitude towards risk that seeks risks.

The risk appetite of an entity will influence the operating style and decisions that are taken. To illustrate this, take the example of an ntity or project which bears a particularly high overall risk, and for which funding in the form of a loan is r quir d. A financial institution (Bank A) that has a higher risk appetite, might be willing to provide loan finan e to this entity or project, that Bank B, with a moderate or low risk appetite, will not be willing to provide, sin e the degree of credit or repayment risk that will be assumed for Bank B is not within acceptable levels given the lower risk appetite assumed by Bank B.

In Chapter 1 we consider the relationship between risk and return, and it is important to bear in mind that the entity sho ld only assume risk in any decision or activity if the degree of risk is commensurate with the expected ret rn. In other words, in the example, Bank A will charge a high interest rate on the loan since Bank A is exp sed to high repayment risk, this being compensation to Bank A for the high degree of risk assumed. Risk appetite for any entity is developed by the management of an entity, and is reviewed, overseen and appr ved by the Board of Directors. Risk appetite should also be well communicated throughout any entity through the stated strategies and objectives.

The ri k appetite of any entity will depend on the following factors:

Risk capacity, in other words the maximum risk that the entity can assume.

Risk culture, that is, the entities' overall approach to risk, including the shared attitudes, values and practices towards risk in the entity.

Risk management strategy

Risk management can be described as the management function aimed at protecting the entity and its assets against the consequences of risks by planning, coordinating and monitoring the risk to which the entity is exposed. The goals and objectives of risk management should be aligned with the mission, goals, and objectives of the entity. The key activities in the risk management process are:

Risk identification, by reviewing all information internal as well as external to the entity in order to identify potential events that may affect the achievement of the objectives of the entity.

Risk assessment, estimating the *impact* of these potential events on the entity in terms of financial and other losses, as well as estimating the *likelihood* that these potential events wi have on the entity.

Risk responses or *risk mitigation* by selecting and implementing me sures to modify risk by risk avoidance, reduction or transfer of risk to another entity.

The *risk management strategy* is the approach adopted for managing of risks and will be based on and supported by the objectives and strategies of the entity.

Residual risk is the risks that remain after taking into considerati n the effectiveness of the entities responses to risk.

The risk management goals and objectives must be aligned with the goals and objectives of the entity. These objectives should be set out in a documented *risk manage ent policy* that describes the aims and objectives of the risk management policy. The risk management policy assigns responsibility for performing key activities and accountability, determines risk authorities in the entity, sets li its and boundaries, as well as the reporting channels.

2.8 Governance principles relating to risk management

The board of directors (and the company's management) are accountable to the company and ***through*** the company to the shareholders who are the owners and suppliers of risk capital to the entity. The board of directors and management has the responsibility to achieve a key outcome of creating long-term sustainable wealth for the shareholders, with due regard to the interests of major stakeholders. This implies that a certain degree of risk will be assumed in the pursuit of the objectives of the entity. The key role-players in determining the risk appetite of the entity, and for giving the assurance that appropriate risk management processes are in place to mitigate and limit losses due to risks, are the board of directors, management, the audit committee as well as the internal audit function .

The King Code of Governance Principles for South Africa of 2009 (King III), sets out the governance principles relating to risk management. The code emphasises that risk management is inseparable from the strategic and business processes. Furthermore, in terms of the code, risks are viewed as an inevitable part of value creation, and the board of directors should mitigate its exposure to losses by responsible risk taking and well- defined risk strategies, which are align d with the objectives of the entity. The code furthermore sets out the obligations and the responsibiliti s of the board of directors, management and internal audit. Note that King III makes provision for certain specific responsibilities to be delegated to a risk committee of the board.
There are however a number that ***cannot*** be delegated. Figure 2.6 outlines a number of obligations and responsibilities of va ious role-players and the extent of overarching responsibility of the board.

Obligations and responsibilities:	Board of directors	Risk Committee	Manage-ment	Internal audit
Overall responsibility to oversee the risk management process	x			
Approval of risk appetite, risk philosophy, risk policy and risk bearing capacity	x			
Approval of key risk indicators for each risk as well as tolerance limits for key risks	x			
Performing risk assessments on an ongoing basis			x	
Approval of a documented risk management plan	x			
Approval of the disclosure reports to third parties	x			
Designing, implementing and monitoring the process of risks management and integration into the business activities of the entity	x		x	
Overseeing the IT strategy, governance and risk management	x	x		
Ensuring that key risks are quantified and responded to	x			
Monitor the risk management process	x	x		
Protection of the reputational risk of the entity	x			
Ensure that the risks relating to sustainability are suitably identified and reported upon	x	x		
Evaluate the register of risks, estimated cost of losses, changes to the risk profile and risk financing arrangements	x	x		
Ensure that the information technology (IT) is aligned with the business objectives	x	x		
Report on the effectiveness of risk management processes in terms of adequacy of risk identification	x			x
Report on the adequacy and effectiveness of risk management process in terms of adequacy and effectiveness of risk mitigation and residual risk assessment	x			x
Ensure that risk ass ssm nt, risk r ports and assurance on risks are r f rr d to r levant board committees	x	x		
Provide independent assu ance on the effectives of the risk management p ocess				x
Advise the Board regarding the effectiveness of risk management process including adequacy of the risk identification process				x

Figure 2.6: Resp nsibilities of the various role players in the governance of risk management

2.9 Risk identification

Risk identification can be described as the process of finding, recognising and describing various risks that the entity is exposed to. The risks identified at this point are *inherent risks*, which is the risk (and risks) exposure of the entity before control measures are taken into account.

Macro risks are major risks that may have a significant impact on the ability of the entity to achieve its goal (for example, the acute shortage nationally of skilled labour), whilst *micro risks* are sub-risks within the major risk classes (for example, the risk that the entity will not be able to recruit a suitable engineer or that the immigration authorities will not process the work permit in time for an expatriate with special skills needed in the entity).

It is unlikely that a single method will suffice to identify all risks, and the entity therefore relies on a variety of sources and methods that assess the external as well as the intern l environment during the process of identifying risks. This will include consultation with a wide variety of line managers within the entity in order to establish and identify potential risks. Potential sources of information and resultant warning signs or 'red flags' during the risk identification process include:

PESTLEGE analysis of all the Political, Economic, Social, Techn l gical, Legal, Ecological (environmental), Global and Ethical factors that could affect the entity.

SWOT analysis as discussed in section 2.4 above in order to evaluate the strengths, weaknesses, opportunities and threats.

Porter's Five Forces Model discussed in section 2.5.2 above to assist in identifying market risks relating to competitors and products.

Stakeholder engagement in respect of specific areas of concern and perceptions of stakeholders.

Techniques involving data collection and could include the survey of stakeholders by interview or questionnaire.

Benchmarking against similar entities in the same industry could be applied to risk management as management identifies the best risk management practices in their industry.

Organisational charts and flowcharts detailing the reporting structure and activities of various functions or business units within the entity.

Flowcharts of business processes which may identify consequential losses due to interruption risks, and highlight the interdependencies and interaction between various processes, suppliers, stages of production and customers.

Entity charts and flowcharts that indicate the processes/divisions of the entity and assist to identify human factor risks (for example too many reporting lines to a single manager, or inadequate skills to perform the required tasks) as well as indicate risk concentrations and dependencies (excessive reliance on a unit for strat gic support services).

Financial stat m nts and management accounts which may provide information on the sources of income as well as potential liabilities and how well the assets of the entity are utilised. Analysis of the financial statements is also useful in identifying asset values that are at risk, possible legal exposures or contractual liabilities (on the statement of financial position), and/or to indicate sources of income and losses (statement of profit or loss and other comprehensive income).

Physical inspection of assets, equipment, hazard and safety audits.

Results of quality control checks, inspections and audit findings will assist with the identification of risks that manifest in the 'price of non-conformance', for example cancelled orders.

Compliance audits of relevant legislation and regulations that apply to the entity provide information on ri ks relating to non-compliance, and quality assurance risks.

Se f-assessments completed by management. This is a tool to assess management's perception of perceived strengths, risks, weaknesses within the business processes and the adequacy and effectiveness of the external and internal controls designed to mitigate the risks and achieve business objectives.

'Diagnostics' is a term used in risk management to refer to methodologies measuring specific risk exposures.

Insurance reviews which identifies insured as well as uninsured risks.

2.10 Risk assessment and evaluation

Risk evaluation can be described as the quantification of the inherent risk and determination of its potential impact on the entity. This includes evaluating risks to determine the potential severity and the likelihood of risk events, as well as the adequacy of the risks control. The result of the evaluation is the *residual risk.* The purpose is to quantify the size of the various risks and their impact on the KPIs of the entity, such as profit, return on equity, as well as non-financial indicators.

Risks are analysed by considering two dimensions, namely the *likelihood* of the event occurring and its *impact* (potential damage or loss). This is used as a basis for determining how the risk shou d be managed on both an inherent (gross) and residual (net) basis.

- *Inherent risk* involves the assessment of risk before the application of ny risk responses. Risk responses can include the introduction of internal controls, the transfer of the risk or m n gement responses.

  Residual risk involves the assessment of risk after taking into account the application of any controls, transfer or management responses to reduce the risk.

The residual risk rating will indicate whether the remaining risk is within the entity's risk appetite. Risk responses are discussed below. The process to assess risks thr ugh the likelihood or impact matrix is called *risk mapping*.

2.11 Risk responses

Risk responses can be described as the actions tak n by an entity to limit, reduce or illuminate the consequences from risk events. The response to each risk will vary depending on various factors, such as the risk and return relationship, the cost to transfer the risk (e.g. by hedging the risk) versus the potential risk exposure, and the expected cost of risk control measures compared to the benefits. An entity may accept potential risks that have an insignificant financial impact, such as minor inventory losses due to inventory becoming obsolete, or employee theft, but may choose to insure the entity (transfer of the financial consequences of the risk) against risks events with a significant impact, such as natural disasters.

2.11.1 Risk avoidance

This response is to illuminate or highlight activities that lead to the risk exposure and then avoid them. This is however often not possible, since risk is an inherent part of business and creating value. An example is an entity that is exposed to currency fluctuations due to international trade. By buying forward on certain transactions, the risk of the currency value moving against the entity can be avoided.

2.11.2 Risk acceptance

This response is wh re the xp cted return compensates for the expected risk. This is also referred to as *risk retention,* and this ntails making provision in the form of an accounting provision or reserve for acceptable losses.

2.11.3 Risk mitigation

Risk mitigation also accepts the risk, but every attempt is made to minimise its impact. *Risk mitigation* is the process of selecting and implementing measures to modify risk (avoidance, risk reduction and risk transfer). Risk mitigati n c mprises of two aspects:

Risk c ntr l is the design and implementation of a risk management programme which aims to reduce the magnitude as well as the frequency of the potential loss, as well as dealing and recovering from loss-producing occurrences.

Risk financing aspects have the objective of ensuring that the cost of risk management does not exceed the benefits. Risk financing ensures that provision is made for acceptable losses encountered in the operations of the entity, as well as for the cost of control measures aimed at loss mitigation.

Examples of risk financing are the cost of insurance premiums to insure the entity against the financial losses of a risk, the cost of potential uninsured losses, the cost of risk control and risk prevention systems, as well as administrative costs relating to the above. It remains an overriding principle that the cost of any control measure or insurance premium should be weighed up against the expected benefit derived from such cost. The

long-term cost of the cost of risk to an entity should therefore be optimised, which means minimising both the cost of risk and the level of risk that the entity is exposed to.

Risk control and risk financing should both be undertaken within the broader corporate financial objectives and constraints.

2.12 Monitoring and reporting on risks

Risk monitoring entails a continual evaluation of the business operations to ensure the adequacy of the control measures and the identification of new risk exposures to the entity.

The *risk register* contains a summary of identified risks, which are listed, described and assessed (measured), based on their potential impact and likelihood.

Risk reporting involves the collating of relative information and producing risk reports for management. The general principles that apply in respect of any reporting in the entity, also apply in respect of risk reports. These principles applied to the information content of the reports are rele ance, accuracy, and timelines and should include all the information required for managers to base their decisi ns n in respect of the risk management process.

2.13 Enterprise risk management (ERM)

The corporate governance principles contained in King III require that risk management be integrated in the management processes of the entity, since risk is inh r nt to the value creating process. ERM aims to fully link or embed risk management into core business process s and structures of an entity instead of risk management functioning as a standalone function within the entity.

The Committee of Sponsoring Organisations of the Treadway Commission (COSO) describes ERM in its Enterprise Risk Management Framework (2004) as a process, effected by an entity's board of directors, management, and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within the risk appetite, to provide reasonable assurance regarding the achievement of the entities objectives.

The framework comprises eight interrelated activities and components:

Activity	Components
Internal environment	l isk appetite and the entity's view on risk l Values of the entity including integrity, ethical values, attitudes towards risk
Objective setting	l Set objectives aligned with the entity's mission l Align objectives with the risk appetite
Event identification	l Identify external and internal events that can affect achievement of the entity's objectives l Identify risks as well as opportunities
Risk assessment	l Analyse risks, considering likelihood as well as impact l Assess risks on an inherent as well as on a residual basis
Risk response	l Develop a set of responses (avoiding reducing, transfer) l Ensure that actions/responses align with the entity's risk tolerances and risk appetite
C ntr l activities	l Establish and implement policies and procedures to ensure the risk responses are implemented
Information and communication	l Identify relevant information and communicate and report to and from various responsible persons
Monitoring	l Monitor ERM on an ongoing basis and continually evaluate the adequacy of the risk management process of the entity

An ERM approach to risk management can be implemented in any entity over a period of time by initially focusing on the strategic risks that are deemed critical to the entity achieving its objectives, and then expanding the focus with time to encompass a fully integrated and comprehensive ERM process within the entity.

Practice questions

Question 2–1: Developing a corporate strategy *(Intermediate)*

Required:

Discuss the main issues which need to be addressed in developing a corporate strategy for the following:

a bank

a building society

a college

a national charity

a retail store

a local authority.

Source: CIMA study text 2008

Solution:

Developing a corporate strategy

All entities need to plan. Strategic planning is the proc ss th y use to select goals and determine how to achieve them. A **corporate strategy** is a plan for the future of the entity.

Developing a corporate strategy involves top management taking a view of the entity, and the future that it is likely to encounter, and then attempting to organise the **structure and resources** of the entity accordingly. Policies must be formulated and a set of medium- /long-term plans (probably 2–5 years ahead) developed.

The **issues** that need to be addressed and questions to be asked are:

What is our business and what should it be?

Who are our customers and who should they be?

Where are we heading?

What major competitive advantages do we enjoy?

In what areas of competence do we excel?

Developing the strategy involves a process of **strategic planning**. The plan must embrace strategies covering funding, markets, products, technology and resources.

Developing a corporate strat gy mbraces the following:

Setting the orporate/strategic objectives which need to be expressed in quantitative terms with any constraints identified.

From (**a**), establishing the corporate performance required.

Internal appraisal, by means of assessing the entity's current state in terms of resources and performance (SWOT analysis).

(d) External appraisal, by means of a survey and analysis of the entity's environment, including the c mpetitive environment.

Forecasting future performance based on the information obtained from (**c**) and (**d**) initially as purely pa ive extrapolations into the future of past and current achievements.

Analysing the gap between the results of (**b**) and (**e**). This is referred to as **gap analysis**.

Identifying and evaluating various strategies to reduce this performance gap in order to meet strategic objectives.

Choosing between alternative strategies.

Preparing the final corporate plan, with divisions between short-term and long-term as appropriate, and selection of appropriate KPIs for on-going measurement and reporting.

Evaluating actual performance against the corporate plan.

Senior managers must be actively involved in developing the corporate strategy. This should create a unified direction and guide the deployment of resources.

A bank

The prime corporate objective of a bank will be financial (growth in profits). Banks are expected to uphold a high standard of ethical behaviour towards customers.

Clearing banks are very sizable, and so the problems of creating an effective, co-ordin ted planning process are complex and large. It is difficult to involve all the local branch managers in the corpor te planning process, and so getting the commitment of branch managers to the bank's objectives may also be difficult.

Clearing banks are traditionally fairly staid and bureaucratic, but they ha e been faced with rapid changes in recent years, and this is likely to continue in the future.

Examples of change include:

New technology – home banking, cell phone banking and internet services.

Changes in the law – banks can provide more financial services, but so too can building societies. Opportunities must be actively sought. A defensive corporate strategy of reacting to competition will prove to be ineffective.

Changes in the economy – for example, future bank l nding will be dependent to some extent on future interest rates. Environmental analysis is required.

Regulatory changes, for example latest Basel III capital adequacy requirements and the influence of applying the equator principles on the business model and future profitability.

Innovative thinking is essential for banks to maintain their status in financial markets.

A building society

Note ***Building societies do not exist in South Africa anymore. However, the main commercial banks have assumed this role.***

The principal purposes of building societies are to raise funds, primarily from their members, to make advances to members secured upon land and buildings for their residential use.

Objectives to be met are:

Protection of the investments of its shareholders and depositors.

Promoting and s curing financial stability.

Competing successfully with banks, insurance companies, estate agents and other building societies.

A corporate strategy must over the change in the law and the widening of both the range of services to be offered and the activities of competitors.

A college

The prime objective of a college should be to provide education. In the corporate planning process, the college sh uld give th ught to the following issues:

H w much and what sort of education should it provide?

To whom should it offer education?

What tandard of education should it provide?

Who is the customer – student, employer or government?

A loc l college of education, for example, could offer a wide range of courses. It will need funding.

How much finance will it need – say for new buildings, equipment, etc.?

How much funding does it expect to receive? What constraints will be attached?

Can it supplement funding from the government with donations and grants from private companies?

Further information needed by a college is:

What will be the likely size and pattern of demand for education by students?

What will be the demand for qualified students by employers?

How will students want to study – part time, full time, by distance learning?

Will rival colleges or universities offer similar courses of a better standard?

How fast is the rate of change in demand for education, and how is this demand changing?

A private college will supply educational services and fix fees to meet market demand. Its strategy may be to earn an acceptable return on capital.

A national charity

The purpose and values of a national charity will largely be social and ethical (i.e. values based). Emphasis will be placed on developing a strategy covering the following:

The type and quality of service provision.

Identifying worthwhile outlets for funds.

Identifying potential sources of funds and developing fund raising activities.

Arguing the case for political and social change to achieve the objectives of the charity.

Attracting managers, employees and unpaid helpers who hold the same values as the charity's patrons, sponsors and staff.

Generating good morale amongst the workforce.

A retail store

The strategic aim is to sell a wide range of merchandise to individuals. To be able to do this a retail store should aim to –

increase turnover and volume of sales, in total and per area of selling space;

control costs and stocks;

earn a return on capital;

predict what is going on in the market place – identify changes, growth in mail-order business, falling market share;

develop a profile of what competitors are doing and selling. Undertake market research and collect sales intelligence;

decide on price, products and sales promotions.

A local authority

The prime obje tive should be to provide services to meet needs. The authority must consider the following:

The range and quality of services to be provided (some will be mandatory and others discretionary).

How much finance will be needed to meet expenditure?

How m ch f nding will it receive, or should it raise from government grants, community charges and direct charges to service users?

The auth rity must develop a corporate strategy within a framework of political, legal, social and financial constraints. It must plan to provide cost-effective services whilst taking account of conflicting objectives.

Environmental appraisal is a crucial element in developing a strategy. Key factors include the following:

Government policies, inflation and interest rates.

Media and public opinion.

Size/composition of the labour market.

Likely demand for services of different types.

Potential sources of finance.

Question 2–2: Corporate strategy practical application (*Foundation*)

Value and growth over the longer term is often measured by the growth in share price of an entity. It is inevitable that corporate strategy, which essentially maps the future direction of the entity, will have a direct bearing on both the growth and value of the entity, if measured by changes to the share price over a period of time. Although many factors may influence share prices at any given point in time, the success of the corporate strategy over the medium and long term is likely to be the key factor in creating and sustaining shareholder value.

The following three real South African scenarios of listed companies are described below. Carefully consider the facts and circumstances in each case presented.

Case 1 – Woolworths Ltd

The market capitalisation of Woolworths during 2004 was R6 billion. A dec de l ter this amounts to R51 billion, this decade including a time at which the South African economy was hard hit by the global recession. Traditionally Woolworths is an established brand in the wealthier consumer food market. Surprisingly, the success of the company in the past decade has been due to a strategy to expand its customer base to include the lower end of the market, without losing market share in the wealthier consumer market. This strategy of having polarised target markets appears contradictory, but the unique S uth African consumer base and the company's understanding and of the dynamics that drive consu er spending in the South African economy has been a key factor in driving this success. Firstly, South Africa has a large growing middle class, and Woolworths as a brand is viewed as an aspirational brand. By using aggressive weekly store promotions of basic food products at prices which are often lower than the prices offered by Shoprite, Pick and Pay and Spar, Woolworths have succeeded in expanded their custom r base to the aspiring lower and middle end of the consumer market, without compromising on their xisting customer base, the latter which buy the luxury product offering in store.

Case 2 – FirstRand Ltd

A comparison of share price growth across the well- established South African banks (Absa, FirstRand, Nedbank and Standard Bank) for the 10 years 2004 to 2014 reveals increases ranging from 116% (Nedbank R81,90 to R177,10) to 410% (R5,90 to R30,14) in the case of FirstRand Ltd. FirstRand achieved this remarkable growth by the strategy of technological innovation, driven by the CEO of First National Bank (FNB). FNB pioneered the first internet-based commercial bank in South Africa. They also pioneered the first virtual currency rewards programme by a bank, eBucks, which, at the time, was considered a revolutionary idea and was soon followed by similar programmes by competitors. FNB also became the largest vendor of iPads and iPhones in the country through smart device offering to their banking clients. The latest advances include being the first South African bank to launch a banking application ("app"), the first bank in South Africa to facilitate incoming foreign currency through the PayPal portal. FNB was also crowned the most innovative bank in the world at the 2012 Global Banking Innovation Awards.

Case 3 – Investec Ltd

Investec, the South African sp cialist bank and asset manager listed on both the JSE as well as the London Stock Exchange, had a share pri e of R104 in 2004. A decade later, the same share is trading for substantially less at R77. The company has been following a strategy for the past 20 years of aggressively growing the business by investing substantial capital into new business acquisitions, many of them outside of South Africa. This strategy was aimed at g owing the international business, of which several of these acquisitions subsequently proved to be business fail res; in many instances as a result of the unforeseen often volatile international economy and global economic crisis of the past decade.

Required:

Identify and briefly explain for each of the three cases:

The strategy employed by the company;

The impact on the value of the company as a result of the chosen strategy; and

The reasons why you consider the strategy to have succeeded or failed.

Solution 2-2:

Case 1 – Woolworths Ltd

The company employed a *competitive strategy*, specifically a *focus strategy*, by aiming to concentrate on a specific segment of the market, which can be achieved by aiming to be a cost leader for a chosen segment or aiming to pursue differentiation for a chosen segment. In this case the company targeted both the lower end of the market by aiming to be the cost leader for certain basic foodstuffs, whilst simultaneously offering unique (differentiated) luxury food items for the upper end of the market.

The market capitalisation of Woolworths Ltd during 2004 was R6 billion. A decade later this amounts to R51 billion, representing a 23,86% annual growth in the share price.

The success of the strategy is a result of the company underst nding the dynamics of a divided and unequal society in South Africa and understanding the corresponding divergent consumer needs. Although many other factors may influence the share price, over the long term, the success of this unique corporate strategy which is aimed at two specific segments of the market, is clearly reflected in the growth in market capitalisation and share price.

Case 2 – FirstRand Ltd

This is an example of a *competitive strategy*, namely a *differentiation strategy*, in other words a strategy of gaining market share by providing a unique product or service by the company's unique technology offerings (eBucks, PayPal, internet banking, smart device offerings, banking "app").

The share price increased from R5,90 to R30,14 ov r a 10 year period. This represents an increase (growth) of 17,71% p.a. in the share price.

The success of the strategy is a result of the company strategy of encouraging and fostering technology innovation. Although many other factors may influence the share price, over the long term, the success of this unique corporate strategy is evident in the remarkable corresponding increase in the share price of the company, when compared to those of competitors (other banks) in the same industry.

Case 3 – Investec Ltd

This is an example of a *growth strategy*, specifically a*n acquisition strategy*, which is aimed at growing the business by acquiring interests in other established businesses.

(b) The share price decreased from 104 to R77 over a 10 year period. This represents negative growth of 2,96% p.a. in the value of the shares.

The strategy of utilising acquisitions to grow the business was not successful in this case. Although many other factors may influence the share price, over the long term, the success of this strategy of aggressively acquiring high risk businesses which frequently turned out to be subsequent business failures, has r sult d in a declining share price as well as a likely loss of reputation for the entity as an investment option for long term investors. Some of the less successful acquisition decisions were often followed by business failures of these acquisitions, amplified by the unexpected volatile international economy and global e onomic crisis of the past decade.

Question 2–3: P oduct market strategy (*Intermediate*)

Source: CIMA study text 2008

It has been stated that an industry or a market segment within an industry goes through **four basic phases of development**. These four phases – introduction, growth, maturity and decline – each has an implication for an organisati n's development of growth and divestment strategies.

The f ll wing brief profiles relate to four commercial organisations, each of which operates in different indu tries.

Company A. Established in the last year and manufactures state-of-the-art door locks which replace the need for a key with computer image recognition of fingerprint patterns.

Company B. A biotechnological product manufacturer established for three years and engaged in the rapidly expanding animal feedstuffs market.

Company C. A confectionery manufacturer, which has been established for many years and is now experiencing low sales growth but high market share in a long-established industry.

Company D. A retailing organisation which has been very profitable but is now experiencing a loss of market share with a consequent overall reduction in turnover.

Required:

Explain:

The concept of the industry life cycle, and

The phase of development in which each of the industries served by the four companies is positioned.

Discuss how the firms may apply Ansoff's product market growth vector matrix to develop their growth and divestment strategies.

Solution 2-3:

Product market strategy

1 (a) Industries follow a similar pattern to the life cycle of pr ducts f introduction, growth, maturity and decline, as follows:

Introduction

A new industry product takes time to find acceptance by would-be purchasers and there is a slow growth in sales. Unit costs are high because of low output and expensive sales promotion. There may be early teething troubles with technology. The industry for the time-being is a making a loss.

Growth

During this stage:

With market acceptance, sales will eventually rise more sharply, and profits will rise.

Competitors are attracted. As sales and production rise, unit costs fall.

Maturity

During this stage:

The rate of sales growth slows down and the industry reaches a period of maturity, which is probably the longest period of a successful industry's life.

Innovation may have slowed down by this stage.

Most products on the market will be at the mature stage of their life. Profits are good.

Decline

During this stage:

Sales will b gin to d cline so that there is over-capacity of production in the industry.

Severe ompetition occurs, profits fall and some producers leave the market.

The emaining producers seek means of prolonging product life by modification and searching for new ma ket segments.

Many producers are reluctant to leave the market, although some inevitably do because of market fragmentation and falling profits.

The industries in which each of the companies appears to be operating are as follows:

C mpany A. This company is operating in the introductory phase of what is a very new innovation, but this innovation is located within a very old industry.

Company B. This company is positioned in a rapidly expanding and relatively young industry, experiencing a growth phase.

Company C. This company is in a mature industry, as witnessed by the low growth but high market share. Profits are likely to be good.

Company D. While the retailing industry itself is not in decline, this company appears to be, as it is losing ground to competitors in what is a highly competitive industry. The competitors may be larger companies and able to compete more effectively on marketing mix issues such as price.

Ansoff drew up a **growth vector matrix**, describing a combination of a firm's activities in current and new markets, with existing and new products. The matrix can be represented diagrammatically as follows.

		Product	
		Present	**New**
Market	**Present**	Market penetration; (for growth) or consolidation (to maintain position) or withdrawal	Product development
	New	Market development	Diversification

Company A

Company A is involved with launching a very **innovative** product to revolutionise an existing market (home security). Such product development forces comp titors to innovate and may provide initial barriers to entry, with newcomers to the industry being discouraged. This will give Company A the chance to build up rapid **market penetration**, but as competitors enter the market, it must make sure that it keeps household and commercial customers interested via constant innovation. The drawback to this is the related **expense and risk.** Company A must also make sure that it has enough resources to satisfy demand so that competitors cannot poach market share.

Product improvements will be necessary to sustain the market, so Company A must make sure that enough resources are given to **research and development** of new technologies (and hence new products) in its field, as well as to maintaining sufficient production capacity to satisfy current demand.

Company B

Company B is engaged in a rapidly expanding market that is likely to attract many **competitors** keen for their own share of the market and profits. The growth strategy is limited to the current agricultural market, so referring to the Ansoff matrix above, the company is going to be mainly concerned with **market penetration and product development**, with an emphasis on the latter to make life more difficult for new competitors. By investing in product d v lopm nt, the company will see a necessary expansion in its R&D facility. To keep the new products and the company itself in the public eye, it may need to invest more in **marketing and promotion**.

With **market penet ation**, the company will aim to achieve the following:

Maintain or inc ease its **share** of the current market with its current products, for example through competitive pricing, advertising, sales promotion and quality control.

Sec re **dominance** of the market and drive out competitors.

Increase **usage by existing and new customers**. The customer base is likely to be expanding.

Company C

Company C is in the mature phase of its life cycle. As the current market is mature, the company can achieve growth via the investigation of **new markets** . Referring to the Ansoff matrix, this means pursuing a strategy of **m rket development**. Seeing as the current market is mature, with satisfied customers and little innovation, there is small scope for market development, unless it is via short-term aggressive tactics such as cuts in prices.

Selling current products to new markets is likely to be more successful, and may include one or more of the following strategies.

1 New **geographical areas** and export markets.

Different package sizes for food and other domestic items.

New distribution channels to attract new customers.

Differential pricing policies to attract different types of customer and create new market segments.

Mass marketing techniques that encourage customers to switch brands.

The company may also investigate the possibility of developing **new products** to make up for those that are in the **decline phase** of the life cycle. This may lead to the creation of more **cash cows**.

Company D

Company D is in a difficult position, with a weak position in a well-est blished m rket. It needs to undertake some rigorous **analysis of costs**. A strategy of **divestment** may be advised to en ble it to reduce costs and concentrate on more profitable areas of activity. **Resource limitations** me n th t less profitable outlets or products may have to be abandoned. This could involve analysis of indi idual contributions, perhaps using **direct product profitability** techniques.

The market has become less attractive and Company D needs to assess its image and profitability. It is likely that customers have become more discerning on price, as has happened in the UK retailing sector in the past few years. When some product areas have been divested, the co pany may find that it has the **resources** to pursue strategies of **market penetration** for some products and **new product development** to improve its image with customers.

A strategy of **total withdrawal**, and **diversification** into wholly new industries, is not seen as appropriate for any of the companies described in the question. It could not be r commended because of the attendant **risks**.

Company D needs to be careful, and it is facing the most difficult situation of all the companies that have been discussed. It is one thing to eliminate unprofitable products but will there be sufficient growth potential among the products that remain in the product range?

In addition, new products require some initial **capital expenditure**. Retained profits are by far the most significant source of new funds for companies. A company investing in the medium- to long -term which does not have enough **current income from existing products** will go into liquidation, in spite of its future prospects.

Question 2–4: Measurement of performance and reporting against strategic objectives (*Intermediate*)

Healthlife Ltd recently established a large private hospital facility in Gauteng. The CEO, Dr Khumalo, has requested your assistance in establishing and suggesting suitable performance measures at the hospital. Four key performance areas, as well as the objectives for each performance area have been identified by the board of directors.

Required:

Suggest key performan e indicators (KPI's) for the following performance areas and objectives:

Performance a ea	**Objectives identified**
Financial	Generate sufficient return on investment/assets
Customer	Maintain competitive position
	Maintain high levels of service
	Create new mechanisms and new products
	Knowledge and improvement of customer satisfaction
Internal processes	Maintenance of high levels of productivity
	Development of appropriate protocols and procedures
Le rning and growth	Personnel training
	Satisfied and motivated personnel

Solution 2-4:

Performance area	Objectives	Measure	Key Performance Indicators *(Targets should be established for each KPI)*
Financial	Generate sufficient return on investment/assets	Net income in relation to total equity employed	Target percentage: – return on equity – return on net assets
Customer	Maintain competitive position	Occupancy rate	Target bed occupancy rate
	Maintain high levels of service	Satisfaction of discharged patients with service and costs	T rget customer satisfaction index
	Create new mechanisms: products	Number of new pr ducts offered	Target number of new products ffered per year
	Knowledge and improvement of customer satisfaction	Number of custo ers surveyed	Target percentage survey coverage
Internal processes	Maintenance of productivity	Ratio of personnel to duration of hospital stay	Target ratio of staff to patients
	Development of protocols and procedures	New protocols and procedures developed and implemented	Target number of new protocols and procedures developed and implemented per year
Learning and growth	Personnel trained	Number of persons trained per year	Target number of persons trained per year
	Satisfied and motivated personnel	Number of persons evaluated and employee satisfaction index	Target number of persons evaluated Target employee satisfaction index

Question 2–5: Development of performance measures for a service delivery programme (*Intermediate*)

The Comprehensive Plan for Sustainable Human Settlement (CPSHS) of in South Africa introduced a variety of programmes which provide poor South African households access to adequate housing. The policy principles aim to provide poor households with houses as well as basic services such as potable water and sanitation on an equitable basis, within the constraints of limited available government resources. The overall objective of the CPSHS is describ d as providing proper housing structures to communities in the next five years. Service standards are often utilised in the public sector to measure performance, outcomes and outputs of a specific service delivery programme or directorate. These service standards may also be benchmarked to comparable programmes in other pa ts of the country or internationally.

Required:

S ggest meas res for the Department of Human Settlements to determine the service standards for the CPSHS pr gramme under the following headings:

C st f services;

Quality of services; Quantity of

services; and

Client satisfaction.

Explain the factors that should be taken into account when developing service standards for the CPSHS.

Solution 2-5:

Aspects of Service Delivery	**Suggested Indicators**
Costing of Services	l Cost per household of benefits supplied under the housing scheme.
	l Cost of processing each application.
Quality of Services	l Availability of applications in the eleven official languages.
	l Average waiting period from lodge of application to allocation of benefits.
	l % of target population not receiving the service
	l % of population qualifying for low-cost housing that has lodged an application, or that has received the benefits under the scheme.
	l Number of locations where applications can be made.
Quantity of Services	l Number of applicati ns pr cessed.
	l Number of households that received benefits under the scheme.
	l % of qualifying households that have received benefits under the scheme.
Client satisfaction	**Extent to which:**
	Applicants und rstood the working of the scheme, (procedures for application, r quir m nts, and benefits).
	Expectations created were satisfied in terms of: – Waiting period for process of duplication; – Actual benefits received
	Staff were helpful and friendly
	Assistance was granted to illiterate applicants to successfully lodge an application and receive benefits.

Important factors to be taken into account when developing service standards:

Knowing your clients, services and service

partners This entails identifying the following:

Clients – Who are the clients we service?

Service – What are the range of services provided?

Who are our partners – This may be other departments, private sector or other levels of governm nt. R cognising partners means recognising that partners in turn, must understand what is required of them and who is accountable.

How a e we doing now? In order to set service standards, it is important that the organisation's ability to meet expectations is known. This may be determined by conducting customer surveys to recipients of CPSHS benefits.

What do services cost? Cost information provides an essential component in the decision making pr cess and will aid in setting service standards that relate both to high quality, and to cost efficiency of delivery the service.

2 Consult with clients and staff

The following questions may be asked:

Clients – What are the most important features of the CPSHS service provided?
– Where can improvement initiatives be focused?
– What is working well?

Staff – Staff have the best knowledge of customer expectations, systems and procedures, and procedures, and it is paramount that staff are involved with the process from the start.

3 Empower and train service providers

To be effective service providers, staff need the authority and ability to make decisions that matter to clients. Staff need to be properly equipped and trained to be able to make necessary decisions.

Communicate Service Standards and Report and Performance

For the public to fairly assess the CPSHS service that the government provides, they must be familiar with the service standards it has set. Consequently, communicating its CPSHS service standards by means of brochures, websites, billboards and other methods of communication to the public is an important step in the evaluation process, as it provides for the mechanism to ensure non-compliance to standards is reported. CPSHS service standards should be well pub icised before service delivery, and must be clear and easy to understand. The procedure for the pub ic to follow in the event of service standards not being met must also be communicated nd publicised. A public service that is responsive and client focused must provide an easy, clear nd effective way for the public to complain.

Manage the Organisation Based Service Standard

Service standard should form an integral part of the management and evaluation process, and a culture of continuous improvement must become the n rm. Setting client driven standards and measuring how well an organisation is doing against the , is a continuous process which will lead to higher service standards. Ideally, managers should be held accountable for their specific area of control and this should be linked to the organisational service standards. However, this is challenging in the public sector environment where co plicated delivery chains and multiple stakeholders, unclear cause and effect relationships as w ll as d layed impacts of achievements towards public sector objectives often result in difficulty not only in identifying suitable measurable KPI's (in this instance service standards), but also in accurately measuring these.

Question 2-6: Identifying risks and evaluating business models and strategy (*Advanced*)

Source: SAICA Qualifying Examination Part II 2014: Adapted

Cheslin Transport Ltd ('Cheslin') is a company listed in the industrial transportation sector on the Johannesburg Securities Exchange (JSE). The company provides a range of logistical services to customers in Southern Africa, including the following:

Distribution and transportation of third party goods;

Clearing, forwarding and warehousing of third party goods; and

Vehicle renting and leasing.

Poor economic conditions and increased competition in the markets in which the company operates have resulted in subdued earnings growth for Cheslin over the past three years. The board of directors of Cheslin has been considering various alt rnatives over the past two years to diversify operations and to increase earnings growth. The most promising growth opportunity identified is a start-up operation involved in the rental tuk-tuks for the purpose of transporting passengers.

A tuk-tuk is a spe ial onstructed motor tricycle, which can transport two or three passengers and a limited amount of their luggage. Tuk-tuks have three wheels and can reach a maximum speed of 70 km per hour, although the maxim m recommended speed for urban areas is 45 km per hour. These vehicles are ideal for transporting paying c stomers over short distances (between two and eight km) in cities – for example from their homes to resta rants or form transport hubs (train stations and bus deports) to their homes.

Sh rt Haul Transport (Pty) Ltd

Che lin has incorporated a wholly- owned subsidiary called Short Haul Transport (Pty) Ltd ('SHT'). SHT is current y dormant but will be used to carry out the new business venture if it is approved by the board of directors of Cheslin.

There are numerous tuk- tuk operations in Johannesburg, Cape Town and Durban and these are generally owned by individuals who have fleets, ranging between two and 20 tuk-tuks. Currently the demand for the taxi service provided by tuk-tuks exceeds the supply in these cities. According to recent market research, customers opt for tuk-tuks services because of their lower fares and the novelty of travelling in a three-wheel vehicle. The market research also revealed that the taxi fare charged by a conventional taxi (four-wheel sedan) is R15 per km in Johannesburg while tuk-tuks charge an average fare of R5 per km.

SHT will not provide tuk-tuks taxi services directly to the public but instead will rent tuk-tuks to licensed taxi drivers on a daily basis. The board of directors of Cheslin is interested in the opportunity for various reasons:

It will leverage existing infrastructure as Cheslin currently rents out commercial passenger vehicles, light delivery, light delivery vehicles (1-8 tons) and refrigerated trucks to include tuk-tuks, is within the group's expertise.

The tuk-tuks rental operation could add significantly to the group's profitability.

There is an opportunity to become the first major transport group to expand into this sector. Cheslin could have the first mover advantage and dominate the industry. Other transport groups are likely to pursue this opportunity if Cheslin does not rapidly move into this high growth industry.

Financial viability of SHT

The chief financial officer (CFO) of Cheslin, Ms Laura Brown, has prepared det iled business plan for SHT. The new company will not conduct any other business apart from renting out tuk-tuks. Ms Brown proposed that the new business venture be housed in a separate company, so as to limit Cheslin's exposure should there be any public liability claims: for example, the risk that passengers injured in an accident involving a tuk-tuk could claim damages from Cheslin or its insurers.

SHT is to rent out tuk-tuks to taxi drivers on a daily basis. SHT is in the process of finalizing an agreement with Baobab Ltd ('Baobab'), a major financial services group in South Africa, to place Baobab's logo and advertisements on the exterior of SHT's tuk-tuks (i.e. 'brand' the tuk-tuks). Baobab is very excited about the opportunity, as it will give their group enormous mobile exposure in Johannesburg, Cape Town and Durban. The cost of advertisements on tuk-tuks is also much more affordable than outdoor, radio and television advertisements.

SHT is planning to place Baobab's advertisement on 240 tuk- tuks at the start of year 1 and on a further 160 tuk-tuks at the start of year 2. Since these advertising rates are slightly higher than market rates, SHT has agreed not to allow any other company (except for the Cheslin group itself) to place advertisements on their tuk-tuks.

Cheslin will be responsible for providing all finance, administration, human resources, marketing and managerial services to SHT. The CFO of Cheslin is of the opinion that Cheslin should make a reasonable return on the services it provides. Furthermore, the managers of Cheslin would be prejudiced in their performance evaluations if Cheslin did not make a profit on the services it provides.

SHT is to outsource the call centre operations to Skyworks Ltd ('Skyworks'), an independent provider. Skyworks's call centre agents will answer all incoming calls on behalf of SHT and route requests for taxi services to the closest tuk-tuks driver. Skyworks will, at its cost, install a global positioning system (GPS) in each tuk-tuk to enable call centre agents to track and identity the closest tuk-tuks to the customer. Skyworks will charge a fixed annual fee to SHT based on the number of dedicated call centre agents who answer SHT's incoming calls and refer taxi service requests. These fees are designated as 'call centre costs' in the financial forecasts above.

The tuk-tuks branding costs represent the cost to Cheslin of designing and printing its own advertising material for placement on the tuk-tuks. Baobab will pay for the development of its own advertisements and affixing them to the tuk-tuks. SHT will be responsible for licensing each tuk-tuk and renewing such licenses annually.
Tuk-tuk taxi drivers will be r quired to pay rental fees due to SHT in advance on a daily basis. Taxi drivers will be responsible for petrol used by tuk-tuks.

Alternative business model

The board of directors has asked the CFO to investigate the feasibility of an alternative business model. The changes s ggested are as follows:

Introduction of an exclusive membership scheme whereby only members thereof will be transported in SHT's tuk-tuks:

- Members of the public will be offered the opportunity to become members of the scheme;
- Members will pay monthly fees upfront for travelling up to a maximum number of kilometers;
- Members will pay additional amounts if they exceed the maximum number of kilometers purchased on a monthly basis; and
- Members will be entitled to cancel the contract by providing six months' written notice.

SHT will own and operate a tuk-tuk taxi service as opposed to renting out tuk-tuks to licensed taxi drivers. It would then have to employ tuk-tuk taxi drivers to ensure a reliable service for its members. Should SHT introduce the above proposals, this would entail a fundamental change to the way it intends to operate.

Press article – Tuk-tuks

The board of directors of Cheslin noted an article published recently in a leading financial magazine in South Africa which *inter alia* stated the following:

> *'…… the big question is whether the tuk-tuk industry is sustainable. Tuk- tuks are a global phenomenon and can be profitable if they stick to niche markets. However, tuk -tuks suffer from limited capacity (they can only transport two or three passengers at a time) and, hence, struggle to generate the returns of mini-buses, which can cram in 20 to 25 passengers. Furthermore, if mini-buses perceive tuk-tuks to be a threat to their livelihood, it could lead to outbreaks of violence …..'*

Required:

Assuming that the original business model of renting out tuk-tuks is to be pursued,

identify and explain the key business risks to which SHT will be exposed; and

critically discuss the strategy of Cheslin to enter the tuk-tuks market.

Identify and discuss the merits and challenges, from the perspective f SHT, of offering a membership-based service to passengers who make use of the tuk-tuks taxi service.

Solution 2-6:

1 (i) Introduction

Any new venture or change to an existing busin ss will have resulting changes to the risks that the business is exposed to. These risks will have to be w ighed up against the resulting expected increase in revenue. The key business risks to be considered are as follows:

Increased government regulations on passenger transport and safety regulations of tuk-tuks specifically could render the venture unprofitable.

Financial forecasts could prove to be inaccurate or incomplete (for example, the demand for services may be over-estimated, or costs could be underestimated).

Increased competition or new entrants to the market could make the venture unprofitable.

There is an increased financial risk associated with obtaining additional loan finance. Interest rate risk is also a factor to bear in mind especially in an inflationary economy such as the South African economy.

Dependency exists on the advertising revenues to make the business model sustainable. This increases the risk since advertising contracts may not be renewed.

Adverse exchange rate movements could result in higher tuk-tuk acquisition costs.

The call c ntre op rator may not provide the required service levels, which could result in custom rs opting for competitor offerings.

Labour unrest, stayaways and possible widespread strike action could mean that SHT does not ea n any in ome during strike periods due to non-rental by taxi-drivers who have no customers.

The tuk-tuks are very specialised vehicles, which may make them difficult to re-sell if the venture proves to be unsuccessful, resulting in a failure to recover the initial investment.

Being associated with Baobob may have positive or negative reputational implications, depending n Baobab's conduct.

Cheslin may not understand the market or its customers, since transporting passengers is not the same business as transporting cargo. The company does not have experience in this business which creates business risk.

There is a risk of not getting the tuk-tuks, from the Thailand supplier in time, or the necessary licenses, in order to start the operations as predicted. This will result in start-up delays and lost revenue.

Threat of violence from taxi drivers could disrupt operations.

There is a reputational risk associated with the risk that tuk-tuk drivers could drive irresponsibly, overcharge passengers and there is an inherent safety risk relating to transporting passengers.

Conclusion

Since the tuk-tuk concept is relatively new in the country, and still unregulated, significant risks are associated with entering this new market, especially since expertise within the company may be lacking. The dependency on advertising revenue as well as uncertainty regarding the response of the taxi industry to the new entrant to the market does pose risks. However, the benefits of starting up the new business may still outweigh the risks, provided that proper risk management processes are in place to continually assess and respond to the risks involved.

Any new venture or change to an existing business will have resulting changes to the risks that the business is exposed to. These risks will have to be weighed up against the resu ting expected increase in revenue. Renting tuk-tuks instead of providing a holistic taxi service may be advisable, as it transfers the risk of obtaining sufficient passenger numbers to tuk-tuk drivers. Operating the business through a separate company will also protect Cheslin directly from lawsuits (for ex mple, due to motor vehicle accidents.) Furthermore, requiring taxi drivers to pay daily rent l upfront reduces the credit risk. However, it may prove difficult to penetrate the market as a new entrant to the market. Entering the tuk-tuk market to prevent competitors from doing so is not an ad isable strategy, since, given the high margins in renting out tuk-tuks, Cheslin's competitors will enter the market and erode margins through price cutting.

Renting tuk-tuks is similar to renting out light commercial delivery vehicles. therefore Cheslin should have the expertise to manage the new operation, and could ake use of existing systems. Starting up a new venture instead of acquiring existing players is a cheaper alternative, but it may take longer to reap benefits. Furthermore, using SHT tuk-tuks to advertise the Cheslin brand may prove to be a cost-effective marketing tool. At the same time advertising expenditure is kept in-house which could improve group profitability and therefore prove to be advantageous.

Cheslin should be aware of the higher risks associated with utilizing outsourced drivers since it is difficult to impose policies on outsourced drivers as opposed to employees. It would therefore be essential to clear drivers and impose minimum standards (for example, ensuring that each driver has a valid driver's license) to protect itself from the reputational risk mentioned above.

Merits

Members may not use the full kilometres paid for every month resulting in a windfall gain for SHT. Furthermore, it will be advantageous to 'lock in' customers to use SHT services by the membership scheme. This will also enable both SHT as well as Cheslin to develop a database of members that it could use to sell other services or sell data to external parties for marketing purposes.

Another potential merit of a membership scheme is the potential that exists for the utilisation of third-party loyalty benefits to members, which could expand the membership base if employed. For example, card holders of an institution pay for a drinking and driving benefit for its members and SHT could provide such service.

The membership scheme will be beneficial to the cash flow position of the company since SHT is to receive revenue upfront, which improves its cash flow position. Furthermore, imposing policies and regulations on drivers as employ s will be a less challenging task and will improve the quality of the service to customers. The membership sch me will have less cash transactions which reduces the risk for drivers carrying large amounts of ash.

Challenges

SHT will be eliant on taxi drivers to provide details of kms travelled (which may not be accurate) in order to manage members' benefits and additional payments. SHT will therefore also have to monitor the drivers' movements, as the risk exists that they could drive non-members for a cash payment if this is not well controlled. In addition, there will be some credit risk associated with collecting amounts for 'excess' kms travelled.

The c sts associated with this alternative may be higher. This is as a result of increased costs of admini tration and compliance in respect of employees (UIF, PAYE), higher operating leverage due to higher fixed employee costs, as well as marketing costs. Marketing costs for new members could be expensive and, furthermore it could be difficult to achieve critical mass of members to make the business viable. Initially, SHT may have to offer discounted rates per km to members to induce them to join which will affect profitability in the early stages.

Many users of transport may be occasional users of transport for example, foreign tourists in which case the membership will be limited to frequent users of this type of transport. As a result, SHT will lose all once-off customers, who may only be interested in using the service on an occasional basis.

Chapter 3

Present and future value of money

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –
explain the meaning of and apply formulae to calculate th : – future value of a cash flow; – future value of an annuity; – present value of cash flows; and – present value of an annuity; solve for interest rate and number of periods in a present value equation; apply formulae where the number of periods is less than a year; evaluate options at a future date; calculate the value of shares with and without growth; and calculate the value of debt.

A clear understanding of the value of money over a period of time is essential to the understanding of **finance.** This chapter deals with the elementary theory of interest. Once the student has grasped it, he or she will find that the chapters that follow are relatively simple. The authors have in the past assumed that students fully understand the conc pt of 'time value of money', only to discover that they struggle with the basics of present and future value. The value of shares, debentures, and loans, as well as the derivation of the Weighted Average Cost of Capital (WACC) is based on the concept of 'present value' (PV). This is the future value of an instrument expressed in **today's** terms or money. 'Future value' (FV), in turn, is the mirror image of 'present value' (PV) i.e. today's value of an inst ument calculated to what it will be in the **future**.

3.1 Time val e of money

Invest rs in a firm, both shareholders and lenders, expect to be compensated for both the *time delay* in waiting for the returns n their investments (the opportunity cost), and for the *risk* to which they expose their investment capital. Furthermore, when prices in general are *rising* (inflation), these investors also expect to be compen ated for the *erosion in the value* of their investment capital.

When money is borrowed, the borrower must pay interest to the lender for the use of the money. The borrower pays this interest because the potential value created by the use of the money (e.g., investing in vi ble projects) exceeds the cost of borrowing. The lender makes the money available because the return e rned on the lending will exceed the return from alternative investment opportunities at lower risk, as the lender will normally require security or collateral to be provided by the borrower. The supply and demand for the lending and borrowing of this money is in effect a money market and the cost of this use is the prevailing interest rates.

From this, the three elements of interest rates can be established, namely:

Compensation for the time value of money. From the lender's point of view, this represents the *opportunity cost* of forfeiting alternative investment opportunities, and from the borrower's point of view, the cost of being able to receive/use the money now rather than later.

Compensation for risk. From both the lenders' and borrowers' points of view, this is consistent with the essence of financial management, that is, any finance or investment decision must be in agreement with the fundamental principle that return on investment has a relationship to the risk involved (in this case, the default risk), namely, the risk that the loan will not be repaid.

Compensation for inflation. In times of inflation, the spending power of money decreases over time and lenders would expect to be compensated for this decline in spending power. If the interest rate did not compensate for the effect of inflation, the lender would be worse off by the time the loan is repaid than when the loan was made.

If money expended later is more favourable than money spent today, due to the eroding effects of inflation, the same principle applies in reverse to moneys receivable. Money recei ed today is more favourable than money received later, since that money can be invested today and interest earned over time. To determine the value of money in current (or today's) terms, one discounts the future cash flows it generates to the present value using an appropriate discount rate. This is called the present value of a cash flow. The opposite of discounting is compounding; in other words, if one wanted to deter ine the value of money at a future date, one would compound the current (or today's) value to deter ine the future value of a cash flow.

The financial calculator instructions have been included below the calculations in this chapter since many students may prefer to use a financial calculator inst ad of using the formulae or tables in Appendix 2 of this textbook, which may be time-consuming, especially in an xam setting. Students must make sure that they know how their specific financial calculators operate and clearly document their steps. Also remember that it is important to understand the calculations and the theory behind time value of money **before using a financial calculator**. The calculator is just a tool; the student still needs to have a good understanding of the time value of money since it is used in many of the calculations in this textbook.

3.2 Future value

The future value of an amount is derived using the following formulae:

$FV = PV(1 + i)$ [One year or one period]

$FV = PV(1 + i)^n$ [Multiple years or periods]

Where:

FV = Future value
PV = Pr s nt value
i = Int r st rate
n = Number of years/periods

Mr C invests R1 000 at 10% with a bank. How much does he expect to receive at the end of one year?

$FV = PV(1 + i)$

$FV = 1\,000(1 + 0{,}10) = R1\,100$

How much d es he expect to receive at the end of two years?

$FV = 1\,100(1 + 0{,}10) = R1\,210$

Financial calculator instructions:

PV = 1 000
I/YR = 10
N = 2
FV = 1 210

How much does he expect to receive at the end of three years?

The effect over a three-year period is that interest is compounded at 10%.

FV = 1 210(1 + 0,10) = R1 331

Financial calculator instructions:	
PV	= 1 000
I/YR	= 10
N	= 3
FV	= 1 331

Compound interest formula

$FV = PV(1 + i)^n$

The compound interest formula can be broken down over a three-year peri d at 10% to:

FV = PV(1 + 0,10)(1 + 0,10)(1 + 0,10)

This is the same as was done in the example above over a period of three years by re-calculating the future value each year.

In this example, the FV can be calculated as:

FV = 1 000(1 + 0,10)(1 + 0,10)(1 + 0,10) = R1 331

or

$FV = 1\,000(1 + 0,10)^3 = R1\,331$

Financial calculator instructions:			
1 000 × 1,1 = 1 100	**or**	**PV**	**= 1 000**
2ndF		**I/YR**	**= 10**
y^x 3		**N**	**= 3**
= 1 331		FV	= 1 331

Key assumptions:

The compound interest formula assumes that the interest receivable at the end of the year is reinvested at the same interest rate.

2 It is safe to assume that the nd of any year is treated the same as the beginning of the next year; in other words, a ash flow at 31st December 20Y2 (end of 20Y2) is treated the same as a cash flow at 1st Janua y 20Y3 (beginning of 20Y3) for purposes of time value of money calculations.

3 The value of money **today** (present value) is referred to as **Year 0** in time value of money calculations.

Assume that the f t re value (FV) of R1 000 at the end of five years must be determined, using a factor of 10% which is compo nded annually. The interest is paid on the last day of each year. Using a future value table, the answer w uld be as follows:

Year	(1 + i)		*Factor	Future value of R1 000
0	(1 + 0)	=	1	R1 000
1	$(1 + 0,10)^1$	=	1,1	R1 100
2	$(1 + 0,10)^2$	=	1,21	R1 210
3	$(1 + 0,10)^3$	=	1,331	R1 331
4	$(1 + 0,10)^4$	=	1,4641	R1 464
5	$(1 + 0,10)^5$	=	1,6105	R1 610

* Factors can be found in the tables in Appendix 2

Financial calculator instructions (year 5):
PV = 1 000
I/YR = 10
N = 5
FV = 1 610

3.2.2 Solving for interest rate (i) and number of periods (n)

Example: Solving for interest rate (i)

Ms A can invest R1 000 today for a period of three years. At the end of three ye rs, her investment will have grown to R1 331. Interest is compounded annually.

Required:

Calculate the annual interest rate.

Solution:

$$FV = PV(1 + i)^n$$

$$1\,331 = 1\,000(1 + i)^3$$

$$\frac{1\,331}{1\,000} = (1 + i)^3$$

$$1{,}331 = (1 + i)^3$$

To solve for **i**, do a trial and error calculation, for example:

Try 5% $(1 + 0{,}05)^3 = 1{,}1576$

Try 8% $(1 + 0{,}08)^3 = 1{,}2597$

Try 10% $(1 + 0{,}10)^3 = 1{,}331$

The answer must be 10%, as the factor of 1,331 is the same as FV divided by PV, that is, 1 331 / 1 000 = 1,331.

Alternatively, go to the future value tables and look along the 3-year row for the future factor of 1,331 (Tables Appendix 2). Why the 3-year row? Because the power of 3 means 3 years or 3 periods.

Financial calculator instructions:
PV = 1 000
FV = – 1 331
N = 3
I/YR = 10

Example: Solving for number or periods (n)

Ms A can invest R1 000 today at 10% per annum to receive R1 331 at a future date.

Required:

Calculate the number of years required for the investment to reach R1 331.

So ution:

$$FV = PV(1 + i)^n$$

$$1\,331 = 1\,000(1 + 0{,}10)^n$$

$$\frac{1\,331}{1\,000} = (1 + 0{,}10)^n$$

$$1{,}331 = (1 + 0{,}10)^n$$

Or, solve for n (the number of years) by trial and error for example:

$(1 + 0{,}10)^1 = 1{,}1$

$(1 + 0{,}10)^2 = 1{,}21$

$(1 + 0{,}10)^3 = 1{,}331$

Alternatively, go to the PV tables in Appendix 2, look for the 10% column and then go down to the 1,331 factor; then move to the left to read off the number of years.

Financial calculator instructions:
PV = 1 000
FV = – 1 331
I/YR = 10
N = 3

Note: ***The above two examples show how to solve for the interest rate and for the number of years. Students are required to do these calculations in future chapters. They are expected to be able to do all PV and FV calculations by creating the required factors on a calculator. The student should also be able to use PV and FV tables. Students should only use progra mable calculators if they understand the calculations and the theory behind the ti e value of oney very well. They should not simply read off the final answer from the calculator.***

Introducing periods of time compared to years

The formula **FV = PV(1 + i)^n** assumes that **n** refers to a year or years. It also assumes that interest (**i**) is compounded annually. What happens if interest is compounded bi-annually (every six months), or quarterly (every three months), or monthly (every month)?

Example:

Ms B has a sum of R10 000 which she wishes to invest for a period of three years. She has the following investment choices over the three-year investment period:

Invest at 10% per annum.

Invest at 9,2% per annum, compounded bi-annually.

Invest at 9% per annum, compounded quarterly.

Invest at 8,4% per annum, compounded monthly.

Required:

Advise on the best investment option.

Solution:

In the form la, **n** refers to the number of periods, but is calculated on the basis of one year. The way to adapt the form la to provide for multiple periods within a year, is to:

Divide the annual investment rate by the number of interest payments within a period of one year.

Calculate the number of interest payments over the period required (this is referred to as ‘equivalent year ’).

The conversion translates the payments to the equivalent of annual payments at a lower equivalent interest rate.

(i) i = 10% / 1 = 10% per period (1 year)
n = 3 × 1 = 3 equivalent years
PV = R10 000

FV = R10 $000(1 + 0{,}10)^3$ = R13 310

Financial calculator instructions:
Mode: 1 P/YR

PV	=	10 000
I/YR	=	10
N	=	3
FV	=	13 310

(ii) i = 9,2% / 2 = 4,6% per period (6 months)
n = 3 × 2 = 6 equivalent years

FV = $R10\,000(1 + 0,046)^{6}$ = R13 097,55

Financial calculator instructions:

			or	Mode: 2 P/YR		
PV	=	10 000		PV	=	10 000
I/YR	=	9,2/2		I/YR	=	9,2
N	=	6		N	=	6
FV	=	13 097,55		FV	=	13 097,55

(iii) i = 9% / 4 = 2,25% per period (3 months)
n = 3 × 4 = 12 equivalent years

FV = $R10\,000(1 + 0,0225)^{12}$ = R13 060

Financial calculator instructions:

			or	Mode:4 P/YR		
PV	=	10 000		PV	=	10 000
I/YR	=	9/4		I/YR	=	9
N	=	12		N	=	12
FV	=	13 060,5		FV	=	13 060,5

(iv) i = 8,4% / 12 = 0,7% per period (1 month)
n = 3 × 12 = 36 equivalent years

FV = $R10\,000 \times (1 + 0,007)^{36}$ = R12 855

Financial calculator instructions:

			or:	Mode:12 P/YR		
PV	=	10 000		PV	=	10 000
I/YR	=	8,4/12		I/YR	=	8,4
N	=	36		N	=	36
FV	=	12 854,67		FV	=	12 854,67

Conclusion:

Invest at 10% per annum to receive the highest future value of R13 310.

F t re value of an annuity

An **annuity** is the receipt or payment of a fixed amount over a number of years or periods. For example, if R1 000 was invested at the end of every year over a period of ten years, the investment would be described as a ten-year annuity investment.

The timing of the annuity can take place either at the **end of a period** or at the beginning of a period. Where payment is made at the **beginning of a period** it is called an 'annuity due'. If payment is made at the end of the ye r or end of a period it is called a 'regular', 'ordinary' or 'deferred' annuity.

Example:

Mr A will invest R1 000 per year over a period of three years at a return of 10% per annum.

Required:

Determine the future value at the end of three years if the investment is made:

at the end of the year (regular, ordinary or deferred annuity).

at the beginning of the year (annuity due).

Solution:

(i) End of year (i.e. beginning of the following year)

	Today			
Year-end	**0**	**1**	**2**	**3**
Investment	–	1 000	1 000	1 000
Interest from Year 1 investment	–	–	100	110
Interest from Year 2 investment	–	–	–	100
	–	1 000	1 100	1 210

Future value 1 000 + 1 100 + 1 210 = R3 310

Or:	Year 1	Investment	1 000 $(1 + 0{,}10)^2$	=	1 210
	Year 2	Investment	1 000 $(1 + 0{,}10)$	=	1 100
	Year 3	Investment	1 000	=	1 000
					R3 310

Or using the tables: R 1 000 × 3,31 (annuity factor for 10% interest for 3 years) = R 3 310

Or: FV(Annuity) Constant amount × Future value factor of an annuity

$$FV_A = I \times \left[\frac{(1 + i)^n - 1}{i} \right]$$

$$FV_A = 1\,000 \times \left[\frac{(1 + 0{,}1)^3 - 1}{0{,}1} \right]$$

$$FV_A = 1\,000 \times \left[\frac{1{,}331 - 1}{0{,}1} \right]$$

$$FV_A = 1\,000 \times 3{,}31 = \text{R}3\,310$$

Financial calculator instructions:

PMT = 1 000

I/YR = 10

N = 3

FV = 3 310

(ii) Beginning of year (i.e. end of the previous year)

	Today			
Year-end	**0**	**1**	**2**	**3**
Investment	1 000	1 000	1 000	–
Intere t from Year 1 investment	–	100	110	121
Intere t from Year 2 investment	–	–	100	110
Interest from Year 3 investment	–	–	–	100
	1 000	1 100	1 210	331

Future value 1 000 + 1 100 + 1 210 + 331 = R3 641

Or:	Year 0	Investment	$1\,000\,(1 + 0{,}10)^3$	=	1 331
	Year 1	Investment	$1\,000\,(1 + 0{,}10)^2$	=	1 210
	Year 2	Investment	$1\,000\,(1 + 0{,}10)$	=	1 100
					R3 641

Or: FV(Annuity) = Constant amount × Future value factor of an annuity

$$FV_A = I \times \left[\frac{(1+i)^n - 1}{i}\right](1+i)$$

$$FV_A = 1\,000 \times \left[\frac{(1+0{,}1)^3 - 1}{0{,}1}\right](1+0{,}1)$$

$$FV_A = 1\,000 \times \left[\frac{1{,}331 - 1}{0{,}1}\right](1{,}1)$$

$$FV_A = 1\,000 \times 3{,}31 \times 1{,}1 = R3\,641$$

Or using the tables: R 1 000 × 3,31 (annuity factor for 10% interest for 3 years) × *1,1 = R 3 641

Important note: The annuity tables assume that the annuity is a regular ordinary annuity payable at the end of the year. For paym nts at the beginning of the year, multiply the answer by (1 + i).

Financial calculator instructions:

2^{ND} FUNCTION BEG/END

PMT = 1 000

I/YR = 10

N = 3

FV = 3 641

Note: For the purpose of this textbook, students are not required to manually calculate future value annuities. If required, annuity tables will be provided. Students are expected to familiarise themselves with the tables, which are provided in Appendix 2.

3.3 Present value

Present value al ulations and PV tables are the inverse of future value. All the remaining chapters of this textbook deal almost ex lusively with present value calculations. If the student understands the concept of present value, he will have little problem with finance.

Present val e represents the *value today of future cash flows*. It is very important because the value of a project or company or investment is

Present value of future cash flows

The value of a share in a company, for instance, is based on the present value of all future cash flows, which for an inve tor is often in dividends. The underlying assumption of the calculations below **is that cash flows take p ace at the end of the year.**

If $FV = PV(1 + i)$ [One year or one period]

$FV = PV(1 + i)^n$ [Multiple years or periods]

Making PV the subject results in the PV formula, as follows:

$$PV = \frac{FV}{(1+i)^n}$$

The present value factors are therefore the inverse of the future value factors.

Years	**10% FV factors**	**10% PV factors**		
1	1,1	1/ 1,1	=	0,909
2	1,21	1/ 1,21	=	0,826
3	1,331	1/ 1,331	=	0,7513
4	1,4641	1/ 1,4641	=	0,6830
5	1,6105	1/ 1,6105	=	0,6209

Hint: ***The PV factor tables will have to be calculated manually many times from now on. The easiest way to create them is as follows:***

Creating a 10% PV table:

Year 1 1 / 1,1 = 0,9090

Dividing 1 by 1,1 on the calculator results in the figure of 0,9090. Do not clear the calculator. Now press ÷ followed by **1,1** followed by = . The result will be 0,8263.

Year 2 0,9090 / 1,1 = 0,8263

Continue dividing by 1,1 followed by **=** for all other factors, as follows:

Financial calculator instructions (Year 5): <u>or:</u>

Example 1: Single future

An ive R1 100 in one

Calculate the value of the R1 100 today if the interest

Year 3 0,8263 / 1,1 = 0,7513
Year 4 0,7513 / 1,1 = 0,6830
Year 5 0,6830 / 1,1 = 0,6209

Solution:

$$PV = \frac{FV}{(1+i)^n}$$

$$PV = \frac{1\,100}{(1+0{,}10)} = \frac{1\,100}{(1{,}1)} = R1\,000$$

Financial calculator instructions:

FV	=	1 100
I/YR	=	10
N	=	1
PV	=	1 000

Example 2: Multiple future payments

Mr A has recently inherited money which will be paid out as follows:

Year 1	10 000
Year 2	12 000
Year 3	8 000
Year 4	6 000
Year 5	4 000

Assume that each payment will take place at the end of the corresponding year, and that the annual discount rate is 10%.

Required:

Calculate the present value of the future cash payments.

Solution:

	Present day	Year	Year	Year	Year	Year
Year-end	**0**	**1**	**2**	**3**	**4**	**5**
Cash-flow		10 000	12 000	8 000	6 000	4 000
PV factor		$(1 + 0{,}10)$	$(1 + 0{,}10)^2$	$(1 + 0{,}10)^3$	$(1 + 0{,}10)^4$	$(1 + 0{,}10)^5$
Present value	=	$\frac{10\,000}{(1 + 0{,}10)}$	$+ \frac{12\,000}{(1 + 0{,}10)^2}$	$+ \frac{8\,000}{(1 + 0{,}10)^3}$	$+ \frac{6\,000}{(1 + 0{,}10)^4}$	$+ \frac{4\,000}{(1 + 0{,}10)^5}$
	=	$\frac{10\,000}{1{,}10}$	$+ \frac{12\,000}{1{,}21}$	$+ \frac{8\,000}{1{,}331}$	$+ \frac{6\,000}{1{,}4641}$	$+ \frac{4\,000}{1{,}6105}$
	=	9 090,91	+ 9 917,35	+ 6 010,52	+ 4 098,08	+ 2 483,70
	=	R31 600,56				

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	10 000
CFj_2	=	12 000
CFj_3	=	8 000
CFj_4	=	6 000
CFj_5	=	4 000
I/YR	=	10
NPV	=	31 600,55

Example 3: Compa ing options

Ms A will receive R20 000 at the end of Year 3 and R10 000 at the end of Year 4. She then has the option to receive R50 000 at the end of Year 5, **or** no payment at the end of Year 5, **but** two equal payments of R28 000 at the end f Years 6 and 7 respectively.

Required:

Determine the present value today of both options at a discount rate of 10%.

Solution:

Option 1

Cash-flow		**Year 3** **20 000**		**Year 4** **10 000**		**Year 5** **50 000**
PV factor		$(1 + 0{,}1)^3$		$(1 + 0{,}1)^4$		$(1 + 0{,}1)^5$
Present value	=	$\frac{20\,000}{(1 + 0{,}1)^3}$	+	$\frac{10\,000}{(1 + 0{,}1)^4}$	+	$\frac{50\,000}{(1 + 0{,}1)^5}$
	=	15 026	+	6 830	+	31 046
	=	R52 902				

Financial calculator instructions:		
CF_{j0}	=	0
CF_{j1}	=	0
CF_{j2}	=	0
CF_{j3}	=	20 000
CF_{j4}	=	10 000
CF_{j5}	=	50 000
I/YR	=	10
NPV	=	52 902

Option 2

		Year 3 20 000		**Year 4** 10 000		**Year 5** 0	**Year 6** 28 000		**Year 7** 28 000
PV factor		$(1 + 0{,}1)^3$		$(1 + 0{,}1)^4$			$(1 + 0{,}1)^6$		$(1 + 0{,}1)^7$
Present value	=	$\frac{20\,000}{1{,}331}$	+	$\frac{10\,000}{1{,}4641}$	+		$\frac{28\,000}{1{,}7715}$	+	$\frac{28\,000}{1{,}9487}$
	=	15 026	+	6 830	+		15 806	+	14 368
	=	R52 030							

Financial calculator instructions:		
CF_{j0}	=	0
CF_{j1}	=	0
CF_{j2}	=	0
CF_{j3}	=	20 000
CF_{j4}	=	10 000
CF_{j5}	=	0
CF_{j6}	=	28 000
CF_{j7}	=	28 000
I/YR	=	10
NPV	=	52 030

Which option is better? R50 000 at the end of Year 5 (Option 1), or two equal payments of R28 000 at the end of Years 6 and 7 (Option 2)?

Answer:

One can *either* discount the cash flows for Years 6 and 7 to Year 5 values (Method 1 below) *or* discount the cash flows for Years 5, 6 and 7 to present (Year 0) values (Method 2 below). Once the cash flows are discounted to the same year values, the two options can be compared, to decide which is more advantageous.

Method 1: Compare the two options at Year 5

Note: ***Where there is an option at a particular point in time, it is always preferable to compare the two options at that point in time. In this example, as the option takes p ace at the end of Year 5, the choices can be shown as:***

R50 000 today; or

R28 000 in Year 1 plus R28 000 in Year 2

Option 1's value at the end of Year 5 equals R50 000

Option 2's value at the end of Year 5:

	Year 6		**Year 7**		
Cash flow	28 000		28 000		
PV factor	$(1 + 0,1)$		$(1 + 0,1)^2$		
Present value	$= \frac{28\,000}{1,1}$	$+$	$\frac{28\,000}{1,21}$		
	$=$ 25 454	$+$	23 140	$=$	R48 594

The factors for Years 6 and 7 are shown as Year 1 and Year 2 factors relative to Year 5. In other words, the cash flows are 1 and 2 years away. Once these cash flows are converted to Year 5 values, they can be compared. Since the Year 5 value of the Years 6 and 7 cash flows is R1 406 (R50 000 – R48 594) less than the Year 5 cash flow of R50 000, this option is better.

Financial calculator instructions:		
CFj_0	=	0
CFj_1	=	28 000
CFj_2	=	28 000
I/YR	=	10
NPV	=	48 595

Conclusion:

Choose R50 000 at the end of Year 5.

Method 2: Compa e the options as at Year 0

Option 1 Cash-flow of R50 000 at Year 5

Present value to Year 0 $= \frac{50\,000}{(1 + 0,1)^5} = \frac{50\,000}{1,6105} =$ R31 046

Financial calculator instructions:		
FV	=	50 000
I/YR	=	10
N	=	5
PV	=	31 046

Option 2 **Cash-flows equal R28 000 at the end of Years 6 and 7**

Present value to Year 0 $= \frac{28\,000}{1{,}7715} + \frac{28\,000}{1{,}9487}$

$= 15\,805 + 14\,368 = R30\,173$

Financial calculator instructions:

Year 6:

FV	=	28 000
I/YR	=	10
N	=	6
PV	=	15 805

Year 7:

FV	=	28 000
I/YR	=	10
N	=	7
PV	=	14 368

Note: ***Method 1 shows that the option of receiving R50 000 is better by 50 000 – 48 594 = R1 406 as at Year 5. The present value of R1 406 as at Y ar 0 is R873, which is the same as the result achieved using Method 2: R31 046 – R30 173 = R873. Both methods result in the same conclusion, namely that receiving R50 000 is better by a value (present value at Year 0) of R873.***

Financial calculator instructions:

			or:	
FV	=	1 406		1,1
I/YR	=	10		2ndF
N	=	5		y^x 5
PV	=	873		x 1 406 = 873

Present value of an annuity

The term **annuity** refers to a stream of equal payments in the future. If the payments take place at the end of each year/period, it is called an 'ordinary annuity'. When the amount payable is paid at the beginning of a period, it is called an 'annuity due'.

Note: ***Virtually all xampl s assume payment at the end of a period, that is, an ordinary annuity.***

Example 1: Ordinary annuity (end of the year)

Mr A will receive R1 000 at the end of Years 1, 2 and 3.

Required:

Calculate the present value today of the cash flows.

S luti n:

Year end	**Today**	**Year 1**	**Year 2**	**Year 3**
Ca h-f ow	0	1 000	1 000	1 000
Present value factor		$(1 + 0{,}1)$	$(1 + 0{,}1)^2$	$(1 + 0{,}1)^3$

Present value $= \frac{1\,000}{(1 + 0{,}1)} + \frac{1\,000}{(1 + 0{,}1)^2} + \frac{1\,000}{(1 + 0{,}1)^3}$

$= 909 + 826 + 751$

$=$ R2 486 (rounded off)

Or: PV(Annuity) = Constant amount × present value factor of an annuity

$$PV_A = I \times \left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right]$$

$$= 1\,000 \times \left[\frac{1 - \frac{1}{(1+0,1)^3}}{0,1} \right]$$

$$= 1\,000 \times \left[\frac{1 - 0,7513}{0,1} \right]$$

$$= 1\,000 \times \left[\frac{0,2487}{0,1} \right]$$

$1\,000 \times 2,487$

R2 487 (rounded off)

Or: Using the tables: R 1 000 × 2,487 (annuity factor for 10% interest f r 3 years) = R 2 487

Financial calculator instructions:	
PMT	= 1 000
I/YR	= 10
N	= 3
PV	= 2 487

Example 2: Present value of an annuity due (beginning of the year)

Mr A will receive three instalments of R1 000 payable now, at the end of Year 1, and the end of Year 2.

Required:

Calculate the present value of the annuity.

Solution:

The payments are receivable at the beginning of the year (Year 0), therefore the first cash flow does not have to be discounted to present value; it is receivable today. The second cash flow is receivable at the beginning of Year 2, which is treated the same as a cash flow receivable at the end of Year 1.

Year-end	**Today**		**1**		**2**
Cash-flow	1 000		1 000		1 000
PV factor	1		$(1 + 0,1)$		$(1 + 0,1)^2$
PV	$= \frac{1\,000}{1}$	+	$\frac{1\,000}{1,1}$	+	$\frac{1\,000}{1,21}$
	= 1 000	+	909	+	826

R2 735 (rounded off)

Or: PV(Ann ity) = Constant amount × present value factor of an annuity

$$PV_A = I \times \left(\left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right] + 1 \right)$$

$$= 1\,000 \times \left(\left[\frac{1 - \frac{1}{(1+0,1)^2}}{0,1} \right] + 1 \right)$$

$$= 1\,000 \times \left(\left[\frac{1 - 0,8264}{0,1} \right] + 1 \right)$$

$1\,000 \times (1,736 + 1)$

R2 736 (rounded off)

Or: Using the tables: R 1 000 × 2,487 (annuity factor for 10% interest for 3 years) × 1,1 = R 2 735,70.

Alternatively: R 1 000 × (1,7355 + 1) (annuity factor for 10% interest for 2 years +1) = R 2 735,70.

Financial calculator instructions:

			or			
2^{ND} FUNCTION BEG/END				CFj_0	=	1 000
PMT	=	1 000		CFj_1	=	1 000
I/YR	=	10		CFj_2	=	1 000
N	=	3		I/YR	=	10
PV	=	2 736		NPV	=	2 736

Periodic payment of a loan

The present value of an annuity formula can be used to compute the peri dic payment of a loan.

$$PVA = I \times \left(\left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right] \right)$$

Making I the subject, that is, the periodic payment, one gets:

$$PV_A \times i = I \times \left[1 - \frac{1}{(1+i)^n} \right]$$

$$I = \frac{PV_A \times i}{\left[1 - 1 / (1+i)^n \right]}$$

Example:

Mr A borrowed R10 000 today at an annual interest rate of 10% per annum. The loan is repayable in two equal instalments at the end of Years 1 and 2.

Required:

Calculate the periodic annuity instalment.

Solution:

$$I = \frac{10\,000 \times 0{,}1}{\left[1 - 1 / (1 + 0{,}1)^2 \right]}$$

$$= \frac{1\,000}{1 - 0{,}82645} = \frac{1\,000}{0{,}17355}$$

= R5 762

Financial calc lator instructions:

PV	=	10 000
I/YR	=	10
N	=	2
PMT	=	5 762

Examp e:

Mr A borrowed R10 000 today at an annual interest rate of 12% per annum. The loan is repayable in equal **monthly** instalments over a period of two years.

Required:

Calculate the periodic monthly annuity instalment.

Solution:

I = 12% / 12 = 1%
N = 2 × 12 = 24

$$I = \frac{10\,000 \times 0{,}01}{\frac{[\,1 - 1/(1 + 0{,}01)^{24}\,]}{100}}$$

$$\frac{-0{,}7876}{\frac{100}{0{,}2124}}$$

R470,81

Note: ***Where the periodic payments are for periods less than one year, one must calculate the equivalent annual payments and at the same time divide the annual interest rate by the number of annual interest payments.***

In the above example:

Number of equivalent periods: 2yrs × 12 = 24

Equivalent interest rate per period = 12% / 12 = 1%

Using PV annuity tables

The above example has been illustrated without the use of tables. Clearly, it is preferable to use PV annuity tables, or a programmable calculator.

Using tables to find the PV annuity factor, simply go to the column showing the interest rate required; in this example the 1% column. Next, go down to the number of periods; in this case 24. Read off the PV annuity factor; in this example shown as 21,243.

Therefore $I = \frac{PV_A}{Factor}$

$= \frac{10\,000}{21{,}243}$

= R470,74

Financial calculator instructions:					
Mode:12 P/YR		**or**	Mode:1 P/YR		
PV	= 10 000		PV	=	10 000
I/YR	= 12		I/YR	=	12/12
N	= 24		N	=	24
PMT	= 470,74		PMT	=	470,74

Present value of a perpetuity

A **perpetuity** is the same as an annuity with an infinite life.

Examp e:

Mr A has invested an amount of money at 10% to receive R1 200 annually in perpetuity (indefinitely).

Required:

Calculate the present value of the perpetuity.

Solution:

$$PV_p = \frac{I}{i}$$

Where: I = Periodic payment

i = interest rate

$$\frac{1\ 200}{0{,}1}$$

R12 000

Present value of shares

No growth

As previously stated, the value of an investment or project, or company or company shares is the **present value of future cash flows**. If one is valuing a share, and if the share pays regular dividends, then the value of a share, where dividend value is unchanged from one year to the next, that is, no growth, is:

$$\text{Value} = \frac{D_o}{k_e}$$

Where:

D_o = Current dividends, or Year 0 dividends

k_e = Shareholders' required return or discount rate

k_e is the same as i in the PV formula

Example 1: No growth

Mr A holds 1 000 shares in Company X. He receives an annual dividend of R100 per share and his required return is 20%.

Required:

Calculate the value of the shares held by Mr A.

Solution:

D_o = R100

k_e = 20%

$$\text{Value} = \frac{100}{0{,}20}$$

= R500

Total value = R500 × 1000 shares = R500 000 ex-dividend (excluding the dividend)

N te: ***The shareholder receives a dividend today. Is that dividend included in the valuation?***

It depends on whether or not it is cum-div or ex-div. The above solution assumes that today's dividend is excluded, hence the word 'ex-dividend'. If the requirement was to include the dividend, one would be asked to do a 'cum-dividend' valuation and in the above example the answer would have been as follows:

$$= R100 + \frac{R100}{0{,}2} = R600$$

Where the question is silent as to dividends received or receivable today, one must do an ex-dividend valuation.

Important: ***Another reason for doing an ex-dividend valuation (unless otherwise asked) is that present value assumes that the first cash flow will take place at the end of a period/year.***

Example 2: No growth

Mr A holds 1 000 shares in Company X. He receives an annual dividend of R100 per share and has a required return of 20%. At the end of three years, he intends selling his shares at a price of R480 each.

Required:

Calculate the value of Mr A's shareholding.

Solution:

		Year 1		Year 2		Year 3
Cash flows – dividend		100		100		100
Cash flows – sale		–		–		480
		100		100		580
Valuation	=	$\frac{100}{(1+0{,}2)}$	+	$\frac{100}{(1+0{,}2)^2}$	+	$\frac{580}{(1+0{,}2)^3}$
	=	83,33	+	69,44	+	335,65
	=	488,42				
Total value	=	R488,42	×	1 000	=	R488,42

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	100
CFj_2	=	100
CFj_3	=	580
I/YR	=	20
NPV	=	488,43

(ii) Constant Growth

Where the dividend from a share increases every year by a fixed or constant amount, the formula is:

$$\text{Value} = \frac{D_1}{K_e - g}$$

Where:

D_1 = Dividend at the end of the year
k_e = Shareholders' required return
g = Growth in annual dividends

This formula is referred to as the dividend growth model.

Examp e 1: Constant growth and shares held to infinity (∞)

Mr A owns 1 000 shares in Company X. He has recently received a dividend of R100 per share. He expects the dividend to grow by 5% per annum. His required return, k_e, is 20%.

Required:

Calculate the value of Mr A's shareholding.

Solution:

D_1	=	R100 × 1,05	= R105
k_e	=	20%	
g	=	5%	

$$\textbf{Valuation} = \frac{105}{(0{,}20 - 0{,}05)} = R700$$

Total value = 1 000 × R700 = R700 000

Example 2: Constant growth but shares held for a finite time

Use the same information as provided for Example 1, except that Mr A will sell his shares at the end of three years at a price of R480 per share.

Required:

Calculate the value of the shareholding at the end of three years.

Solution:

Year		**1**		**2**		**3**
Cash flows – dividend	(100 × 1,05)	105	(105 × 1,05)	110,25	(110,25 × 1,05)	115,76
Sell		–		–		480,00
		105		110,25		595,76
Present value	=	$\frac{105}{(1+0{,}2)}$	+	$\frac{110{,}25}{(1+0{,}2)^2}$	+	$\frac{595{,}76}{(1+0{,}2)^3}$
	=	87,50	+	76,56	+	344,77
					=	R508,83
Total value	=	1 000 shares	×	508,83	=	R508 830

Financial calculator instructions:

CFj_1	=	0
CFj_1	=	105
CFj_2	=	110,25
CFj_3	=	595,76
I/YR	=	20
NPV	=	508,83

Example 3: C nstant growth shares to be bought at a future date

Mr B has c ntracted to purchase 1 000 shares from Mr A in Company X at the end of three years at a price of R480 per hare. The dividend today in Company X is R100 per share and Mr A expects the dividend to grow by 5% per annum. Mr B has a required return, k_e, of 20%.

Required:

C lculate the market value per share in three years' time when Mr B purchases the shares, and state whether or not it is a good buy.

Solution:

$$\text{Value of the shares at Year 3} = \frac{D_4}{k_e - g}$$

The dividend that must be used in the dividend growth model will be the expected dividend in Year 4. (Remember cash flow must be one year in the future).

Year	**0**	**1**	**2**	**3**	**4**	**to infinity**
Dividend	100	105	110,25	115,76	121,55	+ 5% growth to infinity

Valuation date **Year 3**

$$D_4 = 100\,(1 + 0{,}05)^4$$
$$= 100 \times 1{,}2155$$
$$= 121{,}55$$

$$\text{Value at Year 3} = \frac{121{,}55}{(0{,}20 - 0{,}05)}$$
$$= \text{R}810{,}33$$

Mr B will pay R480 per share in three years' time. The shares will, however, have a market value of R810,33 each, assuming that the dividends continue to grow at 5% and the shareholders' return remains at 20%. If he chooses to sell the shares on the day he buys them, he will make a profit of R810,33 – R480 = R330,33 per share.

Example 4: Non-constant growth and share held to infinity

Mr A holds 100 shares in Company Z. He has recently received a dividend of R15 per share. He expects the dividend to grow at 10% for the next two years, and thereafter to grow at 5%. His required return is 20%.

Required:

Calculate the value of Mr A's entire shareholding today.

Solution:

		g = 10%			***g = 5%***	
Year	**1**	**2**			**3**	**to infinity**
Dividend	16,50	18,15			19,06	g = 5%
Year 1 dividend	=	15 × 1,10	=	16,50		
Year 2 dividend	=	16,50 × 1,10	=	18,15		
Year 3 dividend	=	18,15 × 1,05	=	19,06		

The value of the share at Year 0	=	PV of Year 1 dividend	+	PV of Year 2 dividend	+	PV of D_3 $k_e - g$	
Value	=	$\frac{16{,}50}{(1 + 0{,}2)}$	+	$\frac{18{,}15}{(1 + 0{,}2)^2}$	+	$[\frac{19{,}06}{(0{,}20 - 0{,}05)}] / (1 + 0{,}2)^2$	
	=	$\frac{16{,}50}{(1{,}2)}$	+	$\frac{18{,}15}{(1{,}2)^2}$	+	$\frac{127{,}07}{(1 + 0{,}2)^2}$	
	=	13,75	+	12,60	+	88,24	= R114,59
Total va ue	=	100 × R114,59	=	R11 490			

Note: The above valuation is done in 3 steps.

Step 1 Determine the cash flows receivable in each year. At the end of Year 1, the shareholder will receive a dividend of R16,50 and at the end of Year 2, a dividend of R18,15.

S ep 2 Determine the terminal share value as at the end of Year 2. The share value is based on the next dividend (Year 3), taking into account growth at 5% to infinity (in perpetuity). At the end of Year 2,

D_1 equals R18,15 × 1,05 = R19,06 (Year 3 dividend). The value of a share as at the end of Year 2 equals:

$$\frac{19,06}{(0,20 - 0,05)} = R127,07$$

Therefore the annual cash flows from dividends and the value of the shares at the end of Year 2 are:

Year	**1**	**2**
Cash flow – dividend	16,50	18,15
Share value		127,07
	16,50	145,22

Step 3 Calculate the present value of future cash flows, that is, discount to the present value using the required return.

$$= \frac{16,50}{(1 + 0,2)} + \frac{145,22}{(1 + 0,2)^2}$$

$$= 13,75 + 100,84 = R114,59$$

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	16,5
CFj_2	=	145,22
I/YR	=	20
NPV	=	115

3.5 Present value of debt

Debt in the context of a company can be defined as 'any form of outside finance that is not an ordinary share' or that 'does not have an option to convert to ordinary shares'.

The following are classified as debt:

Long-term loans	–	Interest is tax-deductible
Debentures	–	Interest is tax-deductible
Mortgage bonds	–	Interest is tax-deductible
Preference shares	–	ividends after tax

The authors' definition of debt is rather simplistic, as there are certain grey areas where debt is partly debt and partly ordinary share equity. For the purposes of this text, all forms of finance other than ordinary share equity, or debt that has an option to convert to ordinary shares at a future date, are classified as debt.

All calculations of pr s nt value that involve debt must be done at cash flows after tax, with the discount rate also after tax.

Example 1: I edeemable debt

Company A discloses a long-term loan of R1 000 000 in its statement of financial position. The company pays an annual interest of 12% before tax. The loan is for an indefinite period with no fixed redemption date. Current company income tax rate is 28%. Similar long-term loans can be raised today at an interest rate of 16%.

Required:

Ca cu ate the present value of the loan.

Solution:

Annu l interest payable after tax	=	R1 000 000 × 12% × (1 – 0,28)	= R86 400
Discount rate (market rate)	=	16% × (1 – 0,28)	= 11,52%
Present value	=	$\frac{\text{Cash flow}}{k_d}$	

Where k_d is the after-tax cost of debt today. (Note the after-tax cost of debt is used, as interest payments are deductible from income when calculating net income for tax purposes.)

$$\text{Value} = \frac{86\,400}{0{,}1152} = \text{R750 000}$$

Note: ***The book value of debt in the balance sheet is R1 000 000. The company is, however, only paying 12% interest when it should in fact be paying 16% interest. In real terms, the company has less debt than is shown in the balance sheet. In this example, the equivalent market value of debt is R750 000.***

Example 2: Redeemable debt

Use the same information as in Example 1 above, except that the loan is rep y ble in three years' time.

Required:

Calculate the market value of the loan today.

Solution:

Year	**0**	**1**	**2**	**3**
Interest after tax	–	86 400	86 400	86 400
Capital repayment	–	–	–	1 000 000
Total cash flow	–	86 400	86 400	1086 400

$$\text{Present value} = \frac{86\,400}{(1 + 01152)} + \frac{86\,400}{(1 + 01152)^2} + \frac{1\,086\,400}{(1 + 0{,}1152096)^3}$$

$$= \frac{86\,400}{1{,}1152} + \frac{86\,400}{1{,}1152} + \frac{1\,086\,400}{1{,}1152}$$

$$= 77\,475 + 69\,472 + 783\,306$$

$$\text{Market value} = \text{R930 253}$$

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	86 400
CFj_2	=	86 400
CFj_3	=	1 086 400
I/YR	=	11,52
NPV	=	930 253

Example 3: Preference share with non-constant growth

The statement of financial position of Company A shows 10 000 preference shares at a price of R200 each. The annual preference dividend is 20% per share per annum, which is expected to remain the same for the next two years. Thereafter, dividends will increase to R45 per share. Similar preference shares are trading at a return to shareh lders of 18%.

Required:

Va ue the preference shares and state whether they are debt or equity.

Solution:

The preference shares do not have a conversion option to ordinary shares. They are therefore debt.

The valuation of preference shares is the present value of future cash flows, discounted at the current required return of 18%.

Valuation	**Year 1**	**Year 2**	**Year 3 to infinity**
Dividend (200 × 20%)	40	40	45 (market value R250 in Year 2)
Market value		250	(see below)
	40	290	

Note: ***There is no tax on preference shares, therefore no adjustment is required.***

Step 1 Calculate the value of the shares as at the end of Year 2, based on future dividends from Year 3 to infinity.

$$\text{Value} = \frac{R45}{0{,}18} = R250$$

Step 2 Calculate the market value as at Year 0

$$= \frac{40}{(1 + 0{,}18)} + \frac{290}{(1 + 0{,}18)^2}$$

$$= 33{,}90 + 208{,}27$$

$$= 242{,}17$$

Total value $242{,}17 \times 10\,000$

$= R2\,421\,700$

Market value of debt is R2 421 700

Financial calculator instructions:		
CFj_0	=	0
CFj_1	=	40
CFj_2	=	290
I/YR	=	18
NPV	=	242,17

Example 4: 'Convertible' debentures

Company A has 1 000 d b ntur s in issue at a book value of R1 000 each. The current coupon (interest) paid equals R150 per deb nture b fore tax. The debentures fall due for 'conversion' (Note: normally this pertains to conversion to equity, but the same principles apply) in two years' time. The debenture-holders have the option of:

receiving a payout equal to the *book value* (face value or par value) of the debentures, ***or***

converting to new debentures at an indefinite coupon of R175 per debenture (irredeemable debent res), assuming an after-tax interest cash flow of R126 p.a. per debenture (i.e. R175 × (1 – 28%)), ***or***

c nverting to new five-year debentures at a coupon rate of 17,92% before tax per debenture (redeemable debentures), assuming an after-tax rate of 12,9% (i.e. 17,92% × (1 – 28%)).

The current tax rate is 28%, and similar debentures are trading at a yield-to-maturity (YTM) of 12% after tax.

Required:

C lculate the current value of the 'convertible' debentures today.

Solution:

Evaluate the three options at the end of Year 2

Option (i) Value 1 000 × R1 000 = R1 000 000

Option (ii) Value 1 000 × R1 050 = R1 050 000

Interest after tax R126 ×

Required return = 12%

Value $\frac{126}{0,12}$ = R1 050

Option (iii) Value 1 000 × R1 032,427

= R1 032 427

Interest rate after tax 12,9%

Interest after tax 12,9% × R1 000 = R129

Present value $= \frac{129}{1,12} + \frac{129}{1,12^2} + \frac{129}{1,12^3} + \frac{129}{1,12^4} + \frac{129}{1,12^5} + \frac{1\,000}{1,12^5}$

$= 115 + 103 + 92 + 82 + 73 + 567,427$

1 032,427 × 1 000

R1 032 427

Or Present value factor of a 5-year annuity @ 12% = 3,605

Present value factor of 12% at the end of 5 years = 0,567

Present value of a debenture

Interest	129 × 3,605	=	465
Capital	1 000 × 0,567	=	567
			1 032

Total value 1 000 × R1 032 000

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	129
CFj_2	=	129
CFj_3	=	129
CFj_4	=	129
CFj_5	=	1 129
I/YR	=	12
NPV	=	1 032

Choice?

Debenture- holders will choose to convert to indefinite debentures as they have the highest va ue of R1 050 000.

Practice questions

The following questions are intended to reinforce the important concepts that have been introduced in this chapter. Do not proceed to the next chapter before grasping the following questions.

Question 3–1: Present Value *(Fundamental)*

Which amount is worth more at 9%?

R1 000 today **or**

R2 000 after 8 years

Solution:

$$\text{Present value of R2 000 today} = \frac{2\,000}{(1 + 0{,}09)^8} = \frac{2\,000}{1{,}9926} = 1\,003{,}71$$

R2 000 after 8 years is worth more by R3,71

Financial calculator instructions:	
FV	= 2 000
I/YR	= 9
N	= 8
PV	= 1 003,71

Question 3–2: Present Value *(Fundamental)*

Mr B's friend wants to borrow a sum today at 8% interest and repay R20 000 in three years' time. How much will Mr B be willing to lend?

Solution:

$$\text{Present value} = \frac{20\,000}{(1 + 0{,}08)^3} = \frac{20\,000}{1{,}2597} = \text{R15 876,80}$$

Financial calculator instructions:	
FV	= 20 000
I/YR	= 8
N	= 3
PV	= 15 875,8

Questi n 3–3: Future Value *(Intermediate)*

Mr B needs R120 000 at the end of four years. He knows that the best he can do is to make equal payments into a bank account on which he can earn 10% interest compound annually.

His first payment will be made at the end of the first year.

Required:

Determine what amount he must invest annually to achieve his objective.

If he made one lump-sum payment today, how much would he need to invest to achieve his objective?

Solution:

(i) $FV_A = I \times \left[\frac{(1 + i)^n - 1}{i} \right]$

$120\,000 = I \times \left[\frac{(1 + 0{,}1)^4 - 1}{0{,}1} \right]$

$120\,000 = I \times \left[\frac{1{,}4641 - 1}{0{,}1} \right]$

$120\,000 = I \times 4{,}641$

$I = 120\,000 / 4{,}641$

$= R25\,856{,}50$

Financial calculator instructions:		
PV	=	120 000
I/YR	=	10
N	=	4
PMT	=	25 856,50

(ii) $PV = \frac{FV}{(1 + i)^n}$

$PV = \frac{120\,000}{(1 + 0{,}1)^4} = \frac{120\,000}{1{,}4641}$

$= R81\,961$

Financial calculator instructions:		
PV	=	120 000
I/YR	=	10
N	=	4
PV	=	81 961

Question 3–4: Present Value *(Advanced)*

Mr B is conside ing th ee investment opportunities, A, B and C.

A is expected to pay R800 a year for three years, followed by R1 000 a year for four years, followed by R2 000 at the end of the eighth year.

B is expected to pay R3 000 at the end of the fourth year followed by R400 indefinitely.

Investment C will pay R1 000 at the end of Year 2, R500 at the end of Year 3, followed by R400 at the end of Year 4 which will grow by 2% indefinitely.

Mr B has a required return of 10%.

Required:

For Investment A, calculate the present value of future cash flows as at the end of Year 3.

Calculate the present value of Investment A as at Year 0.

Calculate the present value of Investment B as at Year 0.

Calculate the present value of Investment C as at Year 0.

Solution:

(i) Investment A at the end of Year 3

Year	**4**	**5**	**6**	**7**	**8**
Cash flows	1 000	1 000	1 000	1 000	2 000

$$\text{Present value} = 1\,000 \times \frac{[1 - 1 / (1 + 0{,}1)^{4}]}{0{,}1} + \frac{2\,000}{(1 + 0{,}1)^{5}}$$

$$= 1\,000 \times 3{,}17 + \frac{2\,000}{1{,}6105}$$

$$= 3\,170 + 1\,241{,}85$$

$$= \text{R}4\,412$$

Financial calculator instructions:	
CFj_0	= 0
CFj_1	= 1 000
CFj_2	= 1 000
I/YR	= 10
NPV	= 4 412

(ii) Investment A

Year	**1**	**2**	**3**
Cash flows	800	800	800
Future cash flow			4 412
	800	800	5 212

$$\text{Present value} = \frac{800}{(1 + 0{,}1)} + \frac{800}{(1 + 0{,}1)^{2}} + \frac{5\,212}{(1 + 0{,}1)^{3}}$$

$$= 727{,}27 + 661{,}16 + 3\,915{,}85$$

$$= \text{R}5\,304$$

Financial calculator instructions:	
CFj_0	= 0
CFj_1	= 800
CFj_2	= 800
CFj_3	= 5 212
I/YR	= 10
NPV	= 5 304

Investment B

Year	**0**	**1**	**2**	**3**	**4**	**5**	**to infinity**
Cash flow					3 000	400	to infinity

PV at Year 4 of future cash flows

$$= \frac{400}{0,1}$$

$$= 4\,000$$

Cash flow at Year 4 $= 3\,000 + 4\,000$

$$= 7\,000$$

Present value at Year 0 $\frac{7\,000}{(1 + 0,1)^4}$

$$= \frac{7\,000}{1,4641}$$

$$= \text{R}4\,781$$

Financial calculator instructions:		
FV	=	7 000
N	=	4
I/YR	=	10
PV	=	4 781

Investment C

Year	**1**	**2**	**3**	**4**	
Cash flows		1 000	500	400	+ 2% growth to infinity

Value of investment growth as at Year 3

$$= \frac{400}{0,10 - 0,02}$$

5 000 [Formula $D_1 / K_e - g$]

Present value $= \frac{1\,000}{(1 + 0,1)^2} + \frac{500}{(1 + 0,1)^3} + \frac{5\,000}{(1 + 0,1)^3}$

$$= 826 + 376 + 3\,756$$

$$= \text{R}4\,958$$

Financial calc lator instructions:		
CFj_0	=	0
CFj_1	=	0
CFj_2	=	1 000
CFj_3	=	500 + 5 000
I/YR	=	10
NPV	=	4 959

Question 3–5: Future Value *(Intermediate)*

Mr A will invest R10 000 today, followed by four equal amounts at the beginning of each year. Interest rate is 10%.

Required:

Calculate the future value of the annuity if interest is compounded annually.

Calculate the future value if interest is compounded bi-annually.

Re-calculate **(a)** if the investments of R10 000 were made at the end of the year.

Solution:

(a) $FV_A = 10\,000 \times \left[\frac{(1+0{,}1)^5 - 1}{0{,}1}\right] \times (1+0{,}1)$

$= 10\,000 \times 6{,}1051 \times 1{,}1$

$= R67\,156$

Financial calculator instructions:		
PMT	=	10 000
N	=	5
I/YR	=	10
FV	=	67 156

(b) $FV_A = 5\,000 \times \left[\frac{(1+0{,}05)^{10} - 1}{0{,}05}\right] \times (1+0{,}05)^2$

$= 5\,000 \times 12{,}5779 \times 1{,}1025$

$= R69\,336$

Note: ***The assumption has been made that since the interest is compounded bi-annually, the amount invested is R5 000 per six-month period.***

(c) $FV_A = 10\,000 \times \left[\frac{(1+0{,}1)^5 - 1}{0{,}1}\right]$

$= 10\,000 \times 6{,}1051$

$= R61\,051$

Question 3–6: Value of preference share *(Intermediate)*

An investor holds indefinite non-cumulative preference shares. No dividends have been paid in the current year and no dividends are expected to be paid in the next two years.

The company has announced that it will pay a dividend of R38 per share at the end of Year 3, R40 at the end of Year 4 and R48 per share thereafter. Dividends are not expected to increase above R48.

The invest r h lds 1 000 shares. Return on debentures is 12%.

Required:

Ca cu ate the value today of the investor's preference shareholding.

Solution:

Year	**1**	**2**	**3**	**4**	**5**	**to infinity**
Dividends	–	–	38	40	48	to infinity

Value of shares as at Year 4

$$= \frac{48}{0{,}12}$$

$$= R400$$

$$\text{Present value at Year 0} = \frac{38}{(1+0{,}12)^3} + \frac{40}{(1+0{,}12)^4} + \frac{400}{(1+0{,}12)^4}$$

$$= 27{,}05 + 25{,}42 + 254{,}20$$

$$= R306{,}67$$

$$\text{Total value} = R306{,}67 \times 1\,000$$

$$= R306\,670$$

Financial calculator instructions:

CFj_0	=	0
CFj_1	=	0
CFj_2	=	0
CFj_3	=	38
CFj_4	=	40 + 400
I/YR	=	12
NPV	=	306,67

Chapter 4

Capital structure and the cost of capital

AFTER STUDYING THIS CHAPTER,THE STUDENT SHOULD BE ABLE TO –

- explain the advantages and disadvantages of debt finance in terms of financial risk and increased return to shareholders;
- explain the meaning and importance of the Weighted Average Cost of Capital (WACC);
- explain the mechanics of the Traditional theory;
- explain the mechanics of the Miller and Modigliani theory;
- show how a shareholder can benefit through arbitrage;
- explain how the optimal capital structure is derived under the Traditional theory;
- calculate the value and required return for equity and debt; and
- calculate the Weighted Average Cost of Capital (WACC).

When you consider all the debate around the business failure of 1Time Airlines, load-shedding by Eskom and the Gauteng e-tolling issue you will realise how important it is to be able to obtain and structure adequate debt levels to refinance aircraft which are cost efficient, to improve electricity supply and to finance upgrades to provincial roads. Such issues will be addressed in this chapter.

Increasing the value of the firm sustainably is one of the main objectives of a financial manager. When valuing a firm (i.e. determining shar hold rs' wealth), which will be dealt with later under valuations in chapters 10 and 11, we find that risk, cashflow and growth are major determinants of the value of an organisation.

Of these determinants, risk has already been partly discussed in chapters 1 and 2. In this chapter risk will be further analysed with eference to capital structure and the relationship between risk and required returns. You will lea n how to determine the optimal capital structure of an organisation, identify suitable forms of long-term finance in the context of capital structure theory, and how to calculate the weighted average cost of capital (WACC) for a given structure, taking cognisance of financial and business risk. Growth is discussed in the final section of this chapter.

The relati nship between risk and required returns will be revisited and dealt with further under portfolio the ry in chapter 5. The importance of cash flows will be demonstrated in more detail under the investment deci ion in chapter 6, while suitable forms and sources of long-term financing will be discussed under the finance decision in chapter 7. The analysis of financial statements to evaluate risk is handled in chapter 8, whi st the significance of growth as an important determinant of valuation is revisited in chapter 11.

The 'capital structure' of a company refers to its long-term financing. Companies are financed by owners' equity, or by a mixture of owners' equity plus debt. When asked whether debt or equity is cheaper, many people respond that equity is cheaper. The assumption being made here is that equity is 'free' as it has been given by the owners of the business, whereas if the firm takes on debt it is obliged to pay interest to the bank as well as provide security.

The question is: Should a company have debt as part of its capital structure? Put another way, does a company gain any advantage by using debt finance?

4.1 Debt advantage

Contrary to the belief that equity might be cheaper than debt, it is important to note that there are three reasons why equity is more expensive than debt:

Who carries the highest risk when providing capital to a firm? The answer is the ordinary shareholders, or the providers of equity. Should the firm face insolvency, the ordinary shareho ders stand at the back of the queue in respect of getting their money back.

2 Who expects and requires a higher level of return? Notwithstanding the risk spect, ordinary shareholders are the most demanding of all when it comes to getting a return on their funds. After all, this is the reason that they have invested in the company.

3 What achieves the best tax advantage? From the perspective f the firm, all forms of debt (borrowing), other than preference shares, are tax-deductible. This is ften referred to as the tax-shield advantage of using debt to fund operations.

In light of the reasons mentioned above, debt is therefore considered to be cheaper than equity.

Example:

Company A requires R1 million to finance a new proj ct. The cost of equity, k_e, is 20%. The cost of debt is 25% before tax. The tax rate is 40%.

Required:

Determine which form of finance is cheaper.

Solution:

The above example clearly illustrates that ordinary shareholders require a return of 20% after tax. If the company borrows at 25%, the effective cost of debt finance is:

25% × (1 – 40% tax rate) = 15%

If the investment promised an expected return of R400 000 before tax, the return to the shareholders would be as follows:

	Equity financed R1 million	**Debt financed R1 million**
Investment		
Cash flow	400 000	400 000
Debt interest	–	250 000
Return before tax	400 000	150 000
Tax @ 40%	160 000	60 000
Return after tax	240 000	90 000

In this example, if the shareholders provide the funding, they will receive a return

of: 240 000/1 000 000 = 24%, which is 4% above the required return of 20%.

However, if the project is financed using debt, the company will make a profit of R90 000 without the hareholders making any personal investment. Shareholders will make what appears to be a risk-free return of R90 000 without making any additional investment (i.e. their personal investment is zero).

Fin ncial gearing improves shareholder return

Financial gearing refers to the benefit of using debt finance to improve or gear-up the existing return on shareholder investment. Even though the return after tax for equity financed is greater than the debt financed option, the point is that the R90 000 return after tax is without any further shareholder investment.

Example:

Company A is currently financed by R1 000 000 equity only. Company returns after tax equal R240 000. The company wants to expand by investing a further R1 million in a project that promises an expected return of R400 000 before tax.

The shareholders required return k_e = 20%, while the cost of debt is 25% before tax. The tax rate is 40%.

Required:

Compare the return to shareholders, when the investment is financed by new equity as opposed to debt finance.

Solution:

	Equity financed	**Debt financed**
Cash flow	400 000	400 000
Debt interest	–	250 000
Return before tax	400 000	150 000
Tax @ 40%	160 000	60 000
Return after tax	240 000	90 000
Existing return after tax	240 000	240 000
Total return	480 000	360 000
Shareholders' investment	2 million	R1 million
Shareholders' return	480 000/2m	360 000/1m
	= 24%	= 36%

Conclusion:

It would appear that the ordinary shareholders would be better off financing the project using debt finance, as their return on investment has increased to 36% without any personal financial investment.

4.2 Debt disadvantage

Financial risk of the company increases as the company takes on debt finance

There are two types of risk: business (operation) risk and financial risk. **Business** or **operation risk** emanates from the uncertainty attached to the many factors that influence the ability of a company to generate earnings. Clearly, some busin ss s are more risky than others. Operating an oil-rig, for instance, is more risky than running a supermark t. It th r fore stands to reason that shareholders will expect a return (k_e) equal to the level of business risk. When a company is financed by equity only, **k_e = business risk**.

Business risk is dependent on the nature of the business, the operating leverage, that is, whether it is capital-intensive (meaning that it has a high fixed cost and a low variable cost structure) or labour-intensive (low fixed cost and high va iable cost), the state of the physical assets, competition, product substitution, etc. It should be noted, however, that it is debatable whether labour cost in general and especially in South Africa can be treated as variable cost. An enterprise's future annual earnings may be regarded as a probability distribution. The wider the dispersion of the possible earnings, the higher the operating risk.

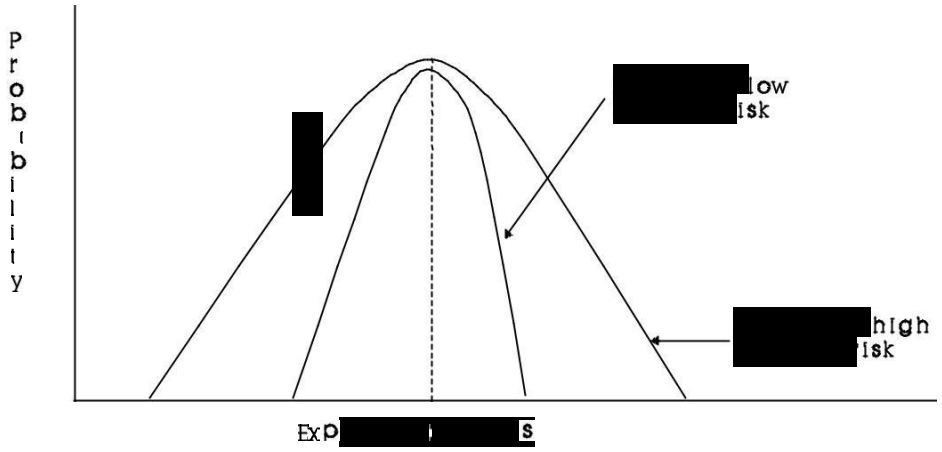


Figure 4.1: Business risk curves

Financial risk is the risk that relates to the borrowing of long- and sh rt-term debt. By financing a part of the company's assets by borrowing money, a company becomes liable f r making –

monthly or annual interest payments; and

capital repayments.

The objective of using financial gearing is to increase the return to the shareholders, as it is anticipated that the cost of debt will be lower than the returns offer d by the assets purchased with the borrowed funds. A company therefore takes the risk that funds will be available to r pay both the interest and the capital liability. It is therefore faced with default risk, which could be avoided if it chose to use equity finance only.

Where a company takes on financial risk, there is no doubt that the shareholders' required return, k_e, will increase to a certain extent, due to financial risk.

Example:

Company A is currently financed by R1 000 000 equity only. Company returns after tax equal R240 000. The company wants to expand by investing a further R1 million in a project that promises an expected return of R400 000 before tax.

The shareholders required return, k_e = 20%, while the cost of debt is 25% before tax. The tax rate is 40%.

Required:

Compare the return to shareholders when the investment is financed by new equity rather than debt finance.

Solution:

The shareholders' required return of 20% refers to business risk only, as the company is financed by equity only. Assuming that the new investment is an expansion of existing business risk, the shareholders' return of 20% will not change, as long as the new investment continues to be financed by equity.

However when the new investment is financed by debt, the shareholders' risk increases due to financial risk. This means that shareholders will demand a higher return for financial risk, which could wipe out the benefits of cheap debt finance.

	Equity financed	**Equity financed plus debt financed**
Ca h flow	400 000	400 000
Debt intere t	–	250 000
Return before tax	400 000	150 000
T x @ 40%	160 000	60 000
Return after tax	240 000	90 000
Existing return after tax	240 000	240 000
Total return	480 000	360 000

Shareholders' investment	R2 million	R1 million
Shareholders' return	480 000/2m	360 000/1m
Expected return, k_e	= 24%	= 36%
Required return, k_e	= 20%	= ?

Shareholders required return for equity and debt financed companies

= Business risk + Financial risk

= k_e + ?

Assuming that in this example, financial risk as perceived by the shareho ders equa s 6%, then the required return will equal 26% (20% + 6%).

If, on the other hand, financial risk is equal to (say) 15%, then the required return will be 35% (20% + 15%), and as the expected return is 36%, the shareholders will receive a return of only 1% bove the required return. However, if the project is financed via equity finance, the shareholders can expect a return of 24%, which is 4% above the required return.

Important: k_e always equals Business risk + Financial risk

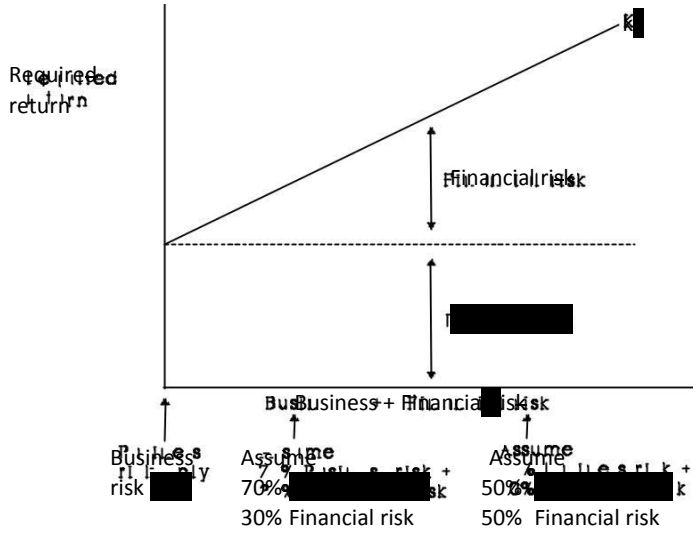


Figure 4.2: Required return and risk

Note: If a company has no debt and the cost of equity, k_e, is 30%, then business risk equals 30%. If the company does have debt in its capital structure, then one can expect the k_e to be higher than 30% (40%, say) as this will r present business risk + financial risk.

4.3 Finan ial gearing

Financial gea ing desc ibes the proportion of debt compared to the proportion of equity financing. It is a measure of financial leverage, showing the degree to which a firm's operations are funded by debt as opposed to equity. High financial gearing means that a company places a heavy reliance on debt financing, while low financial gearing means that the firm is heavily reliant on equity financing. Generally speaking, a company with high financial gearing will show a higher earnings per share in times of economic upturn, compared to a company with a low gearing. In times of an economic downturn, high gearing companies will do worse than companies with low gearing. High financial gearing also implies increased risk. High risk-takers will do well in good times and show below average returns in bad times.

Note: It is important to distinguish between three important ratios.

- Gearing ratio: Long-term debt/(Long-term debt + Equity)
- Debt (solvency) ratio: Total debt/Total assets
- Debt to equity (D:E) ratio: Non-current liabilities to Equity

Example:

Three companies have the following financial structure:

	Company A	Company B	Company C
Total assets	R2,0m	R2,0m	R2,0m
Issued shares (R1 each)	R1,5m	R1,0m	R0,5m
Total debt	R0,5m	R1,0m	R1,5m

All the companies are in the same type of industry and equally efficient. The cost of debt is 15% and the tax rate is 40%.

Consider the following three situations:

Situation 1 operating profit before tax is R150 000

Situation 2 operating profit before tax is R300 000

Situation 3 operating profit before tax is R600 000

Required:

Calculate the earnings per share in Companies A, B, and C for each of the above economic situations.

Solution:

Low gearing Company A

	Operating income		
	Situation 1	Situation 2	Situation 3
	R	R	R
Profit before interest and tax	150 000	300 000	600 000
Interest	(75 000)	(75 000)	(75 000)
Taxable profits	75 000	225 000	525 000
Tax payable	30 000	90 000	210 000
Earnings available to ordinary shareholders	R45 000	R135 000	R315 000
Earnings per share (1 500 000 shares)	R0,03	R0,09	R0,21

Medium gearing Company B

	Operating income		
	Situation 1	Situation 2	Situation 3
	R	R	R
Profit before interest and tax	150 000	300 000	600 000
Interest	(150 000)	(150 000)	(150 000)
Taxable profits	Nil	150 000	450 000
Tax payable	Nil	60 000	180 000
Earnings available to ordinary shareholders	Nil	R90 000	R270 000
Earnings per sha e (1 000 000 shares)	Nil	R0,09	R0,27

High gearing Company C

	Operating income		
	Situation 1	Situation 2	Situation 3
	R	R	R
Profit before interest and tax	150 000	300 000	600 000
Interest	(225 000)	(225 000)	(225 000)
Taxable profits	(75 000)	75 000	375 000
Tax payable	Nil	30 000	150 000
Earnings available to ordinary shareholders	(R75 000)	R45 000	R225 000
Earnings per share (500 000 shares)	(R0,15)	R0,09	R0,45

In the above example, shareholders of the highly-geared company will benefit when operating profits are above R300 000 (15% return on assets), that is, the break-even point.

Companies with high gearing have greater financial risk because the interest charge is fixed, that is, it must be paid, regardless of the level of company profits. The key ratio in this instance is interest cover, that is, the number of times that Earnings before Interest and Tax (EBIT) cover interest. The higher the interest charge or the lower the EBIT, the higher the company risk.

The important question in the long-term financing decision is whether the cost of capital for a company is dependent on its financial structure (i.e. how it is funded). If long -term debt does affect the cost of capital, then the company should minimise its cost of capital by borrowing an amount of debt capital that will give the company the lowest cost of capital.

4.4 Debt as part of the capital structure

The following have been established:

- The cost of debt is lower than the cost of equity due to l wer risk, lower expected returns and tax advantages.
- Introducing debt finance into the firm's capital structure brings with it financial risk which increases the cost of equity, k_e.
- Financial gearing (taking on debt finance) improves the return to shareholders in good economic times, but may lower the return when the economy is struggling.

The question that must now be answered is: **'Should a company take on debt, and if so, how much?'** There are two schools of thought on whether there is any advantage of debt financing. The **Traditional theory** takes the viewpoint that debt finance is acceptable and will lower the overall company cost of finance as long as the company does not take on too much debt.

The second theory, that is, the **Miller and Modigliani theory**, states that debt finance brings with it financial risk such that the cost of equity, k_e, will increase, leaving the Weighted Average Cost of Capital (WACC, see section 4.11) of a company equal to the cost of business risk, which is the required rate of return for the all-equity funded company. Whether a company takes on debt or not, it cannot lower the overall cost of finance below the required return associated with the business risk.

4.5 Compensating providers of capital

WACC represents the return that a company needs to achieve in order to fully compensate the debt providers as well as the equity providers.

Example:

Company A is financ d 60% through equity and 40% via debt. The shareholders' required return, k_e = 20%, while the debt providers require an interest payment equal to 25% before tax. Tax rate is 40%. The market value (MV) of equity equals R600 000, while the market value (MV) of debt equals R400 000.

Required:

Calculate the WACC for Company A and show how much profit must be generated to fully satisfy both the debt and equity providers.

Soluti n:

The co t of equity of 20% represents both the business risk and financial risk of equity shareholders, because the company already has debt in its capital structure.

WACC	= 20% × 60/100	+ (25% × 60% × 40/100)
	= 12% + 6%	
	= 18%	
Interest	= R400 000 × 25%	
	= R100 000	

	Equity return	= R600 000 × 20% = R120 000
	Cash flow before tax	= 120 000/60% = R200 000
	Interest	= R100 000
	Required profit before tax	= R200 000 + R100 000 = R300 000

Proof:	Profit before tax	300 000
	Interest (400 000 × 25%)	100 000
	Profit before tax	200 000
	Tax (@ 40%)	80 000
	Profit after tax	120 000
	Return to ordinary shareholders =	120 000/600 000 20%

Traditional capital structure theory

The traditional, or generally believed, theory of capital structure assu es that an optimal capital structure does exist and depends on the level of gearing. The company cannot maximise shareholders' wealth unless the optimal WACC is achieved. In short, it assumes that the firm's cost of capital is dependent on its capital structure.

Because debt capital has a lower after-tax cost than equity capital, as it is moderately increased, the WACC falls. The moderate increase in debt does not increase the overall risk of the firm and therefore the company does not have to offer a higher return to shareholders to compensate for the increased risk. As debt capital is further increased, the WACC will continue to fall, up to a certain point. After this optimal level is reached, any further increase in debt capital will increase the risk of the firm and the shareholders will demand a higher yield.

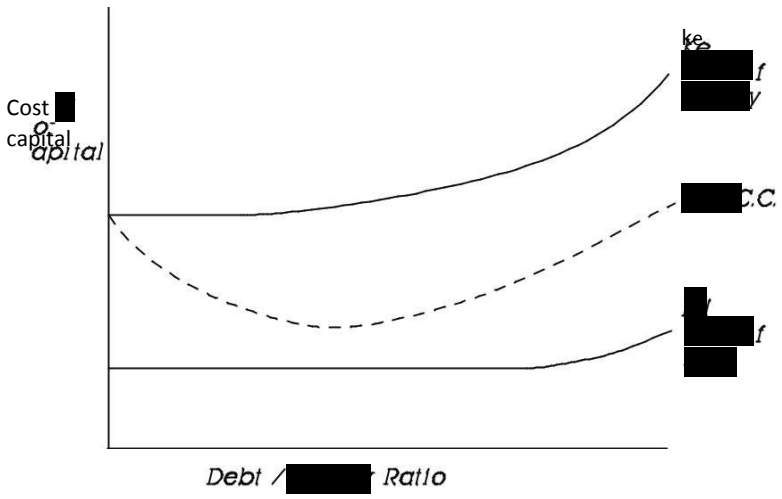


Figure 4.3: Diagrammatic representation of the traditional capital theory

The extreme left of the horizontal axis represents the all-equity firm, while the extreme right represents the fu y-geared company (high proportion of debt to equity). It is assumed that the cost of debt remains constant, a though in practice, it will probably rise, as lenders may require a higher return for higher risk as the proportion of borrowing increases. The traditional view, then, is that up to a moderate level of gearing, the fin ncial risk is minimal and only a small increase in the return on equity is required. The cheap debt will lower he WACC. As the firm continues to increase debt, shareholders become more aware of financial risk and as a result require additional returns on equity capital.

The Traditional theory concludes that there is an optimal or target capital structure for every company. The optimal D:E ratio is determined at the lowest average cost of capital, as shown in Figure 4.3. It is also important

to note that at this point, the overall value of the company is maximised, simply because it has obtained the most optimal financing mix. In practice, it is difficult for a company to determine the target D:E ratio, but it will be guided by the capital structure of similar quoted companies. It must be understood that different business sectors will have different capital structures.

Alternative diagram

It is assumed in Figure 4.4 that the shareholders in an all-equity company require a return, k_e, equal to business risk. As the company takes on financial risk, it can be assumed that the shareholders will initially continue to require a return, k_e, equal to business risk and it is only as financial risk increases significantly that k_e starts to increase to compensate for increased financial risk.

There is nothing wrong however, with making the assumption that k_e incre ses s soon as debt finance is taken on by the company. The key question is: **'What happens to the WACC?'** If the WACC decreases to an optimal point before it starts to increase, the representation is still classified as the Traditional theory.

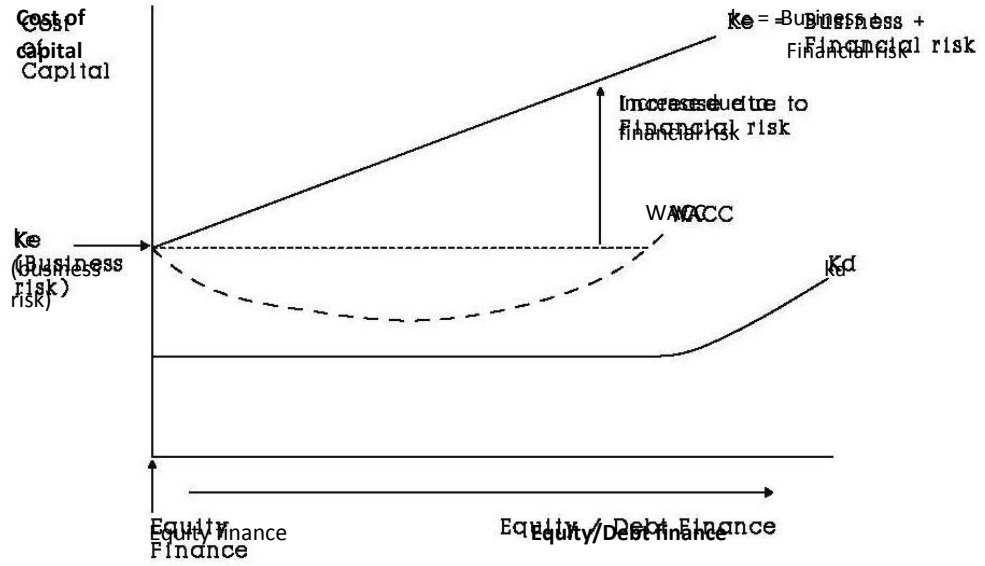


Figure 4.4: Optimal WACC

The WACC can be described as

$$WACC = k_e \times \frac{v_e}{v_e + v_d} + k_d \times \frac{v_d}{v_e + v_d}$$

Where:

k_e = quity-holders' required rate of return
k_d = debt-holders' required rate of return after tax
v_e = MV of equity
v_d = MV of debt

Note that the value of the company = $v_e + v_d$

Example:

C mpany A has determined that the cost of equity k_e increases as the company takes on debt finance as foll ws:

MV of equity	MV of debt	k_d after tax	k_e	WACC
100%	0%	–	20%	20,0%
80%	20%	12%	21%	19,2%
60%	40%	12%	22%	18,0%
50%	50%	12%	25%	18,5%
40%	60%	14%	28%	19,6%
20%	80%	17%	30%	20,0%

Required:

Show how the WACC has been calculated and determine the optimal D:E ratio.

Solution:

D:E ratio	k_d	k_e	WACC		
0:100	–	20	20	=	20,0%
20:80	12	21	(12 × 20/100) + (21 × 80/100)	=	19,2%
40:60 (optimal)	12	22	(12 × 40/100) + (22 × 60/100)	=	18,0%
50:50	12	25	(12 × 50/100) + (25 × 50/100)	=	18,5%
60:40	14	28	(14 × 60/100) + (28 × 40/100)	=	19,6%
80:20	17	32	(17 × 80/100) + (32 × 20/100)	=	20,0%

The company should finance its long-term activities by using a target D:E ratio of 40% debt to 60% equity.

Note: ***The optimal D:E ratio is a target that the company should stri e for. In the short-term, the company will always be in a position of disequilibrium, as it will s metimes use debt finance and on other occasions equity finance. The market value of both debt and equity will also change in value daily, due to market forces.***

Market value of a company

The market value of a company = Market value of quity + Market value of debt

The market value of equity can be calculated as:

$$MV_e = \frac{D_1}{k_e} \text{ (where the company has zero growth)}$$

Or $$MV_e = \frac{D_1}{k_e - g} \text{ (where the company grows at a constant rate)}$$

The market value of debt can be calculated as:

$$MV_d = \frac{\text{Interest paid after tax}}{\text{Current cost of debt after tax}}$$

where debt is for an indefinite period (i.e. a perpetuity).

The market value of a company, V_0, will therefore equal

$$V_0 = \frac{\text{Dividend}}{k} + \frac{\text{Debt interest}}{k_d} \text{ (after tax)}$$

Or $$V_0 = \frac{\text{Divid nd} + \text{Debt interest}}{\text{WACC}} \text{ (after tax)}$$

Note: ***k_d will be the cu rent market required rate of return, not the historical cost of debt.***

In the event that the amount of dividends or interest to be paid is unknown, an alternative way to work out the market val e of the company is:

$$V = \frac{\text{Annual EBIT} \times (1 - \text{Tax rate})}{\text{WACC}}$$

Conc u ion:

The gearing ratio that minimises the WACC, maximises the total market value of the firm, and thus maximises the market value of equity capital.

4.7 The Miller and Modigliani theory

In 1958, Miller and Modigliani proposed that there is no optimal capital structure, because the advantage of debt would be exactly counteracted by an increase in k_e, such that the WACC would always equal business risk. Miller and Modigliani, however, made certain assumptions as follows:

investors are rational;

all investors have the same expectation about the future;

capital markets are perfect;

all relevant information is freely available;

there are no transaction costs;

there is no taxation, or no distinction between company and personal tax;

firms can be grouped into business risk or operating risk classes; and

individuals and firms can borrow at the same rate, and pers nal gearing is assumed to be a perfect substitute for company gearing.

Miller and Modigliani argued that the cost of capital is independent of the capital structure, and hence the value of the firm is independent of the proportion of debt to total capitalisation.

Note: The Traditional theory argues that the cost of capital is dependent on the capital structure.

As debt financing increases, the initial effect would be to low r the WACC, thus increasing the value of the firm. Miller and Modigliani, however, argue that the incr as d gearing results in shareholders requiring an increased return to balance out the increased risk. The change in the required equity return will just offset any possible saving or loss on the interest change. As gearing increases (or decreases), the WACC will remain constant, therefore no optimal level of capital gearing exists. In effect, Miller and Modigliani argue that a firm should be indifferent as to whether it is funded by debt or equity. Further, they argue that it is the assets that determine the value of the company, not the manner in which those assets are financed.

In the Miller and Modigliani theory, the equilibrium factor that restores the WACC to equal the k_e of the all-equity funded firm is the arbitrage process. The arbitrage process takes place where two firms of identical income and risk exist, but one is funded solely by equity and the other has a mixture of debt and equity. The D:E-funded company has a temporarily higher value than the all -equity funded company, due to a lower cost of capital. The investors would arbitrage in order to equalise the values of the two companies. This is achieved when the WACC of the D:E-funded company equals the k_e of the all-equity funded company.

Miller and Modigliani stated that the market value of the firm equals

$$V_o = \frac{Y}{k_o}$$

Where:

	V_o	MV of the firm
	Y	dividend + interest
	k_o	WACC

Very important: Any change in the mix of D:E finance will have no effect on the value of Y.
k_o and V_o will also remain constant.
The gearing mix will result in a change of the dividend/interest mix only.

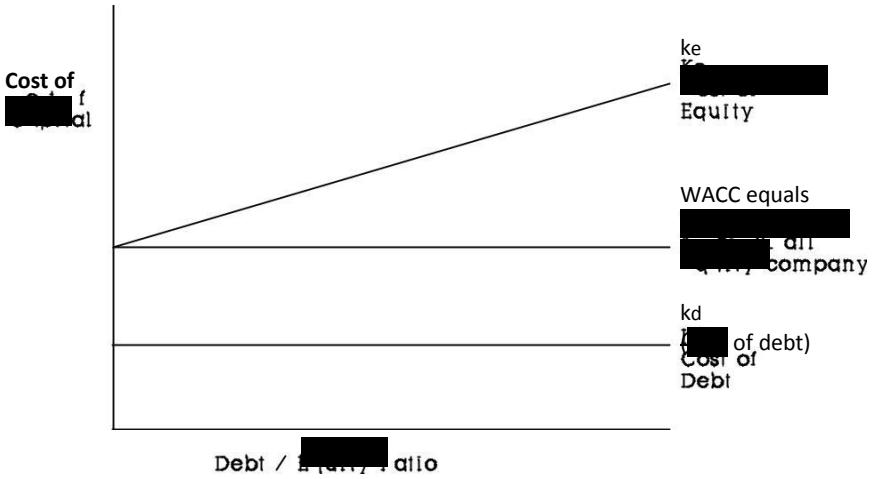


Figure 4.5: Diagrammatic representation of the Miller and Modigliani theory

4.8 The arbitrage process

The **arbitrage process** is a term used to describe how an investor in a company that has both debt and equity finance will only be satisfied if he is receiving a return (k_e) that fully co pensates him for financial risk. If he is not adequately compensated, he will invest in an all- quity financed company and increase his return by taking on personal financial risk by borrowing at a cost equal to the corporate borrowing rate.

Example:

Two companies, A and B, operate the same type of business and have identical levels of business risk.

Company A has the following capital structure:

Book value of equity	=	R1 500 000
MV of equity	=	R3 000 000
Cost of equity capital	=	12%
Issued shares	=	12 000 000
Current dividends	=	R360 000

Company B has the following capital structure:

Book value of equity	=	R4 000 000
MV of equity	=	R6 000 000
Book and MV of debt	=	R6 000 000
Cost of equity capital	=	14%
Cost of debt (aft r tax)	=	6%
Issued shares	=	6 000 000
Current dividends	=	R840 000

Required:

Calculate the WACC of the two companies and state whether the companies are operating in a traditional or Miller and Modigliani world.

Ass ming that the two companies are operating in a Miller and Modigliani world, discuss the advice that c uld be given to the shareholders of Company B.

Calculate the equilibrium cost of equity, k_e, for Company B shareholders, and the equilibrium market value of Company B shares, assuming that the market value of Company A shares and the market value of Company B debt are correct.

So ution:

(i) WACC – Company A

Company A is all-equity financed. The cost of equity, k_e, is 12%. Assuming that the market value of R3 000 000 for equity is correct, then the WACC will be 12%.

WACC – Company B

Company B is financed 50% equity + 50% debt

k_e = 14%

k_d = 6%

WACC = 14% × 50% + 6% × 50%

= 10%

The Traditional theory states that as a company takes on debt, the WACC will decrease and the company should finance its operations at the target D:E ratio. In this example, Company B has taken on debt which has resulted in the WACC dropping from 12% to 10%. It would appear that the company is operating in a **traditional** world.

Which shareholder is better off; Company A shareholder or Company B sh reholder? One would be tempted to state that the shareholders of Company B are better off than Company A sh reholders as they are receiving a return which is 2% higher (14% vs. 12%).

Important: ***Company B shareholders are exposed to financial risk and it is appropriate that they should be compensated for such risk by receiving a higher return. This means that the 14% return for Company B is not necessarily better than the 12% f r C mpany A. The question that needs to be answered is: 'Are the shareholders of Company B adequately c mpensated for the financial risk?' If the answer is 'No', they will sell their shares in Co pany B and invest in Company A.***

It has been stated that it appears that Co panies A and B are operating in a traditional world. This is not necessarily the correct answer. Miller and Modigliani would argue that Company B is in a temporary position of disequilibrium, and that the shareholders of Company B are not adequately compensated for their lev l of financial risk. Arbitrage will take place to ensure that the return for shareholders of Company B will incr ase until the WACC of Company A equals the WACC of Company B.

Possible answers:

(a)

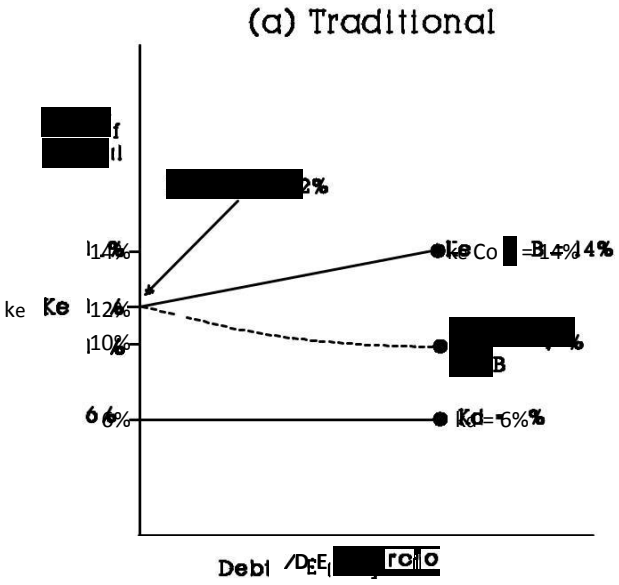


Figure 4.6: Traditional capital theory

(b)

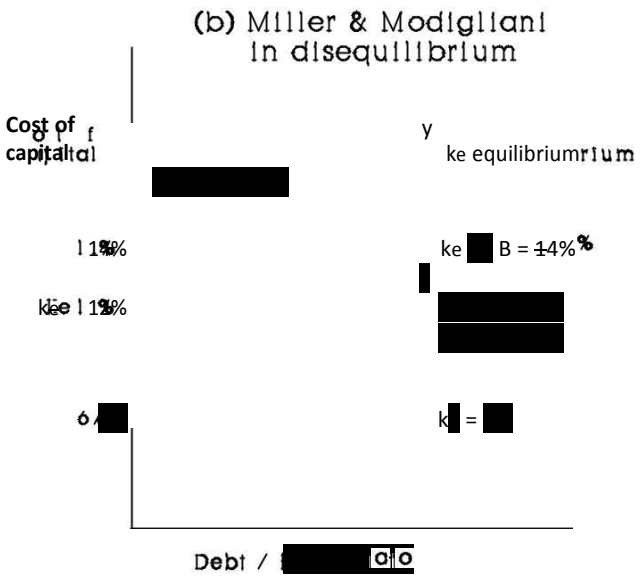


Figure 4.7: Miller and Modigliani theory in disequilibrium

Note: ***k_e of Company A = Business risk only***
k_d of Company B = Business risk plus financial risk

In a Miller and Modigliani world, the **critical factor** is the WACC, which must always equal the business risk of an all-equity company.

In this example, business risk = 12%

Therefore WACC = 12% at all D:E ratios

Company B (refer to Figure 4.7), has a WACC of 10%. Miller and Modigliani would argue that the shareholders' return of 14% is in temporary disequilibrium, as the WACC should equal 12%. As debt is correctly valued, the shareholders of Company B are not adequately compensated for financial risk. In the short-term, Miller and Modigliani would expect k_e to increase to the point **Y**, and the WACC to increase from 10% to 12% at the point **X** in Figure 4.7 above.

Note: Market value of Company B shares = Dividend/k_e

The dividend of Company B, that is, R840 000, cannot change, as it is derived from business operations and is not dependent on the market value of shares or shareholders' required return. For there to be an increase in k_e, it is necessary for the mark t value of the shares to drop. In other words, the share value of Company B is overstated and the share price must drop.

If the value of a share in reases, the cost of equity will drop

For example:

MV = 6 000 000
D_1 = 840 000
k_e = 14%

If the market value dropped to R5 000 000, the following would result:
MV = D_1/ k_eMaking k_e the subject, then
k_e = D_1/ MV
840 000/5 000 000
0,168 or 16,8%

If the market value increased to R7 000 000, the following would result k_e = D_1/MV
840 000/7 000 000
0,12 or 12%

(ii) Advice to the shareholders of Company B

If the two companies are operating in a Miller and Modigliani world, the WACC of both companies should equal the business risk of an all-equity company. Company A is an all-equity company with a k_e or WACC equal to 12%.

The WACC of Company B is currently 10%, which means that the return of 14% for shareholders is too low. The company is in temporary disequilibrium and the share value is too high. k_e must increase such that WACC will equal 12%. For k_e to increase, the share price must drop. The shareholders of Company B should be advised to borrow an amount equal to the D:E ratio of Company B and invest the total amount in Company A, to receive a return higher than the existing 14%.

Assuming that the ordinary shares in Company A are correctly valued at 25 cents, as well as the debt in Company B, investors in Company B will wish to sell their shares and re-invest in Company A. As a result, buying pressure will be placed on Company A's shares.

Assuming an investor in Company B holds 100 shares in that company, the market value is R100 and the annual dividend R14. By holding 100 shares in the company, the investor is exposed to financial risk. He can improve his return by selling his shares in the company, borrowing an am unt f money that will give him the same financial risk as he presently holds, and investing the proceeds in C mpany A.

Is the shareholder better off by investing in Company A?

	Total cash
Sell 100 shares at market price	R100
Borrow to retain 50:50 gearing	R100
Total cash	R200

Purchase 800 shares in Company A.

Current risk/return situation

The investor will have the same risk profile as he previously had with his investment in Company B by borrowing R100 and investing the proceeds of R200 in Company A shares.

His return is now

	Total cash		
Dividends from Company A	R24		
Interest on borrowing (after tax)	(R6)		
Net return	R18	**or**	18/100
			= 18%

This represents a gain of R4 p r year over the income received as a shareholder in Company B, while retaining the same finan ial risk.

Miller and Modigliani state that the share price of Company B will move towards an equilibrium, which will be reached when the WACC of the two companies is the same and no further arbitrage gains can be made.

Note: ***Shareholders in Company B can improve their return, for the same level of financial risk, from 14% to 18%.***

D es this mean that 18% is the equilibrium return that will yield a WACC for Company B of 12%? No. If k_e f r C mpany B increases to 18%, it will mean that the market value of equity will drop such that the D:E ratio will no longer be 50:50 as at the present moment.

Equilibrium k_e and market value of shares in Company

B k_e and WACC for Company A equals 12%

$$\text{Company value} = \frac{\text{Dividend + debt interest}}{\text{WACC}}$$

Equilibrium value of Company B

$$= \frac{840\,000 + 360\,000}{0{,}12}$$

$$= \text{R10 000 000}$$

MV of Company B debt = R6 000 000

Therefore equilibrium value of Company B equity = R10 000 000 – R6 000 000

= R4 000 000

Equilibrium k_e

Dividend = 840 000

Equity MV = 4 000 000

$$k_e = \frac{D1}{MV}$$

$$= \frac{840\,000}{4\,000\,000}$$

= 21%

This results in the following:

Debt	MV	=	6 000 000	k_d	=	6%
Equity	MV	=	4 000 000	k_e	=	21%
WACC of Company B		=	6% × 6/10 + 21% × 4/10		=	12%

Review the steps again, to make sure you follow the logic:

The investor always starts off by owning shares in the D:E funded company, in this case Company B.

Believing that she can receive a higher return from the all equity funded company, the investor sells her shares in Company B worth R100 and borrows an amount at the SAME D:E ratio (50:50) as Company B. In other words, she now substitutes Company B's gearing with her own personal gearing. It stands to reason that this is a rational move, as she can obtain a higher return from Company A with the same level of risk as investing in Company B.

She now takes her own funds (R100) plus the borrowed funds (R100) and invests the total amount (R200) in the all equity funded company.

Even after paying the interest, she still receives a higher return from Company A than Company B (R18 vs. R14).

As Miller and Modigliani assumed that all investors are rational, everybody will take advantage of this arbitrage opportunity. Hence by selling Company B shares and buying Company A shares, the price of B will go down and A will go up, thereby restoring the equilibrium to the point that the WACC of Company B will equal the k_e of Company A.

Concl sion:

In a Miller and Modigliani (1958) world, the above example illustrates temporary market disequilibrium. Market f rces w uld ensure that the market values of both companies will move to a point where they will be in equilibrium. There will thus be no financial advantage for an investor to sell his shares and purchase similar shares in another company, as his return will not improve.

4.9 Optimal capital structure – traditional world

It h s been established that there is no optimal capital structure in a Miller and Modigliani (1958) world.

Miller and Modigliani made a correction to their theory by incorporating tax in 1963, in an article titled *Corporate income taxes and the cost of capital: a correction*, which was published in the *American Economic Review* 53 (3):433–443. According to this view, the value of a company is maximised by taking on maximum

debt. On the other hand, low debt levels have sometimes proved to be indispensable when a company needs to raise cash.

Later research, which incorporated bankruptcy costs and agency theory, led to a theory where an optimal capital structure is obtained where the WACC is at a minimum.

As the assumptions of a Miller and Modigliani world seldom (if ever) apply to South Africa, it is safe to conclude that the traditional view more closely resembles the real world, and that companies should lower their WACC by taking on an amount of debt such that the WACC reaches the optimal level. This reverts to the traditional capital structure theory.

Does that mean that all companies should have debt in their capital structure?

Certain authors believe that individuals and companies should be debt free. However, GB Stewart (1993) is a supporter of aggressive debt in his book *The Quest for Value*. Whether the view of the authors of this publication is followed or not ultimately boils down to one's personal affinity for risk. Debt will always increase the shareholder's risk in the manner stated by Miller and Modigliani. E en in a world that does not conform to the Miller and Modigliani assumptions, the WACC will not decrease bel w business risk. The student is invited to come to his or her conclusions. It is this trying to get to grips with the the ry of capital structure that makes what happens in the so-called 'real world' so interesting.

For the purposes of this textbook, the traditional theory assu ptions as they pertain in a South African context will be followed.

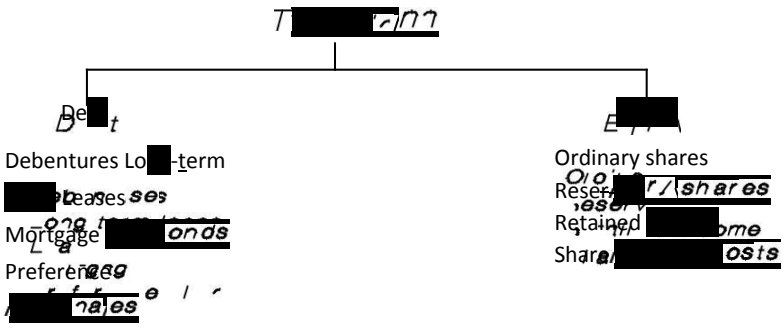


Figure 4.8: Sources of finance

It is not always clear whether a particular security is debt or equity. Companies will sometimes create hybrid securities that look like equity but are called debt for tax-benefit purposes. In the authors' opinion, only ordinary shares (or any security that has conversion rights to ordinary shares) should be classified as equity.

A **preference share** is a debt instrument that entitles the holder to a pre-determined dividend distribution before dividends are paid to ordinary shareholders. These shareholders do not, however, participate in decision-making, ass t own rship or in the distribution of super profits. In the event of liquidation, they also have preference rights ov r company assets. Preference shares have all the characteristics of debt, but unlike debt, the dividend cannot be d ducted as an interest expense when calculating taxable income.

Preference shares without the option of conversion to ordinary shares should be classified as mezzanine or hybrid capital (Annexu e A, chapter 7).

Accepting that the e is an optimal capital structure, one can assume that a company is currently structured at the target D:E ratio at market value, or that it is in temporary disequilibrium. Where a company is in temporary disequilibri m, it will, in the long-term, finance its capital needs in order to move towards the target D:E ratio.

This means that a company can at any point in time have too much debt, or a debt capacity that is under-utilised. As l ng as a company sets its sights on the long-term target D:E ratio, it is acceptable to have too much debt at a pecific point in time, on the assumption that the target ratio will be achieved at some future date.

Important: ***When calculating the current WACC of a company or the WACC after taking on a new investment, all calculations must be made at MARKET VALUES, NOT AT BOOK VALUES.***

4.10 The cost of capital

When appraising a capital investment project, a discount rate is required. The rate used to evaluate the capital investment must reflect the risk of the project. The target WACC (see section 4.11 below) rate is the correct rate for capital appraisal, as it reflects the desired capital structure of the firm and the return required by the

shareholders after allowing for risk. The WACC is the rate that combines the expected returns at a firm's **target** D:E capital ratio. The firm's existing capital structure at market values can be used where it reflects the optimal mix.

There are three assumptions behind the use of a firm's current WACC as the discount rate in investment appraisal, :

The firm will retain its existing proportion of debt to equity capital (i.e. current = target).

The project is marginal. Most investments are indeed small, relative to the total capital value of the firm.

The project has the same level of risk as the firm's existing activities. If the project has a risk structure that differs from that of the existing activities, an appropriate risk-adjusted rate must be used.

Before calculating the current WACC, it is necessary to calculate or ascert in the current market -determined returns on the various types of company capital, as applicable. (For purposes of this chapter you can assume that the market values of the instruments are given, but because they are often not readily available and have to be calculated in practice, these market-value calculations have been included in this chapter to be able to answer some of the questions at the end of the chapter where they appear as integrated parts of a whole question).

4.10.1 Ordinary equity

There are various ways to calculate the value of business enterprises as are discussed in Chapter 11 (Business and equity valuations). These include the Free Cash Flow ethod, ethods utilising the Capital Asset Pricing Model (CAPM), Gordon's Dividend Growth Model, tc. It is g n rally accepted that dividends are one of the major determinants of equity value regarding listed inv stm nts; consequently Gordon's model will be used as the criterion for this section as it doesn't require l ngthy xplanations. The dividend valuation model states that the market value of an ordinary share represents the expected future dividend flow discounted to present value and is expressed as:

$$P = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}$$

Where: P = MV of share
D_t = net dividend per share in time t
k_e = The cost of equity capital.

Two dividend equations can be derived from the above equation, as follows –

dividends expected to remain constant; and

dividends expected to grow at a constant annual rate of growth

Constant divid nds

Assuming that dividends remain constant (i.e. there is no growth) in perpetuity, the value of the firm can be exp essed as:

$$P = \frac{D_1}{k_e}$$

As the market price of the shares and the dividend is easily determined, the cost of equity capital is:

$$k_e = \frac{D_1}{P}$$

Example:

A company pays an annual dividend of 12 cents per share. The market price for the share is 82 cents. Calculate the cost of equity capital.

$$k_e = \frac{12}{82} = 14{,}63\%$$

The share price will change where –

expected dividend flow changes without a change in risk;

company risk changes without a change to the expected dividend flow; or

general economic expectations change, altering the equity holder's required return.

Dividends grow at a constant annual rate

According to Gordon's Dividend Growth Model the assumption is that dividends will grow at a constant compound annual rate. The equation is:

$$P = \frac{D_1}{k_e - g}$$

Where: D_1 = $D(1 + g)$

D_0 = dividend today

P = MV of share

k_e = cost of equity capital

g = constant growth in perpetuity

Example:

A company's shares are quoted at R41 per share. The curr nt dividend of R6 is expected to grow by 10% in perpetuity. Calculate the cost of equity capital.

Re-write equation:

$$k_e = \frac{D_0(1 + g)}{P} + g$$

$$= \frac{6(1 + 0{,}1)}{41} + 0{,}1$$

0,261or 26,1%

Determination of growth

In the equation share value $P = D_1 / (K_e - g)$ one of the components is growth that is, **g**.

It is important to note that **g** implies growth in perpetuity and consequently cannot be too high to be sustainable for v r. Usually sustainable long-term growth cannot be more than population growth plus inflation.

The cost of equity ould however also have been calculated utilising other methods like the Capital Asset Pricing Model (CAPM) whi h are explained in more detail in Chapter 5 (Portfolio management and the Capital Asset Pricing Model).

4.10.2 Retained earnings

Companies ften fund their operations from retained earnings by retaining a proportion of after-tax profits in the business, f rming part of shareholders' capital. As retained earnings form part of ordinary shareholders' equity, the required return for retained earnings is exactly the same as the cost of equity capital, as calculated earlier.

4.10.3 Preference shares

Preference shares carry a fixed commitment on the part of the firm to make annual fixed interest payments. In he event of liquidation, the claims of the preference shareholders take precedence over those of ordinary (or common) equity shareholders.

The preferred yield or cost of debt is calculated using the equation:

$$\text{Preferred yield} = \frac{D}{MV}$$

Where: D = annual dividend

MV = market value

No adjustment is made for tax, as dividends are an after-tax payment.

Example:

Company A issued preference shares at a par value of R100 five years go. A dividend of 15% is paid annually. The preference shares are not redeemable and are currently trading at R92.

Required:

Calculate the cost of the preference dividends and the debentures.

Solution:

Cost of the preference shares

$$k_p = \frac{15}{92}$$

$$= 0{,}163 \text{ or } 16{,}3\%$$

The cost of preference shares is 16,3%.

Any new issues would have to be made at a price of R92.

4.10.4 Debt

Example: Debentures

Debentures mature in three years' time at a discount of 5%.

Similar debentures are trading at 12%.

Tax rate: 35%

Required:

Calculate the cost of the d b ntures.

Solution:

Cost of debentu es:

$k_d = 12\% \times (1 - 35\%)$ The

cost of debt is 7,8% after tax.

N te: The c st of debt is the current after-tax cost of debt, not the cost of debt at which the company riginally acquired the debt.

4.11 The Weighted Average Cost of Capital

The ssumptions behind the use of the Weighted Average Cost of Capital (WACC) are mentioned in section 4.10. The assumption that the project is marginal (i.e. relatively small in relation to the total capital s ructure) is important, as the market valuations of debt and equity are based on the current capital holding. Any major change in the existing amount and proportion of debt to equity will alter the required return characteristics of the equity shareholder, as well as the debt-holder, due to the change in risk.

The cost of capital used for any particular project is not the cost of a specific type of capital, but the cost of the firm's ***pool of capital*** – the target WACC.

The WACC can be described as:

$$WACC = k_e \times \frac{v_e}{v_e + v_d} + k_d \times \frac{v_d}{v_e + v_d}$$

Where:

k_e = equity-holders' required rate of return
k_d = debt-holders' required rate of return after tax
v_e = MV of equity
v_d = MV of debt

Note that the value of the company = $v_e + v_d$

Illustrative example of company structure:

EXTRACT FROM THE STATEMENT OF FINANCIAL POSITION OF COMPANY A:

	R'000
Ordinary issued shares	5 000
Non-distributable reserves	600
Retained income	400
Irredeemable 15% preference shares	2 000
Long-term loans	1 000
Bank overdraft	300
Deferred taxation	600
	9 900

The company has 1 000 000 shares in issue, and is currently paying a dividend of R2 per share with a growth of 5%. The shareholders' required rate of return is 24%. The preference shares have no conversion rights and carry a preference dividend payout ratio of 15%. Similar preference shares are currently trading at 12%. The long-term loan matures in ten years' time and carries an interest rate of 16%. The current long-term interest rate for a similar loan is 18,34%. The bank overdraft rate is 20% and the tax-rate is 40%.

Required:

Calculate the current WACC at (**i**) book value and (**ii**) market value.

Calculate the target WACC if the optimal D:E ratio is ordinary shares 60%, preference shares 20% and long-term loans 20%.

Solution:

(a) (i) WACC at book value:

	Value R'000	**Cost**	**Weighted cost**
Ordinary shares	6 000	0,24	0,16
Preference shares	2 000	0,15	0,03
Long-term loans	1 000	0,096	0,01
	9 000		0,20

WACC = 20%

Note:

The ***ordinary issued shares, non-distributable reserves and retained income are included in the book value of the ordinary shares.***

Why are the bank overdraft and the deferred tax not shown as part of the capital structure?

As the bank overdraft is short-term finance used to finance short-term movements of current assets, it is not deemed to be part of the firm's permanent capital structure. However, when a

company uses bank overdrafts as a form of long- term financing, the portion that is used as long-term should be brought into the capital structure.

Deferred taxation is not included because the timing of tax payments is accounted for when evaluating the project investment decision.

The WACC at book value has little value and should not be used to evaluate future capital investments.

WACC at market value

Market value of equity:

$$MV = \frac{D_1}{k_e - g}$$

$$\frac{R2,10}{0,24 - 0,05}$$

R11,052631

Market value of equity R11 052 631

Market value of preference shares:

$$\frac{300\,000}{0,12}$$

R2 500 000

Market value of long-term loans:

Annual interest (after tax) = R96 000
Current after-tax interest = 18,34% × 60%
= 0,11004 or 11%

PV of 10-year interest annuity at 11%

R96 000 × 5,8892	=	565 363
Redemption 1 000 000 × 0,3522	=	352 200
		R917 563

WACC at market values:

	Value	Proportion × Cost	Weighted cost
E: Ordinary shares	11 052 631	E/V × 0,24 =	0,183
+ P: Pr f r nce shares	2 500 000	P/V × 0,12 =	0,021
+ D: Long-term loans	917 563	D/V × 0,11 =	0,007
= V: Value	14 470 194		0,211

WACC = 21%
(Note that k_d is after tax)

WACC at target ratios:

	Target %	Cost	Weighted cost
E: Ordinary shares	60	0,24	0,144
		0,12	
P: Preference shares	20	0,11	0,024
D: Long-term loans	20		0,022
	100		0,19

WACC = 19%

Conclusion:

In this example, the target rate of 19% should be used to evaluate new investments. Where the target is not given, assume that the current D:E ratio at market value represents the target WACC to evaluate new investments.

Note: ***Where a holding company/subsidiary company set-up exists, one should not use the holding company's WACC. Use the WACC for each individual company in the group, as the companies operate in different industries with different risk structures.***

4.12 Calculating the growth rate

Hitherto we have assumed that the growth rate is either given or is b sed on the growth in dividends. An alternative method of determining growth (g) can be expressed as:

g = br

Where:

g = long-term growth

b = ploughback or retention ratio

r = return on investment (note, some texts also use return on assets)

Example:

Required:

Calculate the potential internal long-term growth of a company where long-term

ploughback ratio b = 40% and

return on investment r = 10%

Solution:

= br

40% x 10%

4%

Notes:

It is easier to rem mb r that potential growth equals ploughback times return on investment

(i.e. g = br) before going into further details.

The result is that the ompany can only grow by 4% in the long-term, which is the percentage of earnings not paid out as dividends (i.e. the ploughback) times the return that is generated thereon.

Future rate of investment and the return from that investment

The fut re rate of investment and the return on that investment are the factors which generate future dividends. The criterion is that a constant proportion of cash earnings per share is reinvested in projects which pr duce an average rate of return.

The growth g can thus be expressed as:

$$g = br$$

where:

$$b = \frac{\text{Annual earnings after tax and interest} - \text{Annual dividends}}{\text{Annual earnings after tax and interest}}$$

$$r = \frac{\text{Annual earnings after tax and interest} + \text{Long-term interest } (1 - \text{tax})}{\text{Book value of total capital employed}}$$

The book value of total capital employed may be calculated as the balance at the beginning of the financial year, or the average assets employed over the year, that is, *beginning asset value plus end of year asset value divided by 2*.

Subject to:

Retained earnings being the only source of investment capital.

A constant proportion of earnings being reinvested each year.

The reinvested earnings generating a constant annual rate of return.

Example:

The current year's after-tax earnings of Company A are R250 000. The comp ny policy is to retain 60% of after-tax earnings. Company tax rate is 55%.

Statement of financial position at beginning of year:

	R'000
Ordinary share capital	3 000
Distributable reserves	1 800
	4 800
10% debentures	1 600
	6 400
Fixed assets	4 200
Net current assets	2 200
	6 400

Required:

Calculate the company growth.

Solution:

$$b = \frac{250\,000 - 100\,000}{250\,000} \text{ (40\% dividend payout)}$$

$$= 0{,}60$$

$$r = \frac{250\,000 + 160\,000\,(1 - 0{,}55)}{6\,400\,000}$$

$$0{,}05$$

$$g = 0{,}60 \times 0{,}05$$

$$= 0{,}03 \quad \text{or} \quad 3\%$$

or

Earnings before interest	715 555
Interest	160 000
Earnings after interest	555 555
Taxation	305 555
Earnings after tax	250 000
Dividends	100 000
Retention (60%) = b	150 000

$$r = \frac{715\,555 \times 0{,}45}{6\,400\,000}$$

$$= \frac{322\,000}{6\,400\,000}$$

$$= 0{,}05$$

$$g = 0{,}60 \times 0{,}05$$

$$= 0{,}03 \text{ or } 3\%$$

Note: ***The above example does not take into account the target D:E r tio of the company. It could be argued that if the company is operating at the optimal D:E ratio, retention of R150 000 means that the company can borrow at the target D:E ratio and thereby increase the growth rate above 3%. However, the above method is an estimate done at book alue.***

An unnecessary complication in the calculation will be caused by taking the target D:E ratio into account.

4.13 Cost of capital for foreign investments

The discount rate used for foreign investments should reflect the risk and required rate of return of the investment in the foreign country, and not necessarily th home country. It is therefore not appropriate to use the home or domestic discount rate for discounting.

Investment appraisal is usually done in nominal (as opposed to real) terms, especially when including the effects of inflation. The effect of inflation is therefore reflected in the discount rate used for the investment decision. Due to the fact that discount rates differ from one country to the next, it would not be appropriate to use the discount rate applicable in one country in another country.

The relationship between the inflation rate, real rate and nominal rate is as follows:

$$(1 + i_r) \times (1 + i_i) - 1$$

$$= i_n$$

Where:

i_r = real rate of return

i_i = rate of inflation

i_n = nominal rate

Example:

A company wishes to make a real return of 5% per annum, and the rate of inflation is 10% per annum. The required rate of return, in nominal terms, can be calculated as follows:

$(1 + i_r)$	×	$(1 + i_i)$	–	1	=	i_n, therefore:
1,05	×	1,1	–	1	=	0,155
						15,5%

Disc unt rate for a foreign investment

Example:

A ume a South African company is considering a foreign investment in the United Kingdom, bearing the same risk as its current operations.

The following applies:

Expected rate of inflation (United Kingdom): 2% per annum

Expected rate of inflation (South Africa): 8% per annum

Nominal discount rate applicable to South African operations: 20%

This discount rate can be converted as follows:

I Firstly, determine the real required rate of return

Rearranging the formula above:

$(1 + i_n) / (1 + i_i) - 1 = i_r$

$1{,}2 / 1{,}08 - 1 = 11{,}11\%$

Using the same formula again, substituting the inflation rate:

$(1 + i_r) \times (1 + i_i) - 1 = i_n$, therefore:

$1{,}11 \times 1{,}02 - 1 = 13{,}33\%$

Practice questions

Question 4–1: Optimal Capital Structure *(Fundamental)* *14 marks 21 minutes*

Company A is currently an all-equity company with a shareholders' required return of 20%. The company has determined that if it takes on debt finance, the cost of equity will increase by a factor equal to **x,** where:

$$\mathbf{x} = 10\% \times \frac{\text{Total MV of debt}}{\text{Total MV of company}}$$

The cost of debt after tax is equal to 10%, as long as the D:E ratio does not exceed 50:50. As more debt is taken on beyond this ratio, the cost of debt increases by 6%.

The following capital structure options are being considered by the company:

100% equity	:	0% debt
80% equity	:	20% debt
60% equity	:	40% debt
40% equity	:	60% debt

Required:

Determine the optimal capital structure for Company A, and the WACC.

Solution:

Total market value of company = Market value of debt plus market value of equity.

At 20% debt:

$= 10\% \times 20/100$
$= 2\%$
$k_e = 20\% + 2\%$
$= 22\%$

At 40% debt:

$= 10\% \times 40/100$
$= 4\%$
$k_e = 20\% + 4\%$
$= 24\%$

At 60% debt:

$= 10\% \times 60/100$
$= 6\%$
$k_e = 20\% + 6\%$
$= 26\%$

Target structure:

	Debt	:	Equity	k_d	k_d	WACC
1	0%		100%	10%	20%	20%
2	20%		80%	10%	22%	19,6%
3	40%		60%	10%	24%	18,4%
4	60%		40%	16%	26%	20%

1	WACC	20% × 100%				=	20%
2	WACC	(10% × 20/100%)	+	(22% × 80/100)		=	19,6%
3	WACC	(10% × 40/100%)	+	(24% × 60/100)		=	18,4%
4	WACC	(16% × 60/100%)	+	(26% × 40/100)		=	20%

Optimal capital structure is 60% equity:40% debt.

The target WACC is 18,4%.

Question 4–2: Arbitrage *(Intermediate)* *20 marks 30 minutes*

The following information for two companies which trade in a Miller and Modigliani world is provided:

	Company A	Co pany B
k_e	20%	18%
k_d	12%	–
Dividends	200 000	432 000
Interest after tax	150 000	–
Shares	1 000	1 000

Investor X holds 100 shares in Company A.

Required:

Calculate the WACC for Company A and Company B.

Determine if shareholder X is adequately compensated for financial risk.

Calculate the correct value for Company A shares, assuming that Company B shares are correctly valued.

Solution:

WACC for Company B is 18%

WACC for Company A

$$\text{Value of equity} = \frac{200\,000}{0{,}20}$$

$$= \text{R1 000 000}$$

$$\text{Val e of debt} = \frac{150\,000}{0{,}12}$$

$$= \text{R1 250 000}$$

$$\text{WACC} = (20\% \times 1/2{,}25) + (12\% \times 1{,}25/2{,}25)$$

$$= 8{,}89 + 6{,}67$$

$$= 15{,}56\%$$

As the WACC for Company A is lower than the WACC for Company B, the k_e for Company A is too low and must increase such that the WACC will equal 18%.

2 Arbitrage

	R	
Sell 100 shares in Company A	100 000	
Borrow	125 000	(See **1** above regarding the D:E ratio)
Invest in Company B	225 000	
Dividend from Company B (225 000 × 18%)	40 500	
Interest 125 000 × 12%	(15 000)	
Return	25 500	

Return on personal investment 25 500/100 000 = 25,5%

Investor X is therefore not adequately compensated for financial risk in Company A; he can receive a higher return at the same level of financial risk by investing in Company B. He will therefore sell his shares in Company A and invest the proceeds, together with borr wings equal to the D:E ratio of Company A in Company B.

3 WACC for Company B = 18%

Therefore the WACC for Company A must also equal 18%.

$$\text{Company value} = \frac{\text{Divid nd + Int r st}}{\text{WACC}}$$

$$\text{Company A value} = \frac{200\,000 + 150\,000}{0{,}18}$$

$$= \text{R1 944 444}$$

Value of Co A	R1 944 444
Value of debt	(R1 250 000)
Value of Equity	R 694 444

$$\text{Equilibrium cost of equity} = \frac{200\,000}{694\,444}$$

$$= 28{,}8\%$$

Question 4–3: Calculating WACC *(Intermediate)* *20 marks 30 minutes*

The following information pertaining to Company Z is provided:

	R'000
Ordina y sha e capital – 25 000 shares	1 000
Reserves	1 000
Preference shares – 1 000 shares	1 000
Debent res	1 000
	4 000

Tax rate is	40%
Preference dividends	R150 000
Debenture interest	R200 000 (before tax)
k_e	21%
growth	3%
D_0	R20 per share

Preference shares current market return is 16%

Debentures current market return is $18\frac{1}{3}\%$
Preference shareholders have the option of converting their shareholding to 8 500 ordinary shares in three years' time, or continuing with indefinite preference shares at 18% dividend per annum. Debentures mature in three years' time.

Required:

Determine the current WACC.

Solution:

Equity

$k_e = 21\%$

$$\text{Value} = \frac{D_1}{k_e - g}$$

$$= \frac{20 \times 1{,}03}{0{,}21 - 0{,}03}$$

$$= 114{,}44$$

Total value = 25 000 × 114,44

= R2 861 000

Debentures

k_d = 18 1/3 × 60%

= 11%

Interest after tax = 200 000 × 60%

= 120 000

$$\text{Value} = \frac{120\,000}{(1{,}11)} + \frac{120\,000}{(1{,}11)^2} + \frac{1\,120\,000}{(1{,}11)^3}$$

= 108 108 + 97 395 + 818 934

= R1 024 437

Preference shares

Option 1 – Ordinary shar s in Year 3

$D_4 = 20(1 + 0{,}03)^4 = 22{,}51$

$$\text{Value as at end of Year 3} = \frac{22{,}51}{0{,}21 - 0{,}03}$$

$$= 125{,}056$$

Total share val e 125,056 × 8 500 = R1 062 980

Opti n 2 – Indefinite preference shares

$k_d = 16\%$

Dividend = 1 000 000 × 18%

= 180 000

$$\text{Value as at end of Year 3} = \frac{180\,000}{0{,}16}$$

= R1 125 000

Preference shareholders will choose the new preference shares.

Present value of preference shares today

$$= \frac{150\,000}{(1{,}16)} + \frac{150\,000}{(1{,}16)^2} + \frac{150\,000}{(1{,}16)^3} + \frac{1\,125\,000}{(1{,}16)^3}$$

= R1 057 623

Note: ***Assuming that the ordinary shares had the highest value, then the present value (PV) calculation would be exactly the same as shown above, except that the terminal value would be R1 062 980. The discount rate would still be 16%. However, the PV would then be c assified as ordinary shares with a k_e of 21%.***

Current WACC

		Value	Cost	WACC
Equity	– ordinary shares	2 861 000	21%	12,15
Debt	– preference shares	1 057 623	16%	3,42
Debt	– debentures	1 024 437	11%	2,28
		4 943 060		17,85%

The WACC for Company Z is 17,85%.

Question 4-4: Calculating WACC *(Fundam ntal)* *14 marks 21 minutes*

Mr Pillay, the financial director of Shingalana Ltd, wants to determine the WACC of the company to help management decide whether to replace an existing machine or not (a topic which is dealt with in more detail in chapter 6 (*The investment decision*)).

EXTRACT FROM THE STATEMENT OF FINANCIAL POSITION OF SHINGALANA (PTY) LTD:

	R'000
Ordinary issued shares	2 000
Non-distributable reserves	300
Retained income	700
Preference shares	1 000
Debentures	500
Bank overdraft	300
	4 800

The company has 1 000 000 shares in issue with a market value of R3 500 000. The shareholders require a rate of return of 24%.

The preferen e shares have no conversion rights, a market value of R1 166 667 and carry a dividend payout ratio of 14%. Similar preference shares are currently trading at 12%.

The debentu es with a market value of R515 318 mature in ten years' time and carry an interest rate of 16%. The cu ent long-term interest rate for similar loans is 15,27%.

The bank overdraft rate is 10%.

The tax rate is 28%.

Required:

A i t Mr Pillay to determine the WACC of Shingalana Ltd.

Solution:

WACC:	**MV** **R**	**Weight**	**Cost** **%**	**Weighted cost** **%**
Ordinary shares	3 500 000	67,54%	24%	16,21%
Preference shares (1)	1 166 667	22,51%	12%	2,70%
Debentures (2)	515 318	9,94%	11%	1,09%
	5 181 985	100,00%		20,01%

Notes:

(1) Preference shares

MV:

= (R1 000 000 × 14%)/ 0,12

= R1 166 667

(2) Debentures

MV:

Annual interest after tax	=	R500 000 × 16% × 72%	=	R57 600
Current after tax interest rate	=	15,27% × 72%	=	11%
Interest at 11% annuity factor for 10 years	=	R57 600 × 5,8892	=	339 218
Redemption R500 000		R500 000 × 0,3522	=	176 100
				515 318

The WACC of Shingalana Ltd is 20%

Question 4–5: Cost of preference shares and debentures *(Fundamental)* *10 marks* *15 minutes*

Ms Dulamo, managing partner in Nzinga & Dulamo Inc, wants to determine the cost of the preference shares and debentures in Excalibur Holdings. Details are as follows:

The preference shares

Excalibur Holdings issued 10 000 100 preference shares without conversion rights at a discount of 5% when it was incorporated six years ago. The dividends of 11% per annum are payable every six months in arrears. Similar preference shares are currently trading at R96. The tax rate is 28%.

The debentures

The debentures in Excalibur Holdings carry an interest rate of 14% and mature in eight years' time at a discount of 6%. The current long-t rm int rest rate for a similar debenture is 12%.

Required:

Assist Ms Dulamo to determine the cost of the preference shares and debentures in Excalibur Holdings.

Solution:

C st f the preference shares

$$k_p = \frac{11}{96}$$

0,115 or 11,5%

The cost of preference shares is 11,5% per annum payable half-yearly.

Therefore the effective annual cost $= (1 + 0{,}0575)^2 - 1$

$= 11{,}8\%$

The cost of the preference shares is 11,8%.

Cost of the debentures

$k_d = 12\% \times (1 - 28\%)$

The cost of debt is 8,6% after tax.

Note: ***The cost of debt is the current after-tax cost of debt, not the cost of debt at which the company originally acquired the debt.***

Question 4–6: Capital Structure *(Fundamental)* *40 marks 60 minutes*

Zambezi (Pty) Ltd is a company which is financed entirely by ordinary shares.

Zambezi has the opportunity to invest in a major new investment project which has the same business risk as the existing operations of the company. The project requires an immediate outlay of R1,4 million and is expected to produce annual cash inflows of R210 000 indefinitely, the first receipt arising in one year's time.

The company has distributed an annual ordinary dividend of R600 000 for many years, and is expected to continue doing so. Two million shares are in issue and the current market price is R2,30 cum div. The next annual dividend payment of R600 000 is due shortly.

The financial director of Zambezi believes that the value of the company could be increased by the introduction of debt finance into the company's capital structure. By introducing debt into the capital structure of the company, he suggests that the new investment project should be accepted and financed by the issue of debt capital and partly by a reduction in the current dividend.

The introduction of debt will cause the existing shareholders to require an increase of **k** on their existing return to compensate them for the increased financial risk created by gearing.

The value of k is given by

$$k = 5\% \times \frac{\text{Total MV of debt}}{\text{Total MV of debt plus equity}}$$

The financial director also believes that the cost of debt depends on the ratio of the total market value of debt to the total market value of equity capital, as follows:

$$\text{Ratio} = \frac{\text{Total MV of debt}}{\text{Total MV of equity}}$$

Ratio	Cost of debt
0,00	–
0,10	9,0%
0,20	9,5%
0,30	10,0%
0,40	11,0%

Required:

(a) Briefly explain what is meant by 'the traditional capital structure theory' **(*8 marks*)**

(b) Calculate the optimal gearing ratio (i.e. the ratio of the total market value of debt to the total market value of equity) for Zambezi (Pty) Ltd, assuming that one of the ratios given in the question is adopted. **(*14 marks*)**

(c) Calculate how much of the capital required for the new project should be raised by debt and how much by reduction in the current dividend, if Zambezi (Pty) Ltd is to achieve the optimal gearing ratio calculated in **(b)** above. **(*7 marks*)**

(d) Calculate the gain to ordinary shareholders if the new project is accepted and financed in the manner calculated in **(c)** above. **(*6 marks*)**

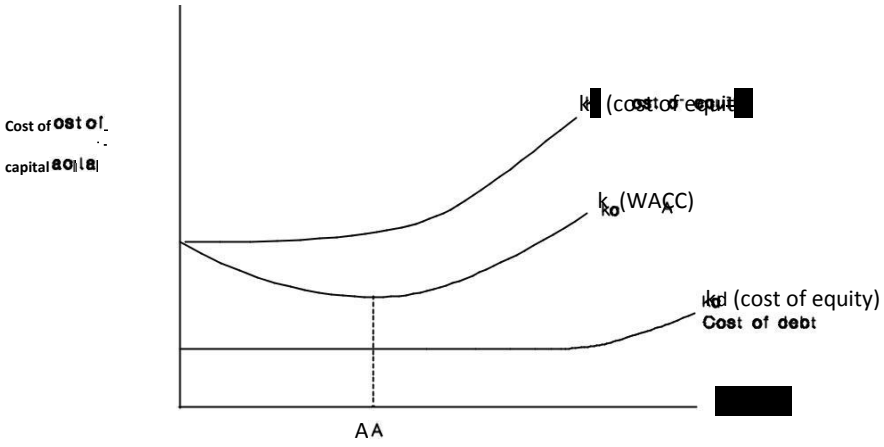
(e) Calculate the gain to the company. **(*5 marks*)**

Ignore taxation.

Solution:

The Traditional theory of capital structure assumes that an optimal capital structure exists and depends on the level of gearing. The company cannot maximise shareholders' wealth unless the optimal WACC is achieved.

Because debt capital has a lower after-tax cost than equity capital as it is moderately increased, the WACC of capital falls. The moderate increase in debt does not increase the overall risk of the firm and therefore the company does not have to offer a higher return to shareholders to compensate for the increased risk. As debt capital is further increased, the WACC will continue to fall, up to a certain point. After the optimal level is reached, any further increase in debt capital wi increase the risk of the firm and the shareholders will demand a higher yield.



Optimal WACC

(b) Existing cost of equity $= \frac{30}{200}$

$= 15\%$

	Proportion of debt to equity	Cost of equity				Cost of debt
(i)	0,00	15%				0%
(ii)	0,10	15% + 5%	×	$\frac{10}{110}$	= 15,455%	9%
(iii)	0,20	15% + 5%	×	$\frac{20}{120}$	= 15,833%	9,5%
(iv)	0,30	15% + 5%	×	$\frac{30}{130}$	= 16,154%	10%
(v)	0,40	15% + 5%	×	$\frac{40}{140}$	= 16,429%	11%

WACC

	15%						
(ii)	15,455	× $\frac{100}{110}$	+	9	× $\frac{10}{110}$	=	14,868%
(iii)	15,833	× $\frac{100}{120}$	+	9,5	× $\frac{20}{120}$	=	14,777%
(iv)	16,154	× $\frac{100}{130}$	+	10	× $\frac{30}{130}$	=	14,734%
(v)	16,429	× $\frac{100}{140}$	+	11	× $\frac{40}{140}$	=	14,878%

The optimum gearing proportion is 0,30.

(c) Current MV R4 000 000
Funds required R1 400 000
Debt and equity R5 400 000

D:E ratio = 0,30 or debt = 30:equity = 100

∴ Debt = 5 400 000 × $\frac{30}{130}$ = 1 246 153,8

Equity = 4 153 846,2

The company must therefore raise R1 250 000 debt and reduce the dividend by R150 000 (rounded to the nearest R50 000).

New dividend to shareholders

R(600 000 + 210 000) – 10% × R1 250 000 = R685 000

	R	R
MV of equity at 16,154%		4 240 436
Less: Dividend foregone	150 000	
Previous MV	4 000 000	
		4 150 000
Gain to shareholders		R90 436

(e) Gain to the company

Company WACC = 14,734%

NPV of investment

Year 0	– 1 400 000
Cash flow 210 000/0,14734	1 425 275
	25 275

Question 4–7: Miller & Modigliani *(Intermediate)* *35 marks 52 minutes*

Elvis is a citizen of Utopia, a country where personal (and company taxation) is set at 10% of taxable income. There are no transaction costs on share purchases or sales and all investors are rational.

Individuals and companies can borrow at the same rate and both are allowed to claim loan interest as a deduction against taxable income, provided the loan is used to finance equity investments or capital expenditure.

In 20X0, Elvis pur hased 1 000 shares in Graceland Ltd at a price of R100 per share. Over the past four years, his dividend income f om this investment has been growing at a rate of 2% per annum.

The following is a s mmary of Graceland Ltd's statement of financial position as at 31 May 20X4:

	R'000
Ordinary shares (10 000 issued)	1 000
L ng-term loan (indefinite) 9%	700
Capital employed	1 700
Earnings per share	R30
Dividend per share	R24,706

The required rate of return of Graceland's shareholders is 22% per annum and long-term loans are available at 10% per annum.

Elvis has been advised by his broker to sell his shares in Graceland Ltd and invest in Y'Ono Ltd, a company identical to Graceland Ltd, but with no debt in its capital structure. Y'Ono Ltd also has 10 000 shares in issue, which are currently trading at R100 per share. The required rate of return of Y'Ono shareholders is 20% per

annum and dividend income has been growing at a rate of 2% per annum. The latest dividend at 31 May 20X4 was R17,65 per share.

Elvis is convinced that his broker has been giving him bad information as he is currently receiving a return of 22% from his investment in Graceland Ltd which is 2% higher than Y'Ono Ltd, and has approached an accountant for advice. The accountant's investigations of market prices and yields on the Utopia stock exchange have revealed that Y'Ono Ltd shares are correctly priced in terms of its business and financial risk.

Required:

Calculate whether Elvis should sell all his shares in Graceland Ltd and invest the proceeds in Y'Ono Ltd in order to improve his return and yet retain his current risk profile. The ca cu ations must compare the expected returns in the two companies as at 31 May 20X5. **(*14 marks*)**

Calculate the equilibrium market value of Graceland Ltd shares th t would equ te to its current degree of financial risk. **(*5 marks*)**

Discuss whether companies operating in Utopia should use debt as a form of finance and the advantages to them (if any). **(*10 marks*)**

What investment advice would an accountant give to Elvis if pers nal tax, ability to borrow, or debt rates were different for individuals as compared to companies? **(*6 marks*)**

Solution:

Equity market value

$D_0 = 24{,}706$

$g = 2\%$

$k_e = 22\%$

$$MV = \frac{D_1}{k_e - g}$$

$$= \frac{24{,}706 \times 1{,}02}{0{,}22 - 0{,}02}$$

$$= 126$$

10 000 shares × 126 = R1 260 000

Debt market value

After-tax inter st R700 000 × (9% × 90%) = R56 700

Current mark t value R56 700 | (10% × 90%) = R630 000

Elvis will sell 1 000 shares for R126 per share and borrow an amount in order to have the same financial risk st uctu e as that of Graceland Ltd.

Sale	R126 000	
Borrow	R63 000	
	R189 000	R100

= 1 890 shares

Dividend at D_1

R17,65 × 1,02 = R18,00

Total dividend	R18,00 × 1 890 =	R34 020
Interest after tax	(R63 000 × 10% × 90%) =	(R5 670)
Net return		R28 350

Return

$$MV = \frac{D_1}{k_e - g}$$

$$k_e = D_1/MV + g$$

(R28 350 ÷ R126 000) + g

= 0,225 + 0,02

= 0,245 or 24,5%

Comparative return in Graceland Ltd

1 000 shares × (24,706 × 1,02) = R25 200

Conclusion:

Elvis should sell his shares in Graceland and purchase shares in Y'Ono.

Shareholders in Graceland Ltd will sell their shares and invest in Y'Ono Ltd as the return is higher in Y'Ono Ltd.

As the market price of Y'Ono shares is correctly valued, one would expect the value of Graceland shares to decrease until there are no arbitrage benefits from switching to Y'Ono shares.

K_o Graceland = k_o Y'Ono = 20%

From $V_o = \frac{\text{Dividend + Debt interest}}{\text{WACC}}$

We get $V_o = \frac{247\,060 + 56\,700}{0{,}20}$

V_o = 1 518 800

V_d = 630 000 [700 000 × 9% ÷ 10%]

∴ V_e = 888 800 and $_v$ = R88,88 per share

k_e = 247 060 / 888 800 = 27,8%

∴ MV = 88,88 per share

More correctly: (k_e – 0,02) = 252 000 / 888 800

k_e = 0,30 or 30%

Companies operating in Utopia will not be able to decrease their WACC as individual investors are able to borrow at the same rate as companies and so create their own portfolios with gearing advantages.

Utopia is repr s ntative of a Miller and Modigliani world where –

investors are rational;

all investo s have the same expectations about the future;

capital ma kets are perfect;

all relevant information is freely available;

there are no transaction costs;

there is no taxation or no distinction between company and personal tax;

firms can be grouped into business risk or operating risk classes;

there is no limited liability; and

individuals and firms can borrow at the same rate and personal gearing is assumed to be a perfect substitute for company gearing.

Miller and Modigliani argued that the WACC is independent of the capital structure; hence the value of the firm is independent of the proportion of debt to total capitalisation. As debt financing increases, the initial effect would be to lower the WACC, thus increasing the value of the firm. The model, however, argues that increased gearing results in shareholders requiring an increased return to balance the

increased risk. The change in the required equity return will just offset any possible saving or loss on the interest change. Therefore, as gearing increases, the WACC will remain constant and so no optimal level of capital gearing exists.

The equilibrium factor in the Miller and Modigliani theory is the arbitrage process. The arbitrage process takes place where two firms of identical income and risk exist and where one of the firms has a temporarily higher value, due to the different D:E ratios of the two firms. The investors would arbitrage in order to equalise the values of the companies.

If Elvis was not able to borrow on the same basis or at the same rate as companies in Utopia, then he would not be able to improve his return through arbitrage.

Graceland would borrow funds in order to lower the WACC and the return to shareholders would be superior to that offered by Y'Ono Ltd. The traditional view of capit l structure would apply.

The traditional, or generally believed theory of capital structure, assumes that an optimal capital structure exists and depends on the level of gearing. The company cannot maximise shareholders' wealth unless the optimal WACC is achieved.

Because debt capital has a lower after-tax cost than equity capital as it is moderately increased, the WACC falls.

The moderate increase in debt does not increase the overall risk of the firm; therefore the company does not have to offer a higher return to shareholders to co pensate for the increased risk. As debt capital is further increased, the WACC will continue to fall, up to a certain point. After this optimal level is reached, any further increase in debt will increase the risk of the firm and the shareholders will demand a higher yield.

The Traditional theory concludes that there is an optimal or target capital structure for every company. The optimal D:E ratio is determined at the lowest average cost of capital. In practice, it is difficult for a company to determine the target D:E ratio, but it will be guided by the capital structure of similar quoted companies.

Question 4–8 *(Fundamental & Intermediate)* *30 marks 45 minutes*

Rosina Ltd is at the present time an all- equity-financed company with a cost of capital of 12,5%. The manager, Basilio, is considering whether it might be desirable to issue some debt capital. Debt is currently yielding 5% per annum (p.a.) and may be assumed to be risk-free for all firms which issue it (or may wish to issue it). To this end, Basilio has collected data on four other companies, each of which falls into one of two industrial sectors (A and B). The data that he has collected is summarised below:

Company	Industrial sector	:E ratio	Anticipated growth of earnings/ dividends	Ex div. market price per share	Dividend per share
X	A	0	0	R1	10c
Y	A	1:1	0	R2	30c
T	B	0	0	R2	30c
U	B	1:4	0	R2	35c

Required:

(a) Explain what the terms 'business risk' and 'financial risk' mean to an investor. **(*5 marks*)**

Describe the f ndamental elements of the Traditional theory and the Miller and Modigliani theory. **(*5 marks*)**

Advise Basilio on the capital structure policy which he should follow, explaining and justifying the figures. **(*15 marks*)**

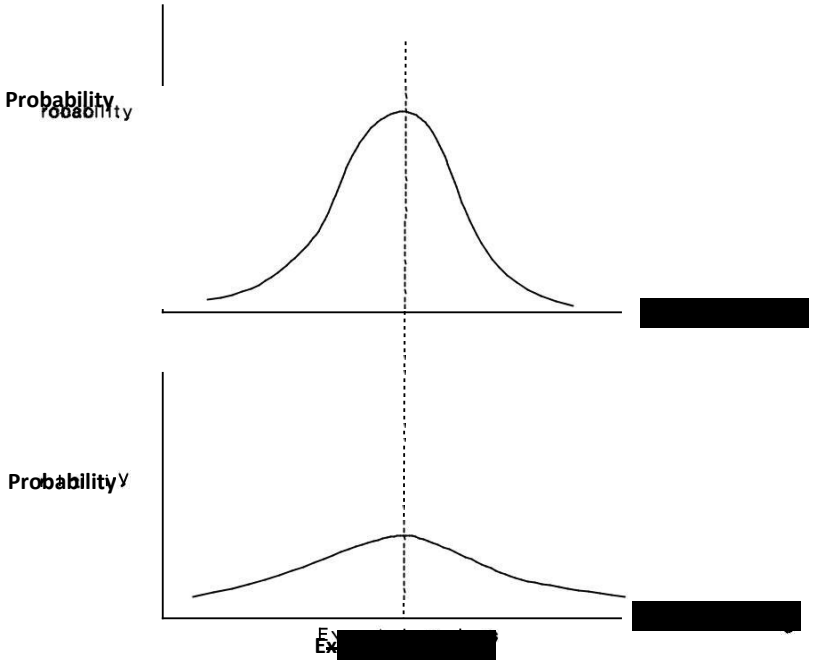
Indicate how that advice might be modified if corporate taxes were introduced into the analysis. **(*5 marks*)**

Note: Ignore taxation for requirement (c).

Solution:

Operating (or business) risk comes from the uncertainty attached to the many factors which influence the ability of the company to generate earnings (e.g. the state of world trade, the national economy, the

prosperity of the company's business sector, consumer tastes, technology changes, etc.). A company's future annual earnings may be regarded as a probability distribution. The wider the dispersion of the possible earnings the higher the operating risks. The following diagrams illustrate two companies with the same average (expected) earnings but different levels of operating risk.



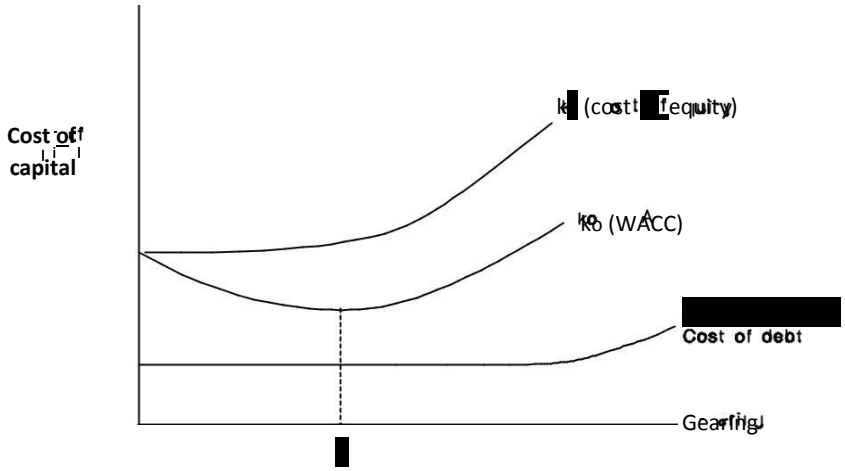
Financial risk: The variability of equity earnings will be relatively higher than the variability of earnings before interest for a company which has debt in its capital structure. This is because the debt interest must be paid before any dividend is paid to shareholders.

Theory of capital structure

Traditional theory

The 'traditional view' may be briefly described and illustrated as follows:

As debt is introduced into the capital structure, the WACC is reduced. The shareholders require increased compensation for financial risk, but this is relatively small at low gearing levels. Eventually, however, their financial risk premium is such that it outweighs the effect of further cheap debt. There is an optional capital structure, at point A on the diagram:

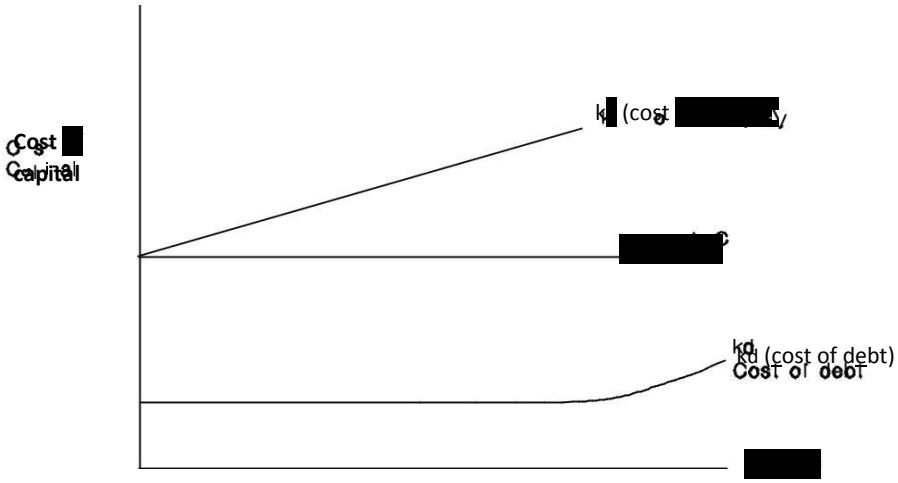


The company should therefore aim for the point where WACC is at a minimum.

Miller and Modigliani theory

The Miller and Modigliani view (ignoring taxation) predicts that the two effects of debt will exactly balance out, so that WACC remains equal to the cost of equity in an ungeared firm at all levels of gearing.

There is therefore no optimal level of gearing. Unlike the traditional view, this is a normative theory which follows directly from a set of assumptions, and is explained in the following diagram.



The assumptions made by Miller and Modigliani can be bri fly stated as follows –

all investors make the same predictions about the possible earnings of firms in terms of expected value and dispersion about that value;

there are no impediments to trading in the capital market, that is, investors behave rationally;

there are no transaction costs, and investors and firms can borrow and lend at the same rate;

(iv) there is no difference between corporate and personal borrowing in terms of risk (e.g. no limited liability advantage for companies); and

no company taxes exist, or there is no differentiation between company and personal tax.

Advice to Basilio

It is generally assumed that the higher the risk attached to an investor's earnings, the higher the average return he will expect as compensation will be.

An equity investor will therefore expect a higher return if the operating risk of this company is higher, and a higher return in a g ar d company than in an ungeared company.

Comparing Rosina with the two other all-equity companies, it can be seen that Rosina is midway in terms of operating risk when omparing industrial sector A to industrial sector B.

Company	**Cost of equity**
X (sector A)	10%
Rosina	12,5%
T	15%

If c mpanies in the same industrial sector may be assumed to be subject to the same level of operating risk, the effect of gearing on the cost of equity may be seen.

Indu trial Sector A	**D:E ratio**	**Cost of equity**
	0	10%
	1:1	15%
Industrial Sector B	**D:E ratio**	**Cost of equity**
	0	15%
	1:4	17,5%

Computing the WACC

Company	Cost of equity (div per share – ex div price)	D:E ratio	Cost of debt	WACC
Industrial Sector A				
X	10%	0	N/A	10%
Y	15%	1:1	5%	10%

WACC = (0,5% × 15%) + (0,5 × 5%)

Industrial Sector B				
T	15%	0	N/A	15%
U	17,5%	1:4	5%	15%

WACC = (1/5 × 5%) + (4/5 × 17,5%)

Conclusion:

WACC differs according to industrial sector (because of perating risk differences) but companies in the same industrial sector appear to have the same WACC.

On the basis of these figures, there is no advantage or disadvantage to debt financing. Basilio may follow any capital structure policy he likes, with no effect on the value of the firm.

Introduction of company taxes into the analysis

Miller and Modigliani originally ignored company tax s in their analysis. The effect of introducing taxation is as follows:

There is no effect on optimal capital structure if taxation is introduced, but debt interest is not an allowable expense against company tax.

If debt interest is tax deductible and the company is earning sufficient taxable profits to take full advantage of the tax relief, then there is no way in which the arbitrage process can compensate for the fact that a company can obtain tax relief by borrowing whereas an individual cannot. It now makes sense for a company to borrow as much as possible. Basilio should **aim for a very high level of gearing** because WACC falls as gearing increases up to the optimum D:E ratio.

If the company is prevented from taking full advantage of tax relief on debt interest, for instance because it is not earning sufficient profits or because it has very high capital allowances, then the advantage of gearing is reduced, and completely removed if no effective tax relief is possible. This last extreme case, which is fairly common in practice, means that the WACC would behave as in the original Miller and Modigliani theory.

If individuals and firms can both obtain tax relief on borrowings, then the advice depends on the differential tax rat s. If both are subject to the same tax rate, then there is no optimal capital stru ture. If the ompany tax rate is higher than the personal tax rate, the company should borrow as mu h as possible, but if the reverse is the case it should remain ungeared.

Question 4–9 *(Advanced)* *40 marks 60 minutes*

The Board of Directors of Lekker Fruit Ltd requires R12 million for expansion of existing business activities and is discussing whether to finance the project through debt financing.

A summary f Lekker Fruit's current statement of financial position as at 30 September 20X4 shows:

Capital employed	**R'000**
R10 ordinary shares	12 000
Share premium	1 000
Distributable reserves	2 000
Non-distributable reserves	3 000
Shareholder's interest	18 000

	R'000
10% preference shares (R5 issue price)	4 000
16% debentures (indefinite)	14 000
Long-term loan	20 000
	56 000
Employment of capital	
Fixed assets	42 000
Net current assets	14 000
	56 000

Statements of Comprehensive Income	**20X2 R'000**	**20X3 R'000**	**20X4 R'000**
Operating income	11 412	11 858	12 340
Debenture interest	2 240	2 240	2 240
Long-term loan interest	3 600	3 600	3 600
Income before taxation	5 572	6 018	6 500
Dividend per share	R2,14	R2,31	R2,50
Dividend yield	0,11	0,11	0,111111

The following information is also available:

Long-term debentures similar to those issued by L kk r Fruit Ltd are currently yielding a return of 22%.

The 10% preference shares carry an option of conversion into ordinary shares on 30 September 20X7. The offer is on the basis of one ordinary share for every four preference shares held by the preferential shareholders. The preference shareholders have indicated that they are likely to take up the option. Preference shares are currently trading at 18%.

The long-term loan matures on 30 September 20X8. Long-term loans are currently being offered at a yield to maturity of 20%.

The finance required for expansion will be raised through a long-term loan at the current ruling interest rate.

The current company tax rate is 40%.

The financial director of Lekker Fruit believes that the market price of the existing ordinary shares and the cost of existing debt finance will not change as a result of the proposed issue of a long-term loan.

Required:

(a) Evaluate the ff ct on the current WACC of Lekker Fruit Ltd if the company raises the required finance through a long-t rm loan and there is no change in the current market value of all securities.

All relevant al ulations must be shown. **(*27 marks*)**

Discuss why the finan ial director of Lekker Fruit Ltd might be wrong in his belief that the market price of the company's sha es and securities will not change, and conclude what changes might occur. **(*13 marks*)**

Solution:

Calculation of current WACC

Equity valuation

Dividend yield = 0,1111

Market value of shares

$$DY = \frac{DIV}{MV}$$

$$0{,}111111 = \frac{2{,}50}{MV}$$

$$MV = R22{,}50 \times 1\,200\,000 \text{ shares} = R27\,000\,000$$

Shareholders' required return

Growth

20X2 – 20X3	**20X3 – 20X4**
$\frac{6018 - 5572}{5572}$	$\frac{6500 - 6018}{6018}$
= 8%	= 8%

Dividend

D_0 = R2,50

D_1 = R2,50 × 1,08 = R2,70

$$M = \frac{D_1}{k_e - g}$$

$$22{,}50 = \frac{2{,}70}{k_e - 0{,}08}$$

$$22{,}50\,k_e - 1{,}8 = 2{,}70$$

$$k_e = 20\%$$

Preference share valuation

Step 1: Share value at 30 September 20X7

Dividend at 30 September 20X8 is equal to $2{,}50 \times (1 + 0{,}08)^4$ = R3,4012

k_e = 20% g = 8%

$$\text{Share value at 20X7} = \frac{R3{,}4012}{(0{,}20 - 0{,}08)} = R28{,}344$$

Share exchange 4:1

Preference shares	4 000 000	5	=	800 000
	800 000	4	=	200 000 ordinary shares
Valuation at 20X4	200 000	× R28,344	=	R5 668 800

Step 2: Preference share valuation at 30 September 20X4 will equal

$$\frac{400\,000}{(1 + 0{,}18)} + \frac{400\,000}{(1 + 0{,}18)^2} + \frac{400\,000}{(1 + 0{,}18)^3} + \frac{5\,668\,800}{(1 + 0{,}18)^3}$$

= 338 983 + 287 274 + 243 452 + 3 450 207 = 4 319 916

Debentu e valuation: 16% indefinite debentures

Ann al interest	14 000 000 × 16% × 60%	=	1 344 000
C rrent interest rate	22% before tax		
Valuati n	$\frac{1\,344\,000}{0{,}22 \times 60\%}$	=	10 181 818

Long-term loan valuation

Book value	R20 000 000			
Annual interest	3 600 000			
Current interest rate	3 600 000 / 20 000 000	=	18%	
Market rate: 20% before tax				
After-tax interest	3 600 000	× 60%	=	R2 160 000
After-tax required return	20%	× 60%	=	12%

$$PV = \frac{2\,160\,000}{(1{,}12)} + \frac{2\,160\,000}{(1{,}12)^2} + \frac{2\,160\,000}{(1{,}12)^3} + \frac{22\,160\,000}{(1{,}12)^4}$$

$$= 1\,928\,571 + 1\,721\,939 + 1\,537\,445 + 14\,083\,080$$

R19 271 035

Current WACC		**MV R'000**	**Required return**	**WACC**
Equity	– Ordinary shares	27 000	0,20	
	– Preference shares	4 320	0,20	
		31 320	0,20	0,103
Debt	– Debentures	10 182	0,132	0,022
	– Long-term loans	19 271	0,12	0,038
		29 453		0,163

Current WACC is 16,3%

New WACC	**MV R'000**	**Required return**	**WACC**
Equity	31 320	0,20	0,086
Debentures	10 182	0,132	0,018
Long-term loans	31 271	0,12	0,052
	72 773		0,156

New WACC is 15,6%

If Lekker Fruit's financial director believes that the price of the firm's securities will not change, he is inferring that, irrespective of the level of gearing, the cost of debt and equity will remain the same. This would imply that by continually gearing up, and substituting cheap debt capital for expensive equity capital, a continual decrease in the WACC may be obtained. This situation seems unlikely, to say the least. All the major theories of capital structure recognise that the cost of equity finance will increase (with a resultant change in equity value) as financial risk is increased. The main subject for debate is the size of the change.

In a world without taxation, Miller and Modigliani argue that as gearing increases, so the cost of equity rises; the cost of debt remains constant (except at extreme levels of gearing) and the overall cost of capital remains constant. The overall value of the company remains unchanged but the value of equity will fall, up to a point.

In a world with corporate taxes, Miller and Modigliani argue that the cost of equity will rise, and the cost of debt will r main constant, but the overall cost of capital will fall due to the benefit of the tax shield on debt interest paym nts. Once again, the market value of equity will fall.

The Traditional theory argues that the cost of equity (and eventually debt) will rise as gearing increases, which results in either a reduction or an increase in the overall cost of capital (depending on the level of gearing of the company), and a change in the value of equity (and ultimately debt), for example the use of more debt will inc ease the risk to shareholders and lead to a fall in share price, but the expected return on eq ity normally increases with the use of debt, which tends to increase share price. The overall effect co ld be either a rise or fall in share price.

When bankruptcy costs, agency costs and other costs of high gearing are also considered, the likelihood f a change in the value of equity and debt becomes even greater as gearing increases.

The financial director is, therefore, likely to be wrong in his belief that the market price of the company's exi ting shares debentures and long-term loans will not change.

The value of existing equity is as likely to drop sharply as the level of debt is to rise sharply with new debt being introduced. The existing D:E ratio is 29:31, while the new ratio will be 41:31 at current values. The most likely scenario is that the shareholders' required return will increase substantially as financial risk is increased.

It is also probable that the issuers of debt will see the increased debt as giving them more risk and will therefore require a higher return.

Question 4–10 *(Advanced)* *40 marks 60 minutes*

Wishbone (Pty) Ltd is a holding company with investments in various industries. Its directors are currently considering several projects which will increase the range of the business activities undertaken by Wishbone (Pty) Ltd, the holding company. The directors would like to use discounted cash-flow techniques in their evaluation of these projects, but as yet no WACC has been calculated.

Wishbone (Pty) Ltd has an authorised share capital of 10 million 25 cent ordinary shares, of which 8 million have been issued. The current ex div market price per ordinary share is R1,10; a dividend of R0,10 per share having been paid recently. The company's project analyst has established the following information:

The current long-term gilt yield is 12% per annum.

Wishbone's historic beta has been calculated at 1,5.

The Johannesburg Stock Exchange market required return is 16%.

Extracts from the latest statements of financial positions for both the group and the holding company are given below:

	Wishbone (Pty) Ltd consolidated state ents of financial position	**Wishbone (Pty) Ltd**
	R'000	**R'000**
Issued share capital	3 000	3 000
Share premium	500	500
Reserves	7 400	900
Shareholders' funds	10 900	4 400

	Wishbone (Pty) Ltd consolidated statements of financial position	**Wishbone (Pty) Ltd**
	R'000	**R'000**
4% irredeemable preference shares	2 800	1 400
10% irredeemable debentures	3 600	1 500
12% bank loans	3 200	2 000
Overdraft	800	50
Total liabilities	10 400	4 950

All debt interest is payable annually and all the current year's payments will be made shortly. The current market yields on pr f r nce shar s and debentures are 8% and 14% respectively.

The 12% bank loans are not traded on the open market, but the project analyst estimates that their effective pre-tax cost is 2% above overdraft rate (which is currently 14%), and they are repayable in five years. The effective company tax ate is 50%.

Required:

(a) Calc late the effective after-tax WACC as required by the directors. **(*20 marks*)**

Outline the fundamental assumptions that are made whenever the WACC of a company is used as the discount rate to evaluate investments in new projects. **(*9 marks*)**

(c) Di cu what is meant by a 'target WACC' and how a company should decide on how to finance an investment project that has a positive NPV. **(*11 marks*)**

Solution:

The valuation of WACC cannot be done on the consolidated statements of financial position figures as each company in the group will have its own financial structure and business risk, which will be different to every other company and different to the holding company's average.

(i) Cost of equity capital

$k_e = R_f + \beta (R_m - R_f)$

$12 + 1{,}5 (16 - 12)$

18%

Equity value:

8 000 000 × R1,10 = R8 800 000

(ii) Preference shares required return 8%

MV: 1 400 000 × $\frac{4}{8}$

R700 000

Debentures required return 7% after tax

MV: 1 500 000 × $\frac{5}{7}$

R1 071 428,50

Loans required return 8% after tax

Market value

Interest after tax 120 000

5 year PV factor at 8% = 3,991

(Year 1 – 0,926; Year 2 – 0,857; Year 3 – 0,794; Year 4 – 0,735; Year 5 – 0,681)

120 000 × 3,991 = R478 920

Redemption value R2 000 000 × 0,681 = 1 362 000

Market value = R478 920 + R1 362 000 = R1 840 920

Basis for weighting

	V	**Weighting**	**Required return**	**WACC**
Ordinary shares	8 800 000	71%	18%	12,78
Preference shares	700 000	5,5	8	0,44
Debentures	1 071 428	8,5	7	0,60
Loans	1 840 920	15	8	1,20
	12 412 348	100		15,02

The effective after-tax WACC is 15%.

(i) Only und r conditions of capital market perfection will the costs of capital calculated represent the true opportunity costs of funds used.

The proje t must be small relative to the size of the company (i.e. it represents a marginal investment). This is because the costs of capital calculated refer to the minimum required return of ma ginal investors, and therefore are only appropriate for the evaluation of marginal changes in the company's total investment.

Using the existing market value mix of funds as weights in the calculation assumes that in the long-term f nds will be raised in this proportion (i.e. in the long-term the capital structure of the c mpany will remain unchanged). This implies that the current gearing ratio is regarded as optimal.

In the short- or medium-term, funds will not be raised in the exact proportion of existing market values. Hence no attempt is made to match a project with a particular issue of funds. All funds are regarded as forming a pool out of which all projects are financed (the 'pool' concept).

The project is of average risk for the firm and will cause no change in the risk of the firm as perceived by investors. This is because the cost of capital estimate is only valid for the existing level of risk in the firm.

The 'target WACC' implies that a company will have an optimum D:E ratio that is derived from a pool of funds. The target WACC is based on long-term expectations, both economic and political. It is further assumed that a company will attempt to move towards the optimum D:E ratio when new funds are raised.

Where a company has a positive net present value (NPV) and the company wishes to invest in the project, management must consider the present D:E ratio in relation to the optimum or target D:E ratio. Where a company has too much debt at current market value of debt and equity, the company will have to use equity funding.

Equity debt increases both the company risk and the shareholders' required return.

Question 4–11 *(Fundamental & Intermediate)* *40 marks 60 minutes*

Grove Ltd is considering rapid expansion in a range of differing activities in the near future.

The directors have been advised that discounted cash flow techniques provide the most acceptable appraisal methods for their needs.

Grove Ltd has the following statement of financial position taken from its dr ft ccounts:

		R'000
Authorised share capital	15 000 000 at 50c	7 500
Issued share capital	10 000 000 at 50c	5 000
Share premium		2 340
Revaluation reserve		1 610
Other reserves		4 615
Shareholders' funds		13 565
12% irredeemable debentures		2 500
10% redeemable debentures		2 000
14% long-term loan		3 000
		7 500

Grove Ltd's shares have a current market value of R1,56 cum div. A dividend of 18c is due to be paid shortly. All debt interest is paid annually in arrears and has just been paid. The company has been growing at a rate of 5%. This growth should be maintained in the foreseeable future.

The 12% debentures have a market value of R80,00 per cent. The 10% debentures are to be redeemed in eight years' time at R95 per R100 nominal. The company has a current market required return of 16,67% before tax. The 14% loan is not traded on the open market, but its effective pre-tax cost has been estimated at 18%. It is redeemable at par in three years' time.

The company tax rate for Grove Ltd is 40%.

Required:

(a) Calculate the after-tax WACC of Grove Ltd. **(*28 marks*)**

Outline the fundam ntal assumptions that are made whenever the WACC is used as a discount rate in NPV calculations. **(*12 marks*)**

Solution:

Equity value: 10 000 000 × (R1,56 – 0,18)

R13 800 000

Shareh lders' required return:

$$\text{Value} = \frac{D_1}{k_e - g}$$

$$1{,}38 = \frac{0{,}18\,(1 + 0{,}05)}{k_e - 0{,}05}$$

$$k_e = \frac{0{,}189}{1{,}38} + 0{,}05$$

$$k_e = 18{,}7\%$$

12% irredeemable debentures:

$$k_d = \frac{\text{Interest } (1 - T)}{\text{Ex-interest market value}}$$

$$k_d = \frac{12 \times (1 - 0{,}40)}{80}$$

= 9% after tax

Market value: R80/100 × 2,5 million = R2 000 000

10% redeemable debentures

k_d = 16,67% × 60%	=	10%		
Market value	=	PV of interest + PV at redemption		
Interest after tax	=	R6 (per R100 nominal)		
Redemption value	=	R95		
Years 1–8	=	R6 × 5,335	=	32,01
Year 8	=	R95 × 0,467	=	44,365
				R76,375

Market value: R76,375 × R2 million = R1 527 500

14% loan:

k_d = 18% × 60% = 10,8%

Annual interest after tax: R8,40 (per R100 nominal)

Redemption value R100

Years 1–3	=	R8,40 × 2,4523	=	R20,60
Year 3	=	R100 × 0,7352	=	R73,52
				R94,12

Market value: R94,12/100 × 3 million = R2 823 600

WACC

	MV	**% weight**	**Required return**	**WACC**
Equity	13 800 000	68%	18,7	12,716
12% debentures	2 000 000	10%	9	0,9
10% debentures	1 527 500	8%	10	0,8
14% loan	2 823 600	14%	10,8	1,512
	20 151 100			15,928

WACC = 16%.

Assumptions underlying the use of WACC as a discount rate:

It can be shown that, in a perfect capital market in which the market value of an ordinary share is the discounted p esent value of the future dividend stream, acceptance of a project which has a positive NPV when disco nted at the WACC will result in the share price increasing by the amount of the NPV. It is this relationship between the NPV and the market value which is the basis of the rationale for using the WACC in c njunction with the NPV rule. However, the use of the WACC in this way depends upon a number of assumpti ns as follows:

The objective of the firm is to maximise the current market value of the ordinary shares. If the firm is pursuing some other objective, for example sales maximisation subject to a profit constraint, ome other discount rate may be more appropriate.

The market is perfect and the share price is the discounted present value of the dividend stream. Market imperfections may undermine the relationship between NPV and the market value, and cast doubt upon the usefulness of WACC as a discount rate. Furthermore, if the market values shares in some other way (earnings multiplied by a PE ratio) then the link will also be broken.

The current capital structure is to be maintained and the existing capital structure is optimal.

The risk of projects to be evaluated is the same as the average risk of the company as a whole. The discount rate has two components, namely the risk-free rate and a premium for risk. The WACC incorporates a risk premium which is appropriate to the risk of the company as a whole, that is, the average risk of all its existing assets and projects. Where a project is to be considered which has a different level of risk, the WACC is not the appropriate rate.

Thus for Grove Ltd, where expansion is being considered across a range of differing activities, the WACC is unlikely to be appropriate, particularly if the investments are large relative to the size of the company.

Note: ***It would be inappropriate here to launch into a deep analysis of the Capital Asset Pricing Model (CAPM) as a means of obtaining a risk adjusted discount rate for project appraisal purposes. It is not asked for by the question and a brief mention is all that should be made.***

Question 4–12 *(Fundamental & Intermediate)* *40 marks 60 minutes*

Jasmond (Pty) Ltd is a holding company owning shares in various subsidiary companies. Its directors are currently considering several projects which will increase the range of the business activities undertaken by Jasmond (Pty) Ltd and its subsidiaries. The directors would like to use disc unted cash-flow techniques in their evaluation of these projects, but as yet no WACC has been calculated.

Jasmond (Pty) Ltd has an authorised share capital of 10 illion 25 cent ordinary shares, of which 8 million have been issued. The current ex div market price per ordinary share is R1,10, with a dividend of R0,10 per share having been paid recently. The company's Project Analyst has calculated that 18% is the most appropriate after-tax cost of equity capital. Extracts from the latest state ents of financial position for both the group and the holding company are given below:

	Jasmond (Pty) Ltd and subsidiaries	**Jasmond (Pty) Ltd**
	'000	**R'000**
Issued share capital	2 000	2 000
Share premium	1 960	1 960
Reserves	3 745	708
Shareholders' fund	7 705	4 668
Minority interests	895	–
3% irredeemable debentures	1 400	–
9% redeemable debentures	1 500	1 500
6% loan stock	2 000	2 000
Bank loans	1 540	600
Total long-term liabilities	6 440	4 100

All debt interest is payable annually and all the current year's payments will be made shortly. The current cum interest market price for R100 nominal value 3% debentures is R31,60, while the 9% debentures have a value of R103,26. Both the 9% debentures and the 6% loan are redeemable at par in ten years' time. The 6% loan is not traded on the open market, but the analyst estimates that its effective pre- tax cost is 10% per annum. The bank loans bear inte est at 2% above bank rate (which is currently 11%) and are repayable in six years. Jasmond (Pty) Ltd's effective company tax rate is 46%.

Required:

Calculate the effective after-tax WACC of Jasmond (Pty) Ltd and its subsidiaries as required by the direct rs. [Fundamental] **(*20 marks*)**

(b) Di cu the problems that are encountered in the estimation of a company's WACC when the following are u ed as sources of long-term finance: [Intermediate]

(i) Bank overdraft.
(ii) Convertible long–term loans. **(*10 marks*)**

Outline the fundamental assumptions that are made whenever the WACC of a company is used as the discount rate in NPV calculations. [Fundamental] **(*10 marks*)**

Note: ***Ignore personal taxation.***

Solution:

Effective after-tax WACC

Capital	MV R	Proportion	Cost %	Proportion × cost %
Ordinary shares	8 800 000	0,6364	18,00	11,46
3% debentures	400 400	0,0290	5,66	0,16
9% debentures	1 413 900	0,1023	5,72	0,59
6% loan	1 672 800	0,1210	5,40	0,65
Bank loans	1 540 000	0,1113	7,02	0,78
	R13 827 100	1,0000		13,64%

The WACC is approximately 14%.

Workings

1 3% irredeemable debentures

Ex interest MV per R100 nominal = R(31,60 – 3) = R28,60

Total market value = R1,4m × 0,2860 = R400 400

Net of tax cost $= \frac{3(1 - 0{,}46)}{28{,}60}$

= 5,66% or 3 / 28,60

= 0,1049 × 54%

= 5,66%

2 9% redeemable debentures

Ex interest MV per R100 nominal = R(103,26 – 9) = R94,26

Total market value = 1,5m × 0,9426 = R1 413 900

Annual net of tax interest = 9(1 – 0,46) = R4,86

Time	Cash flow R	5% factors	PV R	10% factors	PV R
0	(94,26)	1,00	(94,26)	1,00	(94,26)
1 – 10	4,86	7,72	37,52	6,14	29,84
10	100,00	0,61	61,00	0,39	39,00
			4,26		25,42

By interpolation, net of tax cost $= 5\% + \frac{4{,}26}{4{,}26 + 25{,}42} \times (10 - 5)\% = 5{,}72\%$

(Interpolation gives only an approximate cost)

3 6% l an

After-tax interest R6 × 54% = R3,24

Pre ent value of future cash flows discounted at after tax cost

10% × 0,54 = 5,4%

1–10 yrs	R3,24 × PV annuity at 5,4% of 7,5740	=	R24,54
Year 10	R100 × PV at 5,4% of 0,5910	=	R59,10
			R83,64 per R100

Total market value = R2m × 0,8364 = R1 672 800

4 Bank loans

Cost = (11 + 2)% gross of tax, that is, 13% × (1 – 0,46) net of tax = 7,02%

Note: ***The correct WACC is the WACC for each company in a group of companies and not an overall WACC as calculated above, as each company will have a different business and financial risk which will lead to a different but appropriate WACC.***

Assumptions made

1 The effective rate of company tax applies to the whole Jasmond group, not just the holding company.

2 The bank loans and 3% irredeemable debentures are liabilities of who y-owned subsidiaries.

Problems of estimation

Bank overdraft

The rate of interest payable on a bank overdraft will fluctuate with general changes in interest rates. For example, it is likely to be granted at a given percentage rate abo e the bank's base rate. Thus, unlike a fixed interest loan, if interest rates fluctuate while the funds are being used, the interest payments vary. It is necessary to estimate these p ssible interest rate changes in computing the overdraft rate to be included in the WACC.

Overdrafts are normally regarded as a short-term source of funds because (technically) they are repayable on demand. However, the reality for any s aller firms is that the overdraft is a major long-term source of funds. Such a firm should atte pt to identify its 'core' overdraft (i.e. the amount which is expected to be outstanding for many years) separately from the variable portion which results from fluctuations in working capital. Only the core overdraft should be included in the WACC calculation.

Convertible long-term loan

The holder of a convertible loan receives fixed interest for a number of years, whereafter he may convert his holding to ordinary shares at a predetermined conversion price over a range of possible dates. Alternatively, he may prefer redemption of the loan at a fixed price on the due date.

The problems of estimation are uncertainties in the time of conversion, the proportion converting and the value of equity at the date of conversion.

The discount rate will be the discount rate which equates to the current market value of the loan with the following stream of cash flows –

l annual net of tax interest to redemption/conversion; **l**

redemption proceeds for those not converting; and **l**

market value of shares received by those converting.

The cash-flows should always be discounted at the after-tax cost of the convertible loan.

The cost of the liability will be the current market value of debt where the conversion is not taken up, or the ost of equity where the debt-holders take up the conversion option.

Fu ther un e tainties are posed by the fact that the company may have the right to redeem the loan over a ange of dates (a 'stick' to encourage conversion) or may offer different conversion prices at different dates (a 'carrot').

The f ndamental assumptions behind the use of WACC as a discount rate

(i) Only under conditions of capital market perfection will the cost of capital calculated represent the true pportunity cost of funds used, that is, all shareholders have the same k_e, because all have perfect information and make the same assessments.

The project must be small relative to the size of the company.

Using the existing market value mix of funds as weights in the calculation assumes that in the long-term funds will be raised in this proportion (i.e. in the long-term, the capital structure of the company will remain unchanged). This implies that the current gearing ratio is regarded as optimal.

In the short- or medium-term, funds will not be raised in the exact proportion of existing market values. Hence no attempt is made to match a project with a particular issue of funds. All funds are regarded as forming a pool out of which all projects are financed (the 'pool' concept).

The project is of average risk for the firm and will cause no change in the risk of the firm as perceived by investors. This is because the cost of capital estimate is only valid for the existing level of risk in the firm.

Question 4–13 *(Fundamental)* *10 marks 18 minutes*

Maranta Ltd, a profitable company, is currently evaluating its capital structure. The management of Maranta have asked you to advise it on the ideal capital structure for the company.

You have estimated that the market relationship between debt (after tax) and equity for companies similar to Maranta Ltd is as follows;

Debt	:	Equity	K_d %	K_e %
0	:	100	–	22
20	:	80	12,5	23,125
40	:	60	12,5	25
50	:	50	16	28
60	:	40	19	34

Required:

Determine the optimum capital structure for Maranta Ltd.

Solution:

Long-term WACC:

Debt	:	Equity	K_d %	K_e %	WACC (weighting)
0	:	100	–	22	22%
20	:	80	12,5	23,125	21%
40	:	60	12,5	25	20%
50	:	50	16	28	22%
60	:	40	19	34	25%

The lowest WACC at different ebt-Equity (D : E ratios) is 20%. The company should use this as the rate to evaluate capital decisions. The company should finance its projects in order to move towards a D : E ratio of 40 : 60.

Chapter 5

Portfolio management and the Capit l Asset Pricing Model

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

understand the background to portfolio theory;
explain the investor's attitude to risk;
explain the investor's expected return, required return and how these are influenced by risk;
distinguish between single-asset and portfolio risk and return;
illustrate the use of the probability distribution and expected values in risk management;
assess the risk and return of a two-asset portfolio;
illustrate graphically the combination of two or more portfolios;
explain the effects of diversification on portfolio risk;
explain the derivation and rationale of the securities market line (SML);
explain the derivation of the capital asset pricing model (CAPM);
discuss and illustrate the various applications of the CAPM; and
discuss the limitations of CAPM for capital budgeting decisions.

The modern con ept of portfolio theory was introduced by Henry Markowitz in a paper entitled 'Portfolio selection' published in the Journal of finance in 1952. At the root of portfolio theory is the concept of risk and return. He p oposed that investors should focus on selecting portfolios (not individual shares) based on the risk – reward cha acte istics of each portfolio.

5.1 Backgro nd to portfolio theory

The risk f a p rtfolio is measured by the portfolio standard deviation of its expected returns. The expected returns f a p rtfolio include increases (or decreases) in the value of the portfolio as well as income from the portfolio in the form of dividends received or interest earned. From a universe of possible portfolios, there is a e ection of those portfolios that will optimally balance risk and reward and these are referred to as 'efficient frontier of portfolios'.

The important criteria for any investment are:

the expected return from the investment;

the variation in that return (risk) – which can be measured by the standard deviation; and

the association between the return for an investment and that for every other investment.

The theory for portfolio selection is thus dependent on the expected return of a portfolio, in conjunction with its risk. Investors are assumed to be rational; therefore when comparing investment choices, they will choose those investments which give greater return when investment risk is equal, and lower risk when investment return is equal. Efficient portfolios can be identified by examining the expected *return* (mean) of the individual shares (or securities) comprising the portfolio, the *risk* measured by the standard deviation of the portfolio's return, and the *relationship* between all the shares comprising the portfolio (coefficient of correlation).

5.2 The concept of risk and return

The principal objective for a rational investor is to maximise the return on an investment or a portfolio of investments for a given level of risk. For most securities (shares, bonds, debentures nd the like), the components of return are the expected capital appreciation/gains in the investment together with dividends/interest arising from the investment. In other words for a share, this would be the c pit l growth plus the dividend yield. It is therefore important that the investor clearly understands the following key issues arising from the investment process:

What risk and return are.

The origins of the said risk and return.

How risk and return are measured.

Return may be defined in terms of:

- Realised return, that is, the return which has b n arn d; and

  Expected return, that is, the return which the inv stor anticipates to earn over a defined investment horizon in the future.

The expected return is a forecast return and may or may not occur. The realised return is a historic return that allows an investor to estimate cash inflows in terms of capital gains (or losses), dividends and/or interest available to the holder of the investment. The return can be measured as the total gain or loss to the holder over a given period of time and may be defined as a percentage return on the initial amount invested. With reference to investment in equities, the realised return consists of the capital gain (or loss) plus the dividend at the time of disposal of the investment.

The risk associated with an investment means that future returns from the investment are unpredictable. The concept of risk may be defined as the probability that the actual return may not be the same as what is expected. In other words, risk refers to the chance that the actual outcome (return) from an investment will differ from an expected outcome. With reference to a firm, risk may be defined as the possibility that the actual outcome of a financial decision may not be the same as estimated. The risk may be considered as a chance of variation in returns. Investments having a greater chance of variation are considered riskier than those with a lesser chance of variation. Between equity and bonds, the former tends to be riskier than the latter as there are many more variabl s that impact on a share price than on a bond value.

There is a trade-off b tw n risk and return. The higher the risk of an investment, the higher the return that is expected. Conversely, the lower the risk from an investment, the lower the return. In practice taking on higher risk may not esult in higher returns. A portfolio consisting of equities (shares listed on the JSE) and derivative instruments (e.g. options and futures) may yield attractive returns over time but the investor takes on significant risk. On the other hand investments in government bonds (e.g. RSA treasury bonds) will yield low returns for moderate risk. The risk – return trade-off is illustrated in Figure 5.1 below.

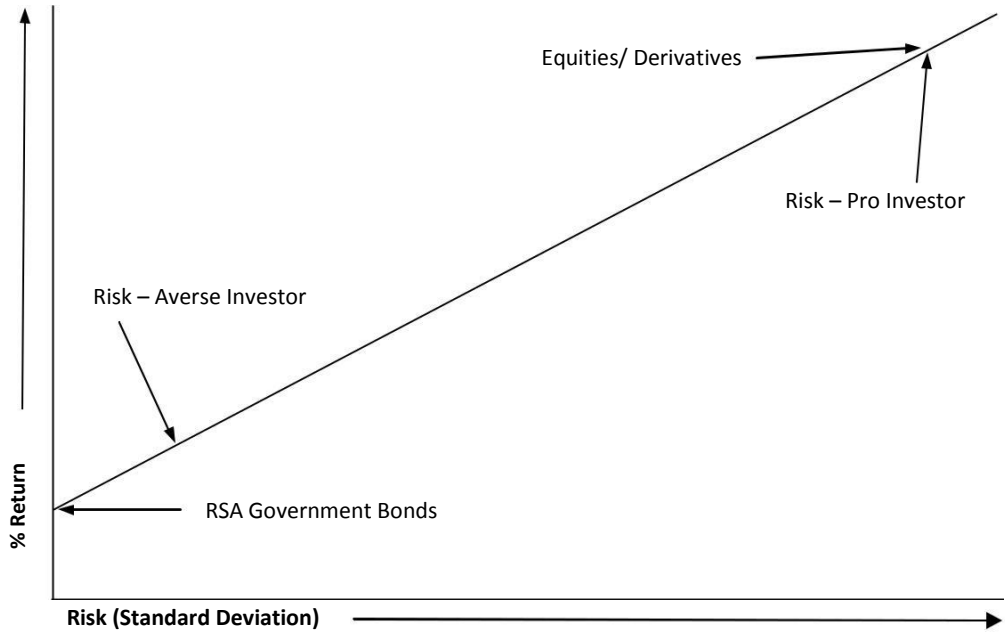


Figure 5.1: Risk – Return Trade-Off

Investors' attitudes to risk

Investors that require low -risk investments (and as a consequence of such a selection – low returns) are said to be 'risk-averse'. Investors with an appetite for higher returns will incur higher risk and are said to be 'risk-pro'. In practice investors are constantly on the lookout for either the same risk for a larger return, or the same return for lower risk. Doing so ensures that enough return is realised for a given level of risk or alternatively, an appropriate level of risk (deemed to be not excessive) is borne given the expected return of an investment. The positioning of investors along the risk – return curve is a matter of choice from investor to investor and such a decision is influenced by a number of factors peculiar to the investor. Risk tolerance depends on the investor's goals, income, personal situation, even their egos.

Probabilities and expected values

For a single stand-alone asset

It is assumed that a rational investor invests for capital gains + dividend yield in a given security or portfolio. Both the dividend income and capital gains are uncertain. Dividend income is dependent on company profitability and whether or not the directors will declare one. Both these outcomes are uncertain. The capital gain is dependent on the mark t b ing bullish (i.e. the expectation is that share prices will increase, as opposed to a bear market, where it is anticipated that share prices will decline). Again, quite often, markets are unpredictable and hence apital gains are not guaranteed. Both the capital gain and the dividend income constitute the return to the investor. The expected return on a given stand-alone asset security is the average (mean) of the probability dist ibution of possible future returns, calculated by using the following formula:

$$E(R) = \sum_{i=1}^{n} P_i \times R_i$$

Where:

- $E(R)$ = The expected return on the security
- P_i = The probability factor
- R_i = The observed return
- n = The number of observations

Example: Expected return on a stand-alone asset

You own a share that has the following probability/return characteristics, based on future scenarios regarding the state of the economy:

State of economy	Probability	Rate of return
		%
Recession	0,30	– 7
Normal	0,60	13
Boom	0,10	23

What is the expected return on the share? (Note: This is referred to as an ex-ante ana ysis, as it is concerned with future states).

Solution:

Expected return = (0,30 × – 7%) + (0,60 × 13%) + (0,10 × 23%) = 8%

For a portfolio consisting of two assets

The formula for calculating the **expected return** on a two-asset portfolio is:

$$E(R_P) = W_A E(R_A) + W_B E(R_B)$$

Where:

$E(R_P)$ = The expected return on the portfolio
W_A = The proportion of the portfolio invested in stock A
$E(R_A)$ = The expected return on stock A
W_B = The proportion of the portfolio invested in stock B
$E(R_B)$ = The expected return on stock B

Example: Expected return on a portfolio consisting of two assets

The probability distribution of the returns of a two asset portfolio is as follows:

Year	Probability	Return A	Return B
1	0,20	5%	50%
2	0,30	10%	30%
3	0,30	15%	10%
4	0,20	20%	– 10%

There is a 50:50 split between A and B in the portfolio.

Required:

Calculate the expected return on a two-asset portfolio.

S luti n: Expected return on a two-asset portfolio

W_A = 0,50
$E(R_A)$ = 0,20(5%) + 0,30(10%) + 0,30(15%) + 0,20(20%) = **12,5%**
W_B = 0,50
$E(R_B)$ = 0,20(50%) + 0,30(30%) + 0,30(10%) + 0,20(–10%) = **20,0%**
The formula = $E(R_P) = W_A E(R_A) + W_B E(R_B)$
$E(R_P)$ = 0,50(12,5%) + 0,50(20,0%) =**16,25%**

Single-asset risk measures

Balancing risk and return is important for any investor and hence it is critical to have a proper approach to portfolio risk management. To better understand the latter, the risk dynamics as applied to stand-alone assets are first explored. This requires the student to have a grasp of the concept of the **normal curve** and the statistical measures of variance, standard deviation, covariance and correlation coefficient.

The normal distribution curve

The normal curve is a symmetrical distribution of scores with an equal number of scores above and below the midpoint of the horizontal axis of the curve. Since the distribution of scores is symmetrical, the mean (the average value), median (the middle value), and mode (the most frequent va ue) are a at the same point. In other words, in a normal curve, the mean = the median = the mode. The following illustrations are based on population data.

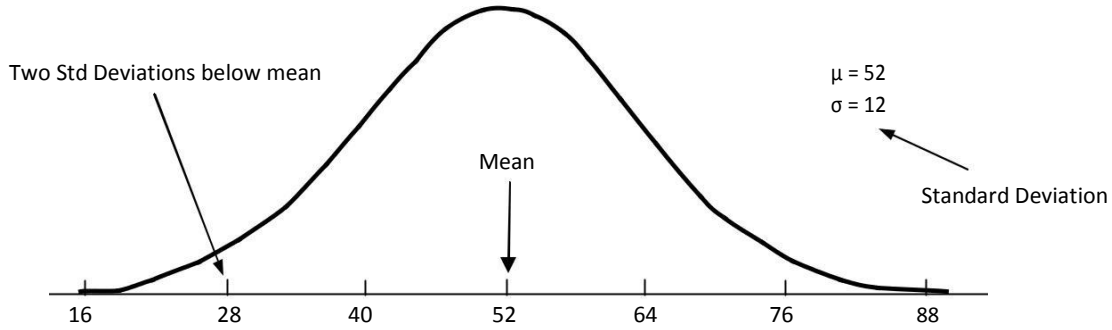


Figure 5.2: Illustrated example of the normal curve (mathematics results of a matric class)

If we divide the distribution into the standard deviation units, a known proportion of scores lies within each portion of the curve.

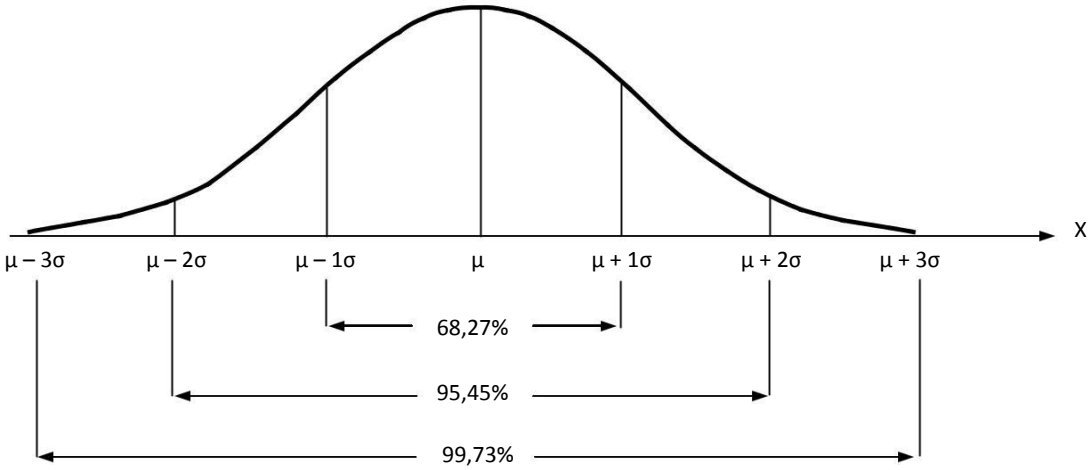


Figure 5.3: Percentages of areas under the normal curve

Interpretation: Within a random sample of say 100 pupils 68,27% of them (68 students) will have a math result of between 40 and 64 (i.e. between one standard deviation to the left and right of the mean) and 95,45% of the tudents (95 students) will have scores of between 28 and 76 (i.e. between two standard deviations to the left and right of the mean).

The v riance: The variance and the closely-related standard deviation are measures of how dispersed (spread out) the distribution of variables (e.g. scores, points, values or results) are around the mean. In other words, they are measures of variability. The greater the dispersion, the higher the variance. The variance is computed as the average of the sum of the squared deviation of each observation from the mean.

The formula for the variance computed from population data is:

$$\sigma^2 = \frac{\sum(X-\mu)^2}{N}$$

Where:

σ^2	Population variance
X	Observed variable (students' maths score)
μ	Population mean
N	Number of subjects under analysis

The formula for the variance computed from sample data is:

$$S^2 = \frac{\sum(X-M)^2}{N}$$

Where:

S^2	Sample variance
X	Observed variable (students' maths score)
M	Sample mean
N	Number of subjects under analysis

The standard deviation (σ):

The standard deviation measures the spread of data around the mean value. It is useful in comparing data sets which may have the same mean but a different range. For example, the mean of the following two data sets is the same: 15, 15, 15, 14, 16 (by adding them up and dividing by 5, a mean of 15 is obtained) and 2, 7, 14, 22, 30 (by adding them up and dividing by 5, a mean of 15 is derived). However, the second is clearly more spread out (hence more risky). If a data set has a low standard deviation, the values are not widely dispersed. The standard deviation is often used by investors to measure the risk of a share or a share portfolio. The basic idea is that the standard deviation is a measure of volatility; the more a share's returns vary from the share's average return, the more volatile the share is in relation to its price movements.

The formula for the standard deviation computed from population data is:

$$\sigma = \sqrt{\frac{\sum(x_i-\mu)^2}{N}}$$

Where:

σ	= Population standard deviation
x_i	= Obse ved variable (students' maths score)
μ	= Population mean
N	= N mber of subjects under analysis

The form la for the standard deviation computed from sample data is:

$$S = \sqrt{\frac{\sum(x_i-\mu)^2}{n-1}}$$

Where:

S	= Sample standard deviation
x_i	= Observed variable (students' maths score)
μ	= Sample mean
n	= Number of subjects under analysis

Example: Calculating the mean, variance and standard deviation from sample historic data (Ex-post)

You have observed the following returns on Memeza Limited's share price:

Year	Returns
20X7	6%
20X6	– 10%
20X5	4%
20X4	23%
20X3	12%

Required:

Calculate the average return (mean) on the share over the past five years.

Calculate the variance and standard deviation on the share over the past fi e years.

Solution: Calculating the mean, variance and standard deviati n fr m sample historic data (Ex-post)

Using the Sharp EL 738 calculator:

Operation 1	Operation 2	Result
MODE	1 0	STAT 0
2ndF	M – CLR 0 0	Clear Registers
6	ENT	1
10 +/–	ENT	2
4	ENT	3
23	ENT	4
12	ENT	5
ALPHA	[redacted] =	7
ALPHA	**sx** =	12,04
2ndF	**X**^{2} =	145

From the above calculations, the mean return ($\bar{x}$) over the five-year period is 7%, the variance (X^2) is 145 and the standard deviation (sx) is 12,04. Notice that the standard deviation is the square root of the variance.

Comparing the risk of two stand-alone assets/projects

In assessing the risk of stand-alone projects, a situation may arise where there is need to compare the risk among two stand-alone proj cts. In addition to calculating the variance and standard deviation, the coefficient of variation (CV) may prove us ful in the decision making process. The latter measures the risk per R1 of return.

Example:

A company is conside ing two independent investment opportunities as follows:

	Project A	Project B
Investment capital	R500 000	R500 000
Project life	1 year	1 year

Estimated cashflows

Probability	Cashflow	Probability	Cashflow
0,25	600 000	0,25	200 000
0,50	700 000	0,50	800 000
0,25	800 000	0,25	1 000 000

Required:

Determine which investment the company should choose.

Solution:

The calculated mean return, standard deviation and CV are as follows:

Probability	Project A (R000s)				Project B (R000s)			
	R_A	$R_A \times P$	$(R_A - R_A)$	$(R_A - R_A)^2 \times P$	R_B	$R_B \times P$	$(R_B - R_B)$	$(R_B - R_B)^2 \times P$
0,25	600	150	(100)	2 500	200	50	(500)	62 500
0,50	700	350	0	0	800	400	100	5 000
0,25	800	200	100	2 500	1 000	250	300	22 500
Expected mean (R_A)		700				700		
Variance (σ^2)				5 000				90 000
Standard deviation (σ)				70,71				300
CV			(70,71 / 700)	0,10			(300 / 700)	0,43

The calculation of the expected mean return indicates that both projects yield a positive return of R700 000, or a net value of R200 000, being the difference between the return and the investment outlay of R500 000.

The standard deviation measures the dispersion around the mean. In the ab ve example, Project A has a lower standard deviation of R70 711, which means it has a lower risk in comparison to Project B, which has a standard deviation of R300 000. This is indicated by the range of cash flows for Project A, which is between R600 000 and R800 000, whereas for Project B it is between R200 000 and R1 000 000.

The company should therefore choose Project A.

In order to compare two projects with different m an valu s, one must calculate the coefficient of variation (CV) which measures the risk per R1 of return, that is the CV standardises the risk per R1 of return. In the above example, the CV of Project A is only 0,10, compared to a high CV of 0,43 for Project B. To obtain the CV, one merely has to divide the standard deviation by the expected mean return.
The correct method of evaluating two separate projects or investments is to use the mean variance approach as developed by Markowitz in 1952. This states that:

> Given a choice of two projects (or portfolios) with the same return but different risk, an investor will choose the one with the lower risk, in this case Project A.
> Alternatively, where two projects (or portfolios) have the same risk but different returns, an investor will choose the one with the higher return.

5.3 Portfolio risk and return

Most investors invest in a collection of two or more assets. Such a collection of assets held by an investor is known as a portfolio. It is often assumed that a rational investor will build a portfolio that will give him or her maximum possible r turns for a given risk profile remembering that the greater the returns the greater the risk. The components of the total risk of a portfolio is the systematic (market) and unsystematic (asset specific) risk. The former affe ts all market participants and is due to changes in economic fundamentals (e.g. interest rates, exchange rates, inflation, consumer demand, the price of oil, etc). Systematic risk cannot be eliminated or minimised by managerial intervention. The latter is associated with the basic functions of the organisation (e.g. information technology, innovation, better production processes, financing, leadership, etc). Managerial intervention can minimise this type of risk.

Two-asset portfolio risk and return

At least two shares constitute a portfolio. A two-asset portfolio is unlikely to achieve sufficient diversification of ri k and can therefore not constitute an efficient portfolio. However, the principles being explored here are the ame irre pective of the number of shares that comprise a portfolio. The expected return on a portfolio of two assets is explained and calculated under section 5.2. The primary objective of this sub-section is to explore ways of assessing the risk of a two-asset portfolio. The primary risk measures of a two-asset portfolio are the following –

- the portfolio variance; and
- the portfolio standard deviation.

The portfolio variance:

This is a measure of the risk (volatility) of a portfolio, and it takes into consideration the combination of the variance and co-variance of each security and its proportion in that portfolio – not just the weighted average of all security variances.

There are two variations of the formula used to calculate the portfolio variance, namely:

One that relies on the *covariance of returns* of the assets in the portfolio.

The other that relies on the *correlation coefficient* of the returns of the assets in the portfolio.

The statistical formula for the portfolio variance based on the covariance is:

$$\sigma^2_p = \sqrt{W^2_x\sigma^2_x + W^2_y\sigma^2_y + 2W_xW_y \times COV_{xy}}$$

Where:

σ^2_p = The portfolio variance
W_x and W_y = The proportions invested in Share X and Share Y respectively
σ^2_x and σ^2_y = The variance on shares X and Y respectively
Cov (x,y) = Covariance of X and Y

The statistical formula for the portfolio variance based on the correlation coefficient is:

$$\sigma^2_p = \sqrt{W^2_x\sigma^2_x + W^2_y\sigma^2_y + 2W_xW_y P_{xy}\sigma_x \sigma_y}$$

Where:

σ^2_p = The portfolio variance
W_x and W_y = The proportions invested in X and Y respectively
σ^2_x and σ^2_y = The variance on shares X and Y respectively
σ_x and σ_y = The standard deviation on shares X and Y respectively
P_{xy} = The *correlation coefficient* on shares X and Y

The covariance:

The covariance is a *multi-variable* statistical measure (as opposed to *single* statistical measures such as the mean, standard deviation and variance). It is a measure of the degree to which returns on two risky assets move in tandem. A positive covariance means that asset returns move together. A negative covariance means returns move invers ly. If share A's return is high whenever share B's return is high and the same can be said for low returns, th n th se shar s are said to have a positive covariance. If share A's return is low whenever share B's return is high then these stocks are said to have a negative covariance. If the covariance is zero there is no relationship between the variables.

The statistical fo mula for the covariance is:

$$Cov(x,y) = P_{xy}\sigma_x\sigma_y$$

Where:

C v (x,y) = Covariance of X and Y
P_{xy} = Correlation co-efficient of X and Y
σ_x = Population standard deviation of X
σ_y = Population standard deviation of Y

The correlation coefficient:

In probability theory and statistics, correlation (often measured as a correlation coefficient), indicates the strength and direction of a linear relationship between two random variables. The calculated value lies be-tween – 1 and + 1. Although the covariance measures the degree to which returns on two risky assets move in tandem, it does not explain the strength of the relationship.

If ***x*** and ***y*** have a strong positive linear correlation, ***r*** *(the correlation coefficient)* is close to + 1. An ***r*** value of exactly + 1 indicates a perfect positive fit. Positive values indicate a relationship between ***x*** and ***y*** variables such that as values for ***x*** increase, values for ***y*** also increase.

If ***x*** and ***y*** have a strong negative linear correlation, ***r*** is close to – 1. An ***r*** value of exactly – 1 indicates a perfect negative fit. Negative values indicate a relationship between ***x*** and ***y*** such that as values for ***x*** increase, values for ***y*** decrease.

If there is no linear correlation or a weak linear correlation, ***r*** is close to 0. A value near zero means that there is a random, nonlinear relationship between the two variables. A perfect correlation of ± 1 occurs only when the data points all lie exactly on a straight line. If ***r*** = + 1, the slope of this line is positive. If ***r*** = – 1, the slope of this line is negative**.**

The statistical formula for the correlation coefficient is:

$$P_{xy} = \frac{Cov\,(x,y)}{\sigma_x \sigma_y}$$

Where:

P_{xy} = The correlation coefficient between X and Y

Cov (x,y) = Covariance between X and Y

σ_x = Population standard deviation of X

σ_y = Population standard deviation of Y

Example: Calculating the portfolio variance

Two shares offer the following four historical % returns:

Return X	Return Y
20%	40%
24%	12%
10%	20%
26%	24%

Required:

Calculate the correlation coefficient of the shares.

Calculate the portfolio variance.

Calculate the portfolio standard deviation.

Solution: Cal ulating the portfolio variance (based on the correlation coefficient)

The following answer is based on the financial calculator – Sharp EL738:

Operation 1	Operation 2	Result
MODE	1 1	STAT 1
2ndF	M – CLR 0 0	Clear Registers
20 (x,y) 40	ENT	Data Set = 1
24 (x,y) 12	ENT	Data Set = 2
10 (x,y) 20	ENT	Data Set = 3
26 (x,y) 24	ENT	Data Set = 4
RCL	σ_x	6,16
RCL	σ_y	10,20
RCL	r (correlation coefficient)	– 0,0318

Input the calculator variables into the formula:

Operation 1	Operation 2	Result
$W^2_x\sigma^2_x$	(0,60)(0,60) × (37,95)	13,66
$W^2_y\sigma^2_y$	(0,40)(0,40) × (104,04)	16,65
$2W_xW_yP_{xy}\sigma_x\sigma_y$	2(0,60)(0,40)(– 0,0318)(6,16)(10,20)	– 0,96
σ^2 portfolio	13,66 +16,65 – 0,96	29,35
σ portfolio	Square root of 29,35	5,42

1 The correlation coefficient (**r**) of the shares = – 0,0318

2 The portfolio variance = 29,35

3 The portfolio standard deviation = 5,42

Interpretation:

- The correlation is negative and very weak. The variables pp se each ther but the magnitude of change of one variable is not matched by the change in the other variable.

The standard deviation of 5,42% is an indication of the risk of the portfolio. It is only useful if compared with the standard deviation of another portfolio or the standard deviation of the current portfolio if its asset composition is changed.

The efficient frontier

Investors often hold a set of portfolios. For each portfolio there is need to balance the risk of the portfolio to the expected return. Overall, the investor strives to balance the risk of all portfolios to the attendant return. To achieve this, the investor needs to select the most efficient set of portfolios in terms of the risk – return trade-off. The process of assessing the risk and return of a portfolio of say 50 shares or five sets of portfolios consisting of 50 shares each is the same as the procedure we employed in assessing the risk and return of a two asset portfolio. The portfolio selection process is as follows:

For any level of volatility, consider all the portfolios which have the same or similar risk. From among those portfolios, select the one which has the highest expected return.

Alternatively, for any expected return, consider all the portfolios which have the same or similar expected return. From among those portfolios, select the one which has the lowest risk.

As the number of shares in a portfolio or the number of portfolio sets increases, the resultant calculations become more complex, but can be done with the aid of appropriate computer models. Calculations for analysing portfolios that contain more than two shares are outside of the scope of this textbook.

The concept of the ffici nt frontier is illustrated below in Figure 5.4.

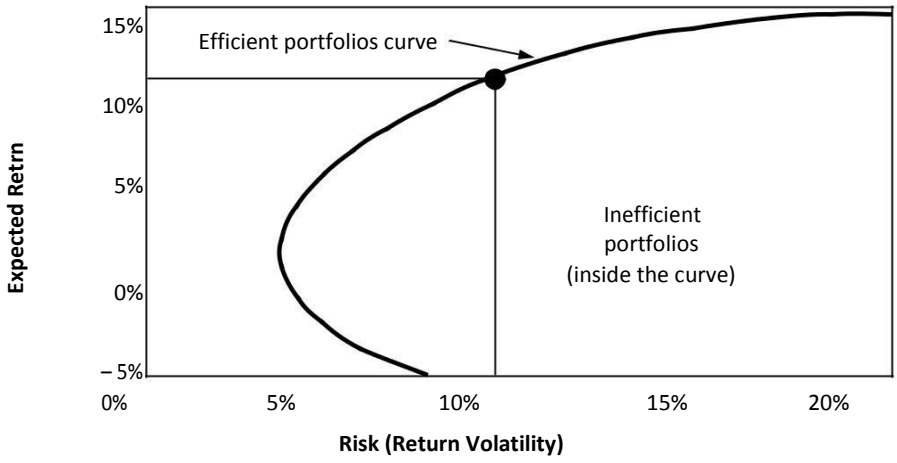


Figure 5.4: Graphic illustration of efficient frontier

Conclusion: An investor should select a portfolio that lies on the **efficient frontier curve**.

5.4 Diversification

Diversification is a strategy designed to reduce exposure to risk by combining, in a portfolio, a variety of investments, such as stocks, bonds, and real estate, which are unlikely to all move in the same direction. The goal of diversification is to reduce unsystematic risk in a portfolio. Volatility is limited by the fact that not all asset classes or industries or individual companies move up and down in value at the same time or at the same rate. Diversification reduces both the upside and downside potential and allows for more consistent performance under a wide range of economic conditions. Mathematically, the purpose of diversification is to reduce the standard deviation of the total portfolio. As you add securities, you expect the average covariance for the portfolio to decline, but not to disappear since correlations are not perfect y negative. It is thought that a portfolio of not less than 20–30 shares will approximate the market in terms of systematic risk. (Satrix's JSE top 40). But one needs a 'balanced' portfolio – avoid putting one's golden eggs in one b sket. One should structure the portfolio so that some shares are positively correlated to the market (m rket cycles) and some are negatively correlate to it in terms of returns.

Systematic versus unsystematic risk

Total risk = Market risk (systematic) + firm-specific (unsystematic) risk

Market risk (systematic): Risk that affects all players in the arket place is called 'market risk' or 'systematic risk'. Changes in economic fundamentals (interest rates, exchange rates, inflation, consumer demand, the price of key commodities such as oil, etc.). Market risk is measured by the beta co-efficient. The market (JSE) has a beta of 1, the market's riskiness relative to itself. Shares/portfolios with a beta greater than 1 (say 1,2) face a bigger risk than the market. Shares/portfolios with a b ta l ss than 1 (say 0,8) face a smaller risk than the market.

Firm-specific risk (unsystematic): Risk associated with the basic functions of the organisation (information technology, production processes, product-markets, innovation, financing, leadership, human skills, etc.). This is operational/business risk. It is often assumed that management can eliminate this risk by diversification or simply managing better.

In theory, if it were possible to eliminate firm-specific risk, the total risk facing the firm would be the market risk. In practice, however, a firm, as a going concern, is faced with a dynamic and ever changing environment and therefore cannot totally eliminate firm-specific risk but can minimise it.

A graphic illustration of total firm risk is shown in Figure 5.5 below.

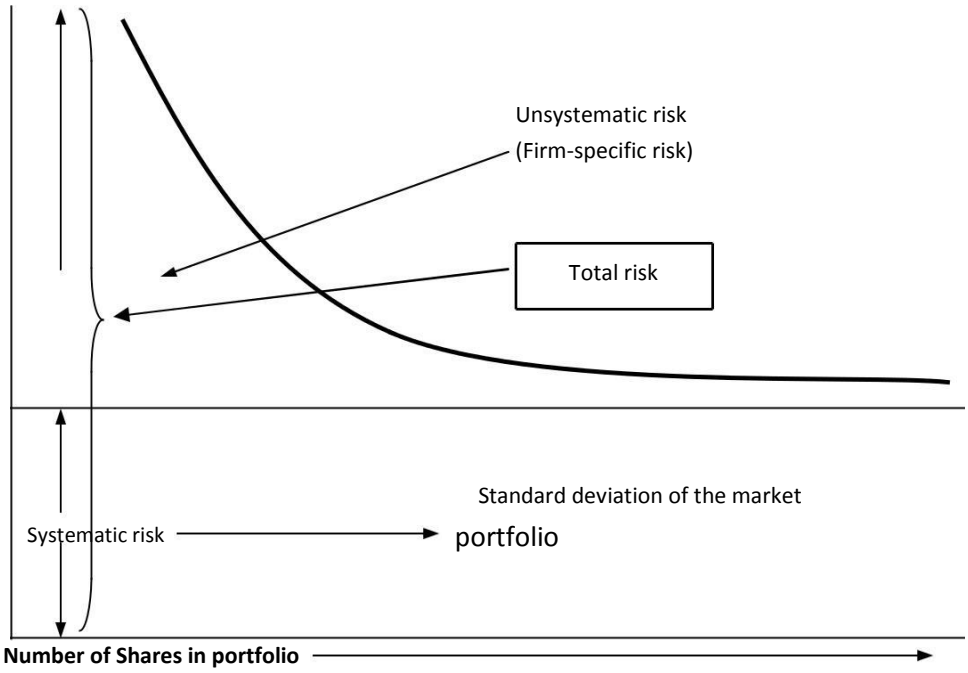


Figure 5.5: Graphic Illustration of total firm risk

5.5 The securities market line (SML)

In 1958, James Tobin expanded on the work of Markowitz, by adding a risk-free asset to the analysis. This led to the notions of a super-efficient portfolio and the capital market line. With the aid of the risk-free asset, an investor could be able to better portfolios on the efficient frontier. The introduction of the risk-free asset had the following implications to an investor:

The return required of any risky asset is determined by the prevailing level of risk-free interest rates plus a risk premium.

Investors require returns that are commensurate with the risk level they perceive.

The security market line (SML) indicates the going required rate of return on a security in the market for a given amount of systematic risk. The SML intersects the vertical axis at the risk-free r te, indicating that any security with an expected risk premium equal to zero should be required to e rn return equal to the risk-free rate. The slope (gradient) of the security market line will increase or decrease with uncertainties about the future economic outlook and/or the degree of risk aversion of investors.

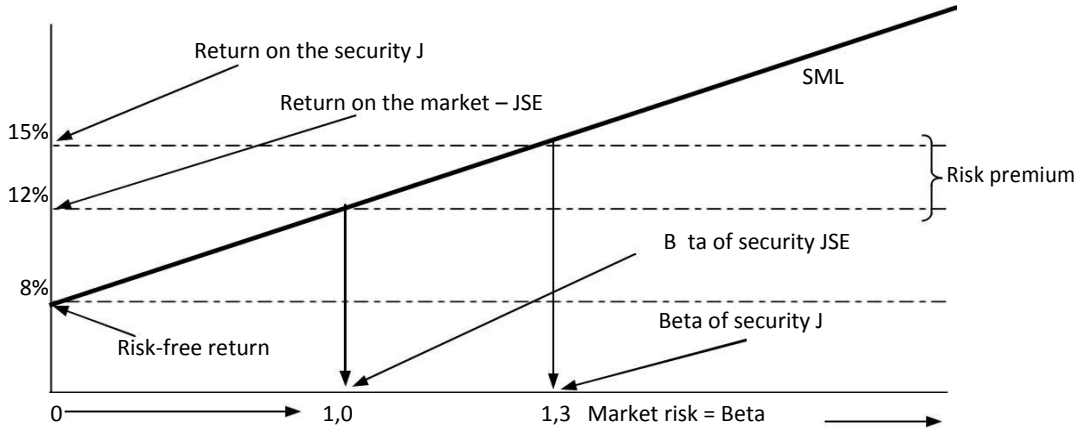


Figure 5.6: Graphic illustration of the S L (figures are imaginary)

5.6 The capital asset pricing model (CAPM)

The capital asset pricing model (CAPM) is derived from the securities market line (SML) and is based on the concept that a security's required rate of return is equal to the risk -free rate of return plus a risk premium that reflects the riskiness of the security after diversification. The key components of the CAPM are the risk-free rate of return, the beta coefficient and the market risk premium.

The following is the mathematical equation for the

CAPM: $E(R_i) = R_f + \beta_i[E(R_m) - R_f]$

Where:

$E(R_i)$	=	Required rate of return on security i
R_f	=	Risk free rate of return
β_i	=	Systematic risk for security i (Beta)
$E(R_m)$	=	Return on the market portfolio
$E(R_m) - R_f$	=	The risk premium

Expected return ($E(R_i)$)

We dealt with the concept of expected return under section 5.2 above. The positioning of the investor on the SML determines the investors' risk and return trade off. A risk averse investor who prefers minimal or close to zero risk has government bonds as a possible investment choice. In this situation government bonds are assumed to be free of default risk. In practice, there are instances where states have defaulted on their debt (the Russi n default of 1998 is a case in point) but the probabilities of such occurrences is negligible.

The risk-free rate of return (R_f)

This is the theoretical rate of return of an investment with zero risk. The risk-free rate represents the return an investor would expect from an absolutely risk-free investment over a specified period of time. In theory, the

risk-free rate is the minimum return an investor expects for any investment because he or she will not accept additional risk unless the potential rate of return is greater than the risk -free rate. In practice, however, the risk-free rate does not exist because even the safest investments carry a very small amount of risk. The yield (required return) on a ten -year government bond is often used as an approximation of the risk-free rate of return.The risk-free rate of return is the sum of two components –

real rate of return; and
expected inflation premium.

The inflation premium compensates investors for the loss of purchasing power due to inflation.

The beta coefficient (β_i)

The slope of the SML line is a measure of market risk. It relates the movement of company's stock relative to the market. A beta of 1 indicates that the security's price will move with the m rket. A beta of less than 1 means that the security will be less volatile than the market. A beta of greater than 1 indicates that the securi-ty's price will be more volatile than the market. For example, if a stock's beta is 1,2, it is theoretically 20% more volatile than the market. If the correlation between the security and the market index is negative the regres-sion line would slope downward, and the beta would be negative. A negative beta is mathematically possible but highly unlikely in practice (except for gold as an asset.)

The beta (β) is measured

$$\text{by: } \frac{COVAR_{iM}}{S_M^2}$$

Where:

$COVAR_{iM}$ = The covariance of returns of stock i with those of the market

S_M^2 = The variance of market returns

Example 1: Calculating the beta coefficient

The following information relates to the return of Kwangena Limited's stock and the return on the JSE index over a five-year period:

Year	*X* Variable: Market Return	*Y* Variable: Stock Return
	$E(R_m)$	$E(R_i)$
	%	%
20X1	23,8	38,6
20X2	(7,2)	(24,7)
20X3	6,6	12,3
20X4	20,5	8,2
20X5	30,6	40,1

Solution: Calculating the beta coefficient

The following answer is based on the financial calculator – Sharp EL738

Operation 1	Operation 2	Result
MODE	1 1	STAT 1
2ndF	M – CLR 0 0	Clear Registers
23,8 (x,y) 38,6	ENT	Data Set = 1
– 7,2 (x,y) – 24,7	ENT	Data Set = 2
6,6 (x,y) 12,3	ENT	Data Set = 3
20,5 (x,y) 8,2	ENT	Data Set = 4
30,6 (x,y) 40,1	ENT	Data Set = 5
RCL	σ_x	13,52
RCL	σ_y	23,73
RCL	**r** (correlation coefficient)	0,91

Input the calculator variables into the formula:

Operation 1	Operation 2	Result
Cov (x,y)	$r\ \sigma_x\sigma_y$	291,95
Variance of X	σ_x^2	182,79
Variance of Y	$\sigma_y^2\ (S_M^2)$	563,11
β	Cov (x,y)/ S_M^2 (291,95/182,79)	1,60

Note: The beta can be calculated directly from the calculator by pressing RCL and "b" after imputing Data Set 5.

Example 2: Calculating the beta coefficient

The Arjent Co wishes to purchase 100% of Murcury.

	Arjent Co	Murcury	Market
Expected returns	10%	16%	14%
Standard deviation of returns	5%	7%	4%
Expected returns correlation with market	+ 0,3	+ 0,6	1

The risk-free rate is 6%, while the correlation between Arjent and Murcury is + 0,1.

If Murcury is taken over, it will account for 20% of the value of the new company.

i.e. Argent = 80% Murcury = 20%

Required:

Calculate the beta for both Arjent and Murcury.

Calculate Arjent's existing cost of equity.

Calculate the risk and return of Arjent after accepting the takeover of Murcury.

Calculate Murcury's required return based on CAPM.

Solution:

1 Beta = covariance with the market/variance of the market

Arjent $= \frac{5 \times 0,3}{4} = 0,375$

Murcury $= \frac{7 \times 0,6}{4} = 1,05$

2 Cost of equity

$k_e = R_f + \beta_i(R_m - R_f)$

$= 6 + 0,375\ (14 - 6)$

9%

3 Risk and ret rn

Return f Arjent after taking over Murcury

$= (0,8 \times 10\%) + (0,2 \times 16\%) = 11,2\%$

Ri k of Arjent after the takeover:

$$\sigma_p = \sqrt{w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_Aw_BCOV_{(A,B)}}$$

$$\sigma_p = \sqrt{(0,8^2 \times 5^2) + (0,2^2 \times 7^2) + (2 \times 0,8 \times 0,2 \times 5 \times 7 \times 0,1)}$$

$= 4,37$

The weighted average risk for the new company is calculated as [80% × 5%] + [20% × 7%] = 5,4.

As expected, portfolio risk (4,37%) is less than weighted average risk (5,4%), as the two companies have a correlation of almost zero (+ 0,1) with each other.

What is interesting to note is that despite Murcury having a higher standard deviation than Arjent, once combined, the resultant risk is less than both of their respective standard deviations.

Why?

This is significantly less than + 1 (perfect positive correlation) and hence in terms of the portfolio theory, the combination is highly advantageous.

To reconfirm – this is due to them having an almost zero correlation with each other.

4 Murcury's required return

$R_p = R_f + \beta_p(R_m - R_f)$

$= 6 + 1{,}05\ (14 - 6) = 14{,}4\%$

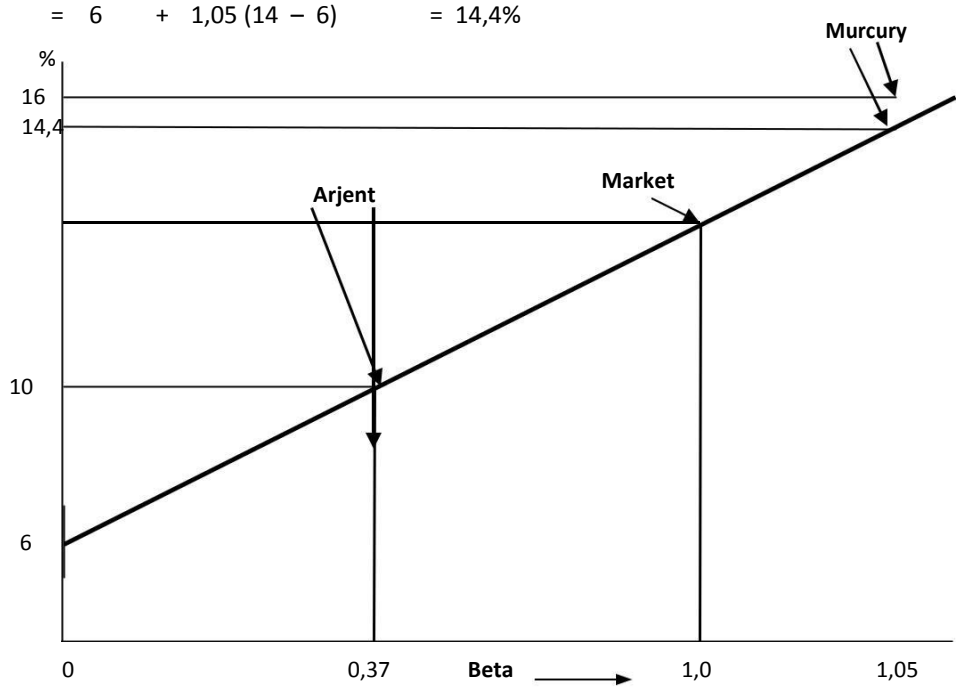


Figure 5.7: Risk/Return profile

In the above example, both Arjent and Murcury have expected returns that exceed the required return (see Figure 5.7). Both returns will drop to the SML due to market forces until the expected return equals the required return. At the mom nt, Murcury should be accepted, as the returns are above the SML.

Risk and return for Arj nt as calculated in **(iv)** above will improve, but only in the very short-term. Market forces will bring the values into equilibrium once the information is available to the market. At the present moment, A jent should invest in Murcury, as the share value of Murcury is less than the required market value and the retu n is above the market required return.

Equity vers s asset betas

The **eq ity beta** (also called geared or levered beta) is the beta of the company that takes into account the capital structure effects (financial risk) as well as the systematic effects related to market conditions. The **asset beta** (also called ungeared or unlevered beta) is the beta of the company without the effects of the capital tructure. If one was calculating the required return for an unlisted (private) company without an equity beta, one would have to use a 'proxy' beta of a similar listed company. The challenge of using the 'borrowed' equity beta is that it probably comes from a company with a different capital structure from the one we are analysing. The fo owing steps would have to be undertaken to the proxy equity beta before we can use it:

Ungear the proxy beta.

Re-gear the proxy beta.

Ungear the proxy beta: This means removing the capital structure effects of the listed company from the proxy beta. This turns an equity beta into an asset beta. The formula to use to ungear the equity beta is the following

$$(\beta)\ \text{ungeared} = (\beta)\ \text{geared} \times \frac{E}{E + D(1-t)}$$

Where:

(β) geared	The equity beta of the listed company (the borrowed/proxy beta).
(β) ungeared	The asset beta of the listed company after 'stripping' it of its capital structure
E	Equity % in listed company (40% will be written s 40 only)
D	Debt % in listed company (60% will be written s 60 only)
t	The tax rate of the public company (40% will be written as 0,40). The tax rate applies to the debt (D) only.

Regear the proxy beta: This means effecting the capital structure effects of the private company on the asset beta calculated under **1** above. This turns the asset beta into an equity beta of the new firm. The formula to use to re-gear the asset beta is the following:

$$(\beta)\ \text{Geared} = (\beta)\ \text{ungeared} \times \frac{E + D(1-t)}{E}$$

Where:

(β) geared	The equity beta of the private company (target beta)
(β) ungeared	The asset beta of the listed company after 'striping' it of its capital structure
E	Equity % in private company (40% will be written as 40 only)
D	Debt % in private company (60% will be written as 60 only)
t	The tax rate of the private company (40% will be written as 0,40). The tax rate applies to the debt (D) only.

After undertaking the adjustments in **1** and **2** above, the proxy beta can be used in the CAPM equation in calculating the cost of equity (required rate of return) of the private company.

The risk premium

The **risk premium** is the additional return over and above the risk-free rate needed to compensate investors for assuming an average amount of risk. Its size depends on the investors' perceived risk of the stock market and the investors' degree of risk aversion.The risk premium assigned by an investor to a given security in determining the required rate of r turn is a function of several different risk elements. These risk elements (premiums) include –

maturity risk premium;

default isk p emium;

seniority isk p emium; and

marketability risk premium.

Risk premium (R_p) = Return on the market portfolio (R_m) – Risk-free return (R_f)

5.7 CAPM applications

There are a number of significant contributions of portfolio theory to the study and practice of financial management. Two of the most important of these contributions are the following:

It helps us understand the **relationship between risk and return**; what part of the total risk we can manage through diversification and what part we cannot.

It is also the basis for estimating the required rate of return by equity investors (cost of equity) through the SML and the CAPM.

CAPM and weighted average cost of capital (WACC)

An equity investor in a company requires a return as compensation for the risk he/she bears for putting his/her capital at the disposal of the firm. In turn the company compensates the investor for his/her capital investment. The later compensation equals the risk-free rate of return plus a risk premium as discussed under section 5.6 above. The equity investor's required rate of return therefore equals the firms cost of equity capital. The CAPM is used in capital markets to define the required rate of return by equity investors and hence the firm's cost of equity capital.

Example: CAPM and WACC

Bulelwa Limited has 7 million ordinary shares of R1 each in issue, 5 million 6% preference shares of a par value of R1 each, 100 000 9% semi-annual bonds with a par value of R1 000 e ch. The sh res currently sell for R30 per share and have a beta of 1,0. The preference shares are currently selling for 110 cents per share and the bonds have 15 years to maturity and currently sell for 89% of par. The market risk premium is 8%, the ten-year treasury-bonds are yielding 7% and the company's tax rate is 40%.

Required:

Calculate Bulelwa Limited's WACC

Solution: CAPM and WACC

Calculate the required rate of return by equity hold rs (cost of quity)

$K_e + R_f \quad \beta(R_m - R_f) = 7\% + 1{,}0\,(8\%) = 15\%$

Calculate the required rate of return by preference shareholders (cost of preference shares)

$K_p = D/P_0 = 6/110 = 5{,}45\%$

Calculate the required rate of return by bondholders (yield on the bonds)

Using the Sharp EL738:

– 890	PV	
45	PMT	[0,09 × R1 000/2]
30	N	[15 × 2]
1000	FV	
COMP	I/Y	

Answer: 5,23%

Calculate market valu s of funding sources:

Equity	=	7 m	×	R30	=	R210m
Preferen e shares	=	5m	×	R1,10	=	R5,10m
Bonds	=	100 000	×	R890	=	R89m

Calculate the WACC

F nding So rce	Market Value Rm	Capital Structure	Cost of Source %	WACC %
Equity	210,00	0,69	15,00	10,35
Preference shares	5,10	0,02	5,45	0,11
Bonds	89,00	0,29	5,23	1,52
	304,10	1,00		11,98

The WACC is 11,98% (say 12%).

The calculation of the WACC was included in this section only as an illustration of the application of the CAPM to the estimation of the cost of equity. (See chapter 4 *Capital structure and the cost of capital* for a detailed analysis of these concepts.)

CAPM and the investment appraisal decision

The discount rate for capital projects in a levered firm (has debt as part of its capital structure) is the WACC. The use of the WACC to discount the projects in a levered firm is based on the assumption that the projects will have the same business risk as the current portfolio of projects, meaning the project will not result in the alteration of the existing capital structure and hence the overall financial risk. The WACC will comprise the weighted average of the respective debt and equity components. The cost of equity could be estimated using the CAPM. In a non-levered firm the WACC will equal the cost of equity. In the latter case, the required return on projects will equal the required return by equity holders only.

Example: Project evaluation in a non-levered firm

A manufacturing company with a beta of 1,2 wishes to diversify into the food ret iling business.

Quoted companies involved in food retailing have a beta of 0,9.

The market required return is

18%. The risk-free rate is 9%.

Required:

Determine the rate at which the new project should be evaluated.

Solution: Project evaluation in a non-levered firm

When a company is not quoted or wishes to diversify, it is suitable to use the β of a similar quoted company in that particular industry.

In the above example, the correct rate is calculated as:

Project required return = 9% + 0,9 (18% – 9%) = 17,1%

17,1% is the required return for any investor in this sector, based on the risk of the project relative to the overall market, and accepting that the company is all-equity.

Note: ***The CAPM measures both business and financial risk through the use of the equity beta. Therefore, shareholders in an all-equity firm are only concerned with the business risk associated with a particular industry.***

Example: Project evaluation and the CAPM

Penholt Limited is considering investing R100 000 in one of two projects. Both projects have a life of one year only and the potential return is dependent on the following economic states:

	State 1	**State 2**	**State 3**
Probability	0,4	0,3	0,3
Net cash return: Proje t A	R35 000	R20 000	R0
Net cash return: Proje t B	R5 000	R30 000	R30 000
Net cash etu n f om existing activities	(R20 000)	R100 000	R300 000

The company has a c rrent market value of R1 million. The Directors of Penholt believe that the risk return per R1 of c rrent market value of their existing activities is virtually the same as those for the stock market as a whole, incl ding general economic risk. The current risk-free rate on short-dated government investments is 10%.

Required:

Ignoring taxation, determine which of the two projects the company should accept.

Solution:

Calculating rate of return:

	State 1	State 2	State 3
Project A	35%*	20%	0%
Project B	5%**	30%	30%
Existing operations	– 2%***	10%	30%

* **R35 000/R100 000 = 35%**
** **R5 000/R100 000 = 5%**
*** **(R20 000)/R1 000 000**

Expected return and standard deviation:

Project A	0,35	×	0,4	=	0,14
	0,20	×	0,3	=	0,06
	0,0	×	0,3	=	0,00
					0,20

Expected return 0,20 or 20% standard deviation = 0,1449

Project B	0,05	×	0,4	=	0,02
	0,30	×	0,3	=	0,09
	0,30	×	0,3	=	0,09
					0,20

Expected return 0,20 or 20% standard deviation = 0,1225

Existing operations	– 0,02	×	0,4	=	– 0,008
	0,10	×	0,3	=	0,03
	0,30	×	0,3	=	0,09
					0,112

Expected return 0,112 or 11,2%standard deviation = 0,1327

Both Projects A and B have the same expected return of 20%, with Project B having a lower risk in comparison to Project A.

On this basis, it would appear that Project B should be selected.

Using the CAPM model, one can evaluate Projects A and B using the formula:

$R_i = R_f + \beta_i (R_m - R_f)$

Calculate the beta for Projects A and B as follows:

Step 1 ***Calculate the ovariance for Projects A and* B:**

Covariance: P oject A

Use the following formula:

$(\tilde{R}_A - \blacksquare_A)(\tilde{R}_O - \blacksquare_O) P$

Where:

$\tilde{R}_A$	Project A expected return
■	Project A mean return
R_O	Existing operations expected return
■	Existing operations mean return
P	Probability factor

To calculate the covariance: Project B, use the same formula as above, but replace A with B.

Covariance: Project A:

0,15*	× – 0,132****	×	0,4	=	– 0,00792
0**	× – 0,012*****	×	0,3	=	0
– 0,20***	× 0,188******	×	0,3	=	– 0,01128
Covariance (R_A,R_O)				=	– 0,0192

* 0,35 – 0,20 = 0,15
** 0,20 – 0,20 = 0
*** 0 – 0,20 = – 0,20
**** – 0,02 – 0,112 = – 0,132
***** 0,10 – 0,112 = -0,012
****** 0,30 – 0,112 = 0.188

Covariance: Project B

– 0,15	× – 0,132	×	0,4	=	0,00792
0,1	× – 0,012	×	0,3	=	– 0,00036
0,1	× 0,188	×	0,3	=	0,00564
Covariance (R_B,R_O)				=	0,0132

Step 2 ***Calculate beta*: (note this is an alternative for ula to that shown earlier in section 5.6)**

$$\beta_i = COR_{im} \frac{\sigma_i}{\sigma_m}$$

Correlation of project A to existing operations

Correlation coefficient $\rho_{AO} = \frac{COV(A,O)}{\sigma_A \sigma_O}$

$= – 0,0192 / (0,1449 \times 0,1327)$

$= – 0,9985$

Correlation of project B to existing operations

Correlation coefficient $\rho_{BO} = \frac{COV(B,O)}{\sigma_B \sigma_O}$

$= 0,0132 / (0,1225 \times 0,1327)$

$= 0,8120$

Beta for project A

$\beta_A = (– 0,9985 \times 0,1449) / 0,1327 = – 1,0903$

Beta for project B

$\beta_B = (0,8120 \times 0,1225) / 0,1327 = 0,7496$

Step 3 ***Calc late required return*:**

Pr ject A return = 0,10 + [– 1,0903(0,112 – 0,1)]
= 0,10 – 0,0131
= 0,0869 OR 8,69%

Project B return = 0,10 + 0,7496(0,112 – 0,1)
= 0,10 + 0,009
= 0,109 OR 10,90%

Conclusion:

Although Project A has the greater amount of total risk its required return is below that of Project B. Most of the risk of Project A is eliminated due to its favourable correlation (i.e. away from + 1) with existing operations. Project A is thus preferred as it provides a better return per R1 risk.

Limitations in using CAPM in investment appraisal decisions

The use of CAPM in investment appraisal lies in the inherent weaknesses of the CAPM as a model for estimating the cost of equity. Some of the assumptions are as follows:

The CAPM is a single-period model. Thus, when using the rate as determined from the SML to evaluate a project, one is assuming that the beta, risk-free rate and the expected market return will remain constant over the life of the project.

The use of the beta as a measure of systematic risk assumes total diversification of unsystematic risk, resulting in total risk being equal to systematic risk. In practice, firms are unab e to eliminate all unsystematic risk.

The assumption that the government bonds are risk free, though l rgely true, may not be always the case. Government bonds in some instances do carry a small amount of risk (infl tion is a case in point and in some countries default risk).

The assumption of perfect capital market: This assumption means that all securities are valued correctly and that their returns will plot onto the SML. In the real w rld capital markets are clearly not perfect.

When analysing projects in private companies there may be **difficulties in finding suitable proxy betas**, since proxy companies very rarely undertake only one business activity.

Practice questions

Question 5–1 *(Fundamental)* *40 marks*

An investor wishes to invest in two shares that have the following risk/return profiles:

Economic State	Probability	Expected return Share A	Expected return Share B
1	0,3	2%	15%
2	0,5	10%	22%
3	0,2	12%	– 2%

The following information is available:

The risk-free rate is 3%.

The market return is 12%.

The standard deviation of expected market returns is 6%.

The covariance of Share A r turns with those of the market is 25,2.

The covariance of Share B r turns with those of the market is 39,6.

Required:

Calculate the expected returns for Shares A and B; the covariance of returns between the two shares, and the correlation between Share A and Share B. **(*8 marks*)**

Determine the expected return of a portfolio consisting of 40% Share A and 60% Share B together with the risk of the portfolio and discuss whether you would advise the investor to purchase the portf lio. **(*5 marks*)**

Calculate the required return for Shares A and B according to the Capital Asset Pricing Model, and discuss whether you would advise the investor to invest in either Share A or Share B. **(*8 marks*)**

I ustrate your answer to (**c**) above by showing the position of Shares A and B in relation to the Securities Market Line. **(*4 marks*)**

(e) Briefly explain why the CAPM measures return versus beta, rather than standard deviation. **(*8 marks*)**

(f) Briefly describe the limitations of using the CAPM for capital budgeting decisions. **(*7 marks*)**

Solution 5–1

Calculate the expected returns for Shares A and B; the covariance of returns between the two shares, and the correlation between Share A and Share B.

Share A

Probability		Return		Mean	P(return – mean)^2		Variance
0,3	×	2	=	0,6	$0,3(2-8)^2$	=	10,8
0,5	×	10	=	5,0	$0,5(10-8)^2$	=	2
0,2	×	12	=	2,4	$0,2(12-8)^2$	=	3,2
				8,0	σ^2		**16,0**
					σ	=	4

Share B

Probability		Return		Mean	P(return – mean)^2		Variance
0,3	×	15	=	4,5	$0,3(15-15,1)^2$	=	0
0,5	×	22	=	11,0	$0,5(22-15,1)^2$	=	23,81
0,2	×	– 2	=	– 0,4	$0,2(-2-15,1)^2$	=	58,48
				15,1	σ^2		82,29
					σ	=	9,07

Expected return for investment A = 8%

Expected return for investment B = 15,1%

Covariance of returns

0,3	(2 – 8)(15 – 15,1)	=	0,18
0,5	(10 – 8)(22 – 15,1)	=	6,9
0,2	(12 – 8)(– 2 – 15,1)	=	– 13,68
		Cov	– 6,6

Covariance between A and B = – 6,6

Correlation between A and B $= \dfrac{-6,6}{4 \times 9,07}$ **= – 0,1819**

Determine the expected return of a portfolio consisting of 40% Share A and 60% Share B together with the risk of the portfolio and discuss whether you would advise the investor to purchase the portfolio.

Return on portfolio

(0,4 × 8) + (0,6 × 15,1) **= 12,26%**

Standard deviation of portfolio

$$\sigma_p = \sqrt{w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_Aw_BCOV(A,B)}$$

$$\sigma_p = \sqrt{0,4^2 \times 16 + 0,6^2 \times 82,29 + 2 \times 0,4 \times 0,6 \times -6,6}$$

$$\sigma_p = \sqrt{2,56 + 29,62 - 3,168}$$

5,38%

The portfolio consists of 40% investment in Share A and 60% investment in Share B, with a return of 12,26% and a risk of 5,38%. The return is greater than the market return of 12% and the risk is lower than the market risk of 6%.

The investor should be advised to invest in Shares A and B. Another good reason to invest in the Shares is because they are negatively correlated; consequently there is a substantial reduction in risk per R1 return.

Note: ***It is impossible for an investor to get a return higher than market return with a risk lower than market risk. The above calculations show that the expected return for the shares is probably higher than the required return, which means that they are in temporary disequi ibrium.***

Calculate the required return for Shares A and B according to the C pit l Asset Pricing Model, and discuss whether you would advise the investor to invest in either Sh re A or Share B.

Share A

Required return

$$\beta_A = \frac{COV(R_A,R_m)}{\sigma^2_m}$$

$$\beta_A = \frac{25,2}{6^2} \qquad 0,7$$

- $R_A = R_f + \beta(R_M - R_f)$
  - $R_A = 3\% + 0,7(12 - 3)$ 9,3%

The required return for Share A is 9,3% while the expected return is only 8%. This means that the share is in temporary disequilibrium and in the short run the return is likely to increase. The shareholder should be advised not to purchase Share A.

Share B

Required return

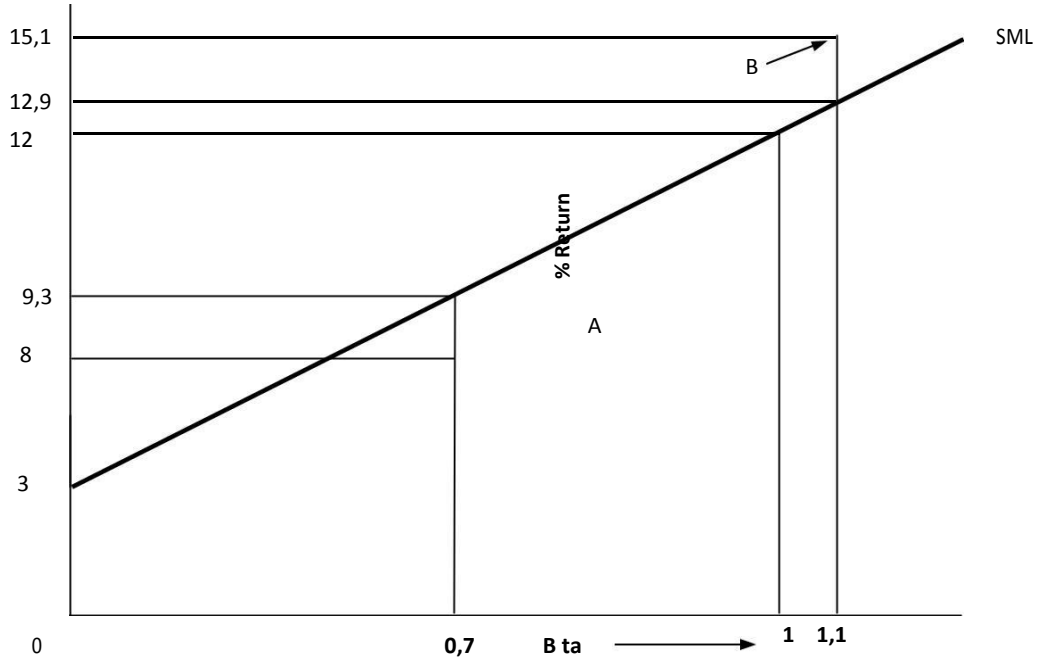
$$\beta_B = \frac{COV(R_B,R_m)}{\sigma^2_m}$$

$$\beta_B = \frac{39,6}{6^2} \qquad 1,1$$

- $R_B = R_f + \beta(R_M - R_f)$
  - $R_B = 3\% + 1,1(12 - 3)$ 12,9%

The requi ed etu n for Share B is 12,9% while the expected return is 15,1%. This means that the share is in tempo a y disequilibrium and in the short run the return is likely to decrease. The shareholder should be advised to purchase Share B.

Illustrate your answer to (c) above by showing the position of Shares A and B in relation to the Securities Market Line.



(e) Briefly explain why the CAPM measures return versus beta, rather than standard deviation.

The major determinant of the required return on an asset is its degree of risk. Risk refers to the probabilities that the returns, and therefore the values of an asset or security, may have alternative outcomes. The measure of risk is generally accepted as the standard deviation (σ) of an asset or security.

Two types of risk are identified or associated with a security –

unsystematic (avoidable) risk; and

systematic (unavoidable) risk.

Unsystematic risk may be referred to as the internal risk of a company. It represents those financial management, legal or worker decisions that affect the profitability of the company. An investor can therefore reduce the unsystematic risk by holding a diversified portfolio. Empirical studies show that most of the unsystematic risk is eliminated by portfolios consisting of as few as ten securities.

Systematic risk cannot be avoided by diversification. Systematic risk is the fundamental risk that a share's possible return is xpos d to, and is caused by general economic trends, political or social factors affect-ing all companies simultaneously. Therefore, the relevant risk for an investment is the systematic risk.

The riskiness of assets or securities can be measured by their contribution to the portfolio risk. This relationship is measured by the covariance of the security return with market returns. The CAPM is developed from portfolio theory and explains the relationship between the risk of a security and the re-q ired risk adj stment factor.

As the market represents a portfolio of all available securities, the market return represents the average yield with a given average systematic risk. The market is the benchmark; consequently we say that R_m is the market return, with a systematic risk factor of 1 or beta = 1. From this relationship we draw the SML, which is a line joining the risk-free rate to the market return and beyond. All securities on the SML line are efficient and yield a return that equates to its covariance with the market return, R_m.

Briefly describe the limitations in using the CAPM for capital budgeting decisions.

Using the rate as determined from the SML to evaluate a project means that one is assuming that the beta, risk-free rate and expected market return will remain constant over the life of the project.

The assumptions of the CAPM model, especially 'borrowing and lending can be made at the risk-free rate'. At high levels of gearing, debt will not be risk free. The problem is that M and M assume that risk is

measured entirely by variability of cashflows. At high gearing, there will be fears of bankruptcy which will increase the cost of both debt and equity resulting in an increased WACC.

Tax implications change for different categories of investors. Tax relief is available on debt interest as long as taxable profits are high enough. Not all companies will be able to obtain this advantage, and the probability of taxable profits being high enough decreases with increasing gearing. Therefore, at high gearing, the debt is not so attractive. However, since capital allowances will be lower in future, there is more chance of debt interest being advantageous, albeit at a lower company tax rate.

Risk is regarded as an increasing function over time (risk is compounded over time).

Major shareholders are institutions, some of whom are able to obtain tax re ief on borrowings (e.g. investment trusts). This removes the advantage of company borrowing.

Question 5–2 *(Intermediate)* *35 marks*

Marine Fisheries is an established company which is looking to expand its fishing interests by purchasing a 100% interest in Shark Bait. The management of Marine Fisheries believes that the expected returns from the acquisition of Shark Bait are dependent on the state of the econ my.

The following information is made available:

		Estimated return		
State of the economy	**Probability of occurrence**	**Marine Fish ri s**	**Shark Bait**	**The market**
Favourable	0,3	16%	20%	14%
Neutral	0,4	10%	12%	8%
Unfavourable	0,3	2%	0%	6%
Book value in million		12m	R8m	–
Market value in million		R8m	R12m	–
Standard deviation of returns		5,4%	7,8%	3,2%
Covariance with the market		0,0024	0,0023	–

The risk-free rate is 5% and there is no company or personal taxation.

Required:

Determine whether Marine Fisheries should acquire Shark Bait in line with the portfolio theory. **(*13 marks*)**

Illustrate and explain what the term 'risk premium' means in the context of the portfolio theory and calculate the required return for a portfolio that has the same return/risk characteristics as Marine Fisheries. **(*8 marks*)**

Calculate, in line with the portfolio theory, how an investor can move along the capital market line to a point that gives him a standard deviation equal to 6,4%. (Ignore Marine Fisheries and Shark Bait.) **(*6 marks*)**

Determine whether Marine Fisheries and Shark Bait are a good investment in the context of the Capital Asset Pricing Model. **(*8 marks*)**

Solution 5–2

(a) Determine whether Marine Fisheries should acquire Shark Bait in line with the portfolio theory.

Marine Fi heries expected return

State		**Return**			**Expected Mean**
0,3	×	0,16		=	0,048
0,4	×	0,10		=	0,04
0,3	×	0,02		=	0,006
			Mean		0,094 or 9,4%
			σ		0,054 or 5,4%

Shark Bait expected return

State		Return		Expected Mean
0,3	×	0,20	=	0,06
0,4	×	0,12	=	0,048
0,3	×	0	=	0
		Mean		0,108 or 10,8%
		σ		0,078 or 7,8%

Covariance: Marine Fisheries/Shark Bait

State	Deviation		Covariance
0,3	(0,16 – 0,094)(0,20 – 0,108)	=	0,0018216
0,4	(0,10 – 0,094)(0,12 – 0,108)	=	0,0000288
0,3	(0,02 – 0,094)(0 – 0,108)	=	0,0023976
			0,004248

Return: Marine Fisheries &Shark Bait combined

$$\frac{8^{*}}{20^{**}} \times 9,4\% + \frac{12}{20} \times 10,8\% = 10,24$$

Market value of Marine Fisheries
Combined market values of Marine Fisheries and Shark Bait

$$\text{Risk} = \sqrt{0,4^2 \times 0,054^2 + 0,6^2 \times 078^2 + 2 \times 0,4 \times 0,6 \times 0,004248}$$

$$= 0,069 \text{ or } 6,9\%$$

The return of Marine Fisheries has increased by only 0,84%, while the risk has increased by 1,5%. The returns of Marine Fisheries and Shark Bait are positively correlated; consequently one would not expect a reduction in risk.

The CV for Marine Fisheries is:

$$\frac{9,4}{5,4} = 1,74$$

While that for the new company is:

$$\frac{10,24}{6,9} = 1,48$$

which once again shows that Marine Fisheries offers a better return per R1 of risk.

Illustrate and explain what the term 'risk premium' means in the context of the portfolio theory and calculate the required return for a portfolio that has the same return/risk characteristics as Marine Fisheries.

Risk premium represents the required return above the risk-free rate that should be required on a portfolio where risk is greater than zero.

It is expressed as:

$$\frac{\sigma_p (R_m - R_f)}{\sigma_m}$$

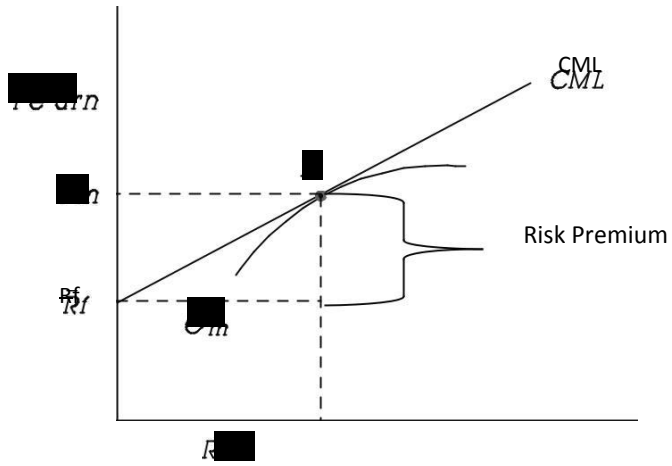
The required return for a portfolio with the same characteristics as Marine Fisheries is:

$$R_f + \frac{5,4}{3,2}(R_m - R_f)$$

$$= 5 + \frac{5,4}{3,2}(9,2^{*} - 5)$$

12,0875%

Market returns = (0,30 × 14%) + (0,40 × 8%) + (0,30 × 6%) = 9,2%



Calculate, in line with the portfolio theory, how an investor can move along the capital market line to a point that gives him/her a standard deviation equal to 6,4%. (Ignore Marine Fisheries and Shark Bait.)

$$R_f + \frac{\sigma_i}{\sigma_m}(R_m - R_f)$$

$$= 5 + \frac{6,4}{3,2}(9,2 - 5)$$

$$= 13,4\%$$

As the required risk is twice the market risk, an investor would have to borrow an amount equal to his/her investment in the market portfolio at the risk-free rate and invest the whole amount in the market.

i.e. Borrow		1
Own capital		1
Invest in the market		2
Market return	9,2 × 2 =	18,4
Cost		5
Return		13,4%

Determine wh th r Marine Fisheries and Shark Bait are a good investment in the context of the Capital Asset Pricing Mod l.

The required return for both ompanies is determined by:

$$k_e = R_f + \beta (R_m - R_f)$$

	β for Marine Fisheries	**β for Shark Bait**
	$\frac{0,0024}{0,032^2}$	$\frac{0,0023}{0,032^2}$
	= 2,34	**= 2,25**

	Marine Fisheries	**Shark Bait**
Required return	5 + 2,34 (9,2 – 5)	5 + 2,25 (9,2 – 5)
	= 14,828%	**= 14,45%**
Expected return		
	= 9,4%	**= 10,8%**

Both companies offer a return well below their required return. This means that both returns are below the SML and are over-priced.

Question 5–3 *(Intermediate)* *35 marks*

Bean Ltd is a division of Earl Enterprises and has been allocated R5 million for capital expansion in the forthcoming year. The management of Bean Ltd believes that the company must spread its risk by investing in projects with different risk profiles and has identified two possible investments.

The capital available to Bean Ltd is sufficient to invest in only one of the projects. The following information has been made available:

		Estimated return %		
Economic growth (annual average)	**Probability of occurrence**	**Project 1**	**Project 2**	**Existing investments**
Zero	0,3	14	8	6
3%	0,4	10	16	12
6%	0,3	8	22	16
Book value		R5m	R5m	R10m
Market value		R5m	R5m	R15m

The division manager has requested the accountant to determine which f the two projects should be accepted using the portfolio theory to make the selection.

Required:

(a) Using the above information, calculate which invest ent Bean Ltd should select in line with the portfolio theory. **(*20 marks*)**

Identify and describe the kind of risk the manag m nt of B an Ltd wishes to spread by investing in different investments and state whether they should be concerned about reducing such risk. **(*8 marks*)**

(c) Explain how Bean Ltd could use the CAPM to evaluate the investment options available. **(*7 marks*)**

Solution 5–3

Using the above information, calculate which investment Bean Ltd should select in line with the portfolio theory.

Project 1

Return %		**Probability**			**Return deviations**		**(Return deviations)^2 × probability**
14	×	0,3	=	4,2	3,4		3,468
10	×	0,4	=	4,0	– 0,6		0,144
8	×	0,3	=	2,4	– 2,6		2,028
		M an		10,6		Variance	5,64
						σ	2,37

Project 2

8	×	0,3	=	2,4	– 7,4		16,428
16	×	0,4	=	6,4	0,6		0,144
22	×	0,3	=	6,6	6,6		13,068
		Mean		15,4		Variance	29,64
						σ	5,44

Exi ting

6	×	0,3	=	1,8	– 5,4		8,748
12	×	0,4	=	4,8	,6		0,144
16	×	0,3	=	4,8	4,6		6,348
		Mean		11,4		Variance	15,24
						σ	3,9

Covariance Project 1 + existing

Probability		Return deviations Project 1		Return deviations Existing		
0,3	×	3,4	×	– 5,4	=	– 5,508
0,4	×	– 0,6	×	0,6	=	– 0,144
0,3	×	– 2,6	×	4,6	=	– 3,588
				Covariance	=	– 9,24

Covariance Project 2 + existing

0,3	×	– 7,4	×	– 5,4	=	+ 11,988
0,4	×	0,6	×	0,6	=	+ 0,144
0,3	×	6,6	×	4,6	=	+ 9,108
				Covariance	=	+ 21,24

Expected return:

Project 1 + existing investments

$$10,6 \times \frac{5}{20} + 11,4 \times \frac{15}{20}$$

$$= 11,2\%$$

Project 2 + existing investments

$$15,4 \times \frac{5}{20} + 11,4 \times \frac{15}{20}$$

$$= 12,4\%$$

Risk – Standard deviation of Projects + existing investments

Project 1 + existing investments

$$\sigma_p = \sqrt{w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_A w_B \, COV_{(A,B)}}$$

$$\sigma_p = \sqrt{0,25 \times 0,25 + 5,64 + 0,75 \times 0,75 \times 15,24 + 2 \times 0,25 \times 0,75 \times -9,24}$$

$$2,34\%$$

Project 2 + existing investments

$$\sigma_p = \sqrt{0,25 \times 0,25 + 29,64 + 0,75 \times 0,75 \times 15,24 + 2 \times 0,25 \times 0,75 \times 21,24}$$

$$4,29\%$$

The ab ve calculations indicate that Project 2 offers a higher return in comparison with Project 1 and has the effect f increasing the portfolio return from 11,4% to 12,4%. However, the risk of the new portfolio (consisting of Pr ject 2 + existing) increases from 3,9% to 4,29%. The combination of Project 1 plus existing reduces the return by 0,2%, but has a significant effect on reducing the overall risk to 2,34% as the covariance is negative.

The company is advised to accept Project 1 on the basis of the significant risk reductions.

Identify and describe the kind of risk the management of Bean Ltd wishes to spread by investing in different investments and state whether they should be concerned about reducing such risk.

The major determinant of the required return on an asset is its degree of risk. Risk refers to the probabilities that the returns, and therefore the values of an asset or security, may have alternative outcomes. The measure of risk is generally accepted as the standard deviation (σ) of an asset or security.

Two types of risk are identified or associated with a project –

unsystematic (avoidable) risk; and

systematic (unavoidable) risk.

Unsystematic risk may be referred to as firm specific risk. It is risk associated with the company's functions in the main areas of strategy, leadership, innovation, skills, processes, product- markets, capital structure, etc. An investor can therefore reduce the unsystematic risk by holding a diversified portfolio. Empirical studies show that most of the unsystematic risk is significantly reduced by portfolios consisting of as few as ten securities.

Systematic risk cannot be avoided by diversification. Systematic risk is the fundamental risk that a share's possible return is exposed to, and is caused by general economic trends, po itical or social factors affecting all companies simultaneously. Therefore, the relevant risk for n investment is the systematic risk.

As stated above, an investor has the ability to diversify away unsystematic risk and it is up to the investor (not a company) to spread the investment in different companies in order to reduce his overall risk. A company should concentrate its efforts on maximising its profits to the benefits of its shareholders.

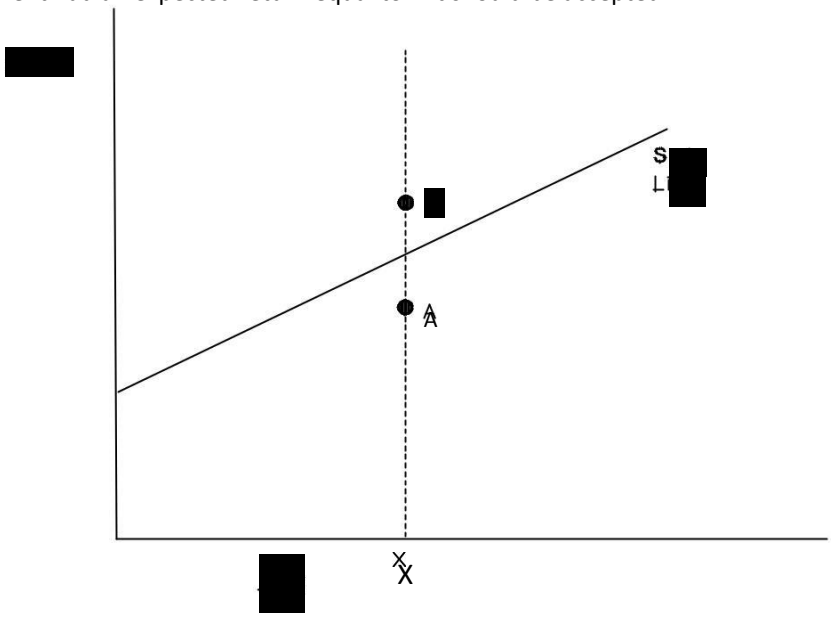
(c) Explain how Bean Ltd could use the CAPM to evaluate the investment ptions available.

Given certain assumptions (including perfect capital markets and homogeneous investor expectations) the CAPM states that the required rate of return on an invest ent is the risk- free rate plus a premium for systematic (un-diversifiable) risk expressed in terms of the market-risk pre ium. Systematic risk is measured by beta, which relates the covariance between the expected return on the investment and expected return on the market portfolio to the variance of the market portfolio. The model may be used in the determination of an appropriate WACC to use as a discount rate in a capital inv stm nt. A discount rate is a rate which takes into account the specific systematic risk of the project concerned. The model is, however, subject to criticism with respect to its theoretical assumptions and practical application.

Bean Ltd should use the CAPM to determine the required rate of return for the two investments and compare that return to the expected return. If the required return is lower than the expected return, the investment should be accepted. If the required return is higher than the expected return, the investment should be rejected.

Diagrammatic illustration

If Project 1 has a beta of X and offers a return of A it should be rejected as it is below the SML. It is irrelevant that it has a negative covariance with existing investments and that the overall risk is reduced. The CAPM model states that at a level of systematic risk equal to X an investment must offer a return that is on the SML line. If the investment had an expected return equal to B it should be accepted.



Question 5–4 *(Intermediate)* *35 marks*

United Brew Limited is considering whether to accept one of two major new investment opportunities, Pro-ject 1 and Project 2. Each project would require an immediate outlay of R400 000 and United Brew expects to raise sufficient funds to undertake one of the projects only.

The Directors of United Brew Limited believe that returns from existing activities and from the new projects will depend on which of three economic environments prevails during the coming year. They estimate returns for the coming year and the probabilities of the three possible environments as follows:

	A	B	C
Probability of environment	0,3	0,4	0,3
	%	%	%
Returns from Project 1	25	25	– 5
Returns from Project 2	0	17,5	30
Aggregate returns from existing Portfolio of projects	– 10	20	30

The Directors of United Brew Limited are of the opinion that the risk and returns per R of market value of their existing activities are similar to those for the stock market as a wh le, including their dependence on whichever economic environment prevails.
The current rate of return on short-term government bonds and Treasury Bills is 10% per annum.

Required:

Calculate, for Projects 1 and 2:

The covariance with the market.

The beta values.

(iii) The required returns using the CAPM model. **(*18 marks*)**

Write a brief report to the Directors of United Brew Limited showing which, if either, of the two proposed projects should be accepted in terms of the Portfolio theory and the CAPM. Explain the CAPM principles used in arriving at the recommendation. **(*17 marks*)**

Solution 5–4

(i) Expected rates of return from Project 1, Project 2 and the company's existing portfolio

Environment	P	Project 1	Project 2	Existing portfolio
A	0,3	0,25	0	– 0,1
B	0,4	0,25	0,175	0,2
C	0,3	– 0,05	0,3	0,3
Expected return		0,16	0,16	0,14

Variance of the ma ket

This can be estimated as the variance of the company's existing portfolio.

Environment	P	$rm - \overline{rm}$	$p(rm - \overline{rm})^2$
A	0,3	– 0,24	0,01728
B	0,4	0,06	0,00144
C	0,3	0,16	0,00768
		Variance σ^2	0,02640
		Standard deviation σ	0,16248

Covariance of project returns with the market

		Project 1		Project 2	
Environment	P	$(r_1 - \bar{r}_1)$	$p(r_1 - \bar{r}_1)(r_m - \bar{r}_m)$	$(r_2 - \bar{r}_2)$	$p(r_2 - \bar{r}_2)(r_m - \bar{r}_m)$
A	0,3	0,09	– 0,00648	– 0,16	0,01152
B	0,4	0,09	0,00216	0,015	0,00036
C	0,3	– 0,21	– 0,01008	0,14	0,00672
Covariance			– 0,01440		0,01860

(ii) The beta values of Projects 1 and 2

$$\beta \text{ Project 1} = \frac{\text{Covariance (Project 1 and Market)}}{\text{Market variance}}$$

$$= \frac{-0,01440}{0,02640} = -0,545$$

(Note that as this is a negative β Project 1 is inversely related to the rest of the market)

$$\beta \text{ Project 2} = \frac{\text{Covariance (Project 2 and Market)}}{\text{Market variance}}$$

$$= \frac{0,01860}{0,02640} = +0,7045$$

(iii)Required rates of return on each project

Project 1 = rf + β (rm – rf)
10% – 0,545 (14% – 10%)
7,82%

Project 2 = rf + β (rm – rf)
10% + 0,7045 (14% – 10%)
12,82%

Report to Directors of United Brew Limited

TO:
FROM:
DATE:

The acceptance of Project 1, rather than Project 2 is recommended. Both projects offer an expected return of 16%, but Proje t 1 only requires a return of 7,82% on a CAPM required return basis, in comparison with Pro-ject 2 which equi es a eturn of 12,82%.

Principles involved in the investment recommendation

The recommendation that Project 1 should be undertaken is made after taking into consideration the risk and the expected return of the two projects, and how this relates to the company's (and the stock market's) existing risk and expected return relationship. It is based on the principles and conclusions of the portfolio theory.

This theory, under a set of restrictive assumptions, shows that when risky investments (i.e. investments whose outcomes are uncertain) are combined (into a portfolio), the expected return that results is a simple weighted average of the expected returns of the individual investments. However, the risk of the resulting combinations (measured by the standard deviation or variance of the possible returns), may be less than, or equal to, the weighted average of the risk of the individual investments. The actual outcome depends upon the sign and the m gnitude of the correlation coefficients of the possible returns of the combined investments.

Therefore, when considering the addition of a new investment to an existing collection of investments, the effect of the action on the company's overall risk level is the point of importance in determining the required return from the new investment. As a result, the required returns from the two investment projects under

consideration are determined not by their own overall risk levels (i.e. their standard deviations of possible returns) but by the effect each would have (if accepted) on the overall risk level of the company.

One way of utilising this result is to divide an investment project's overall risk level into two components, that is, systematic and unsystematic risk. Systematic risk is, in effect, that part of an investment's total risk which actually affects the existing risk level of the company. Unsystematic risk is the residual part which can effectively be ignored as it does not affect the company's existing risk (it is in fact eliminated through the combining process).

Therefore, in order to choose between the two projects, their respective levels of systematic risk have to be found and used to estimate their required returns. These are then judged against their actual expected returns.

This procedure was carried out for the two investment projects under consideration, and it appears that both produce an expected return above the level required by the systematic risk of e ch. However, the greatest excess of expected return is likely to be provided by Project 1. Therefore this is deemed to be the preferred alternative. This excess return should translate itself into an increased market price of the company's equity and enhance the shareholders' wealth.

Two further points of importance need to be made to present a m re c rrect picture of the principles used when arriving at the recommendation. Firstly, although the reas ning has been couched in terms of the rela-tionship between project risk and the risk of the company, in truth the relationship of importance is between project risk and general stock market risk. However, it is correct for United Brew to view the relationship in terms of the project and the company, because the co pany's risk and return is thought to reflect the risk and return of the market as a whole.

The second point is that the portfolio theory is construct d und r a number of strict assumptions which may not hold in the real world. However, its general conclusions are logically sound and probably form useful guidelines for investment decision-making in practice. Of particular importance is the idea that an investment project's return should not be viewed in terms of its own overall risk level, but in terms of the effect of combin-ing it with other investments on the overall risk of that combination.

Important: A company should only invest in projects that are in the same risk class as existing investments. It would appear that Project 1 is in a different risk class; therefore it would be up to the shareholder (not the company) to diversify.

Question 5–5 *(Intermediate)* *30 marks*

The Directors of Marshall (Pty) Ltd are currently evaluating the investment in a new project and have extracted the following information:

	Marshall (Pty) Ltd	Project	Market
Expected returns	16,4%	28%	24%
Standard deviation of r turns	4%	6%	3%
Correlation of expected returns with return on the market portfolio	+ 0,4	+ 0,7	

The cu ent isk-f ee rate is 8%.

The Directors of Marshall (Pty) Ltd have also established that the correlation between the returns of the project and that of the company's existing projects is + 0,1. If the project is accepted it would account for 10% of the value of Marshall (Pty) Ltd after investing in the project.

Required:

Calculate the existing beta value and systematic risk of Marshall (Pty) Ltd and that of the proposed project.

Ca culate Marshall (Pty) Ltd's equity required return.

Calculate the company return of Marshall (Pty) Ltd after accepting the project and the standard deviation using a two-asset portfolio formula.

Determine the project required return using the CAPM model, and briefly explain why the calculations in **(c)** above appear to give conflicting project appraisal when compared to the result of using the CAPM model.

Solution 5–5

Calculate the existing beta value and systematic risk of Marshall (Pty) Ltd and that of the proposed project.

$$\text{Beta} = \frac{\text{correlation} \times \sigma_p}{\sigma_m}$$

$$\text{Marshall} = \frac{4\% \times 0,4}{3\%} = 0,53$$

$$\text{Project} = \frac{6\% \times 0,7}{3\%} = 1,40$$

Systematic risk

Marshall = 4 × 0,4 = 1,6%
Project = 6 × 0,7 = 4,2%

Calculate Marshall (Pty) Ltd's equity required return.

Return = Rf + β(Rm – Rf)
= 8% + 0,53(24% – 8%) = 16,48%

Calculate the company return of Marshall (Pty) Ltd aft r accepting the project and the standard deviation using a two-asset portfolio formula.

Return = (0,9 × 16,4%) + (0,1 × 28%) = 17,56%

Standard deviation of a two-asset portfolio

$$\sigma_m = \sqrt{wM^2\sigma^2M + wP^2\sigma^2P + 2w \quad wPCOV(M,P)}$$

Where:

M = Marshall
P = Project
W = Weighting

As the covariance of Marshall and the project is not an available one can substitute covariance for correlation multiplied by the standard deviation of Marshall and standard deviation of the Project.

$$\sigma_m = \sqrt{0,9^2 \times 4^2 + 0,1^2 \times 6^2 + 2 \times 0,9 \times 0,1 \times 4 \times 6 \times 0,1}$$

$$\sqrt{13,752}$$

3,71%

Note: Using the CAPM, the beta of Marshall + project

= (0,9 × 0,53) + (0,1 × 1,4) = 0,617

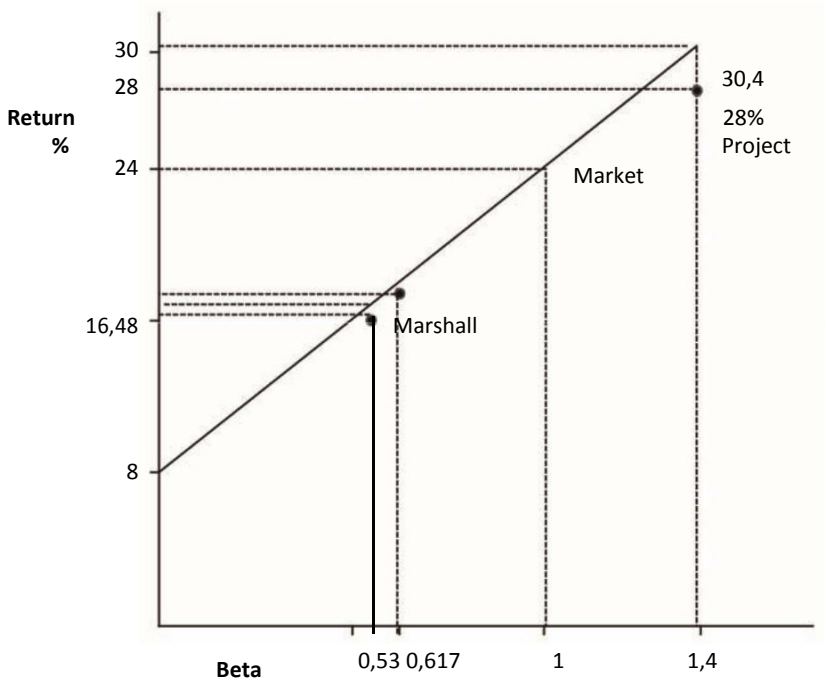
Required return: 8% + 0,617(24 – 8) = 17,872%

Determine the project required return using the CAPM model, and briefly explain why the calculations in (c) above appear to give conflicting project appraisal when compared to the result of using the CAPM model.

Project required return

8% + 1,4 (24% – 8%)

30,4%



As one can see from **(c)** above, the acceptance of the n w proj ct increases the expected return from 16,4% to 17,56%, and simultaneously reduces risk from 4% to 3,71%. This would appear to make the project highly attractive to investors in Marshall. However, the required return from the project, based on the CAPM is 30,4%. Since the project is only expected to produce a 28% return, this would indicate rejection.

How can these apparently conflicting positions be reconciled? The answer lies in the distribution between systematic and unsystematic risk. Systematic risk is that part of the risk of a particular security (i.e. variability in return) that can be explained in terms of movements in the market. Unsystematic risk is that part of the variability in return that is due to events specific to the individual security. The CAPM ignores unsystematic risk because it can be eliminated by diversification.

While acceptance of the project reduces the total risk of Marshall, it does not reduce the systematic risk; on the contrary it increases it.

This may be demonstrated as follows:

$$\text{Beta} = \frac{\text{Systematic risk}}{\text{Risk of the market}}$$

Beta Marshall (pre-proj ct)	=	0,53		
Beta project	=	1,4		
Beta of Marshall post-project	=	0,9 × 0,53 + 0,1 × 1,4	=	0,62
Systematic isk post-project	=	3 × 0,62	=	1,86%
Systematic isk p e-project	=			1,60%
Increase in systematic risk	=			0,26%
Req ired increase in return	=	0,26% × (24 – 8) / 3	=	1,39%
Act al increase in return	=	(17,56% – 16,4%)	=	1,16%

The increase in return is inadequate; therefore the project should be rejected

OR	Beta of Marshall post-project	0,617
	Beta of Marshall pre-project	0,53
	Increased Beta	0,087

Required increase in return 0,087(24 – 8) = 1,392%

Actual increase = 1,16%

Question 5–6 *(Intermediate)* *30 marks*

ABC (Pty) Ltd is a company operating in the retail industry in two cities within the province of Gauteng. The company is privately owned with a staff complement of 100. The company is 60% debt funded.

DEF Ltd is a company that is also operating in the retail industry. The company is operating across South Africa and has eight boards of directors. The company also has a staff compliment of 2 500. DEF Ltd is 80% debt funded and has a beta of 0,7.

Additional information:

The market rate of return is 13%.

ABC (Pty) Ltd debt consists of a bank loan at 8,5% interest per annum.

Five-year Government Bonds are currently trading at 7%.

The tax rate in South Africa is 28%.

Required:

You are the FD of ABC (Pty) Ltd, and have been instructed by the MD to write a report covering the following (show all your workings in an appendix to the report):

Calculate a suitable beta for ABC (Pty) Ltd, factoring in both financial and non-financial factors. **(*8 marks*)**

Discuss the difference between systematic and non-syste atic risks, and their impact on the beta of a company. **(*5 marks*)**

(c) Calculate the cost of equity of ABC (Pty) Ltd. **(*6 marks*)**

(d) Calculate the weighted average cost of capital of ABC (Pty) Ltd. **(*6 marks*)**

The company has an opportunity to invest in a project yielding an annual return of 13% per annum. Should the company embark on this project? **(*5 marks*)**

Solution 5–6

Calculate a suitable beta for ABC (Pty) Ltd, factoring in both financial and non-financial factors.

The beta of DEF would be used as a proxy beta. Since the company is a public company, has governance structures in place, a bigger staff complement than ABC and a larger foot print in terms of product markets its beta would be lower than that of ABC.

The first step would be to ungear the beta of DEF using its own capital structure:

The formula to use is:

$$(\beta)\text{ ungeared} = (\beta)\text{ g ar d} \times \frac{E}{E + D(1 - t)}$$

$$= 0{,}70 \times \frac{20}{20 + (80)(0{,}72)}$$

$$= 0{,}18$$

The second step wo ld be to re-gear the beta of DEF using ABC'S capital structure:

The f rmula to use is:

$$(\beta)\text{ geared} = (\beta)\text{ ungeared} \times \frac{E + D(1 - t)}{E}$$

$$= 0{,}18 \times \frac{40 + (60)(0{,}72)}{40}$$

$$= 0{,}40$$

Discuss the difference between systematic and non-systematic risks, and their impact on the beta of a company.

Systematic risk or market risk is risk that affects all market participants and is measured by the beta coefficient. Economic fundamentals such as inflation, interest rates, foreign exchange, the price of key commodities such as oil, consumer demand, etc., contribute to systematic risk. Unsystematic risk or firm specific risk is risk that is peculiar to an individual firm. Issues such as leadership, innovation, capital structure, product/portfolios, production processes, skills, etc., contribute to unsystematic risk. Systematic risk cannot be diversified away but unsystematic risk can be diversified through managing effectively. Theoretically, since unsystematic risk can be diversified away, total risk would be composed of market risk which is measured by the beta. Increasing systematic risk increases the beta. The reverse is true.

Calculate the cost of equity of ABC (Pty) Ltd.

Using the CAPM:

$$K_e = R_f + \beta (R_m - R_f)$$
$$K_e = 7\% + 0{,}4\ (13\% - 7\%)$$
$$K_e = 9{,}4\%$$

Calculate the after tax cost of debt:

Cost of ABC bank loan = 8,5%

The tax rate = 28%

The after-tax cost of debt = 8,5% (1 – 0,28)

K_d = 6,12%

Calculate the weighted average cost of capital of ABC (Pty) Ltd.

Funding Source	Proportion	Cost %	WACC %
Equity	0,40	9,4	3,76
Debt	0,60	6,12	3,67
Total	1,00		7,43

The company has an opportunity to invest in a project yielding an annual return of 13% per annum. Should the company embark on this project?

Since the return of 13% on the project is higher than the cost of funds at 7,43, the company should invest in the project provided the following is met:

The risk of the project is similar to the risk of the current portfolio of projects that the company currently is invested in.

The funding of the project will not alter the capital structure of the company. Altering the capital structure w uld pr bably increase the weighted average cost of capital.

Chapter 6

The investment decision

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

apply different capital budgeting techniques to evaluate capital projects, asset acquisitions and replacements;

appraise capital investment opportunities;

evaluate an investment decision and determine whether new capital assets should be acquired;

evaluate an investment decision and determine whether an existing capital asset should be replaced;

evaluate an investment decision and determine whether an existing capital asset should be abandoned without replacing it with a new asset; and

calculate the following:

- payback period;
- discounted payback period;
- Net present value (NPV);
- Net present value Index (NPVI);
- Internal Rate of Return (IRR);

Modified Internal Rate of Return (MIRR); and

taking into consid ration the following:

- the treatm nt of taxation;
- the treatment of Inflation;
- the t eatment of un ertainty and risk;
- the t eatment of projects with different life cycles;
- capital rationing; and

take q alitative factors into account and consider the so-called ESG (environment, social and governance) issues and equator principles;

perf rm sensitivity analyses;

appreciate the importance of sustainability as part of the investment decision; and

prepare International capital budgeting appraisals.

Adequate electricity supply, the Gauteng e-tolling issue and the failure of 1Time Airlines have highlighted the importance of long-term capital budgeting. This is, however, just as applicable to small, medium and micro businesses (SMMEs) when budgeting for plant, machinery, vehicles, office buildings and other expansions.

This chapter relies heavily on knowledge of the time value of money which was dealt with extensively in chapter 3, while capital structure and the importance of WACC have been emphasised in chapter 4.

Companies regularly replace existing productive assets or purchase new assets to expand their business operations. Both decisions require the company to evaluate the future cashflows to decide whether or not the investment will increase the value of the company. The method used to evaluate investments is called **capital budgeting.**

Capital budgeting forms part of the master budget and involves the planning for longer term projects, which stretches out over more than one year. It is formulated within the framework of the strategic plan and involves strategic decisions normally taken by senior management. There is often significant risk involved as the monetary implications can be enormous, the entity is committing known resources today to an unknown and uncertain future and once the decision has been made it is often irreversib e. Hence, capital budgeting decisions should not be taken lightly!

6.1 Capital budgeting

The technique takes all future cashflows that are derived from the in estment and discounts them to Year 0 at the target weighted average cost of capital (WACC), less the investment cost at Year 0. If the resultant net present value (NPV) is positive, the investment is undertaken.

The first problem associated with a capital budgeting exercise is **determining the basis of the investment decision**, by considering assumptions such as**:**

determining the appropriate discount rate, the target WACC;

estimating future sales, demand and cost structures;

the length of time that the project will run for; and

the value of the assets at the end of the project.

It is clear that a capital budgeting exercise requires an enormous amount of guess-work; therefore one must be careful when evaluating the calculated NPV of a project.

The second problem that needs to be addressed when looking at new investment projects is **how to finance the investment**. This is the subject of chapter 7 (*The financing decision*).

The two choices for finance are **debt** and **equity**. The important issue is whether the company has the capacity to take on debt finance. In other words, the company must establish what it considers to be the optimal debt to equity (D:E) ratio, determine how much debt and equity it currently has in issue and then decide whether it already has too much debt or whether it is in a position to take on more debt to finance the new project.

There are various schools of thought on the correct WACC to be used when evaluating new investment decisions, and whether the finance decision should be made before or after the investment decision.

6.2 Correct WACC to be used

The following views have b n put forward by various authors:

The method of finan e should be determined first, because the correct rate to evaluate the investment decision is the rate attributable to the method of finance.

The method of finance should be determined first, because the correct WACC required to evaluate a new investment is the marginal WACC, which incorporates the current WACC plus the new proportion of finance to be acquired.

All investments should be evaluated at the target WACC and, if the investment yields a positive NPV, then the c mpany must determine the correct financing strategy that will move towards the target D:E ratio in the l ng-term.

The authors are of the opinion that the only acceptable method is (**c**)**,** as this method ensures that all projects of equal bu iness risk are evaluated on an equal basis without prejudice to the method of finance.

Examp e: Cost of capital and financing position

A company has two divisions; one in Pretoria and the other in Cape Town. All capital requirements are handled by the Head Office, which is situated in Durban. The current capital structure of the company at market value is as follows:

Equity	R3 000 000	Required return 20%
Debt	R2 000 000	Required return 12%

The company believes that the optimal capital structure for the type of business that it is involved in is 50% equity and 50% debt. It does however accept that from time to time the capital structure will be in dis-equilibrium, but it will in the long- term strive towards a target of 50% debt:50% equity. Its target WACC is therefore 16% (50% × 20% k_e + 50% × 12% k_d).

The Pretoria division requires R1 500 000 for a new capital project that will yield a return of 16%.

The Cape Town division requires the same capital amount for an identical project yielding a return of 16%.

Required:

Determine the correct cost of capital that should be used to evaluate the two projects, and how they should be financed.

Solution:

Evaluating the projects at the rate used to finance the project

Head Office would look at the required R1,5 million from the Pret ria divisi n and decide that it would finance the project (if accepted) using debt, because it is the cheapest f rm f finance and the company has the capacity to take on debt finance as it is currently below the target of 50:50.

The required return from the Pretoria investment, if evaluated at the cost of debt rate, would be 12%; therefore, as the project yields a return of 16%, it would be accepted.

When Head Office looks at the identical investment in the Cape Town division, it may decide as follows:

Current equity	R3 000 000
Current debt	R3 500 000 (after Pretoria investment).

As the company has too much debt relative to the target ratio, it may decide to finance the new project using equity funding. If the company evaluates the project at the equity required return of 20%, it would reject the project because it only yields a return of 16%.

The above argument is incorrect as it is evaluating two identical projects at different required returns. This is inconsistent with the principle of **divisional performance evaluation** where the required return should be the same for identical business operations.

Evaluating the projects at the Weighted Marginal Cost of Capital (WMCC)

Once again, because the Pretoria division requested the finance first, Head Office would use debt financing as it is cheaper than equity to fund the Pretoria project, and calculate the cost of capital as:

		Return	**Proportion**	**WMCC**
Equity	R3 000 000	20%	R3,0m / R6,5m	9,23%
Debt	R2 000 000	12%	R2,0m / R6,5m	3,69%
Debt (Pretoria)	R1 500 000	12%	R1,5m / R6,5m	2,77%
	R6 500 000			15,69%

As the project yields a eturn higher than 15,69%, it would accept the Pretoria project.

As the company now has too much debt in its capital structure, a decision would now be made to finance the Cape Town project sing equity funds; therefore the new WMCC would be determined as follows:

		Return	**Proportion**	**WMCC**
Equity	R3 000 000	20%	R3,0m / R8,0m	7,5%
Equity(Cape)	R1 500 000	20%	R1,5m / R8,0m	3,75%
Debt	R3 500 000	12%	R3,5m / R8,0m	5,25%
	R8 000 000			16,5%

The required return is now 16,5%, but as the Cape Town project only offers a return of 16%, it would be rejected. Again identical investments are being evaluated at different rates, yielding inconsistent results and creating problems in evaluating divisional performance. The WMCC allows the type of finance to influence the cost of capital and is no better than evaluating an investment at the required rate of return equal to the method of finance.

The correct method – evaluating the projects at a target WACC

The target WACC is:

	Ratio	Return	WACC
Equity	50%	20%	10%
Debt	50%	12%	6%
			16%

Using the target cost of capital of 16% to evaluate the two identical projects wi yie d consistent decisions and allow both divisions' performance to be evaluated on an equitable basis.

Assuming that both investments are accepted, the financing decision would be c rried out as follows:

Current equity	R3 000 000
Current debt	R2 000 000
Required finance	R3 000 000
	R8 000 000

	Optimal capital structure		Current capital		Finance capacity
Equity	R4 000 000	–	R3 000 000	=	R1 000 000
Debt	R4 000 000	–	R2 000 000	=	R2 000 000
	R8 000 000	–	R5 000 000	=	R3 000 000

The company may therefore opt to finance the new investments by raising R1 million equity and R2 million debt. It may also decide to finance solely by debt, with the next project to be financed by equity. This is to avoid the costs or raising both debt and equity simultaneously, as it may be desirable to minimise these so-called 'double flotation' costs.

Note: ***It is not necessary for a company to be at its target structure at any particular point in time, but it should strive towards the target in the long-term.***

Notes regarding the investment decision versus the financing decision:

It is important to note that financing costs are excluded from calculations under the investment decision, but included in calculations under the financing decision.

Under the investment decision cashflows are discounted at the WACC, while under the financing decision cash flows are discounted at the after-tax cost of debt.

Depreciation is not a cashflow, but indeed a component of the cashflow of taxation payable.

6.3 Traditional methods of investment appraisal

Before doing an in-depth analysis of evaluating an investment project by discounting the future cashflows at an appropriate **ta get WACC**, other methods that may be used to evaluate an investment are considered.

Payback period method

The payback period method represents a simple calculation or estimate of how long it will take a company to get the investment cost repaid. It is a simple method that gives an investor a gut-feel for risk over a period of time. The longer it takes to break even, the higher the risk associated with the project.

The payback period is only useful as a crude method of estimating how long a company will be in the red before it can start to make some money. The lower the payback period, the lower the 'time-risk' of the project. The method is intuitive and simple to understand.

The severe down-side of the payback period method is that it ignores inflation and the cost associated with ime. There is a risk associated with receiving money later rather than sooner. That risk has a cost which is measured using the WACC, which allows for business risk as well as financial risk requirement. Allowing for business and financial risk means that the payback period could be considerably longer.

In comparing investments under the payback period method, one simply determines the number of years it will take to recover the initial investment.

Example: Payback

Year		Investment A	Investment B
0	Capital outlay	(30 000)	(50 000)
1	Expected cash inflow	4 000	15 000
2	Expected cash inflow	8 000	15 000
3	Expected cash inflow	12 000	10 000
4	Expected cash inflow	8 000	10 000
5	Expected cash inflow	5 000	15 000
6	Expected cash inflow	4 000	–

Investment A's payback period is 3,75 years;

Investment B's payback period is 4 years.

This is derived by adding up the cash inflows and determining the p int in time at which the inflows equals the initial outlay.

In the case of A, this would be 4 000 (Y1) + 8 000 (Y2) + 12 000 (Y3) + **6 000** (Y4) = 30 000.

This calculation indicates that the project pays for itself so eti e in Year 4. The question is: how long into Year 4? Note that the total inflow in Y4 is 8 000, and 6 000 of this 8 000 is required to total the initial outlay of 30 000.

So the 'proportion of time' is 6 000 / 8 000 = 0,75 of a year. Therefore the payback is 3,75 years.

In the case of B, this would be 15 000 (Y1) + 15 000 (Y2) + 10 000 (Y3) + 10 000 (Y4) = 50 000. The calculation reveals that the project pays for itself in *exactly* four years.

On the basis of the payback period method, Investment A is better than Investment B as it pays itself off in a shorter time.

Companies sometimes set a limit for a project to break even. Small projects may have a two- or three-year required payback before a project is accepted. Large projects may allow for longer payback periods, as long as they offer higher returns once they break even. However, this method is simplistic and has a major weakness in that it ignores the time value of money. It also ignores the cashflows after the payback period. Nevertheless, it can be a useful starting point or screening mechanism.

Discounted payback period method

When using the discounted payback period method, one takes into account the time value of money, that is one discounts back any future cashflows to a present value and then compares the investments on a payback basis.

This method simply states that R1 today is worth more than R1 at the end of the year. The risk associated with time must be ompensated at a rate that equals business plus financial risk. This rate is called the weighted average cost of capital (WACC).

Example: Disco nted payback

If a company has a WACC of 10%, this means that R10 invested today is expected to grow to R11 after a period of 1 year r (in reverse) R11 at the end of 1 year has a present value of 11 / (1 + 0,1) = R10 today.

The example presented above indicates the following assessment, assuming that the company has a WACC of 8%.

For the above example, if the time preference rate is 8%, then the investment appraisal is as follows:

Year	Investment A	Investment B	PV factor 8%	PV 'A'	PV 'B'
0	(30 000)	(50 000)	1	(30 000)	(50 000)
1	4 000	15 000	0,9259	3 704	13 888
2	8 000	15 000	0,8573	6 858	12 860
3	12 000	10 000	0,7938	9 526	7 938
4	8 000	10 000	0,7350	5 880	7 350
5	5 000	15 000	0,6806	3 403	10 209
6	4 000	–	0,6302	2 521	–
				1 892	2 245

Investment A's discounted payback period is 5,25 years.

Investment B's discounted payback period is 4,75 years.

Note that to derive the PV factors, enter 1 / 1,08 for Year 1 n the calculator, and thereafter divide each answer by 1,08. Thus:

Y1	1	/ 1,08	= 0,9259
Y2	0,9259	/ 1,08	= 0,8573
Y3	0,8573	/ 1,08	= 0,7938
Y4	0,7938	/ 1,08	= 0,7350
Y5	0,7350	/ 1,08	= 0,6806

and so on.

The **discounted payback period method** is useful in assessing the amount of time it will take to break even in terms of cashflow. It allows for risk to be evaluated over a time frame. Once again, it is a good starting point, but it should never be used as the sole method of analysing an investment. Its major drawback is that it ignores the cashflows after the payback period.

Net present value method (NPV)

Shareholders are a key stakeholder constituent since they provide equity and hence the entity should compensate its shareholders for the risks associated with the business and to yield a return higher than the assessed business risk. This method is generally accepted as the correct conceptual method of analysing an investment decision and is seen to be superior to other methods based on the assumptions that it makes. As with any business assessment, it relies on (at best) accurate data, which is not always available, or at least well researched data. Busin ss is not an exact science and any attempt to treat it as such will lead to bad decisions.

Important assumptions

The NPV method assumes that all cashflows that are received as a result of an investment will be used by the company to yield a etu n equal to the WACC. Where, for example, a company receives R10 000 at the end of Year 1 with a p oject life of five years, one assumes that from Year 2 to Year 5 the R10 000 will be invested at the WACC.

Or F t re val e = $R10\,000 \times (1{,}10)^4$ = R14 641
(where WACC is equal to 10%)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Actual	–	R10 000				
Equiva ent	–	–	–	–	–	R14 641

R10 000 at the end of Year 1 is equivalent to R14 641 at the end of Year 5.

Proof : Present value at t_1 = $\dfrac{R14\,641}{(1 + 0{,}10)^4}$ = R10 000

Calculating the present value back to Year 0 reveals that

Actual $\frac{R10\,000}{(1 + 0{,}10)}$ = R9 090,91

Equivalent at Year 5 $\frac{R14\,641}{(1 + 0{,}10)^5}$ = R9 090,91

Conclusion:

All intermediate cashflows are assumed to be re-invested at the company's WACC.

The NPV is the present value of future returns discounted at the company's t rget WACC, minus the cost of the investment. For *independent* investments, if the NPV is positive, the project should be accepted; if it is negative, the project should be rejected. If two projects are *mutually exclusi e*, the one with the higher NPV index should be chosen. When a company accepts a project with a positi e NPV, the value of the company increases by that amount. Therefore the NPV method chooses pr jects to maximise share value.

Key concepts and terminology

Note that in the conclusion section above, reference is ade to projects that are independent and mutually exclusive. At this point it would therefore be useful to define unique ter s relevant to capital budgeting:

Independent events

Two events are independent of each other wh n the occurrence of one event has no influence on the probability of the other event occurring. For example, a change in the gold price isn't likely to determine the success of our sporting teams. However, should the rand weaken against the United States dollar, this will have a positive impact on South Africa's export prices and make the gold mines more profitable.

Independent projects

The acceptance or rejection of one project has no bearing or influence on the acceptance or rejection of any other project. In short, you can choose or reject either or both projects.

Mutually exclusive events

Mutually exclusive events are those that cannot occur simultaneously. For instance, it is not possible for the rand exchange rate to strengthen **and** weaken simultaneously against the dollar. The foreign exchange market does not work like that. However, it is possible that the rand can strengthen against the euro and weaken against the dollar or vice versa, or weaken or strengthen against both. Hence, the rand/dollar and the rand/euro exchange rate movements are not mutually exclusive events. Are they independent events though? Over the long-term, probably not. This is due to the South African inflation rate exceeding that of both the USA and Europe. Hence, the expectation is that the rand will weaken against both of th se curr ncies.

Mutually ex lusive projects

Mutually ex lusive projects are projects where only one of several alternatives may be chosen at a time. Rolling a 'six' or a 'two' with a die represents mutually exclusive events. A six and a two cannot be rolled simultaneously, so the probability of both happening together equals nil. In effect, if two projects are m t ally excl sive and they both meet the minimum financial return criteria, the acceptance of one immediately (and automatically) leads to the rejection of the other.

Capital rationing refers to the situation where an enterprise is unable to initiate all available apparently viable pr jects because of limited funds. Consequently choices have to be made as to which combination of projects derive the total highest return subject to the funds available.

Single-period capital rationing

Single-period capital rationing refers to the situation where the shortage of funds is limited to the present period only, while it is anticipated that sufficient funds will be available in subsequent periods.

Multi-period capital rationing

Multi-period capital rationing refers to the situation where the shortage of funds is expected to extend over a number of periods.

Divisible projects

Divisible projects are projects where the whole project or any fraction thereof may be initiated. In other words, the project can be reduced or increased in size, or broken into smaller projects.

Indivisible projects

Indivisible projects are those where a whole project must be undertaken in its entirety or not at all. In other words, such a project cannot be broken into smaller sizes, or scaled up or down.

Example:

Period	Project A	Project B	Project C
0	(50 000)	(30 000)	(40 000)
1	14 000	4 000	20 000
2	20 000	8 000	20 000
3	26 000	12 000	5 000
4	5 000	10 000	–
5	–	9 000	–

Assume the WACC to be 8%.

Required:

Calculate the NPV.

Solution:

NPV Project A

Period	Cashflow	Factor	PV
0	(50 000)	1	(50 000)
1	14 000	0,9259	12 962
2	20 000	0,8573	17 146
3	26 000	0,7938	20 639
4	5 000	0,7350	3 675
NPV			R4 422

NPV Project B **3 563**

NPV Project C **R(367)**

The above example has two potential problems:

The investment amounts are different for each project

Can one compare Proj ct A to Project B when one project requires an investment of R50 000 while the other only requir s R30 000?

Yes, one can, and one an further conclude that Project A is better than Project B as it has a higher NPV. Howeve , it may be argued that Project B only requires R30 000, which leaves the company with an extra R20 000 to invest elsewhere. That is correct, but one should assume that the extra R20 000 will be invested at the company's WACC and yield a nil NPV (i.e. actual return equals WACC, which is the required return).

Project A	R50 000	Net return	R4 422
Pr ject B	R30 000	Net return	R3 563
+	R20 000	Net return	Nil
Total	R50 000		R3 563

If it were possible to invest in multiple/divisible amounts of Project B, then the solution would be as fo ows:

Project A	R50 000	Net return	R4 422	
Project B	R30 000	Net return	R3 563	
+	R20 000	Net return	2 375	[3 563 × 2 / 3]
Total	R50 000		R5 938	

In this case, if one can invest in 1,6667 of Project B (R30 000 × 1,6667 = R50 000), the new NPV derived from B is greater than simply investing R50 000 in Project A. Thus, it makes sense to scale up Project B from R30 000 to R50 000. (Note this is only possible as B is divisible).

2 The lives of the projects are different

All three projects have different lives.

Project A = 4 years
Project B = 5 years
Project C = 3 years

Can the three projects be compared?

Yes, if one assumes that cashflows from Projects A and C are re-invested in the company at the WACC of the company. In other words, future benefits have a nil NPV.

Net present value index method (NPVI)

Advantages and disadvantages of NPV

NPV and IRR are often referred to as discounted cashflow techniques as they focus on cashflow rather than profit.

NPV assumes that –

investors are rational;

investors seek to maximise their wealth in terms of cash;

capital markets are perfect; and

investors are risk-averse.

The assumption that capital markets are perfect does not hold in the real world, due to uncertainty. Perfect capital markets imply that future outcomes and events are known, and the capital market rate would reflect the future outcomes. NPV also assumes that the risk of a particular project can be identified and reflected in the appropriate discount rate. Real world situations show that risk cannot be identified accurately.

Note: The discount rate used in all NPV appraisals assumes that all cash received before the end of the project can be re-invested at the discount rate.

This is sometimes referred to as the **profitability index** (PI). **Net present value index** (NPVI) is defined as the ratio of (**Initial investment + NPV**) **/ Initial investment**. NPVI is a method used when projects with different initial outlays are compared and capital rationing is applicable. The ratio results in the NPV per R1 investment:

Single-period capital rationing

In situations wh re capital rationing is applicable, the rule of accepting all projects with positive NPVs no longer applies. The NPVI method is then used to choose between the various projects. Projects with the highest NPVI are favoured, subject to the funding constraints.

Note, howeve , that selection based on relative NPVI ranking may not be optimal. One should allocate scarce funds amongst a combination of projects that collectively derive the highest NPV.

M lti-period capital rationing

Divisible projects subject to multi-period capital rationing can be ranked using linear programming techniques, by optimising NPV per limiting factor, which is scarce capital in this case. Indivisible projects subject to multi-period capital rationing can be ranked by using integer programming techniques, which fall outside the scope of this book.

As per the previous example, since the initial capital outlay is different and the possibility of capital rationing exists, the decision should be based on NPVI.

Project A 54 422 ÷ 50 000 = 1,09
Project B 33 563 ÷ 30 000 = 1,12
Project C 39 633 ÷ 40 000 = 0,99

Therefore B is preferred, even though NPV A > NPV B.

Note: ***The ranking of Project B above Project A can only be used where there are several projects available with a positive NPV and one is attempting to maximise return, and available capital is rationed. Therefore, projects will need to be placed in order of preference to ensure best utilisation of scarce funds.***

Example 1: Capital rationing

A company has R50 000 available and can choose from the following three projects:

	Investment	NPV	NPV index	Ranking
A	50 000	4 422	1,09	2
B	30 000	3 563	1,12	1
C	20 000	1 437	1,07	3

To maximise return, the company must invest in Projects B and C.

	Investment	NPV
B	30 000	3 563
C	20 000	1 437
		5 000

Why should the company invest in B and C?

The total investment for B + C = 50 000, which falls within the capital rationing constraint.
The total NPV for A + B = 7 985; however, the total investment required is 80 000.
The total NPV for A + C = 5 859; however, the total investment required is 70 000.

What if there was no investment constraint (i.e. no capital rationing)?

Then all three projects should be accepted, because they all generate a positive NPV.

Example 2: Indivisible projects

A company has R50 000 available and can choose from the following three projects, all of which are indivisible, implying that only part of the investment cannot be undertaken:

	Investment	NPV	NPV index
A	50 000	4 422	1,09
B	30 000	3 563	1,12
C	40 000	– 367	0,99

Solution:

Take Project A only, be ause it generates the highest absolute NPV. Even though its NPVI is lower than Project B's, Project B cannot be s aled up, because the projects are indivisible.

All projects with a positive NPV should be accepted. This assumes that all desirable projects can be funded by the company. This is not always the case, however, as cash is not necessarily available. Equity providers are not an instant so rce of funding and may not have funds available at a particular point in time. They may also be reluctant to seek f nding from new shareholders as it may dilute their personal holdings. Company growth must be managed and shareholders are often reluctant to see a company expanding too fast as it may increase company risk.

Debt providers may have certain criteria that the company needs to meet before they are willing to provide further funding. High debt ratios will restrict further borrowing to finance projects with positive NPV.

Different project life cycles

Replacement chains

Where mutually exclusive projects with different lives exist, one uses the technique of replacement chains, where one calculates the NPV with infinite replicated cashflows.

The calculation is carried out by dividing the NPV of the project by the product of the present value of an annuity at the given rate for the cashflow period of the project and the discount rate.

$$\text{NPV to } \infty = \frac{\text{Calculated NPV}}{\text{PV(annuity)} \times r}$$

Where:

PV(annuity) = the annuity for a period equal to the cashflow years
r = the discount rate

Example: Different lives

Two mutually exclusive investments have the following cashflows:

	Cashflow Project A	**Cashflow Project B**
Year 0	(10 000)	(10 000)
Year 1	2 300	1 100
Year 2	3 000	1 600
Year 3	3 500	2 000
Year 4	3 400	2 300
Year 5	3 100	2 500
Year 6		2 900
Year 7		3 100
Year 8		4 000
NPV @ 12%	**857**	**1 049**
PV(annuity)	3,605	4,968
	(12%, 5 years)	(12%, 8 years)

Required:

Determine the NPV to ∞ for each project.

Solution:

NPV to ∞ for Project A – i.e. a perpetuity of 238 (the equivalent annual income – see below) at 12%

$$= \frac{857}{3{,}605 \times 0{,}12} = 1\,981$$

NPV to ∞ for Project B – i.e. a perpetuity of R211 (the equivalent annual income – see below) at 12%

$$= \frac{1\,049}{4{,}968 \times 0{,}12} = 1\,760$$

Applying the NPV rule would result in Project B being chosen in preference to Project A, on the basis that Project B's NPV of 1 049 is greater than Project A's 857. However, using the NPV to ∞, Project A is superior to Project B, on the assumption that in the long-term both projects can be replaced to ∞ at the same replacement cost and same expected cashflows.

Note also that the projects are mutually exclusive and thus only one project can be chosen.

Equivalent annual income (i.e. maximising NPV per annum)

Where mutually exclusive projects with unequal useful lives have to be considered, one could maximise the NPV per limiting factor, namely time, by utilising the **equivalent annual income** method.

According to this method, the NPV of each alternative investment opportunity is divided by the present value of R1 per period factor (i.e. the PV of an annuity factor).

Alternative solution to the previous example

Equivalent annual income for Project A = 857 / 3,605 = R238
Equivalent annual income for Project B = 1 049 / 4,968 = R211

As in the previous example, Project A is superior to Project B – by determining the NPV per annum in this case.

Internal rate of return method (IRR)

The IRR is the cost of capital that equates the present value of the expected future cashflows or receipts to the initial cash outlay. The IRR formula is the same as the NPV formula, except that it sets the NPV at nil and solves for the discount rate. In short, the IRR is the cost of capital, where the NPV of the project is equal to nil. The IRR must be found by trial and error unless the expected cashflows are equal and can be treated as an annuity. For independent projects, if the IRR is greater than the WACC, the value of the company increases and the project should be accepted. If it is equal to the WACC, the company breaks even; if the IRR is less than the WACC, the project should be rejected. If two projects are mutually exclusive, the one with the higher IRR should be accepted.

Example: IRR

Period	Project A	Project B
0	(20 000)	(5 000)
1	10 000	1 000
2	10 000	3 000
3	4 000	3 000

Required:

Calculate the IRR for Projects A and B.

Solution:

Project A at 12%

Period	Cashflow		PV factor		NPV
0	(20 000)	×	1	=	(20 000)
1	10 000	×	0,8929	=	8 929
2	10 000	×	0,7972	=	7 972
3	4 000	×	0,7118	=	2 847
NPV					(252)

Project A at 10%

Period	Cashflow		PV factor		NPV
0	(20 000)	×	1	=	(20 000)
1	10 000	×	0,9091	=	9 091
2	10 000	×	0,8264	=	8 264
3	4 000	×	0,7513	=	3 005
NPV					360

IRR = approximately 11%.

Interpolation

A more acc rate res lt (although not an absolutely correct one) can be obtained in the above example by using a techniq e known as interpolation.

The f rmula f r interpolation is: A + [P / (P + N) × (B – A)]

Where:

A = Di count rate which gives a + NPV
B = Di count rate which gives a – NPV
P = Positive NPV
N = Negative NPV

Thus interpolating for the example above, that is between 10% and 12% is: 10%

+ [360 / (360 + 252) × (12% – 10%)] = 11,1765% (round to 11,2%)

Alternatively, one can show as follows:

Discount rate	10%	?	12%
NPV	+ R360	0	(R252)

In effect, one is attempting to solve for the '?', which is the discount rate where the NPV = 0. Decreasing the discount rate increases the NPV, whereas increasing the discount rate decreases the NPV. By establishing that 10% derives a positive NPV (+R360) and 12% a negative NPV (–R252), we know that the IRR is *between* 10% and 12%.

IRR = 10% + [(360 – 0) / (360 + 252)*] × (12% – 10%) = **11,2%** (rounded to $^{1}/_{10}$ of a %)
(*Strictly speaking, this should read (360 – – 252). But as two negative signs re +, we add the two NPVs).

Project B at 16%

Period	Cashflow		PV factor		NPV
0	(5 000)	×	1	=	(5 000)
1	1 000	×	0,8621	=	862
2	3 000	×	0,7432	=	2 230
3	3 000	×	0,6407	=	1 922
NPV					14

Project B at 18%

Period	Cashflow		PV factor		NPV
0	(5 000)	×	1	=	(5 000)
1	1 000	×	0,8475	=	847
2	3 000	×	0,7182	=	2 154
3	3 000	×	0,6086	=	1 825
NPV					(174)

Therefore IRR = approximately 16%.

Advantages and disadvantages of I

IRR's main advantage is the fact that a project is appraised in terms of rate of return – a concept which has wide acceptance with management. The IRR assumes that all cash receipts can be re-invested at the IRR. However, the re-investment rate is often lower than the IRR, thus invalidating the investment choice arrived at using IRR.

A further problem is that a proj ct may have more than one IRR. Where the cashflows are standard (only one change in the cash-flow sign) th re will be only one IRR. Where the cashflows are non-standard (more than one change in the ash-flow sign), the project will have multiple internal rates of return. As a general rule, a project will have as many inte nal rates of return as its cashflow has changes of sign.

Comparative example of NPV and IRR

Two m t ally excl sive projects (A and B) are being considered. The discount rate (target WACC) for both pr jects is 10% and all funds can be invested at that rate. The following table shows the initial outlay and cashfl ws which ccur at the end of the year.

Year		Project A	Project B
0	Cashflow	(50 000)	(50 000)
1	Cashflow	25 000	Nil
2	Cashflow	20 000	8 000
3	Cashflow	20 000	25 000
4	Cashflow	15 000	65 000

Required:

Determine which of the two projects should be selected using the NPV and IRR techniques.

Solution:

NPV calculation at 10%

	Project A	Project B
NPV	+ R14 527	+ R19 790

IRR calculation

IRR	24%	21%

Using the NPV rule, Project B should be chosen, whilst the IRR method favours Project A. This shows a conflict in the ranking. What should one do if the projects are mutually exclusive?

Reason for the difference:

Examining the two projects reveals that Project B's cashflow takes place towards the end of the project. This means that interest on early cashflows has very little influence on the total income generated by the project. By contrast, Project A generates most of its income in the early years and the interest received on early cashflows is very substantial.

If one looks at terminal values, one sees this more clearly, as follows:

Assuming that interim cashflows are re-invested at 10% (i.e. the WACC).

	Proj ct A	Project B
Outlay	(50 000)	(50 000)
Cashflow	80 000	98 000
Interest on interim cashflows	14 475	4 180
Net return Year 4	44 475	R52 180

At the low re-investment rate, Project B is preferable to Project A.

Assuming a re-investment rate of 20% (i.e. closer to the IRR)

	Project A	Project B
Outlay	(50 000)	(50 000)
Cashflow	80 000	98 000
Interest on interim cashflows	28 950	8 360
Net return Year 4	R58 950	R56 360

At the higher re-investment rate (which is closer to the IRR), the early cashflows from Project A substantially increase the interest factor, showing Project A to be preferable to Project B.

The IRR technique assumes that early cashflows can be re-invested at the IRR rate. This assumption is only correct where the NPV rate (which considers risk) is the same as the IRR rate.

Conclusion:

The NPV method is s perior to the IRR method, as the NPV method assumes that all cashflows are re-invested at the WACC and not the project's IRR.

M dified internal rate of return method (MIRR)

The NPV method of investment evaluation assumes that all cashflows will be re-invested at the WACC to the end of the project life. This assumption is acceptable as it assumes that a company is able to yield a return equal to the optimal **business plus finance risk** or target WACC.

The IRR method makes the erroneous assumption that cashflows are re-invested at the IRR. To correct the re-investment problem, one may use the MIRR, which is consistent with NPV.

The MIRR takes all intermediate cashflows and calculates the future value to the end of the project at a re-investment rate equal to the WACC.

To simplify: the first step is to calculate the future value (using the WACC) of the sum of the cash inflows for each year to the end of the project and then compute the NPV and the IRR in the normal way. The revised cashflow will now show an outlay in Year 0 and the sum of the total cash inflows as a lump sum in the final year, with nil cashflows in between. This is better explained by working through an example:

Example: Modified internal rate of return (MIRR)

Using the figures in the previous example, one has:

WACC = 10%

Year		**Project A**	**Project B**
0	Cashflow	(50 000)	(50 000)
1	Cashflow	25 000	Nil
2	Cashflow	20 000	8 000
3	Cashflow	20 000	25 000
4	Cashflow	15 000	65 000
		Pr ject A	**Project B**
NPV		+ R14 527	+ R19 790
IRR		24%	21%

Required:

Calculate the MIRR where WACC = 10%.

Solution:

Project A		**Future value at Year 4**				
Year 0	(50 000)					
Year 1	25 000	25 000	×	$(1,1)^3$	=	33 275
Year 2	20 000	20 000	×	$(1,1)^2$	=	24 200
Year 3	20 000	20 000	×	1,1	=	22 000
Year 4	15 000	15 000	×	1	=	15 000
						94 475

The results are:

Year 0	(50 000)	
Year 1	0	
Year 2	0	
Year 3	0	
Year 4	+ 94 475	
NPV =	14 527	
MIRR =	17,2429%	(Calculated IRR on adjusted cashflows)

Project B		**Future value at Year 4**				
Year 0	(50 000)					
Year 1	–					
Year 2	8 000	8 000	×	$(1,1)^2$	=	9 680
Year 3	25 000	25 000	×	1,1	=	27 500
Year 4	65 000	65 000	×	1	=	65 000
						102 180

This re ults in the following:

Year 0	(50 000)	
Year 1	0	
Year 2	0	
Year 3	0	
Year 4	+ 102 180	
NPV =	19 790	
MIRR =	19,564%	(Calculated IRR on adjusted cashflows)

Conclusion:

Project B now shows a higher NPV as well as MIRR in comparison to Project A.

MIRR is consistent with the NPV calculation.

6.4 The investment decision

All investment decisions should be evaluated at the target WACC. Where the target is *assumed* to be the current WACC of the company at market values, one further assumes that –

all projects being evaluated are of the same risk class;

(b) the project is marginal and will not alter the value of the company substantially; and

current WACC = target WACC.

Most investment decisions involve the investment in new capital equipment or the replacement of existing equipment.

Inflation

Concepts and terminology

General inflation

General inflation can be defined as the increase in the average price of goods and services, normally linked to the **retail price index** (RPI), which is based on a basket of consumer goods.

Synchronised inflation

Synchronised inflation occurs when all costs and revenues rise at the same rate as general inflation.

Differential inflation

Differential inflation relates to the more common situation where the various costs and revenues do not all rise at the same rate as general inflation, for example the cost of capital equipment, labour and medical aid revenues.

Money cashflow

Money cashflows refer to cashflows to which an amount is added to compensate for the effects of inflation.

Money rate of return

The money rate of return or nominal rate is defined

as: $[(1 + R)(1 + i)] - 1$

Where:

R = Real rate of return; and
i = Inflation

Money cashflows should be discounted at the money rate of return, while real cashflows should be discounted at the real rate of return. It might be preferable to use money cashflows and money rates of return, because taxation incentives are usually expressed as money flows.

The current shareholders' required return, k_e, as well as the current cost of debt, k_d, includes inflation. The money rate or nominal rate is the current rate that includes inflation. The real rate is the required rate where inflation is nil.

The relationship between the money (nominal) rate, real rate and inflation is as

follows: $(1 + M) = (1 + R)(1 + i)$

From which follows that the money rate (nominal rate)

$M = [(1 + R)(1 + i)] - 1$

Where:

M = Money (nominal) rate
R = Real rate
i = inflation.

Example: Money rate of return (nominal rate)

Inflation is running at 6% and an investor requires a real return of 10%.

Required:

Calculate the required money (nominal) rate M.

Solution:

Nominal rate M = [(1 + 0,10)(1 + 0,06)] – 1

(1,10)(1,06) – 1

0,166 or 16,6%

Notes:

The nominal rate of 16,6% is nearly, but not exactly 16% (10% + 6%).

It is important to note that when discounting at the money (n minal) rate, inflation must be included in the estimated future cashflows.

Example: Real rate of return

Inflation is running at 5% and an investor requires a nominal return of 15%.

Required:

Calculate the required real rate of return R.

Solution:

(1 + M) = (1 + R) / (1 + i) per definition

Therefore (1 + R) = (1 + M) / (1 + i))

= (1 + 0,15) / (1 + 0,05)

= (1,15) / (1,05)

= 1,0952

Therefore R = 1,0952 – 1 = 0,0952 = 9,52%

Notes:

The real rate of 9,52% is almost, but not exactly 10% (15% – 5%).

It is important to note that when discounting at the real rate of return, inflation must NOT be included in the estimated future ashflows.

Example: Comparing calculations with real and nominal rates of return

The req ired real rate of return is 10%. Inflation is currently 5%.

Evaluate a pr ject that will cost R500 000 today and offers the following cashflows at today's prices:

Year 1	+ 180 000
Year 2	+ 300 000
Year 3	+ 200 000

Required:

Ev lu te the investment at:

Real rates of return.

Nominal rates of return.

Solution:

Real rates of return

The information provided above clearly states that all cashflows are at today's prices, that is, inflation has not been taken into account. The required return is also stated at the real rate of return (also known as the clean return) and represents the required return excluding inflation.

Note: ***If one discounts the future cashflows at the real rate of return and ignores the effect of inflation altogether, per the figures below, one will obtain exactly the same NPV as if one had included the effects of inflation in the cashflows and discounted at the nominal rate.***

PV factors calculated at (1 + 0,10)

		PV 10%	PV
Year 0	(500 000)	1	(500 000)
Year 1	+ 180 000	0,909	163 620
Year 2	+ 300 000	0,826	247 800
Year 3	+ 200 000	0,751	150 200
		NPV	+ 61 620

Conclusion:

Accept the investment as it offers a positive NPV.

Nominal rates of return

Always assume that the shareholders' required rate of return, k_e, as well as the debt-providers' required return, k_d, as given in a question, represent the nominal rate of return unless the question specifically states that the required return excludes inflation. Assume further that the cashflows as given include inflation and no adjustments are required unless otherwise stated.

In this example, one must allow for inflation when determining the nominal discount rate as well as the future cashflows in order to apply the nominal discount method.

Nominal rate = [(1 + 0,10) (1 +0,05)] – 1

= 0,155 or 15,5%

Discount rate = 15,5% or (1 + 0,155)

					PV 15,5%	PV
Year 0	(500 000)	× 1	=	(500 000)	1	(500 000)
Year 1	180 000	× 1,05	=	189 000	0,866	163 674
Year 2	300 000	$\times (1{,}05)^2$	=	330 750	0,749	247 731
Year 3	200 000	$\times (1{,}05)^3$	=	231 525	0,649	150 260
					NPV	61 665

Conclusion:

Accept the investment as it offers a positive NPV.

Note: ***The difference of R45 when comparing (a) to (b) above is due to rounding off of the PV factors.***

Relevant costs and revenues

In apprai ing any project, care must be taken that only those cashflows which would arise as a result of the investment decision are taken into consideration. Any costs that have already been incurred, such as product or market research, are **sunk costs** and should be ignored.

Example: Relevant costs

To date, a company has spent R3 million on research and development on a product. The company is now considering whether it should proceed with the investment. If it does, it will incur further cash outflows of

R1 million in Year 0 and R2 million in Year 2. It will also need to utilise employees currently employed who are performing tasks at a cost of R200 000 per annum, whereas employing new employees would only cost R50 000 per annum. The company has the following raw materials:

A	100 000 kgs	cost R5 million	Realisable value	R2 million
			Replacement value	R7 million
B	100 000 kgs	cost R3 million	Realisable value	R1 million
			Replacement value	R2 million
C	100 000 kgs	cost R2 million	Realisable value	(R1 mi ion)
			Replacement value	R1 mi ion

The company requires:

150 000 kgs
50 000 kgs
20 000 kgs this year and 50 000 kgs next year.

A is not regularly used, and B and C have no further use if not used f r this pr ject.

Note: C will incur a disposal cost of R1 million.

Required:

Determine the relevant cost for each cost item above.

Solution:

Research and development of R3 million

The question states that the company is currently considering whether it should proceed with the investment or abandon it. In this instance, the R3 million is a *sunk cost* (it has *already* been spent) and must be excluded.

However, when the question states that a company is considering an investment that will require R3 million research and development expenditure (it is still *to be* spent), after which the company will invest X and receive Y cashflows; then the R3 million is relevant.

Further investments of R1 million in Year 0 and R2 million in Year 2

The cashflows are relevant and must be included, as they can be avoided (i.e. not incurred) if one chooses not to undertake the investment, but are outflows if the investment is accepted.

Labour costs

The company is curr ntly paying R200 000 to employees who can be replaced with new employees at a cost of only R50 000. The existing employees can then be re-deployed to a new project. The relevant cost is R50 000, as this represents the in remental (or additional) cost to the company. Students often struggle with this concept. Note that as the existing employees will be re-deployed, the company will continue to pay their salaries and so nothing changes insofar as the R200 000 to existing employees are concerned. Hence the R200 000 is not relevant to the decision. (Assuming that the existing employees were NOT re-deployed, then what? The project would now generate a cost-saving of R150 000, that being the difference between the existing labo r costs of R200 000 and the new labour costs of R50 000.)

Raw materials

A R2 million for the first 100 000 kgs, (not regularly used so relevant cost is realisable value)

R7 million × $\frac{50\,000}{100\,000}$ for next 50 000 kgs (use replacement value)

B R1 million × $\frac{50\,000}{100\,000}$ (replacement cost – not relevant)

C This year 'saving' of $\frac{20\,000}{100\,000}$ × R1 million = R 200 000 positive cashflow

Assuming that the balance of 80 000 kgs is disposed of in the current year, next year's required 50 000 kgs will cost R500 000.

However, if raw material C is still available, the relevant cost is a saving

of: 50 000 / 100 000 × R1 million = R500 000 positive cashflow.

Opportunity costs and revenues

Only the incremental costs and revenues that arise as a result of a project should be included in the cashflows that are appraised. The marginal analysis should be used.

Example:

A company is currently manufacturing a product that requires five machine hours of manufacturing time per unit. The product generates a contribution of R50 per unit. The machine is operating at full capacity.

The company is now considering the manufacture of a new product that has the following cashflows:

Selling price	R100
Materials	(30)
Labour	(20)
Allocated overheads	(10)
Profit	R40

The product requires two hours of machine time.

Required:

Determine the relevant cashflow if the new product is manufactured.

Solution:

As machine time is fully utilised, the company would have to produce less of the existing product to enable it to produce the new product.

For every hour of machine time that is used to produce the new product, the company will have to forego or 'lose' R50 / 5 = R10 per machine hour.

The opportunity cost of utilising machine time is therefore R10 × 2 = R20 for each unit of the new product.

Relevant cashflow

Selling price	R100
Material	(30)
Labour	(20)
Opportunity ost	(20)
Relevant ost	R30

Note: ***The R10 allocated overhead has been left out as it is assumed that there is no incremental overhead cost if the new product is undertaken (in other words, the R10 is a sunk cost).***

However, if the question is clear that the company will incur additional overheads of R10 per unit, then they must be included.

If the R10 overhead was in fact a variable machine cost, that is R5 per hour, the question would be tricky, as the overhead cost of R10 would have to be included, as well as the opportunity cost of R20.

Discount rate (cost of capital)

The discount rate used in appraising a project should be the company's cost of capital calculated on the basis of he company's risk profile, as well as that of the project.

An implicit assumption of importance is that the new project does not alter the basic risk structure of the company.

Changes in working capital requirements

Any annual increase or decrease in stock, debtors or creditors must be accounted for. As sales increase (or decrease), one must assume that working capital will increase (or decrease) by the same ratio.

Example: Working capital changes

A company is considering an investment that offers the following cashflows before taking into account working capital requirements:

Year 1	R1 million
Year 2	R1,2 million
Year 3	R1,5 million

Working capital equal to 20% of cashflow will be required at the 'beginning' of e ch year.

Required:

Calculate the working capital cashflows.

Solution:

Year 0	(200 000)	[R1m × 20%]
Year 1	(40 000)	[(R1,2m – R1m) × 20%]
Year 2	(60 000)	[(R1,5m – R1,2m) × 20%]
Year 3	+ 300 000	

As cashflows increase due to increased sales, one can assume that debtors and stock will also increase and need to be financed. The question states that the cashflow for working capital is required at the beginning of the year, thus the one-year time lag. The R300 000 at the end of Year 3 occurs as the project ends and working capital is realised (i.e. stock is sold, and debtors pay).

The financing of the project

All financing considerations must be ignored. This means that interest expenditure which is tax deductible must also be ignored in the cashflows. The reason is that the interest has already been accounted for in the cost of capital; one would thus be double counting if it was included in the calculation for the investment decision.

Tax losses

When a company has a tax loss and as a result of utilising that loss it has no further tax liability during the life of the project being evaluated, the question arises of whether that tax loss should be brought to account.

In theory, the answ r is 'no', because the investment should stand or fall on its own. The fact that the investment is being partially financed by a tax loss should not cloud the decision about whether it passes the critical test of giving a return greater than the WACC.

It may however be a gued that the tax loss cannot be utilised unless the company accepts the investment being evaluated. Under such extenuating circumstances, the tax loss should be brought to account. Note, however, that the principle is to evaluate an investment free of all financing considerations.

Recoupment/scrapping allowances

Calculate the rec upment or scrapping allowance at the end of the project.

Taxation time lags

Where there is a tax time lag, ensure that you allow for it. Where a question is silent about the timing of tax p yments, you must assume that the taxation is paid in the same year as the cashflows occur.

6.4.10 Tax allowances

The question should indicate how to account for the tax allowances. However, if the question is silent on tax allowances, one must assume that the current tax allowances as per current tax legislation are applicable.

Example: Opportunity costs plus tax consequences

A close corporation has an asset with a nil tax value. The company has decided to sell the asset for R20 000 and replace it with a new asset at a cost of R100 000. The new asset will be written-off for tax purposes as allowed by the SARS as follows:

Year 1	70%
Year 2	30%

At the end of Year 5, the new asset will be sold for R40 000.

Tax rate	40%
Target WACC	10%

Required:

Show the consequences of replacing the asset on an NPV value basis where there is –

no tax lag; and

a one-year tax lag.

Solution:

When a company replaces one asset with another, one ust be very careful to keep the two transactions separate.

The company may, in fact, have three choices –

sell the asset and stop manufacturing altogether; or

continue manufacturing with the old asset; or

replace the old asset with the new asset.

Insofar as option **1** is concerned, the company may have no intention whatsoever of selling the asset, and discontinuing operations altogether. Nevertheless, this option **1** gives rise to an opportunity cost.

Evaluating option 2 with *no* tax lag

If the company continues with the existing machine, there is an opportunity cost of selling the machine. In this case, the solution is as follows:

			PV 10%	PV
Year 0	Sell – opportunity sales value	(20 000)	1	(20 000)
Year 0	Opportunity r coupment 20 000 × 40% =	8 000	1	8 000
	NPV			(12 000)

If the company sells the asset, one must ask why the sale is treated as a negative cashflow. The reason is that in doing so, the company is foregoing the opportunity of selling the asset altogether. If it did sell the asset, it would receive + R12 000 after tax. Not selling the asset means that the company must make at least R12 000 to be better off as a result of continuing to use the asset. **Opportunity costs are always treated** as the opposite of the actual cashflow, that is if the actual cashflow is + R10 000 then the pp rtunity cost (or cashflow foregone) is – R10 000. If the cashflow were – R10 000, then the rtunity cost would be + R10 000.

Evaluating option 2 with a tax lag

		PV 10%	PV
Year 0	Sell – opportunity sales value	(20 000)	1	(20 000)
Year 1	Opportunity recoupment 20 000 × 40% =	8 000	0,909	7 272
	NPV			(12 728)

(c) Evaluating option 3

					PV 10%	PV
Year 0	Purchase			(100 000)	1	(100 000)
Year 1	Wear-and-tear	100 000 × 70% × 40%	=	28 000	0,909	25 452
Year 2	Wear-and-tear	100 000 × 30% × 40%	=	12 000	0,826	9 912
Year 5	Sell			40 000	0,621	24 840
Year 5	Recoupment	40 000 × 40%	=	(16 000)	0,621	(9 936)
	NPV					(49 732)

If one were to compare option **2** with option **3**, the conclusion would be th t it is better to continue with the old machine as there is a R37 732 saving, that is:

– R12 000 – (– R49 732) = R37 732

This assumes that other cashflows would be the same under both considerations.

Evaluating option 3 *with* a tax lag

					PV 10%	PV
Year 0	Purchase			(100 000)	1	(100 000)
Year 2	Wear-and-tear	100 000 × 70% × 40%	=	28 000	0,826	23 128
Year 3	Wear-and-tear	100 000 × 30% × 40%	=	12 000	0,751	9 012
Year 5	Sell			40 000	0,621	24 840
Year 6	Recoupment	40 000 × 40%	=	(16 000)	0,564	(9 024)
	NPV					(52 044)

An alternative calculation, combining the two choices (i.e. continue *and* replace), that is, a marginal analysis, *without* a tax lag:

				PV 10%	PV
Year 0	Sell – Opportunity sales value	=	–20 000	1	+ 20 000
Year 0	Opportunity recoupment 20 000 × 40%	=	– +8 000	1	– 8 000
Year 0	Purchase	=	–100 000	1	– 100 000
Year 1	Wear-and-tear100 000 × 70% × 40%	=	28 000	0,909	+ 25 452
Year 2	Wear-and-tear100 000 × 30% × 40%	=	12 000	0,826	+ 9 912
Year 5	Sell		40 000	0,621	+ 24 840
Year 5	Recoupment40 000 × 40%	=	–16 000	0,621	– 9 936
	NPV				– 37 732

The opportunity cost is now a positive R20 000 and the recoupment a negative of R8 000, because this is a marginal analysis, that is, one is calculating the net investment in comparison to selling the machine outright.

Note: ***(ve y impo tant): Doing a marginal analysis creates a new problem, as two decisions have been combined. If doing a marginal analysis results in a positive NPV, all that is being said is that it is better to replace than to continue 'as is' The new investment must still be evaluated on its own, to see whether it provides a positive NPV on its own merits. If it does not, it is better to sell the machine outright.***

Example: New investment

Govender & Naidoo Incorporated is considering a new project that will require an investment of R1 million in new machinery. The machinery will be depreciated over the five-year life of the project.

For t x purposes, SARS will allow a wear-and-tear allowance of 60% at the end of the year in which the m chine is first used. A 40% wear-and-tear allowance will be made at the end of the second year.

The project will last five years. The equipment will be sold for R300 000 at the end of the project. The new equipment will be financed by way of a loan at a cost of 10% per annum. The capital will be repaid over the period of the project.

Working capital requirements:

Beginning of the project	R200 000
End of Year 1	Increase by R80 000
End of Year 3	Decrease by 20%

The company has a tax loss of R100 000 but it is making positive cashflows from other projects.

Year 1	**Statement of Comprehensive Income**	**R**
Sales		1 200 000
Variable costs		(720 000)
Fixed costs		(280 000)
Depreciation		(200 000)
Interest		(100 000)
Profit		(100 000)

Sales are expected to increase by 10% for the first two years and stabilise thereafter.

Assume the following:

1-year tax lag
k_e = 20%
k_d = 10%
Tax = 40%
Current D:E ratio 30:70
Target D:E ratio 40:60

Required:

Evaluate the project investment.

Solution:

k_d after tax = 10% × 60% 6%
Target WACC = 40:60 (6% × 40%) + (20% × 60%)
14,4%

Cashflow calculation (R000s)

	Year 1		**Year 2**		**Year 3**	**Year 4**	**Year 5**
Sales	1 200						
Variable costs	(720)						
Contribution	480	+ 10%	528	+ 10%	580,8	580,8	580,8
Fixed costs	(280)		(280)		(280)	(280)	(280)
Cashflow	200		248		300,8	300,8	300,8

Working capital: Remember to liquidate the working capital at the end of the project, that is:

200 000 + 80 000 – 56 000 = R224 000

Ignore the tax loss of R100 000. The question states that the company has other positive cashflows. Assume that cashfl w will cover the tax loss.

N te: Evaluate the investment on a stand-alone basis.

It might be easier and clearer to show your workings, limit mistakes and check yourself by doing the ca cu ations in columns per year, especially when utilising spreadsheets.

Investment evaluation:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Investment	(1 000 000)						
Sale at end of life						300 000	
Working capital	(200 000)	(80 000)		56 000		224 000	
Cashflows		200 000	248 000	300 800	300 800	300 800	
Taxation **1**			160 000	60 800	(120 320)	(120 320)	(240 320)
Net cash in-/outflow	(1 200 000)	120 000	408 000	417 600	180 480	704 480	(240 320)
Factor @ 14,4%	1,000	0,874	0,764	0,668	0,584	0,510	0,446
NPV p.a.	(1 200 000)	104 880	311 712	278 957	105 400	359 285	(107 183)
Total NPV	(146 949)						

1 Taxation:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
		R	**R**	**R**	**R**	**R**	**R**
Cashflows			200 000	248 000	300 800	300 800	300 800
Wear-and-tear **2**			(600 000)	(400 000)			
Recoupment on sale							300 000
			(400 000)	(152 000)	300 800	300 800	600 800
Taxation @ 40%			160 000	60 800	(120 320)	(120 320)	(240 320)

There is a tax lag of one year.

2 Wear-and-tear % of investment: 60% 40%

Conclusion:

Reject the project as it does not meet the required return of 14,4%.

6.5 The keep versus replacement investment decision

Many capital budgeting problems involve the consideration of continued operation with existing machines, or replacement with a new machine, or discontinued operations.

The decision process is as follows:

Determine whether the marginal revenues and costs from the replacement of the new machine will yield a positive NPV.

This may be done in one of two ways. Either calculate the marginal NPV **or** calculate the total NPV for contin ed prod ction and the NPV for replacement. The resultant difference should be positive.

Having determined that replacement is better than continued operation, consider whether it would be preferable to discontinue production altogether.

Example 1: Keep, replace or shutdown

Exi ting machine: Book value = 0 Current realisable (market) value = R10 000

Rep acement machine: Current cost = R20 000

Net total positive cashflows over the life of the assets have been determined as a present value of R7 000 for he existing machine and R18 000 for the new machine. The cashflows do not include the investment cost. Assume that there is no taxation.

Required:

Determine whether the company should continue as is with the existing machine, replace it with the new machine, or cease operations altogether.

Solution:

Many students have difficulty in evaluating the replacement of an existing investment. Often this analysis is done ***incorrectly*** as follows:

Cost of new machine	(20 000)
Sale of old machine	10 000
Cashflows from new machine	18 000
NPV (positive therefore accept)	8 000

Why is the above calculation incorrect? In short, we want to analyse the in estment decision on its own merits, irrespective of how it is to be financed. By selling the old machine and using the proceeds to finance the sale of the new machine, we are mixing the investment and financing decisi n t gether. This is *incorrect*.

The best way of evaluating this type of decision is to:

1 Evaluate the continuation of the existing machine *without* the new investment.

2 Evaluate the new investment on its own, *without* accounting for the existing value of the asset that will be sold or the existing cashflows from that asset.

3 Choose either **1** or **2** based on the option that shows the highest NPV. If both have a negative NPV, then cease operations. The options are therefore:

1 Existing machine:

Opportunity cost	(10 000)
Existing cashflows	7 000
NPV	(3 000)

The existing machine has a nil book value, but it can be sold for R10 000, therefore the company must choose between selling the machine and having R10 000 now, or continuing with the machine, which gives an equivalent value (today) of 7 000. The company is therefore R3 000 worse off if it continues as is. The current market value of R10 000 represents the opportunity foregone of selling the machine.

Note: Opportunity costs represent positive cashflows for a particular decision. Since the company has opted not to go with that decision (sell in this case) the amount must be charged as a negative cashflow (opportunity cost) to continuing as is.

2 New investment: (as a stand-alone):

Cost	(20 000)
Cashflows	18 000
NPV	(2 000)

The new machine yields a negative NPV and must also be rejected.

Conclusion:

In this example, the third option prevails as the company will be better off if it discontinues production alt gether, as b th choices yield a negative NPV.

However, if the company replaces the existing machine, it will sell the old machine for R10 000. To reinforce what was di cussed earlier, because the sale of the old machine is a finance issue, one must *omit* the R10 000 sa e. Whether one finances the new machine with new money or with money from the sale of an existing asset, it shou d have no influence or effect on the investment decision. For instance, the company may choose to use the c sh from the sale of the asset to pay a dividend and finance the new investment from the issue of new sh res or from debt finance.

The calculations above show that the new machine will reduce the loss from R3 000 to R2 000. The new machine is better than the old machine by a marginal amount of R1 000.

Alternative evaluation method – marginal analysis

This method is not recommended unless the incremental or marginal cashflows are provided.

The marginal analysis method combines the evaluations of the existing machine and the new machine. The above solution shows that the new investment is marginally better by R1 000, which is the expected result of the marginal analysis. Where a marginal analysis is undertaken, two valuations are required –

evaluate the new investment on an incremental cash-flow basis; and

evaluate the new investment on its own.

Step 1 Marginal analysis

Sell existing machine	+ R10 000
New machine	(R20 000)
Net cost	(R10 000)
Cashflows	R11 000
NPV	R1 000

Conclusion:

The new machine is better than the old machine by R1 000. As de onstrated earlier, this is due to the new machine having a negative NPV of (R2 000) compared with the existing machine having a negative NPV of (R3 000).

Note: Repeating what was shown earlier, the analysis above is often done in error as follows:

Sell existing machine	+ 10000
New machine	(20000)
Net cost	(R10000)
Cashflows	R18000
NPV	R8000

Incorrect conclusion:

The new machine is better than the old machine by R8 000.

Step 2Evaluate the new machine on its own

Cost	(20 000)
Cashflows	18 000
NPV	(2 000)

Conclusion:

Although the new machine is better than the existing machine due to incremental positive cashflows, the investment m st be rejected, because the new machine has a negative NPV. The company will be better off if it discontin es operations altogether.

Example 2: Keep, replace or shutdown

Nutcracker Company is considering replacing an existing machine with a tax value of R50 000 for a new, more efficient machine at a cost of R250 000. The old machine can be sold for R60 000 today or for R10 000 after five years. The e timated useful life of the new machine is five years, after which it will be sold for R40 000.

	Current (per annum)	**New machine**
Sales	R100 000	R140 000
Cost of sales		
Variable	R56 000	R42 000
Fixed	R30 000	R30 000

Depreciation has not been included in the above costs. Interest repayment on the new machine will be R10 000 per annum. The company will borrow 50% of the cash required at 16% from its bankers. The cost of capital is 13%.

The current tax rate is 40%; assume that there is a one-year lag in the payment of tax.

Also assume that the wear-and-tear for both the existing machine and the new machine is to be written off in full at the end of Year 1.

Required:

Determine whether the company should *replace* the existing machine, *close down* or *continue* production on the current basis.

Solution (on a total basis):

Every capital budgeting question requires an evaluation of certain fundamental principles. It is therefore better to address these principles one by one and present in a logical order. Consider the following issues and associated principles, which are addressed in the solution that f ll ws:

Issues	–	**Principles**
Asset purchase	–	Opportunity cost (do you forgo the opportunity to sell the existing asset? If so, this gives rise to an opportunity cost)
	–	Opportunity recoupm nt on sale of asset (by forgoing the opportunity of selling the existing asset now, m ans that the tax on recoupment that would be payable is now avoided)
	–	Wear-and-tear (ignored when computing operating cashflows, but relevant for the tax computation)
	–	Sale of asset (if there are cash proceeds from the sale of the asset, it must be included, but only when actually sold)
	–	Scrapping/recoupment on sale of asset and tax implications thereof (if the sale proceeds exceeds the tax value, this gives rise to recoupment. If the reverse then a scrapping allowance is applied)
Cashflows	–	After-tax cashflows that emanate from the project (as tax is payable, the after-tax cashflows must be derived)
	–	Relevant revenues and costs only (for instance overhead costs that don't change are not relevant)
	–	Depreciation ignored (non-cashflow expense)
	–	Int rest ignored (accounted for in the discount rate, that is, the target WACC)
Working apital	–	Working capital 'returns'. (Note: the sum of all changes must equal nil)
Tax	–	Take cognisance of tax losses
	–	Time lags (tax payments made or refunds due aren't necessarily paid in the period they pertain to)

Investment evaluation:

Keep Existing machine

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Opportunity cost: Current realisable value forfeited	(60 000)						
Sale at end of life						10 000	
Working capital	0					0	
Cash flows		14 000	14 000	14 000	14 000	14 000	
Taxation **1**		3 000	10 800	(4 200)	(4 200)	(4 200)	(7 200)
Net cash in/outflow	(60 000)	17 000	24 800	9 800	9 800	19 800	(7 200)
Factor @ 13%	1,0000	0,8850	0,7831	0,6931	0,6133	0,5428	0,4803
NPV pa	(60 000)	15 045	19 421	6 792	6 010	10 747	(3 458)
Total NPV	(5 442)						

1 Taxation for Keep:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R			**R**	**R**	**R**	**R**
Opportunity benefit: Tax recoupment avoided **2**		(10 000)					
Tax recoupment on sale							10 000
Cash flows			14 000	14 000	14 000	14 000	14 000
Wear and tear **3**			(50 000)				
Taxable income		(10 000)	(36 000)	14 000	14 000	14 000	24 000
Taxation @ 30%		3 000	10 800	(4 200)	(4 200)	(4 200)	(7 200)

There is a tax lag of one year.

2 Taxable amount reduced by not selling existing machine = R60 000 – R50 000 = R10 000.

3 Wear and tear % of inv stm nt: 100% in second year.

Acquire New machine

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Investment	(250 000)						
Sale at end of life						40 000	
W rking capital	0					0	
Cash fl ws		68 000	68 000	68 000	68 000	68 000	
Taxation **1**			54 600	(20 400)	(20 400)	(20 400)	(32 400)
Net ca h in/outflow	(250 000)	68 000	122 600	47 600	47 600	87 600	(32 400)
Factor @ 13%	1,0000	0,8850	0,7831	0,6931	0,6133	0,5428	0,4803
NPV pa	(250 000)	60 180	96 008	32 992	29 193	47 549	(15 562)
Total NPV	360						

1 Taxation for New:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Cash flows			68 000	68 000	68 000	68 000	68 000
Wear and tear **2**			(250 000)				
Tax recoupment on sale							40 000
Taxable income			(182 000)	68 000	68 000	68 000	108 000
Taxation @ 30%			54 600	(20 400)	(20 400)	(20 400)	(32 400)

There is a tax lag of one year.

2 Wear and tear % of investment: 100% in second year.

Solution on a marginal basis
(i.e. it combines the Keep and New)

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Net investment **2**	(190 000)						
Sale at end of life **3**						30 000	
Working capital	0					0	
Cash flows **4**		54 000	54 000	54 000	54 000	54 000	
Taxation **1**		(3 000)	43 800	(16 200)	(16 200)	(16 200)	(25 200)
Net cash in/outflow	(190 000)	51 000	97 800	37 800	37 800	67 800	(25 200)
Factor @ 13%	1,0000	0,8850	0,7831	0,6931	0,6133	0,5428	0,4803
NPV pa	(190 000)	45 135	76 587	26 199	23 183	36 802	(12 104)
Total NPV	5 802						

1 Taxation:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Cash flows **4**			54 000	54 000	54 000	54 000	54 000
Wear and tear **5**			(200 000)				
Tax recoupment on sale							30 000
Oppo tunity benefit: Tax ecoupment avoided **6**		10 000					
		10 000	(146 000)	54 000	54 000	54 000	84 000
Taxati n @ 30%		(3 000)	43 800	(16 200)	(16 200)	(16 200)	(25 200)

Supporting calculations:

There is a tax lag of one year.					
	New		**Existing**		**Combined***
2 Net investment	(250 000)	less	(60 000)	equals	(190 000)
3 Sale at end of life	40 000	less	10 000	equals	30 000
3 Tax recoupment	(12 000)	less	(3 000)	equals	(9 000)
4 Cash flows	68 000	less	14 000	equals	54 000
4 Tax on cash flow	(20 400)	less	(4 200)	equals	(16 200)
5 Wear and tear **8**	(250 000)	less	(50 000)	equals	(200 000)
5 30% x Wear and tear	75 000	less	15 000	equals	60 000
6 Opportunity benefit:					
Tax recoupment avoided	0	less	3 000	equals	(3 000)
7 Total NPV* as above	360	less	(5 442)	equals	5 802

* NPV calculation of R5 802 :

Figures as per last column above:		**Factor**	**NPV***
2 Net investment	(190 000)	1,0000	(190 000)
3 Sale at end of life	30 000	0,5428	16 284
3 Tax recoupment	(9 000)	0,4803	(4 323)
4 Cash flows	54 000	3,5173	189 934
4 Tax on cash flow	(16 200)	3,1126	(50 424)
5 Wear and tear[1]	(200 000)	N/A	
5 30% x Wear and tear	60 000	0,7831	46 986
6 Opportunity benefit:			
Tax recoupment avoided	(3 000)	0,8850	(2 655)
7 Total NPV* of R 5 802 as above			5 802

[1] Not a cash flow, only the taxation thereon is

Conclusion:

The new machine should therefore replace the old machine, although the NPV is only marginally positive. The disadvantage of the marginal approach is that the combined NPV may be positive even when the new machine reduces the loss, but not earning 13%. In such a case where the NPV of the new machine is negative, the old machine should be disposed of without acquiring the new machine.

Note (very important):

By doing a marginal analysis, we are creating a new problem, as we have combined two decisions into one. If, as a result of doing a marginal analysis, we come to a positive NPV, all we are saying is that it is better to replace than to ontinue as is.

We still need to evaluate the new investment on its own to see whether it provides a positive NPV on its own merits. If it does not, we conclude that we are better off by simply selling the existing machine without replacing it. Hence it is preferable to do the two calculations separately.

Additional notes:

Be careful that you don't omit a negative sign in the formulas, for example when calculating tax from taxable income.

Check that taxable income and taxation have opposite signs.

Wear and tear has a negative sign because it decreases taxable income.

In the case of the existing machine the current selling price of R60 000 is forfeited, therefore reducing inflows by R60 000, resulting in a negative inflow.

In the tax calculation of the existing machine the tax recoupment of R10 000 has been avoided, therefore decreasing the taxable income (accompanied by a negative sign).

Example 3: Keep, replace or shutdown

A company is considering replacing an existing machine with a nil tax value with a new machine that has a greater capacity and lower operating costs. The existing machine and the new machine each have a life of five years.

Existing machine		**New machine**	
Current market value	R250 000	Purchase price	R400 000
Sale value in 5 years	R40 000	Sale value in 5 years	R100 000
Annual cashflows	R50 000	Annual cashflows	R110 000

Assume no tax. Target WACC is 20%.

The company accountant evaluated the two options as

follows: Keep existing machine

			Discount 20%	**PV**
Year 1–5	Annual cashflows	50 000	2,99	149 500
Year 5	Sell machine	40 000	0,40	16 000
	NPV			165 500

Replace with new machine

			Discount 20%	**PV**
Year 0	Sell existing machine	250 000	1	250 000
Year 0	Buy new machine	(400 000)	1	(400 000)
Year 5	Sell new machine	100 000	0,40	40 000
Year 1–5	Annual cashflows	110 000	2,99	328 900
	NPV			218 900

The accountant concluded that the company should replace the existing machine with the new machine as the new machine has a higher NPV value.

Required:

Evaluate the investment in the new machine.

Solution:

There are three options available to the company –

sell the machine and discontinue operations altogether; or

continue with the existing machine; or

purchase the new machine.

There are several methods for evaluating the three options.

Evaluation: Option 2 (Continue)

			Discount 20%	**PV**
Year 0	Opportunity cost – sale	(250 000)	1	(250 000)
Year 5	Sell existing machine	40 000	0,40	16 000
Year 1–5	Annual cashflows	50 000	2,99	149 500
	NPV			(84 500)

Recommendation: Option 2

The existing machine does not provide a positive NPV and must therefore be sold or replaced by the new machine.

Evaluation: Option 3

			Discount 20%	PV
Year 0	Buy new machine	(400 000)	1	(400 000)
Year 5	Sell new machine	100 000	0,40	40 000
Year 1–5	Annual cashflows	110 000	2,99	328 900
	NPV			(31 100)

Recommendation: Option 3

The new machine also yields a negative NPV and must not be purchased. The best choice is to sell the existing machine and discontinue operations, that is, option **1**.

Alternative evaluation of new machine on a marginal basis

Step 1

			Discount 20%	PV
Year 0	Sell existing machine	250 000	1	250 000
Year 0	Buy new machine	(400 000)	1	(400 000)
Year 5	Sell new machine	100 000	0,40	40 000
Year 5	Opportunity cost – sell old machine	(40 000)	0,40	(16 000)
Year 1–5	Incremental cashflows	60 000	2,99	179 400
	NPV			53 400

Conclusion (marginal analysis):

The new machine is better than the old machine by R53 400; however, one must establish whether it provides a positive NPV.

Step 2 Evaluate the new machine on its own

The calculations above indicate that the new machine has a negative NPV of R31 100.

Final conclusion:

Sell the existing machine and discontinue operations.

Note: ***The positive NPV of R53 400 is equal to the difference between the loss from the old machine and the loss from the new machine.***

	R
Existing ma hine	(84 500)
Less: New ma hine	(31 100)
Net imp ovement	53 400

In other words, the loss has been reduced by R53 400.

6.6 Investing in an asset via an operating lease

When a company is considering an investment in a new project, it has the choice of buying the required assets outright, renting them, or investing via an operating lease.

If the company is very confident that the investment will result in a favourable NPV, it is always preferable to buy the asset outright and obtain the tax benefits. There are, however, some situations where the investment c rries a very high risk of failure, and the last thing a company requires is to discover after a year or two that he project is not going to work but it is saddled with an asset it cannot use or sell at a reasonable price.

Under such circumstances, it might be better to rent the assets or enter into an operating lease arrangement. The advantage of an operating lease is that a company can terminate the lease after a short period of time, normally one year. The company is in effect able to cut its losses early. An operating lease will always be more

expensive in the long-term compared to buying the assets outright, but it offers short-term benefits if the project fails and the company wishes to terminate the investment.

As such, an operating lease is not a form of finance; it is an alternative method of investing in an asset. To evaluate an operating lease, one must compare the investment to an outright purchase. The appropriate discount rate is the target WACC.

A financial lease, on the other hand, is a form of finance which is discussed in chapter 7, *The financing decision* where the appropriate discount rate is the after-tax cost of debt.

Example:

A hospital is considering investing in an X-ray machine. The cost of purchasing the machine is R10 million. The asset will have a five-year life with a nil resale value. The wear- and-tear allowance is 50% for Year 1 and Year 2. Alternatively, the hospital can enter into an operating lease arrangement, where the cost is R3 million for Year 1, payable in advance. The operating lease cost increases by 10% per nnum thereafter.

WACC = 10%
Tax rate = 40%

Required:

Compare the two investment options.

Solution:

Investment in the machine

						PV 10%	PV
Year 0	Buy			(10)	million	1	(10)
Year 1	Wear-and-tear R10m × 50%	× 40%	=	2	million	0,909	1,818
Year 2	Wear-and-tear R10m × 50%	× 40%	=	2	million	0,826	1,652
	NPV						(6,53)

Operating lease

							PV 10%	PV
Year 0	Cost				(3)	million	1	(3)
Year 1	Tax allowance	R3	× 40%	=	1,2	million	0,909	1,09
Year 1	Cost	(R3)	× 110%	=	(3,3)	million	0,909	(3)
Year 2	Tax allowance	R3,3	× 40%	=	1,32	million	0,826	1,09
Year 2	Cost	(R3,3)	× 110%	=	(3,63)	million	0,826	(3)
Year 3	Tax allowance	R3,63	× 40%	=	1,452	million	0,751	1,09
Year 3	Cost	(R3,63)	× 110%	=	(3,993)	million	0,751	(3)
Year 4	Tax allowan e	R3,993	× 40%	=	1,597	million	0,683	1,09
Year 4	Cost	(R3,993)	× 110%	=	(4,392)	million	0,683	(3)
Year 5	Tax allowance	R4,392	× 40%	=	1,757	million	0,621	1,09
Year 5	Cost	(R4,392)	× 110%	=	(4,832)	million	0,621	(3)
Year 6	Tax allowance	R4,832	× 40%	=	1,933	million	0,564	1,09
(Ro nded off)		**NPV**						(9,55)

Conclusi n:

The operating lease is more expensive in the long-term. However, in the short-term, it gives the company the option to continue, close down the operation, or terminate the lease agreement and buy the asset outright if it is now confident that future cashflows are strong.

Fin ncial leases are discussed in chapter 7, *The financing decision*.

6.7 Uncertainty and risk

Concepts

Uncertainty

In the case of decision-making based on **uncertainty**, insufficient information is available to the decision-maker to enable him to assign a probability to the outcome of an event. In short, uncertainty cannot be measured.

Risk

In the case of decision-making based on **risk**, enough information is avai ab e to the decision-maker to enable him to assign a probability to the outcome of an event. In short, risk can be measured.

Probability

A probability is represented by a ratio, usually in decimal form, between 0 and 1 (i.e. 100%). This ratio is the proportion of the number of favourable events to the total number of possible events and is determined by dividing the favourable events by the possible events.

Sensitivity analysis

Sensitivity analyses are performed by continuously changing one or more of the variables in a model one at a time and noting the results and influence thereof. So eti es it is undertaken by asking the question 'What if?'.

Simulation

Simulation is the process by which a model is xp rim nt d upon and the results of various alternatives are examined. Simulation is used where analytical quantitative models are not available or too complex or costly to develop, for example in intricate queuing processes at a toll gate at various times of the year.

Random numbers

Random numbers are numbers of which the components are selected randomly, for example by computer or tables of random numbers.

Monte Carlo analysis

Where variables are changed one at a time asking 'what if?' questions in sensitivity analysis, in Monte Carlo simulation the effect on all possible values and combinations of variables are investigated. This enables the construction of a probability distribution where the mean and standard deviation can be calculated.

Simulation based on random computer-generated numbers, for example the number of arrivals at a toll gate within a given time frame at various times of the year, is known as Monte Carlo analysis. The probable occurrence of events based upon probabilities is allotted to random numbers with the purpose of simulating the outcomes.

The incorporation of Monte Carlo analytical techniques are now also required for IFRS 13 share valuations. The us fuln ss of the analyses lies therein that a spread of the different values for an enterprise an be determined, so that probabilities for the maximum and minimum values can be ascertained.

Example:

A Monte Carlo simulation exercise is applied to assist in a feasibility study regarding the possible constr ction of a toll gate in a rural area. The arrival times between 6:00 and 9:00 have been observed in a sample as in the table below:

Time	Number of arrivals observed	Probability	Cumulative probability	Random Numbers
6:00–6:30	50	0,05	0,05	1–5
6:30–7:00	100	0,10	0,15	6–15
7:00–7:30	220	0,22	0,37	16–37
7:30–8:00	300	0,30	0,67	38–67
8:00–8:30	180	0,18	0,85	68–85
8:30–9:00	150	0,15	1,00	86–100
	1000	1,00		

Say, for example, the computer selects a random number of 72 when applying Monte Carlo analysis: That would represent an arrival time between 8:00–8:30 as in the table (random numbers between 68–85). The next random number selected might be 37 and would represent an arrival of between 7:00 and 7:30 (random numbers between 16–37) etc.

The algorithm is then repeated a couple of hundred or preferably a few thousand times with a computer program. The results are then compared to the initial probabilities which have been calculated from the observations with the sample. These probabilities can subsequently be adjusted if necessary. The program enables the construction of a visual graph representing the probability distribution from which the mean and standard deviation can be calculated and probabilities for the maximum and minimum arrivals in half-hour periods in peak hour traffic can be determined.

Investment decision under conditions of uncertainty

If one assumes the certainty of cashflows and an ability to calculate the cost of capital, it is relatively simple to determine the NPV for a project. The basic assumption is, however, that the new project does not alter the basic risk structure of the company.

When a project is perceived to increase the overall risk of the c mpany, the discount rate should be adjusted upwards. Assuming that a company's WACC is 13%, a hierarchy of interest rates may be constructed as follows:

Risk class	Type of product	Discount rate (NPV)
A	Replacement of existing equipment	13
B	New venture – usual mark ts and products	18
C	New venture – either usual mark ts or usual products	23
D	New venture – neither usual markets nor usual products	28

Methods allowing for project uncertainty include –

comparing the payback periods;

increasing the risk premium by raising the discount rate above the cost of capital for later years or more risky projects;

ignoring project results beyond a certain period, say seven years, called the finite horizon;

utilising probability based methods, whereby probability theory is applied to different possible estimates to calculate an expected value instead of using a single value;

applying sensitivity analysis, simulation and Monte Carlo analysis; and

incorporating statistical models utilising discrete and continuous probability distributions.

Probability th ory

Characteristi s of a probability

A probability is ep esented by a ratio, usually in decimal form, between 0 and 1 (i.e. 100%).

This ratio is the p oportion of the number of favourable events to the total number of possible events and is determined by dividing the number of favourable events by the number of possible events.

Independent and dependent events

Two events are **independent** of each other when the occurrence of one event has no influence on the pr bability of the other event occurring.

Two events are **dependent** on each other when the occurrence of one event has an influence on the probability of the other event occurring.

Expected value

One of the most frequently used techniques involves the calculation of an expected value from various possible values, instead of using only one value.

Example:

A manager previously used R450 000 as a possible cash inflow in his calculations, but is now tempted to incorporate probability theory to determine the most likely outcome by calculating the expected value from optimistic, most likely and pessimistic values. He is of the opinion that the probabilities of various alternative revenue cash inflows are as follows:

Alternatives	Cashflows in R	Probability	Cashflows × Probability
Optimistic	600 000	10%	60 000
Most likely	450 000	65%	292 500
Pessimistic	300 000	25%	75 000
Expected value		**100%**	**427 500**

Therefore, R427 500 would be the more scientific estimate of the expected revenue inflow out of a range of possible outcomes than using the single most likely estimate of R450 000.

Decision trees

A decision tree is a diagrammatical representation of a decision-making pr blem.

Decision trees highlight the possible alternative actions as well as the events that may result if a particular decision should be made. The optimum alternative is deter ined by calculating the expected value in respect of each alternative.

The topics linear programming, sensitivity analysis, simulation, Monte Carlo analysis, probability theory, probability distributions (especially the normal distribution) and decision trees are usually covered under Management Accounting in textbooks and not under Financial Management. For a more comprehensive treatment of these topics please refer to textbooks on Management Accounting, and more specifically to decision-making.

6.8 Qualitative (non-financial) factors

Qualitative factors should of course also be taken into account, over and above the financial figures/ calculations, even if the project shows a positive NPV. For example, when evaluating whether to buy or not buy a new machine, the following factors should be considered –

the reliability of the machine;

its lifespan;

the availability of spare parts;

guarantees given;

technological improv m nts in the pipeline;

the reliability of suppliers;

the quality of the products manufactured;

growth in the ma ket for the products to be manufactured;

the choice of capital intensive versus labour intensive operations;

the availability of skilled staff;

envir nmental aspects like global warming, gas emissions and pollution;

s cial aspects like labour relations, job losses, housing and employee satisfaction;

ethical considerations like purpose of products manufactured;

good corporate governance like purchasing process; and

governmental aspects like legislation, by-laws and legal requirements.

In this regard special attention should be given to the so- called ESG (environmental, social and governance) principles, as well as Equator Principles. Equator Principles (EP) is a risk management framework, adopted by financial institutions for determining, assessing and managing environmental and social risk in projects. It is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making as pertain to project finance.

If involved in large projects, it is required that one should determine if it is consistent with Equator Principles, which can be viewed at http://www.equator-principles.com/index.php/about-ep/about-ep.

EP III was effective from 4 June 2013. Interestingly South Africa is not a designated country, meaning its policies are not deemed robust enough.

Examples:

In this regard, reflect on the impact of ESG and Equator Principles on the following:

Erecting a coal or nuclear power station in South Africa

Deciding between labour intensive or capital intensive operations in platinum mines

Implementing an e-tolling system in Gauteng

Allowing Aardgas cracking operations in the Karoo

Developing super building structures near the coast at Plettenberg Bay

- Implementing measures to safeguard beaches against oil leaking f ships

Manufacturing gasoline driven or more energy efficient automobiles

International capital budgeting

Foreign direct investment

The term **foreign direct investment** (FDI) is used for the establishment of new overseas facilities or the expansion of existing overseas facilities by an investor. The purpose of setting up subsidiaries abroad, include the location of new and/or growing markets, addressing the need for a sales organisation in another country, the opportunity to produce goods more cheaply, the need to avoid import controls, obtain access to raw materials and the availability of grants and tax concessions.

Alternatives to FDI include exporting and licensing of products or services.

Direct and indirect quotes of exchange rates

The exchange rate between currencies can be quoted 'directly' or 'indirectly'. This distinction is important in order to apply the purchasing power formulas correctly.

Direct quote: Example, from a South African perspective: $1 = R7,00.

Indirect quote: Example, from a South African perspective: R1 = $0,1429.

The international conv ntion is to place the stronger currency first. When comparing the Rand to the United States Dollar, South Africans will use direct quotation, whilst the USA would use indirect quotation. Both countries will therefore use the convention $1 = R7.

Pu chasing power parity and the impact on future currency exchange rates

Different *inflation rates* in different countries are the determining factor in what one would expect *spot rates* to be at a f t re date (purchasing power parity). (Note the spot rate is the immediate settlement rate.)

The expected future spot rate between two currencies can be determined as follows:

$$\text{Future sp t rate} = \text{Current spot rate} \times \frac{1 + i_f}{1 + i_h}$$

Where:

i_f is the rate of inflation in the foreign country i_h

is the rate of inflation in the home country

The spot rate is expressed as the relation foreign currency to *one* unit of home currency.

In certain cases it may be more practical to use the direct quotation method, and hence the formula to be applied is as follows:

$$\text{Future spot rate} = \text{Current spot rate} \times \frac{1 + i_h}{1 + i_f}$$

Where:

i_f is the rate of inflation in the foreign country i_h

is the rate of inflation in the home country

Example:

Assume the current spot rate between the USA Dollar ($) and the South Afric n Rand (R) is $1 = R7. The respective inflation rates for the foreseeable future are as follows:

RSA: 8%
USA: 3%

Required:

Calculate the expected spot rate in two years' time.

Solution:

$$\$1 = R7 \times 1{,}08^2/1{,}03^2$$

R7,70

The currency with the higher inflation rate must always lose value against the currency with the lower inflation rate.

International capital budgeting

There are basically two approaches to international capital budgeting:

Keep the currency cashflows in the foreign currency, and discount at a rate appropriate to that currency to obtain a NPV in the foreign currency. Convert this NPV into the home currency NPV using the spot rate of exchange.

Convert the currency cashflows from the project for each year into the home currency, and then discount at a local discount rate to generate a home currency NPV.

Of the two methods above, the first is the recommended approach. The reason for this is that there is already a considerable amount of unc rtainty involved in projecting future cashflows. By converting every year's cashflow into the home curr ncy, the uncertainty increases because now the home currency/foreign currency exchange rate at future dates must also be predicted.

Example:

A local company, XYZ Ltd, is investigating the viability of a project in the United Kingdom. The following information applies:

Projected cashflows:

Year	**0**	**1**	**2**	**3**
	£'000	**£'000**	**£'000**	**£'000**
Initial investment	(1 000)			
Net cashflow		500	600	700

Current spot rate: £1 = R12

Expected rate of inflation (United Kingdom): 2% per annum

Expected rate of inflation (South Africa): 8% per annum

Estimated risk adjusted foreign discount rate (applicable in the United Kingdom): 15%

Required:

Apply both approaches to international capital budgeting to determine whether the project should render a positive NPV in South African Rand.

Solution:

Approach 1: Maintain cashflows in the foreign currency

Year	0 £'000	1 £'000	2 £'000	3 £'000
Initial investment	(1 000)			
Net cashflow		500	600	700
	(1 000)	500	600	700

NPV at 15% = £348,730

= R4 184 762 using the current spot rate of R12.

Approach 2: Convert future foreign cashflow to predicted home currency

Year	0 £'000	1 £'000	2 £'000	3 £'000
Initial investment	(1 000)			
Net cashflow		500	600	700
Total	(1 000)	500	600	700
Expected exchange rate	R12	12,71	13,45	R14,24(1)
Cashflow	R'000	R'000	R'000	R'000
	(12 000)	6 353	8 072	9 971

NPV at 21,76%(2) = R4 184 762

R12 × $1,08^3/1,02^3$ – the purchasing power parity principle

1,15 × 1,08/1,02 – 1 = 21,76% – substituting the South African rate of inflation for the United Kingdom rate of inflation, while maintaining the project's real discount rate.

Practice questions

Question 6–1 *(Fundam ntal)* *30 marks 45 minutes*

Mr Kumalo's enterprise is onsidering replacing an existing machine with a tax value of R50 000 for a new, more efficient ma hine at a cost of R250 000. The old machine can be sold for R49 900 today or for R5 000 after five yea s. The estimated useful life of the new machine is five years, after which it will be sold for R50 000.

	Current (per annum)	New machine
Sales	R100 000	R140 000
C st f sales		
Variable	R56 000	R42 000
Fixed	R30 000	R30 000

Depreciation has not been included in the above costs. Interest repayment on the new machine will be R10 000 per annum. The enterprise will borrow 50% of the cash required at 16% from its bankers. The cost of capital is 14%.

The current tax rate is 28%; assume that there is a one-year lag in the payment of tax.

Also assume that the wear-and-tear for both the existing machine and the new machine is to be written off in full at the end of Year 1.

Required:
Determine whether the company should replace the existing machine, close down or continue production on the current basis.

Solution:

Investment evaluation:

Existing machine

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Opportunity cost: current realisable value forfeited	(49 900)						
Sale at end of life						5 000	
Working capital	0					0	
Cash flows		14 000	14 000	14 000	14 000	14 000	
Taxation **1**		(28)	10 080	(3 920)	(3 920)	(3 920)	(5 320)
Net cash in/outflow	(49 900)	13 972	24 080	10 080	10 080	15 080	(5 320)
Factor @ 14%	1,000	0,877	0,769	0,675	0,592	0,519	0,456
NPV pa	(49 900)	12 253	18 518	6 804	5 967	7 827	(2 426)
Total NPV	(957)						

1 Taxation:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Opportunity cost: Scrapping allowance not claimed **2**		100					
Tax recoupment on sale							5 000
Cash flows			14 000	14 000	14 000	14 000	14 000
Wear and tear **3**			(50 000)				
Taxable income		100	(36 000)	14 000	14 000	14 000	19 000
Taxation @ 28%		(28)	10 080	(3 920)	(3 920)	(3 920)	(5 320)

There is a tax lag of one y ar.

2 Taxation s rapping allowance **not** claimed by not selling: R50 000 – R49 900 = R100

3 Wear and tear % of investment: 100% in second year

New machine

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Investment	(250 000)						
Sale at end of life						50 000	
Working capital	0					0	
Ca h flows		68 000	68 000	68 000	68 000	68 000	
Taxation **1**			50 960	(19 040)	(19 040)	(19 040)	(33 040)
Net cash in/outflow	(250 000)	68 000	118 960	48 960	48 960	98 960	(33 040)
Factor @ 14%	1,000	0,877	0,769	0,675	0,592	0,519	0,456
NPV pa	(250 000)	59 636	91 480	33 048	28 984	51 360	(15 066)
Total NPV	(557)						

1 Taxation:

	YEARS						
	0	**1**	**2**	**3**	**4**	**5**	**6**
	R	**R**	**R**	**R**	**R**	**R**	**R**
Cash flows			68 000	68 000	68 000	68 000	68 000
Wear and tear **2**			(250 000)				
Tax recoupment on sale							50 000
Taxable income			(182 000)	68 000	68 000	68 000	118 000
Taxation @ 28%			50 960	(19 040)	(19 040)	(19 040)	(33 040)

There is a tax lag of one year.

2 Wear and tear % of investment: 100% in second year

Although the new machine reduces the loss by R400 (957 – 557), the existing machine should strictly speaking be sold since both alternatives yield a negative NPV. The negative value f R557 in respect of the new machine is however so insignificant, that other qualitative factors sh uld determine whether the new machine is purchased or the existing machine sold.

Notes:

Be careful that you don't omit a negative sign in the formulas, for example when calculating tax from taxable income.

Check that taxable income and taxation have opposite signs.

Wear and tear has a negative sign because it decreases taxable income.

In the case of the existing machine the current selling price of R49 900 is forfeited, therefore reducing inflows by R49 900, resulting in a negative inflow.

In the tax calculation of the existing machine the scrapping allowance of R100 is not claimed, therefore increasing the taxable income (accompanied by a positive sign).

Compare the above to example 2 in the keep versus replacement investment decision (section 6.5) where the tax recoupment of R10 000 has been *avoided*, therefore decreasing the taxable income (accompanied by a negative sign).

Question 6–2 *(Fundamental)* *40 marks 60 minutes*

Capstar Ltd is a mining company that is currently evaluating two independent projects.

The following financial and busin ss information is available:

	Capstar Ltd	**Similar quoted companies**
Market return	–	21,33%
Risk-f ee ate	8%	8%
Standa d deviation of returns	5%	4%
Correlation with similar companies	0,6	1
Target D:E ratio	4:6	4:6

Capstar Ltd is reluctant to take on both of the available projects; therefore the decision has been made to accept nly ne. The cashflows relating to each project, and the NPV calculated at different discount rates are as follows:

	Project A R'000	**Project B R'000**
Cashflows		
Year 0	(6 000)	(6 548)
1	1 500	8 000
2	2 000	4 000
3	3 000	–
4	3 000	(6 000)

NPVs

Discount rate	18%	+ R81	+ R40
Discount rate	20%	– R754	R Nil

Capstar's commercial manager favours Project A as it has a more consistent cashflow over the four-year period, although he does concede that Project B has a higher IRR of 20% compared to Project A.

The managing director also favours Project A, as he believes that the pay-back period is the important criterion in project evaluation. In addition, in view of the fact that Project B has a negative payment in Year 4, he is reluctant to accept Project B. He is also surprised that Project B has an IRR of 20%, since it clearly has a negative accounting return.

Assume no taxation.

Required:

Explain the meaning of the NPV and IRR measures. Outline the major comparative advantages and disadvantages of the two methods for the appraisal of investment pr jects. **(*12 marks*)**

Determine which project Capstar Ltd should accept and draw a diagram showing the NPV for each project at different discount rates. **(*18 marks*)**

(c) List the limitations of using the CAPM for capital budgeting decisions. **(*5 marks*)**

Explain the significance of the SML and how one would use it for an investment appraisal exercise. **(*5 marks*)**

Solution:

NPV and IRR are often referred to as discounted cashflow techniques as they focus on cashflow rather than profit.

NPV assumes that –

investors are rational;

investors seek to maximise their wealth in terms of cash;

capital markets are perfect; and

investors are risk-averse.

The assumption that capital markets are perfect does not hold in the real world, due to uncertainty. Perfect capital markets imply that future outcomes and events are known and the capital market rate would reflect the future outcomes. NPV also assumes that the risk of a particular project can be identified and reflected in the appropriate discount rate. Real-world situations show that risk cannot be identified accurately.

The NPV is the present value of future returns discounted at the company's cost of capital minus the cost of the investment. For independent investments, if the NVP is positive, the project should be accepted; if it is negative, the project should be rejected. If two projects are mutually exclusive, the one with the higher NPV index should be chosen. When a company accepts a project with a positive NPV, the value of the company increases by that amount. Therefore, the NPV method chooses projects to maximise share val e.

N te: The discount rate used in all NPV appraisals assumes that all cash received before the end of the project can be re-invested at the discount rate.

The IRR is the interest rate that equates to the present value of the expected future cashflows or receipts to the initial cash outlay. The IRR formula is the same as the NPV formula, except that it sets the NPV at nil and solves for the discount rate. The IRR must be found by trial and error unless the expected cashflows are equal and can be treated as an annuity. For independent projects, if the IRR is greater than the WACC, the value of the company increases and the project should be accepted. If it is equal to the WACC, the company breaks even, and if the IRR is less than the WACC, the project should be rejected. If two projects are mutually exclusive, the one with the higher IRR should be accepted.

The IRR has few real advantages over the NPV, but the following might be claimed:

There is no need to precisely calculate the cost of capital of the project. Nevertheless, some estimate is required to compare against the IRR.

Managers find IRR easier to understand.

The disadvantages of IRR include:

IRR can signal incorrect rankings for mutually exclusive projects.

Decisions based on percentage returns (as with IRR) can be misleading.

IRR can be difficult to interpret when a project has multiple IRRs, whereas NPV gives a clear indication of a project's acceptability.

The NPV method assumes that interim cashflows are reinvested at the cost of capital, whereas the IRR method assumes that they are reinvested at the IRR. The former assumption is theoretically correct.

NPVs are additive when combining projects, but IRRs are n t.

For independent projects with conventional cashflows, IRR and NPV will signal the same decisions, provided that no capital rationing exists.

Calculating the WACC for Capstar Ltd

$$\beta = Cor_{im} \frac{\sigma_i}{\sigma_m}$$

$$= 0{,}6 \times \frac{0{,}05}{0{,}04} = 0{,}75$$

$$R = R_f + \beta_i (R_m - R_f)$$

$$= 8\% + 0{,}75 (21{,}33\% - 8\%) = 18\%$$

Weighted average cost of capital

$$(8\% \times \frac{4}{10}) + (18\% \times \frac{6}{10}) = 14\%$$

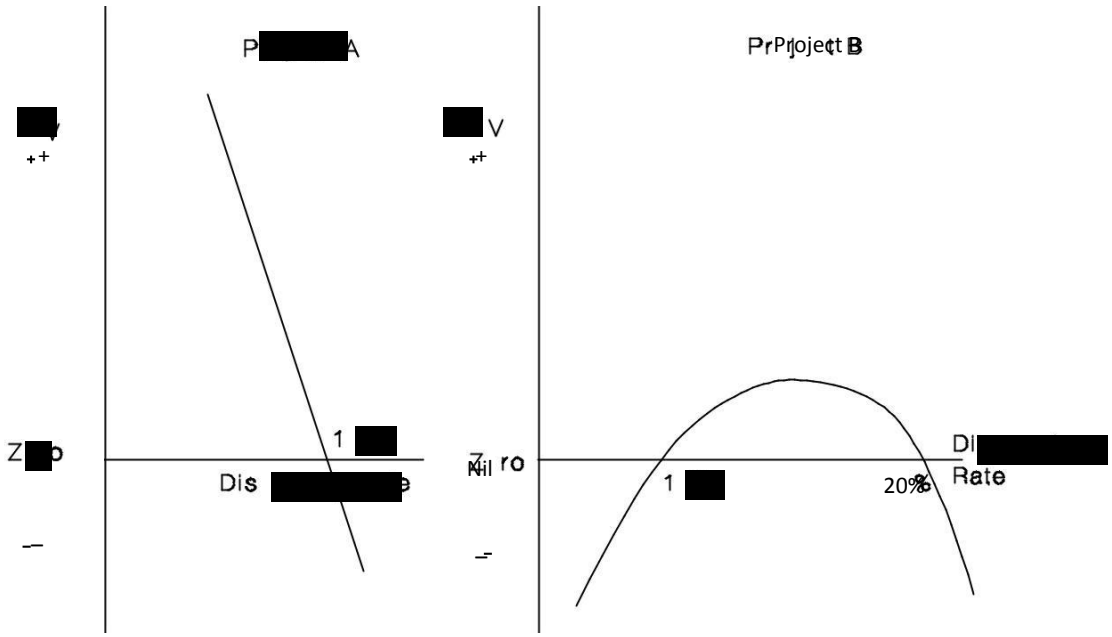
Discounting both projects at 14% results in the following:

Discount rate 14%		**Project A**	**Project B**
Year	**PV Factor**	**R'000**	**R'000**
0	1	(6 000)	(6 548)
1	0,877	1 315,5	7 016
2	0,769	1 538	3 076
3	0,675	2 025	–
4	0,591	1 773	(3 546)
		+ 651,5	– 2

Project A has an IRR of +/– 19%. Project B has two IRRs of 14% and 20% respectively. Where the WACC falls between 14% and 20%, Project B will show a positive NPV.

As Pr ject A shows a higher NPV than Project B at the company's WACC, Project A should be accepted.

Diagrammatic representation of NPV at different discount rates



Limitations of using CAPM for capital budgeting d cisions

In using the rate determined from the SML to evaluate a project, one is assuming that the β, risk-free rate and the expected market return will remain constant over the life of the project.

The assumptions of the CAPM model, especially 'borrowing and lending can be made at the risk-free rate'.

Tax implications change for different categories of investors.

Risk is regarded as an increasing function over time (i.e. risk is compounded over time).

The SML is a line that joins the risk-free rate to the market portfolio and beyond. The market represents a portfolio of all available securities with a given average yield and a given average systematic risk equal to a β value of one. All securities on the SML line are efficient and yield a return that equates to their co-variance with the market return.

Shares with β values greater than one are termed 'aggressive shares' because they can be expected to fluctuate more than the all-share index return, both upwards and downwards.

All securities above the SML line out-perform the market, while all shares below the SML line are inefficient and und r-p rform the market. It must however be noted that returns above or below the SML line are in temporary dis quilibrium.

Question 6–3 *(Fundamental & Intermediate)* *40 marks 60 minutes*

(England & Wales 1981)

Stadler is an ambitio s young executive, who has recently been appointed to the position of Financial Director of Paradis Ltd, a small listed company. Stadler regards this appointment as a temporary one, enabling him to gain experience before moving to a larger organisation. His intention is to leave Paradis Ltd in three years' time, with its hare price standing high. As a consequence, he is particularly concerned that the reported profits of Paradis Ltd hould be as high as possible in his third and final year with the company.

Paradis Ltd has recently raised R350 000 from a rights issue, and the directors are considering three ways of using these funds. Three projects (A, B and C) are being considered, each involving the immediate purchase of equipment costing R350 000. Only one project can be undertaken. The equipment for each project will have a useful life equal to that of the project, with no scrap value. Stadler favours Project C, because it is expected to show the highest accounting profit in the third year. However, he does not wish to reveal his real reasons for

favouring Project C; therefore, in his report to the chairman, he recommends Project C because it shows the highest IRR. The following summary is taken from his report:

	Net cashflows (R'000) Years									Internal rate of return
Project	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**%**
A	– 350	100	110	104	112	138	160	180	–	27,5
B	– 350	40	100	210	260	160	–	–	–	26,4
C	– 350	200	150	240	40	–	–	–	–	33,0

The chairman of the company is accustomed to projects being appraised in terms of payback and ARR, and he is consequently suspicious of the use of IRR as a method of project selection. Accordingly, he has asked for an independent report on the choice of project. The company's cost of capit l is 20% nd a policy of straight-line depreciation is used to write off the cost of equipment in the financial st tements.

Required:

(a) Calculate the payback period for each project. [Fundamental] (***5 marks***)

(b) Calculate the accounting rate of return for each project. [Fundamental] (***8 marks***)

Prepare a report for the chairman with supporting calculations indicating which project should be preferred by the ordinary shareholders of Paradis Ltd. [Funda ental] (***19 marks***)

(d) Discuss the assumptions about the reactions of the stock arket that are implicit in Stadler's choice of Project C. [Intermediate] (***8 marks***)

Note: Ignore taxation.

Solution:

Payback period for each project, that is time taken to repay original outlay of R350 000

Project A	**R'000**
Cash in first 3 years	314
Balance required	36
	350
Cash in 4th year	112

Payback = 3 years + 36 / 112 years = 3,32 years

Project B

Cash in first 3 years = R350 000
Payback = 3 years

Project C

Cash in first 2 years = R350 000
Payback = 2 years

(b) ARR for each p oject

			Project A R'000	**Project B R'000**	**Project C R'000**
T tal cashfl w			904	770	630
Less: T tal depreciation (no scrap value)			350	350	350
Total accounting profit			554	420	280
Project life (years)			7	5	4
Average profit per year	(**R'000**)	(1)	79,14	84	70
Average capital employed	$\frac{(350)}{2}$	(2)	175	175	175
ARR [(1) divided by (2)]			45,2%	48%	40%
Alternatively, ARR could be computed as average profit divided by initial capital employed, giving)			22,6%	24%	20%

To: P Aranoid Esq.
Chairman, Paradis Ltd

From: A Shrink & Co, Financial Consultants

Report on the choice of capital investment project to be financed by proceeds of recent rights issue

Terms of reference

To provide an independent report on which of three projects, A, B and C, should be preferred by the ordinary shareholders of Paradis Ltd.

Introduction

This report examines the strengths and weaknesses of various project ppr is l techniques which are in common use, determines how the three projects stand up in the light of e ch method, and reaches a conclusion about the best choice of project.

Conclusion:

It is recommended that the NPV method of project appraisal sh uld be used. On this basis, Project A appears to be the best, being marginally better than Project B. However, it is suggested that further investigations into the uncertainty of the cashflow esti ates for Projects A and C are undertaken.

Traditional appraisal methods

Since you are familiar with both the payback and the ARR methods, this report deals immediately with their advantages and limitations.

Payback

The payback method is easy to calculate and to understand. It is useful as it shows how long investors have to wait before their initial investment is repaid. Given that no future results are known with certainty, it gives investors an idea of how long their money will be at risk, and since uncertainty usually tends to increase the further into the future one looks, a short payback period is taken to mean low risk as well as quick returns.

The weakness of using the payback method in isolation is that it does not in any sense measure profitability or increase in investor wealth.
For example, refer to the payback periods of Projects A, B and C (in part (a) of the Appendix* to this report).
Project C has the shortest payback period, and Project A has the longest.
However, the cashflows of Project A last much longer than those of Project C, which may make Project A more profitable in the long run.

ARR

This method giv s a measure of relative project profitability by comparing the average accounting profit per annum oming from the project with the average capital employed in it. Its advantages are that it is relatively easy to understand, it measures profitability of returns compared with outlay, and it gives an indication of whether the company's target return on capital employed is exceeded.

Its main weaknesses are:

It pays no attention to the **timing** of project returns. Cash received at an early stage is more valuable than the same cash received in a few years' time, because it can be reinvested to earn interest. For example, Project C returns cash very quickly compared with Project B, but this effect is lost in the pr cess of averaging profits. Thus Project B has a higher ARR than Project C, even though its IRR (see later) is lower.

It is a relative rate of return, rather than an absolute measure of gain in wealth. All rate of return methods ignore the **size** of the project.

The timing of the cashflows is important because early cash can be reinvested to earn interest.

The technique of discounting reduces all future cashflows to equivalent values now (present values) by allowing for the interest which could have been earned if the cash had been received immediately.

There are two possible techniques, that is NPV and IRR.

NPV

This is simply the net of the present values of the project cashflows after allowing for reinvestment at the company's 'cost of capital' (i.e. the average required return (ARR), which is set by the market for the company's operations considering the risk of those operations).

Provided that the project is of average risk for the company, and that there is no shortage of capital, the NPV gives a best estimate of the total increase in wealth which accrues to the shareholders if the project is accepted. This should be reflected in an increased market value of the shares.

NPV computations are attached as an Appendix* to this report. On this basis, Project A gives the greatest increase in shareholder wealth.

IRR

This is defined as the discount rate which gives the project a NPV of nil. When looking at a single project, the IRR will give the same decision as the NPV (i.e. if the project's NPV is greater than nil, its IRR is higher than the cost of capital).

However, the IRR can give an incorrect signal when it is necessary to rank projects in order. Like all rate of return methods, it ignores the size of the project, and thus the abs lute gain in wealth to come from it. For example, Project C has the highest IRR, but although the original outlay is as high as that of the other two projects, it returns most of that outlay after one year, and thereafter effectively becomes a smaller project with a high rate of return.

The IRR also makes an incorrect assumption about the rate at which cash surpluses can be reinvested. It assumes they are reinvested at the IRR. For xampl , it assumes that cash from Project C can be reinvested at 33%, but cash from Project A is r inv st d at 27,5%. Both of these assumptions are wrong: the 20% cost of capital figure is more appropriate. The I R is therefore not good for comparing projects.

The best appraisal method

Given the arguments above, the best appraisal method is the NPV approach, because it takes the time value of money into account in a way that indicates the absolute gain which will be made by shareholders as a result of accepting the project.

On this basis, Project A should be accepted, with Project B just second. However, it should be noted that there are many other factors that affect the decision which have been left out of this report. The most obvious of these is an assessment of project risk. For example, it may be that Project A is regarded as riskier than Project C, simply because it takes longer to pay back. It can then be argued that Project A should be discounted at a higher rate than Project C. This may give it a lower NPV than that of Project C.

We must therefore recommend that further analysis is made of the uncertainty attached to the cashflows of Projects A and C.

Important: ***As the proj cts are of unequal lives, it is assumed that cash available from Projects B and C can be re-inv st d at the company's WACC of 20% up to the end of Year 7.***

Equivalent annual annuity

If Projects A, B and C an be continuously replaced in the future, the correct project comparison is to restate the NPV as an equivalent annual annuity. The company would be indifferent between the NPV for the projects and the annuity in such a situation.

Project	**A**	**B**	**C**
Life (years)	7	5	4
Disc unt rate	20%	20%	20%
Annuity factor	3,59	2,98	2,58
NPV	81,4	62,8	77,9

U ing formula NPV / PF(Annuity) + r, then:

Annuity	113,37	105,37	150,97
Ranking	2	3	1

The equivalent annual annuity method will tend to favour projects with high IRRs.

*** Appendix: Project NPV**

Year	20% factor	Project A	PV	Project B	PV	Project C	PV
0	1,00	(350)	(350,0)	(350)	(350,0)	(350)	(350,0)
1	0,83	100	83,0	40	33,2	200	166,0
2	0,69	110	75,9	100	69,0	150	103,5
3	0,58	104	60,3	210	121,8	240	139,2
4	0,48	112	53,8	260	124,8	40	19,2
5	0,40	138	55,2	160	64,0		
6	0,33	160	52,8				
7	0,28	180	50,4				
			81,4		62,8		77,9

Stadler's assumptions about the reactions of the stock market

Stadler's real reason for selecting Project C is that it will increase the company's profits in Years 1, 2 and 3 by a greater amount than the other projects. He is therefore assuming that historical reported profits are the chief determiners of share prices.

However, the 'efficient market hypothesis' states that share prices adjust very swiftly and correctly to all new information. Of the three forms of 'efficient market hyp thesis', two are worth discussing here.

The 'strong' form of the efficient market hypothesis states that share prices adjust very swiftly to all new relevant information, both public and private. If this form were true, then, as soon as the new project was accepted, the company's shares would speedily reflect the expected gain from the NPV of the project. Subsequent reported profits would only affect share pric s if they were different from expectations.

The 'semi-strong' form of the efficient market hypoth sis says that share prices adjust very swiftly to all new relevant information which is made public. Whether the share price reflects the NPV of the new project depends on whether the project forecasts are released.

Empirical evidence tends to confirm the 'efficient market hypothesis' in its 'semi-strong' form, but not in the 'strong' form. Stadler must therefore be taking one of two positions:

Either (**a**) he is ignorant of or does not believe the efficient market hypothesis

Or (**b**) he does not believe any information about the project will find its way onto the market until the reported accounting results are realised.

Although it is unlikely that detailed cash-flow forecasts will be published by the company, it will probably announce details of the nature of the project fairly soon after making the decision to start it. From this, investors will soon be able to make predictions of the project's lifespan. In a market where 50% of shares are in the hands of institutions that make it their business to analyse information, Stadler's hope that the market will not know at Year 3 that the project is virtually finished is very unlikely to be fulfilled.

Question 6–4 *(Int rm diat)* *40 marks 60 minutes*

Trident Ltd manufactur s a single product called 'Gino'. The company uses absorption costing as a basis for valuing its sto k of finished goods. Based on its production of 100 000 units in 20X0, the manufacturing costs per unit are as follows:

	R
Raw materials	10
Labo r	12
Overheads	8
	30

The above costs exclude depreciation.

The Management Accountant has estimated that the production costs excluding depreciation at a production evel of 150 000 units would be as follows:

	R
Raw material	1 500 000
Labour	1 550 000
Overheads	950 000
	4 000 000

Trident Ltd sold 100 000 units of Gino in 20X0 and the demand for the product is expected to rise by 10 000 units per annum for the next five years.

Trident is considering replacing the existing machine with a larger, more efficient machine that can keep pace with demand.

Details of the existing and new machine are as follows:

	Existing machine	**New machine**
Cost	1 000 000	2 000 000
Book value	400 000	–
Tax value	200 000	–
Market value	700 000	2 000 000
Value at the end of remaining life	200 000	500 000
Remaining useful life	5 yrs	5 yrs
Annual depreciation	100 000	200 000
Annual machine capacity	4 000 hours	4 000 hours
Machine production time per unit	2 minutes	1 minute

The selling price per unit of Gino is set by the market at R30 per unit, and no sales price increase is anticipated. Manufacturing costs are expected to remain the same over the next five years for the existing machine. The new machine is less labour-intensive and a saving of R5 per unit is expected. Fixed costs will, however, increase by R200 000 per annum.

The existing and new machines are used in a proc ss r gard d by the SARS as being in the process of manufacture and are written off on a straight-line basis of 20% p r annum.

Trident Ltd believes that the product will become obsolete after five years, as new technology will make the current product unmarketable. The division manufacturing the Gino is one of several divisions within the Trident group.

The group is currently financed through debt and equity as follows:

		R
Issued share capital	1 000 000 shares	500 000
Debt capital	21% (indefinite)	4 000 000

The current market value of the shares is 6 per share.

Dividends have been growing at 8% and the latest dividend paid was 60c per share. Should the company purchase the new machine, it will be financed with long-term debt at a current cost of 20%.

Current company tax rate is 40%.

Assume that the purchase of the new machine or the sale of the existing machine will take place at the beginning of the financial y ar. All other transactions will take place at the end of the year. There is no tax lag.

Required:

Evaluate the investment options available to the company and write a report to management advising them on what course of action they should follow. This report must state clearly the assumptions made.

Solution:

REPORT TO: Management

FROM:

DATE:

I have evaluated the replacement of the existing machine used in the manufacture of Gino and would advise the company to consider replacing the existing machine.

Alternatives available to the company –

keep the existing machine; or

scrap the existing machine and acquire the new machine; or

stop production altogether.

Keep the existing machiness

The returns offered by retaining the existing machine are a negative of R32 760. The discount rate of 16% used to evaluate the investment assumes that the current WACC of the company at market value reflects the long-term capital structure for Trident. The existing machine does not offer the required 16% and the company would be better off scrapping it. A proviso, however, is that the R1 000 000 fixed costs will be eliminated. Should the R1 000 000 fixed costs continue to be incurred by the company, then keeping the existing machine is a better option.

Scrap the existing machine and acquire the new machine

My evaluation of acquiring a new machine to replace the existing machine shows that the projected cashflows will increase by a present value amount of R86 030. The new machine yie ds an NPV of R53 270, which shows that the company will make a return in excess of 16%.

My advice to purchase the new machine assumes, however, that s les will increase by 10 000 units per annum. The increased annual cashflows resulting from the increased sales of 10 000 units per annum are R150 000. If the anticipated increase of 10 000 units does not materialise, a substantial loss will occur.
Further, the new machine is under-utilised; therefore the company should investigate the possibility of utilising the machine to its full potential by manufacturing s me ther pr duct, if possible.

The company has decided to finance the new machine thr ugh the use f debt capital which indicates that the company probably has the capacity to increase its gearing without an increased return being required by the equity shareholders. If this is the case, then the target WACC may be lower than 16%, which would reduce the overall risk of acquiring the new machine.

Stop production altogether

The opportunity cost of stopping production altog th r is + R500 000. This option should only be considered if the fixed costs are specific to the existing machine and the risk of taking on the new machine is high on the basis of uncertainty in increased sales levels.

Calculations:

Cost determination

Utilising the high-low method:

			Marginal	V/C	F/C
Units	100 000	150 000	50 000		
Raw materials	1 000 000	1 500 000	500 000	10	–
Labour	1 200 000	1 550 000	350 000	7	500 000
Overheads	800 000	950 000	150 000	3	500 000
				20	1 000 000

Machine capacity

Existing 4 000 × 60 ÷ 2 = 120 000 units

New 4 000 × 60 ÷ 1 = 240 000 units

WACC

Equity

Market val e R6 × 1 000 000 = R6 000 000

Share-holders' req ired return k_e

$$MV = \frac{D_1}{k_e - g}$$

$$6 = \frac{60\,(1 + 0{,}08)}{k_e - 0{,}08}$$

$$k_e = \frac{0{,}648 + 0{,}48}{6}$$

0,188 or 18,8%

Debt

Market value $= \frac{21\% \times 60\% \times 4\,000\,000}{20\% \times 60\%}$

$= 4\,200\,000$

$k_d = 20\% \times 60\%$

$= 12\%$

WACC

	MV	Cost	WACC
Equity	6 000 000	18,8%	11,06%
Debt	4 200 000	12%	4,94%
	10 200 000		16,00%

Current machine

Contribution R30 – R20 = R10 per unit

Fixed costs = R1 000 000

Annual after-tax revenue

Year	Units		Contribution fixed cost		After tax		
1	110 000 × 10	=	1 100 000 – 1 000 000	=	100 000 × 60%	=	60 000
2	120 000 × 10	=	1 200 000 – 1 000 000	=	200 000 × 60%	=	120 000
3	120 000 × 10	=	1 200 000 – 1 000 000	=	200 000 × 60%	=	120 000
4	120 000 × 10	=	1 200 000 – 1 000 000	=	200 000 × 60%	=	120 000
5	120 000 × 10	=	1 200 000 – 1 000 000	=	200 000 × 60%	=	120 000

NPV calculation

Year			Value	PV 16%	NPV
0	Opportunity cost		(700 000)	1	(700 000)
0	Opportunity – recoupment	500 000 × 40%	200 000	1	200 000
1	Wear-and-tear	200 000 × 40%	80 000	0,862	68 960
5	Sell asset		200 000	0,476	95 200
5	Recoupment on sale	(200 000 × 40%)	(80 000)	0,476	(38 080)
1	Cash from Gino sales		60 000	0,862	51 720
2	Cash from Gino sales		120 000	0,743	89 160
3	Cash from Gino sales		120 000	0,641	76 920
4	Cash from Gino sales		120 000	0,552	66 240
5	Cash from Gino sal s		120 000	0,476	57 120
					(32 760)

New machine

Contribution R30 – (R20 – R5) = R15

Fixed costs R1 000 000 + 200 000 = R1 200 000

Annual after-tax revenue

Year	Units		Contribution fixed cost				After tax
1	110 000 × 15	=	1 650 000 – 1 200 000	=	450 000 × 60%	=	270 000
2	120 000 × 15	=	1 800 000 – 1 200 000	=	600 000 × 60%	=	360 000
3	130 000 × 15	=	1 950 000 – 1 200 000	=	750 000 × 60%	=	450 000
4	140 000 × 15	=	2 100 000 – 1 200 000	=	900 000 × 60%	=	540 000
5	150 000 × 15	=	2 250 000 – 1 200 000	=	1 050 000 × 60%	=	630 000

NPV calculation

Year			Value	PV 16%	NPV
0	Purchase of asset		(2 000 000)	1	(2 000 000)
1	Wear-and-tear	400 000× 40%	160 000	0,862	137 920
2	Wear-and-tear	400 000× 40%	160 000	0,743	118 880
3	Wear-and-tear	400 000× 40%	160 000	0,641	102 560
4	Wear-and-tear	400 000× 40%	160 000	0,552	88 320
5	Wear-and-tear	400 000× 40%	160 000	0,476	76 160
5	Sale of asset		500 000	0,476	238 000
5	Recoupment	(500 000× 40%)	(200 000)	0,476	(95 200)
1	Cash from Gino sales		270 000	0,862	232 740
2	Cash from Gino sales		360 000	0,743	267 480
3	Cash from Gino sales		450 000	0,641	288 450
4	Cash from Gino sales		540 000	0,552	298 080
5	Cash from Gino sales		630 000	0,476	299 880
					+ 53 270

Question 6–5 *(Advanced)* *45 marks 68 minutes*

(SAICA 1995)

Roebuck Ltd is listed in the clothing, footwear and textile sector of the Johannesburg Stock Exchange. The company specialises in comfortable sports clothing and manufactures a fairly wide range, which it distributes through a network of stores.

The company is considering expanding its product range to include sports shoes. The marketing department estimates that 7% market share is attainable in the first year. With aggressive marketing, the market share is expected to grow by approximately 4% (of the total market) annually. The research team believes that the market share of the company will not exceed 20% at any time.

The following are extracts from a report prepared by the marketing department in collaboration with other departments:

1 Cost structure

	R
Variable manufacturing costs per unit produced	20
Fixed manufacturing costs per annum	850 000
Fixed sales costs per annum	600 000
Variable sales costs per unit sold	8

Fixed manufacturing costs include depreciation on machinery at 15% per annum, determined on the straight-line m thod, and r ntal of R600 000 per annum for additional factory buildings. Since the sports shoes will be sold in xisting stores, 60% of the fixed sales costs comprises apportioned rental of the existing stores.

The machinery used in the manufacture of the shoes will cost R1 million and will have no value after five years.

Turnover in the footwear industry for the 20X4 calendar year was estimated as follows:

Number of pairs	700 000
Val e	R43 680 000

It is estimated that 40% of the volume relates to sports shoes.
The f twear market is estimated to grow at a rate of 4% per annum.
Sports hoes are, on average, 10% more expensive than other shoes.

Financing costs

Mr McIntosh, the financial director, calculated the pre-tax cost of financing for Roebuck Ltd as follows:

	%
Ordinary shareholders' equity	20
Preference shares	9
Long-term loan	14
Debentures	12

Capital structure

The following is an extract from the audited Balance Sheet of Roebuck Ltd at 30 June 20X4:

Capital employed:	**R'000**
Ordinary shares of R2,00 each	100 000
Retained income	47 000
12% preference shares of R2,50 each	10 000
	157 000
Debentures bearing interest at 12% per annum	7 000
Long-term loan bearing interest at 16% per annum	20 000
Deferred taxation	6 000
	190 000

The ordinary shares and preference shares currently trade at R2,35 and R2,65 per share respectively. The long-term loan is repayable after eight years. Current interest rates on loans approximate 14% per annum.

Trademark

Preliminary discussions have been held with an American sports shoe manufacturer to acquire the right to use their trademark exclusively in South Africa. The cost of acquiring the right of use is expected to amount to R2,5 million, payable in advance.

The right of use can be sold and is expected to retain its arket value at that level.
The SARS has indicated that the trademark could be writt n-off over four years.

An additional R300 000 will have to be invested in net working capital.

According to Mr McIntosh, the company will still have taxable income after taking any additional tax charges and allowances arising from the project into account.

The Directors of Roebuck Ltd have approached an accountant to assist them with the decision regarding diversification.

During the accountant's preliminary investigation, he holds discussions with Mr Pienaar, the marketing director, who reacts as follows to the suggestion that a NPV calculation will be necessary:

'I cannot understand why, in addition to a profit analysis of the project, a further NPV calculation is also necessary. If the project generates profit, it will have to be acceptable on the basis of the NPV method. I always maintain that as long as we make a profit, we keep the shareholders happy, and this project will make a profit.'

Required:

(a) Determine an appropriate discount rate for the NPV calculation. **(*10 marks*)**

Determine whether Roebuck Ltd should proceed with the planned diversification assuming that production will ommen e on 30 June 20X5. **(*22 marks*)**

(c) Discuss any other factors that should be taken into consideration in assessing the project. **(*8 marks*)**

(d) Discuss the statement made by Mr Pienaar. **(*5 marks*)**

Calculations sho ld be to the nearest R'000.

For the purp ses of the analysis, assume an effective tax rate of 40% and use a five-year planning period. The effect f inflati n need not be considered.

Solution:

WACC

There is no information in the question about the target WACC for a company such as Roebuck Ltd. The ccountant will therefore assume that the current weighting of D:E at market value is representative of the target WACC.

Ordinary shares

Required return		20%
Value	50 000 × R2,35	= R117 500

Preference shares

Required return		9%
Value	$\frac{10\,000}{2,50}$ × R2,65	= R10 600

Long-term loan

Required return	14% × 60%	= 8,4%

Value

Annual interest after tax	20 000 × 16% × 60%	= 1 920
Capital at the end of	8 years	= 20 000
After tax interest rate	14% × 60%	= 8,4%
8-year annuity at	8,4%	= 5,6603
PV at Year 8 at	8,4%	= 0,5245
Present value	= (1 920 × 5,6603) + (20 000 × 0,5245)	
	= R21 358	

Debentures

Required return	12% × 60%	= 7,2%
Value		R7 000

WACC

	Market value	**% weighting**	**Cost %**	**Weighted cost**
Ordinary shares	117 500	75,1	20,0	15,02
Preference shares	10 600	6,8	9,0	0,61
Long-term loan	21 358	13,7	8,4	1,15
Debentures	7 000	4,4	7,2	0,32
	156 458	100		17,10

Consideration may be given to adjusting the calculated WACC of 17,10% to allow for a new product that is similar to current products manufactured, but competing in a different sector. It may be argued that the new product will increase the risk of the company.

In the accountant's opinion, a discount rate of 17% is considered appropriate.

Investment decision as at 30 June 20X5

Workings	**Selling price (Note 3)**
Number of pairs	700 000
40% sports	280 000
60% other	420 000

As spo ts shoes a e on average 10% more expensive, the equivalent number of sports shoes is:

	280 000 + (10% × 280 000)	= 308 000
Therefore eq ivalent total	420 000 + 308 000	= 728 000
Selling per nit	R43 680 000 ÷ 728 000	= R60
Theref re sports shoes	R60 + (10% × R60)	= R66

C ntributi n (Note 1)

	R
Se ling	66
Variable manufacturing	20
Variable selling	8
Contribution	38

Fixed costs

	R	
Fixed manufacturing cost	850 000	
Less: Depreciation	(150 000)	(i.e. 1 000 000 × 15%)
Net	700 000	
Selling costs	600 000	
Less: Allocated	(360 000)	
Net	240 000	
Total fixed costs	R940 000	

Market share (Note 3)

Total market	4% growth	½ Year
20X4	280 000	
20X5	291 200	145 600
20X6	302 848	151 424
20X7	314 962	157 481
20X8	327 560	163 780
20X9	340 663	170 332
20X10	354 289	177 144

Roebuck Ltd Sales

					Total contribution
20X5/X6	145 600 + 151 424	= 297 024 × 7%	= 20 791 × 38	=	790 058
20X6/X7	151 424 + 157 481	= 308 905 × 11%	= 33 980 × 38	=	1 291 240
20X7/X8	157 481 + 163 780	= 321 261 × 15%	= 48 189 × 38	=	1 831 182
20X8/X9	163 780 + 170 332	= 334 112 × 19%	= 63 481 × 38	=	2 412 278
20X9/20X10	170 332 + 177 144	= 347 476 × 20%	= 69 495 × 38	=	2 640 810

Investment decision

			17%		R
Year 0	Investment		(1 000 000)	1	(1 000 000)
Year 0	Trade mark		(2 500 000)	1	(2 500 000)
Year 0	Working capital		(300 000)	1	(300 000)
Year 5	Trade mark		2 500 000	0,4561	1 140 250
Year 5	Working capital		300 000	0,4561	136 830
Year 1	Contribution/Tax	(790 058 × 60%)	474 035	0,8547	405 158
Year 2	Contribution/Tax	(1 291 240 × 60%)	774 744	0,7305	565 950
Year 3	Contribution/Tax	(1 831 182 × 60%)	1 098 709	0,6244	686 034
Year 4	Contribution/Tax	(2 412 278 × 60%)	1 447 367	0,5337	772 460
Year 5	Contribution/Tax	(2 640 810 × 60%)	1 584 486	0,4561	722 684
Year 1–5	Fixed osts/Tax	(940 000 × 60%)	(564 000)	3,199	(1 804 236)
Year 1–5	Wear-and-tear	200 000 × 40%	80 000	3,199	255 920
Year 1–4	Trade mark	625 000 × 40%	250 000	2,743	685 750
Year 5	Trade mark Recoupment	(2 500 000 × 40%)	(1 000 000)	0,4561	(456 100)
		NPV			(689 300)

As the project yields a negative NPV of R689 300, it should not be accepted.

Financial risk

The company must assess whether the financial risk of the company will be increased or decreased by taking on the new project. A reduction in financial risk may decrease the required return, while an increase in financial risk will increase the required return.

Product risk

It may be argued that the new product is not in the same line of business as existing activities and that it will therefore increase the risk to the company. However, one may argue that risk is reduced through

diversification. It is important to note, however, that it is the shareholders that should diversify, not the company. No benefits resulting from the use of current structures such as transport, advertising, increased sales of existing products etc. have been accounted for. It is possible that such synergies will reduce costs. The information also assumes that the life of the product is only five years and that the asset purchased will have a nil value at the end of five years. An increase in product life, together with a positive value for the assets, will reduce the negative NPV.

The estimated future sales of the shares excludes the effects of inflation. Consideration should be given to increasing the future sales by an inflation-adjusted figure. The accountant also assumes that there are no opportunity costs involved in manufacturing the new product. It is possib e that by producing the new product, the company is foregoing other opportunities, in which case the negative NPV will be increased.

(d) Mr Pienaar's statement that a positive annual profit is giving the sh reholder n increased return ignores the following points:

A new investment will increase the business risk, and possibly the financial risk. The shareholders and debt-holders will therefore require compensation for such risk by way of a return equal to k_e for shareholders and k_d for debt-holders. The WACC disc unt rate takes into account such required return, and a negative NPV of R689 300 means that the investment does not yield an acceptable return.

(ii) Accounting profits ignore the time value of oney. Future cashflows are worth less than current cashflows, due to inflation.

Accounting profits can be substantially different to actual cashflows, depending on the accounting policy used.

Question 6-6 *(Intermediate)* *40 marks 60 minutes*

Maranta Ltd is a profitable company and is currently evaluating a project that, if accepted, will potentially increase sales and profit.

The management of Maranta has asked you to advise it on the ideal capital structure for the company, the desirability of accepting the project and how the project, if accepted, should be financed.

Statement of Financial Position: Maranta Ltd as at 31 July 20X1:

Assets	**R'000**
Non-current assets	
Property, plant and equipment	7 600
Current assets	
Inventory	800
Accounts receivable	600
Short term investments	1 000
Total assets	**R10 000**
Equity and liabilities	
Capital and reserves	
Issued capital (**Note 1**)	2 400
Accumulated profits	3 600
N n-current liabilities	
Long-term loans (**Note 2**)	2 100
Preference shares (**Note 3**)	900
Current liabilities	
Accounts payable	500
B nk overdraft	500
	R10 000

The following information is also available:

Issued share capital represents shares issued at R10 par value. The shareholders' required rate of return is 23,125% and a dividend of 484 cents per share has been paid. Dividends have been growing at 8% and are expected to continue to do so in the foreseeable future.

The long-term loan matures in three years' time. Interest after tax for the year ended 31 July 20X1 was R187 500.

Preference shareholders have recently been paid their fixed annual dividend of R62 500. Preference shares are indefinite, have no conversion rights and trade at a market required return of 12,5%.

Project information

Project cost is R1 800 000, payable at the start of the project.

Project life is 4 years.

Project assets will be sold for R400 000 at the end of f ur years.

(d) SARS will allow Maranta Ltd to write-off the full cost f the pr ject equally over two years (ie at the end of years 1 and 2).

(e) Short-term investments valued at R500 000 will be sold at the beginning of the year. The funds generated will be used to partly finance working capital require ents.

Inventory, accounts receivable and current liabiliti s will double at the beginning of the project and will remain at that level over the life of the proj ct.

The company has an accumulated tax loss of 100 000 which has arisen as a result of temporary differences.

Annual after-tax cash-flows from the project excluding items **(a)** to **(g)** above will be R540 000 per annum for 4 years.

All cash-flows take place at the end of the financial year unless otherwise stated.

Maranta Ltd has been advised by lenders of long-term funds that they are prepared to finance the project at the current long-term loan rate of 20% before tax. Funds can also be raised from ordinary shareholders at the appropriate rate.

The tax rate is 37,5% and you are to assume that there is no tax lag.

You have estimated that the market relationship between debt (after tax) and equity for companies similar to Maranta Ltd is as follows;

Debt	:	Equity	Kd %	Ke %
0	:	100	–	22
20	:	80	12,5	23,125
40	:	60	12,5	25
50	:	50	16	28
60	:	40	19	34

You are required to:

Evaluate the project and advise Maranta Ltd whether or not the investment should be accepted.
(15 marks)

A uming that Maranta Ltd will invest in the project, evaluate how the project should be financed.
(15 marks)

"The return from any portfolio is a function of the risk free rate and a premium for risk. The return from ny investment is a function of the risk free rate and a premium for risk."

On the basis of the above statement, draw a diagram and explain how the 'portfolio' theory derives the required return for a portfolio.

Draw a diagram and explain how the **capital asset pricing model** derives the required return for an investment. Briefly explain the similarities and differences between the 'portfolio' theory and the **capital asset pricing model**. **(10 marks)**

Note: *You are not required to list the assumptions for CAPM.*

Solution:

Long-term WACC:

Debt	:	Equity	K_d %	K_e %	WACC (weighting)
0	:	100	–	22	22%
20	:	80	12,5	23,125	21%
40	:	60	12,5	25	20%
50	:	50	16	28	22%
60	:	40	19	34	25%

The lowest WACC at different D : E ratios is 20%. The c mpany sh uld use this as the rate to evaluate capital decisions. The company should finance its projects in order to move towards a D : E ratio of 40 : 60

Investment dcision:

			PV 20%	
Year 0	Investment	(1 800 000)	1	(1 800 000)
Year 1	Wear-and-tear (900 000 × 37,5%)	337 500	0,8333	281 239
Year2	Wear-and-tear (900 000 × 37,5%)	337 500	0,6944	234 360
Year 4	Sell assets	400 000	0,4823	192 920
Year 4	Recoupment (400 000 × 37,5%)	(150 000)	0,4823	(72 345)
Year 0	Working capital (800 000 + 600 000 – 500 000)	(900 000)	1	(900 000)
Year 4	Working capital (800 000 + 600 000 – 500 000)	900 000	0,4823	434 070
Year 1	Cash-flows	540 000	0,8333	449 982
Year 2	Cash-flows	540 000	0,6944	374 976
Year 3	Cash-flows	540 000	0,5787	312 498
Year 4	Cash-flows	540 000	0,4823	260 442
	Net present value			(231 858)

The sale of short-term investments of R500 000 will not affect the investment decision.

Assessed loss is not accounted for as it is assumed that the company will utilise the tax loss regardless of whether the project is accepted.

Conclusion: The inv stm nt has a negative net present value when discounted at the target required turn of 20% and should not be accepted.

Financing de ision:

Equity

Number of shares 2 400 000 / R10 = 240 000

$$\text{Val e} = \frac{D_1}{k_e - g} = \frac{4{,}84\ (1{,}08)}{23125 - 0{,}08}$$

= R34,56 per share

Total value R34,56 × 240 000 = R8 294 400

Debt: Long-term loans

$$\frac{187\,500}{(1 + 12{,}5\%)} + \frac{187\,500}{(1 + 12{,}5\%)^2} + \frac{2\,287\,500}{(1 + 12{,}5\%)^3}$$

= 166 667 + 148 148 + 1 606 584

R1 921 399

12.5% after tax is arrived at as (20% × 62,5%)

Preference shares

$$\text{Value} = \frac{\text{Dividend}}{K_d}$$

$$= \frac{62\,500}{0{,}125}$$

$$= \text{R500 000}$$

Total debt = R1 921 399 + 500 000
= R2 421 399

Market value	equity	=	8 294 400	
Market value	debt	=	2 421 399	
	New investment	=	2 700 000	[1 800 000 + 900 000]
	Finance		13 415 799	

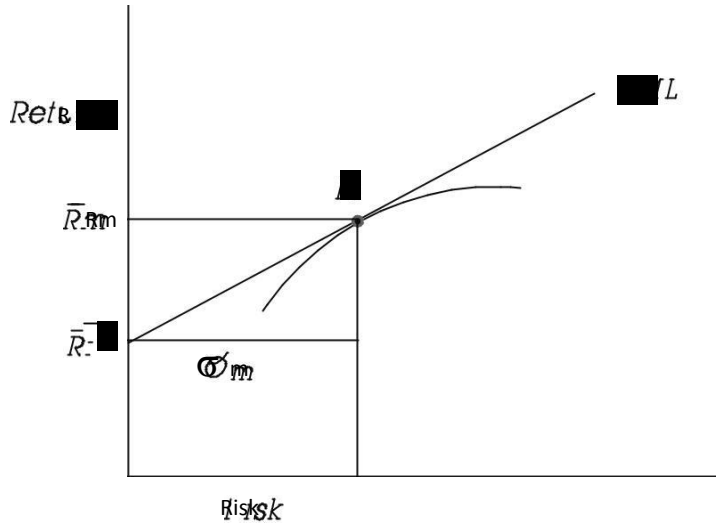
	Equity	**Debt**	**Total**
	60%	40%	
Total	8 049 479	5 366 320	13 415 799
Existing	8 294 400	2 421 399	10 715 799
Required	– 244 921	2 944 921	2 700 000

Based on the current value of debt and equity, the ntire amount can be financed by debt. The total required is R2 700 000. The company has taken the decision to use R500 000 from the sale of investments to partly finance the required funds. The balance required, (R2 200 000) should be financed through long-term loans or preference shares.

(i) Portfolio theory states that an investor will minimise risk by selecting a well-balanced, diversified portfolio. The required rate of return is equal to a risk-free rate plus a risk premium. The extent of the risk premium depends on the level of risk associated with the portfolio:

$$R_p = f + P$$

where: R_p = required return (portfolio)
R_f = risk-free rate
P = risk premium



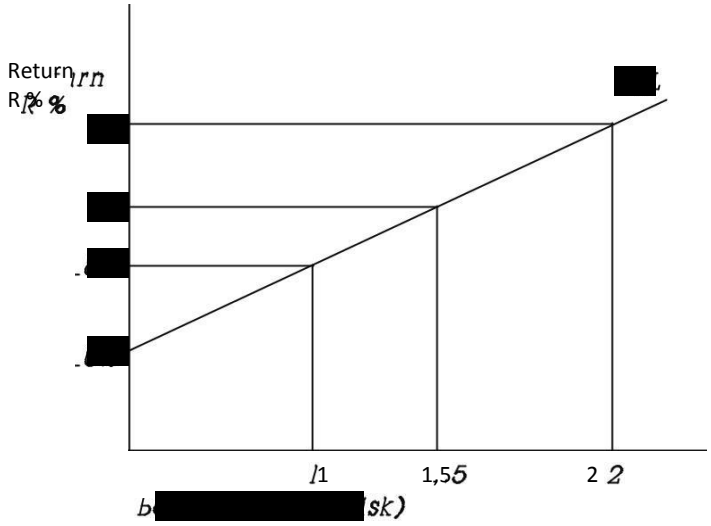
The required return for a portfolio on the CML line is expressed as:

$$R_p = R_f + \frac{(R_m - R_f)\,\sigma_p}{\sigma_m}$$

Portfolio theory derives the required return by assessing the level of risk required for a portfolio in relation to the risk of the market portfolio.

The major determinant of the required return on an asset is its degree of risk. Risk refers to the probabilities that the returns, and therefore the values of an asset or security, may have alternative outcomes. The measure of risk is generally accepted as the standard deviation (σ) of an asset or security.

The CAPM assumes that all investors are diversified and as a result are subjected to systematic risk only. Systematic risk cannot be avoided by diversification. This is the fundamental risk that a share's possible return is exposed to, and caused by general economic trends, political or social factors affecting all companies simultaneously. Therefore, the relevant risk for an investment is the systematic risk.



The CAPM equation is defined as:

$$R_i = R_f + \beta_i(R_m - R_f)$$

where: R_i = required return for security i
R_f = risk-free rate
β_i = systematic risk of security i
R_m = expected return from the market

The CAPM is derived from portfolio theory. The SML line represented in CAPM is the same as the capital market line in terms of the portfolio theory. The risk-free rate is also the same for both CAPM and the portfolio theory. The major difference is that risk under the portfolio theory is measured as a standard deviation while under the CAPM, it is measured as beta, which represents systematic risk only.

Question 6–7 *(Fundamental)* 31 marks 56 minutes

Mr Skosana was p esented with the following investment opportunity for his SME enterprise.

The after-tax cashflows of the project are as follows:

	R	R	R	R	R	R
Year	0	1	2	3	4	5
Cashfl ws	(750 000)	250 000	200 000	270 000	260 000	150 000

The following criteria are applied by Mr Skosana's enterprise to assist in investment decision-

making: Capital investments are to be recovered within four years.

A return above the weighted average cost of capital (WACC) of 16% is required when discounted cashflows methods are employed.

Required:

Calculate the following and state whether the project is acceptable according to this method:

(a) Pay-back period **(4 *marks*)**

(b) Discounted payback period **(6 *marks*)**

(c) Net Present Value (NPV) **(6 *marks*)**

(d) Internal rate of return (IRR) **(6 *marks*)**

(e) Modified internal rate of return (MIRR) **(6 *marks*)**

(f) Net Present Value Index (NPVI) **(3 *marks*)**

Solution

Pay-back period

	R	R		R
Year 0 Outflow Investment =	(750 000)			
Inflows	**Per annum**	**Cumulative**		**Investment**
Year 1	250 000	250 000	‹	750 000
Year 2	200 000	450 000	‹	750 000
Year 3	270 000	720 000	‹	750 000
Year 4	260 000	980 000	›	750 000

Let x be part of the caashflow of year 4:

250 000 + 200 000 + 270 000 + 260 000x = 750 000

720 000 + 260 000x = 750 000

260 000x = 750 000 – 720 000

x = 30 000/260 000 = 0,12

Therefore the payback period equals 3,12 years which is less than four years and the project is therefore acceptable.

(b) Discounted payback period

	YEARS					
	0	**1**	**2**	**3**	**4**	**5**
	R	**R**	**R**	**R**	**R**	**R**
Investment	(750 000)					
Cash inflows		250 000	200 000	270 000	260 000	150 000
Factor @ 16%	1,000	0,862	0,743	0,641	0,552	0,476
NPV pa	(750 000)	215 500	148 600	173 070	143 520	71 400
Total NPV	2 090					

	R	R		R
Outfl w Investment Di counted	(750 000)			
Inflows	**Per annum**	**Cumulative**		**Investment**
Year 1	215 500	215 500	‹	750 000
Year 2	148 600	364 100	‹	750 000
Year 3	173 070	537 170	‹	750 000
Year 4	143 520	680 690	‹	750 000
Year 5	71 400	752 090	›	750 000

Let x be part of the cashflow of year 5:

215 500 + 148 600 + 173 070 + 143520 + 71 400x = 750 000

ˆ 680 690 + 71 400x = 750 000

ˆ 71 400x = 750 000 – 680 690

ˆ x = 69 310 / 71 400 = 0,97

Therefore the discounted payback period equals 4,97 years which is more than four years and therefore the project is not acceptable.

Net present value (NPV)

The NPV equals a positive R2 090 as calculated per **(b)** above and the project is therefore acceptable, although barely profitable.

Internal rate of return (IRR)

Method 1 (by means of interpolation):

Notes:

1 The NPV @ 16% equals a positive R2 090 and has already been calculated in **(b)** above.

2 To obtain a NPV of zero, one would have to discount at a higher interest rate for interpolation purposes.

3 In the case of a negative NPV, one would have to discount at a lower interest rate to obtain a NPV of zero.

4 The next higher available interest rate per tables at the back of the book is 18%.

5 Also refer to 6.3.6.

NPV at 18%:

	YEARS					
	0	**1**	**2**	**3**	**4**	**5**
		R	**R**	**R**	**R**	**R**
Investment	(750 000)					
Cash inflows		250 000	200 000	270 000	260 000	150 000
Factor @ 18%	1,000	0,847	0,718	0,609	0,516	0,437
NPV pa	(750 000)	211 750	143 600	164 430	134 160	65 550
Total NPV	(30 510)					

The NPV @ 18% quals a negative (R30 510) as calculated above.

An approximate IRR by interpolating between 16% and 18% to get to a zero NPV (see 6.3.6)

16% + [2 090 / (2 090 + 30 510) x (18% – 16%)]

16% + (2 090/32 600) x 2%

16,13%

Method 2 (much quicker by means of a financial calculator):

Note:

1 Also refer to time value of money calculations with a financial calculator in chapter 3.

Financial calculator instructions:		
CFj_0	=	–750 000
CFj_1	=	250 000
CFj_2	=	200 000
CFj_3	=	270 000
CFj_4	=	260 000
CFj_5	=	150 000
IRR	=	16,13%

The IRR exceeds the required return of 16% and the pr ject is therefore acceptable, although barely profitable.

Modified internal rate of return (MIRR)

	YEARS					
	0	**1**	**2**	**3**	**4**	**5**
	R	**R**	**R**	**R**	**R**	**R**
Investment	(750 000)					
Cash inflows		250 000	200 000	270 000	260 000	150 000
Factor @ 16%	1,000	1,811	1,561	1,346	1,160	1,000
Values at end*		452 750	312 200	363 420	301 600	150 000
Total of inflows						1 579 970
Outflow	(750 000)					

* Value of inflows at the end of year 5 at WACC of 16%

Financial calculator instructions:		
PV	=	–750 000
FV	=	1 579 970
N	=	5
I/YR	=	16,07%

Note:

The MIRR of 16,07 is very near to the IRR of 16,13% and the WACC of 16% because the NPV is relatively small with no huge initial inflows which are assumed to be reinvested at a higher IRR than 16,07%.

The MIRR exceeds the required return of 16% and the project is therefore acceptable, although barely profitable.

Net present value index (NPVI)

NPVI is defined as

NPVI = (Initial investment + NPV) / Initial investment

(750 000 + 2 090) / 750 000

1,003

The NPVI equals more than 1 and the project is therefore acceptable, although barely profitable.

Question 6–8 *(Intermediate)* *45 marks 68 minutes*

Mr Du Toit has read about the treatment of uncertainty in investment appraisals and wants to incorporate risk in his investment decision-making.

Required:

Show ways how Mr Du Toit can incorporate risk in his investment decision-making.

Solution:

Time based methods of incorporating risk

Payback

Introduce payback periods as a safety net in risk reduction.

Finite horizon

Ignore project results beyond a certain period, say seven years, called the finite horizon to reduce risk.

Risk premium

Increase the discount rate to compensate for increased risk.

- Such an inflated discount rate rais s the hurdle rate for the investment decision, and deals with risk as a function of time as illustrat d b low.
- Note that later cashflows are more heavily discounted.

Illustration:

	YEARS					
	0	**1**	**2**	**3**	**4**	**5**
	R	**R**	**R**	**R**	**R**	**R**
Investment	(750 000)					
Cash flows		250 000	200 000	270 000	260 000	150 000
Factor @ 16%	1,000	0,862	0,743	0,641	0,552	0,476
NPV pa	(750 000)	215 500	148 600	173 070	143 520	71 400
Total NPV	2 090					

	YEARS					
	0	**1**	**2**	**3**	**4**	**5**
	R	**R**	**R**	**R**	**R**	**R**
Investment	(750 000)					
Cash flows		250 000	200 000	270 000	260 000	150 000
Factor @ 18%	1,000	0,847	0,718	0,609	0,516	0,437
NPV pa	(75s0 000)	211 750	143 600	164 430	134 160	65 550
Total NPV	(30 510)					

Result:

NPV ' @ 16%	215 500	148 600	173 070	143 520	71 400
NPV ' @ 18%	211 750	143 600	164 430	134 160	65 550
Difference:	3 750	5 000	8 640	9 360	5 850
Reduction in NPV	2%	3%	5%	7%	8%

Probability based methods of incorporating risk:

Expected value

Utilise probability based methods, whereby probability theory is applied to different possible estimates to calculate an expected value instead of using a single value.

Illustration:

Instead of using the R300 000 below as the sales figure in an investment appraisal, by incorporating probability theory to determine the expected value of R275 000 might lead to a better more realistic estimate.

Sales in R	Probability	Sales × Probabi ity
100 000	10%	10 000
200 000	25%	50 000
300 000	50%	150 000
400 000	10%	40 000
500 000	5%	25 000
Expected value	**100%**	**275 000**

Therefore, R275 000 would be a more scientific esti ate of the expected sales revenue out of a range of possible outcomes than using the single ost likely estimate of R300 000.

Optimistic, most likely and pessimistic views

Utilise probability theory to determine diff r nt possible estimates from optimistic, most likely and pessimistic outcomes to calculate an exp ct d value instead of using a single value.

Illustration:

Instead of using say R450 000 as a possible cash inflow in an investment appraisal, incorporate probability theory to determine the expected value from optimistic, most likely and pessimistic values.

Alternatives	Cashflows in R	Probability	Cashflows × Probability
Optimistic	600 000	10%	60 000
Most likely	450 000	65%	292 500
Pessimistic	300 000	25%	75 000
Expected value		**100%**	**427 500**

Therefore, R427 500 would be a more scientific estimate of the expected revenue inflow out of a range of possible inflows than using the single most likely estimate of R450 000.

Other methods

Apply s nsitivity analysis, simulation and Monte Carlo analysis:

By varying the value of the key factors in an appraisal, the more sensitive elements can be determined and the effect thereof considered.

By simulation and Monte Carlo analysis the initial estimated probabilities could be re-evaluated.

Incorporate statistical models utilising discrete and continuous probability distributions.

By establishing cashflow means and standard deviations, statistical methods can be utilised to estimate the variability of a project – applications of the Normal Distribution is especially beneficial in this regard (see chapter 5).

These would enable Mr Du Toit to estimate:

The mean NPV.

The standard deviation from the mean NPV.

Limits within which parameters (NPV, cashflow etc) would lie, say the estimated NPV within R10 000 above or below the mean value at a confidence level of say 10%.

The probability of obtaining a negative NPV or NPV exceeding R1 500 000.

Question 6–9 *(Fundamental)* ***10 marks 15 minutes***

A large consortium is considering an investment opportunity to invest in a new platinum mine in South Africa.

Required:

List some of the aspects, including ESG* principles, that should be considered over and above the number crunching.

(*Refer to Chapter 2 for environment, social and governance principles.)

Solution:

Consider the following:

The demand for platinum on the world market.

Anticipated future exchange rates.

The best suitable form of financing of the project.

The risk involved and the political security in the country.

- The influence of a mine on the environment and cli ate change.
- Restructuring the environment at the end of the lifeti e of the ine.

The influence of labour unions and strikes.

Capital versus labour intensive operations.

Location of the site and the transport of raw materials and platinum ore.

Availability of qualified mining engineers.

Availability of sufficient underground mining operators.

Availability of sufficient housing, transport, nearby schools and medical facilities for staff.

Royalties payable to the trust for the indigenous inhabitants.

Sustainability aspects.

Equator requirements.

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Chapter 7

The financing decision

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- detail the most prominent forms of finance available to business entities in South Africa;
- for each form of finance, describe the typical business entities that make use of it, typical sources of (or investors in) these forms of finance, and typical associated requirements;
- understand the suitability of different forms of finance to different types of business entities, different types of assets financed, and different intend d purpos s;
- determine the most appropriate form of finance for a South African business entity, given a specific scenario, by performing appropriate calculations for various financing options and by considering other relevant factors; and
- compare and critically evaluate the choice between debt and lease finance.

The previous chapter (*The* investment *decision*) considered the issue of capital budgeting, or whether it is worthwhile to invest in an asset. This chapter (*The financing decision*) considers the next important question, namely, if a capital investment will be beneficial, how best should the asset be financed? It must be noted that this chapter does overlap with chapter 10 (*Valuations of preference shares and debt*), which addresses principles and knowledge linked to the valuation of debt. This chapter will explore the prominent forms of finance available to business entities in South Africa, and the suitability of each of the various circumstances. It further explains and illustrates calculations to determine the most cost-effective form of finance. It also illustrates the complications associated with a lease versus buy decision.

7.1 Finance the lif blood

Finance represents the lifeblood that enables a business to grow, expand, thrive and sometimes, merely survive. Raising finan e is therefore a very important aspect for any business enterprise.

For the new, smaller business it is often a case of using whatever form of finance is available, at whatever cost. The National Credit Act 34 of 2005 may have discouraged unfair credit lending practises but, in this process, this Act f rther red ced the available sources of finance to the small business.

In contrast, a larger business – with track record – can often apply more of the knowledge and skills highlighted in this chapter to secure the right form of finance, at the right time, and at the right cost.

The financial crisis of the past number of years has not only restricted the access to finance for many business entitie , but placed renewed focus on the risk of using excessive debt finance. This hard-won lesson underlines the ink between new forms of finance and the capital structure of a business (refer to chapter 4 *Capital structure and the cost of capita*l).

This chapter highlights important matters surrounding sources and forms of finance, and the cost thereof.

7.2 Which form of finance?

In deciding on a form of finance, an enterprise should consider several factors, including the following:

Suitability to the type of business and/or asset financed – a general principle is that the useful life of the asset and the payback period of the finance (if applicable) should match.

True cost – debt, often bearing lower risk to the investor and being tax deductible, is usually a cheaper source of finance than equity.

Impact on cashflow – debt has a significant impact on the cashflow position of a company, but the associated interest and capital repayments are usually agreed on in advance. If would therefore be sensible to structure financing in such a way that the expected cash outflows strongly correlate with the expected cash inflows from the investment.

Associated constraints – the providers of debt may impose certain lending conditions, such as debt covenants (agreed upon conditions), or requirements for collateral or security.

Impact on the overall risk profile – a company with high debt levels bears increased risk. This increased risk stems from the possible impact of uncertainties, such as an increase in interest rates or an unexpected deterioration in a company's cashflow positi n, which w uld make it increasingly difficult to meet the *fixed* capital and interest payments normally associated with debt finance.

Control – the issue of new shares to investors could dilute the existing shareholding and might impact on the control over the company.

How it pairs with existing finance – will it for instanc , change the capital structure such that the weighted average cost of capital (WACC) chang s? Will it assist the business entity to move closer to a target capital structure, or further away from it?

Availability – will the specific entity have access to a specific form of finance or will investors be interested to invest?

7.3 Classification of different forms of finance

Notwithstanding the effects of the financial crisis and new legislation, several forms of finance are nonetheless available to the South African business, from several sources. In this section we briefly revisit the various forms of finance and explain some associated attributes – specifically from a South African perspective.

Forms of finance can firstly be classified as short-term (less than one year), medium-term (one to five years) or long- term (more than five years; although it must be noted that the exact number of years associated with each category is sometimes blurred).

Finance can be described as secured or unsecured. **Secured** finance has a first claim over some specified asset(s), such as prop rty (as in the case of a mortgage loan, which is long-term finance), or equipment (as in the case of hire-purchas , which is medium-term finance) and debtors (as in the case of factoring, which is short -term finan e). In the event of default on the finance terms, the secured finance provider normally has the right to lay immediate laim over the specified asset(s) in order to recover outstanding debt. In contrast, the providers of **unse u ed** finance cannot lay claim to a specific asset in the case of default. Unsecured finance providers a e, howeve , not totally without recourse as the name might imply: they can normally instigate actions to recover a portion of outstanding debt; though these actions, including application for the liquidation of the defa lter, will be impacted by the new business rescue procedure contained in the Companies Act 71 of 2008.

Forms f finance can further be classified as **debt, equity, hybrid capital** (also known as quasi-equity, with pr perties f debt and equity), or **mezzanine** finance. The term mezzanine finance is associated with the Italian word for 'middle', implying that the claim of the holder of mezzanine finance ranks in between equity (ometimes also unsecured trade debt) and all other forms of finance. Upon liquidation, mezzanine finance will therefore rank junior (below) all other finance, except equity (and occasionally, unsecured trade debt).

Tailor-made finance

Different forms of finance are better suited to different business entities and to different intended purposes. When charting this suitability, numerous classifications may be used. One possibility is to segregate entities in terms of size, development stage, and purpose. The latter can then be further separated in terms of financing of specific assets (e.g., property, vehicles or aircraft), or a Black Economic Empowerment (BEE) transaction.

Sources of finance

Finance can be sourced from the money and capital markets. **Money market** refers to the short-term financial market (usually repayable in less than one year) where borrowers and lenders are brought together by banks and other financial institutions.

The **capital market** refers to the longer term market for securities whereby entities can raise or invest in debt and equity. The capital market can further be segregated into the primary market (the market where new securities are sold) and the secondary market (where existing securities are sold by one investor to another); the latter is facilitated by a formal market (a securities exchange) or over the counter (OTC) trading by dealers. Obviously, a cost-effective and liquid secondary market will indirectly enhance a primary market.

A multitude of entities operate within these markets and, in the end, these entities are the true sources of finance, or investors in securities.

7.4 Equity as a source of finance

Obtaining equity funds

A company may either use its own funds in the form of retained earnings, or source funds from external investors. Retained earnings are past profits that were ploughed back into the company. This is not a free source of finance, as existing shareholders will expect a return on funds invested in the organisation.

The presence of retained earnings in the financial statements does not necessarily imply that there is cash available for expansion, as the retained earnings may be ti d up in existing non-current assets such as plant or property. Deciding on dividend policy is therefore one of the important roles of the financial manager, as the payment of dividends reduces the amount of retained earnings. Company managers find the use of retained earnings an attractive source of funding as they do not have to involve shareholders or outsiders such as banks. There are also no issue costs involved and no change in control is possible.

Equity funds can also be sourced through the capital markets. This can be done by issuing new shares in the company, or by rights issues whereby existing shareholders have the opportunity to take up additional shares in the company. This is usually done at a discounted price. Capital markets can also be used to source certain forms of debt, for example where interest-bearing debentures are issued to the public.

Factors to consider when issuing shares are the cost involved, the income that can be distributed to investors and the effect that the issue of new shares may have on existing control in the company. Obtaining funds through a stock market could be a costly exercise as there are considerable marketing expenses and professional fees that will have to be paid.

Other sources of equity funds include venture capital and international sources. Venture capital involves a venture capitalist investing funds. The venture capitalist's aim is usually to make a significant profit in a relatively short period, and to xit again after a few years. Venture capital can therefore be regarded as an expensive source of finance.

Stock market listing

Reasons for seeking a stock market listing

There are several reasons why companies seek stock market listings:

- It gives them access to a wider pool of finance, making it easier to obtain funds.
- Shares bec me more marketable, which will in turn increase the share price.
- Enhanced public image and more exposure in the media.
- A tock market listing can be used by the original owners of the business as an exit strategy, or to realise ome of their shareholding. Sometimes they regard it as a step to the next level where a stronger management team can be recruited.
- Original owners wish to sell their shareholding to obtain funds for other projects.
- Listed companies find it easier to seek growth by acquisition than unlisted companies.

The methods used to obtain a listing

There are usually two methods used to obtain a listing. The first is an **offer for sale**. In this case the investors can tender for shares which will then be allocated to them. A second, cheaper method is to make use of a placing. A **placing** is where a number of specific investors such as pension funds or business associates are invited to take up the shares.

Underwriting

Underwriters are financial institutions that agree (in exchange for a fixed fee, usually a percentage of the finance to be raised) to buy any securities which are not subscribed for by the investing public at the issue price. This removes the risk of the share issue being under-subscribed.

Rights issues

Capital is raised by giving existing shareholders the right to subscribe to new shares in proportion to their current shareholding. These are usually issued at a discount to market price to make it more attractive to the investor. A shareholder not wishing to take up a rights issue may sell these rights.

Advantages of a rights issue

A rights issue is cheaper than an offer for sale to the general public. Administration costs are cheaper and the company does not need a prospectus. The expenditure on arketing will also be reduced since the investors are familiar with the company.

If shares are offered at a discount it is an attractive inv stm nt opportunity to the existing shareholders.

The existing voting rights and therefore control over the company are unaffected if all shareholders exercise their rights.

The capital raised can be used to repay debt, therefore strengthening the financial position of the company.

Example 1: A rights issue

Ndlovu Enterprises Limited can achieve a profit after tax of 20% on capital employed. The company's capital structure is as follows:

	R million
40 million ordinary shares of R1 each	40
Retained earnings	20
	60

The directors intend to raise an additional R25 million from a rights issue for the construction of a new factory in the Eastern Cape. The curr nt market price is R1,80 per share.

Calculate the number of shares that should be issued if the rights price is respectively R1,60; R1,50; R1,40; R1,20. Also cal ulate the dilution in earnings per share in each case.

Solution:

Earnings at present is R12 million (20% × R60 million). Earnings per share (EPS) is R12 million/40 million = 30 cents. After the rights issue earnings will be R17 million (20% × R85 million)

Rights price R	No of new shares (million) R25 m / rights price	EPS (17 m / total no of new shares)	Dilution cents
1,60	15,625	30,6	+ 0,6
1,50	16,667	30,0	0
1,40	17,857	29,4	(0,6)
1,20	20,833	27,9	(2,1)

The market price of a share after a rights issue: the theoretical ex-rights price

If new shares are issued at a discount to the existing share price, there should theoretically speaking be a dilution of the share price. The theoretical share price immediately after the rights issue is known as the theoretical *ex*-rights price and can be determined as follows:

$$\text{Theoretical } ex\text{-rights price} = \frac{1}{N+1}\ ((N \times cum \text{ rights price}) + \text{issue price})$$

Where:

N = number of shares required to buy one new share

Example 2: Theoretical ex-rights price

Ndlovu Enterprises Limited has 40 million ordinary shares of R1 in issue, which have a market price on 1 March of R1,80 per share. The company has recently decided to make a rights issue, and offers its shareholders the right to subscribe for one new share at R1,55 each for every four shares already held. The market value just before the rights issue is known as the *cum* rights price. What is the the retical *ex*-rights price?

Solution

Applying the formula above:

$(1/(4 + 1)) \times ((4 \times R1{,}80) + R1{,}55) = R1{,}75$

The value of a right

The value of a right is the 'value' the shareholder will lose by not exercising his right. This is also the market value of the right – the value at which the right can be sold to another party. The value of a right is the *ex*-rights price less the issue price.

In the above example it would be: R1,75 – R1,55 = R0,20 per new share or 5 cents per existing share. You require four existing shares to acquire one new share.

Possible course of action open to shareholders in the case of a rights issue

There are four possible actions a shareholder could follow in the case of a rights issue:

Take up or exercise the rights. The shareholder will retain the same relative voting rights in the company as before.

Renounce the rights and sell them on the market. The shareholder will dilute his/her shareholding slightly, but will be compensated in the form of cash received for the sale of the rights.

Renounce part of the rights and take up the remainder. The rest can be sold.

Do nothing – this is a bad option, as the shareholder will experience a dilution in share value without the compensation he/she ould have received by selling the rights.

Warrants

A warrant is a right given by a company to an investor, allowing him to subscribe for new shares at a future date at a fixed, pre-determined price, called the exercise price. Warrants are usually issued as part of a package with unsecured l an stock (debt security or debentures), to make the loan stock more attractive.

Advantages f warrants to the company:

It does not involve payments of dividends or interest.

It makes loan stock more attractive.

It generates additional equity funds.

7.5 Preference shares

Preference shares are a form of hybrid instrument, with characteristics of both equity and debt. Preference shares normally carry a fixed rate of dividends. The holders of the preference shares have a preference claim to distributable earnings over ordinary shareholders. This means that no dividends may be distributed to ordinary shareholders before the preference shareholders have received their preference dividends. In the event of winding up the company, the preference shareholders usually have a senior claim over the ordinary shareholders to the repayment of capital.

In the case of cumulative preference shares, the dividends accumulate if in a given year there is not enough cash available to pay dividends that is the dividend is passed. These dividends wi then be paid in a later year, together with the dividends of that year.

Participating preference shares have an additional entitlement to ordin ry dividends over and above the preference dividend.

Why do companies issue preference dividends?

- Dividends do not have to be paid in a year when profits are p r, which is not the case with interest on loans.

  Preference shareholders do not have voting rights and therefore no control. Ordinary shareholders maintain full control over the company unless preference dividends are in arrears.

  Preference shares will lower the company's gearing, unless they are redeemable. In the latter case it is treated as debt when calculating gearing.

  Preference shares do not increase the company's g aring, allowing it to borrow more in future.

  A disadvantage of preference shares is that preference dividends are not tax deductible, as in the case of interest payments.

7.6 Debt

Broadly speaking there are two categories of debt – funds provided by banks or other financial institutions, such as a **loan**, and funds provided directly by individual investors through their investment in marketable securities issued by a business entity (debtor), such as medium term notes and bonds. (Refer to the concept of *securitisation* as described in Appendix A *Selected concepts, acronyms and terminology*.)

Appendix 1 to this chapter lists several examples of different forms of debt. The most common forms of a loan, and the associated advantages and disadvantages are described below.

Bank loans

Bank loans are a source of m dium-term finance, usually linked with the purchase of specific assets. The interest rate can eith r be fix d for the period of the loan, or it can be linked to the prime rate of interest. The latter is more widely applied in South Africa. The fact that interest rates could increase at any time during the period of the loan in reases the risk to the company, and a company needs to take steps to hedge itself against this risk.

The advantages of a bank **overdraft** (short-term) over a loan (medium-term) are as follows:

- The c stomer only pays interest when his bank account is overdrawn.
- The bank has the flexibility to review the facility from time to time.
- The facility can be renewed when it comes up for review – it can therefore become a permanent arrangement without the commitment to repay the capital component.
- A bank overdraft is regarded as part of working capital and therefore analysts will be less inclined to con ider it in their calculation of the company's gearing.

The advantages of a **loan**:

- The repayment schedule (capital as well as interest) is fixed in advance, which facilitates planning.
- The bank has the right to reduce or withdraw an overdraft facility, which may impact on the company's cashflow planning.
- A loan usually bears a lower rate of interest than a bank overdraft.

Loan capital

Loan stock (debentures) is issued on a capital market to interested investors. As in the case of shares, a secondary market exists for these securities, meaning that the securities can exchange ownership between the date of issue and settlement. The exchange will have no effect on the company's financial position. The securities have a nominal value, and interest is paid at a stated coupon on this amount. If the coupon is 8% of the nominal value, the company will have to pay R8 per annum on R100 loan stock.

Advantages and disadvantages of debt compared to equity

Advantages of debt

Debt is generally a cheaper form of finance as the investor bears lower risk.

Interest is tax deductible, reducing the effective cost to the company.

Debt can be secured against the assets of the company, making it more attractive to investors.

Debenture holders rank above shareholders in the case of liquidati n.

Issue costs of debt are usually lower than that of shares.

- Debt has no immediate impact on the control structure of the co pany.
- The issue of debt instruments or bank borrowing has no i ediate impact on dilution in earnings and dividends per share. Interest may however impact on the profitability of a company.

Disadvantages of debt

Interest has to be paid, regardless of profitability. Capital also has to be repaid in terms of an agreed repayment schedule. This could impact negatively on the company's cashflow, and might even lead to bankruptcy.

Shareholders are likely to demand a higher return due to increased risk.

7.7 Convertible securities

Convertible loan stock gives the holder the right to convert to other securities, normally ordinary shares, at a pre-determined price or rate and time. The current market value of ordinary shares into which a unit of stock may be converted is known as the **conversion value**. The conversion value will be below the value of the stock at the date of issue, but will be expected to increase as the date for conversion approaches on the assumption that the market value of the company's shares will increase over time. The difference between the issue value of the stock and the conversion value as at the date of issue is the implicit **conversion premium**.

Convertible instrum nts have c rtain advantages to ordinary loan stock, making it attractive for both the company and investor:

An investor will a ept a lower initial interest rate, hoping to participate in an increase in the share price in the futu e.

The company will often pay a lower interest rate, which is positive for cashflow and profitability.

Even if the share price does not increase to expectation, the company may still issue at the price and rate determined beforehand.

The pr visi ns may allow for the capital amount to be repaid if the share price does not perform as expected.

I ue costs are only paid once in respect of debt and shares issued.

The company's gearing ratio is reduced when conversion takes place, allowing further borrowing.

The disadvantages of convertibles:

Upon conversion, the company is likely to effectively issue shares at a lower price than market value. This will be the case where there was a significant increase in the share price.

Depending on the provisions, debt has to be repaid if the share price does not increase to expectation.

The low initial yield may be unattractive to investors.

The exercise of convertibles does not provide extra funds upon conversion.

Conversion to ordinary shares will impact on control.

7.8 Criteria applied by providers of finance/investors

The business seeking new finance/investors may obtain insight by first exploring the criteria applied by the financiers/investors. The providers of debt finance – typically banks – pay particular attention to the following areas, before granting debt finance to a business:

Affordability – is the borrower's risk profile such that they are able to afford the new debt to be granted? Companies classified as higher risk, attract higher borrowing costs.

Sustainability – will the borrower generate sufficient income over the long-term such that they can fulfil all their existing operational and financial obligations on the business plus the cost of the new debt to be granted?

Liquidity and cashflow – how liquid is the business? What is the current and expected trend for the business in terms of cash inflows and outflows (before the granting f the finance)? How will this change given the new debt to be granted? How can the repayment terms on the new debt to be granted accommodate the cashflow profile of the specific business? (For asset-based lending the asset normally dictates the term and rate of finance.)

Creditworthiness history – is there evidence of a negative business credit report? Have the owners/management been sequestrated in the past or do they have a negative credit rating?

Security – in the case of secured debt, the realisable value from the underlying asset should be sufficient to cover the debt in the case of default; in the case of unsecured debt, closer attention is paid to the aforementioned criteria.

National Credit Act (NCA) requirements – the credit provider has to comply with additional requirements when granting credit to the smaller business or it may be guilty of 'reckless lending', with associated penalties and other repercussions. (The NCA requirements apply to credit granted to a consumer and the smaller business (currently defined as a business with an asset value or annual turnover equal to R1 million or less).)

Several investors in equity or hybrid capital do not seek an active role in the business investment. (Their services, however, often include advisory services.) Such investors include venture capital funds, private equity houses, merchant banks and developing finance institutions. These investors often look for the following, before investing funds –

an equity interest held by management;

a strong management team;

significant growth pot ntial; and

available exit rout s within a number of years, such as opportunity of a management buyout or for an initial public offering.

A useful ac onym (PARTS) for memorising the most important criteria that lenders will consider when an organisation applies for finance, is the following:

P – P rpose

A – Amo nt

R – Repayment

T – Term

S – Security

7.9 Overview of sources and forms of finance

Appendix 1 to this chapter offers a useful overview of typical elements associated with different forms of finance in the South African business context, including typical users, attributes, sources/investors and requirements. It is suggested that you work through the table on a line-by-line basis, in order to confirm your understanding and to identify areas requiring further study.

Note that this table is not intended to be all -encompassing or relevant under all circumstances. Appendix 1 excludes forms of finance used by specialised entities such as government entities, non-profit entities, banks, and donor institutions (but may include these as the possible providers of finance). Short-term finance is included for the sake of completeness, but its learning outcomes and content are primarily addressed as part of working capital management. Due to a tenuous link, specialised nature or coverage elsewhere in the textbook, Appendix 1 further excludes –

all forms of derivative instruments;

specialised finance (such as securitisation and project finance); and

grants, such as those offered by the Department of Trade and Industry (the dti) to promote investment in certain industries, infrastructure and other specified areas. (These do not represent typical finance instruments and may, under certain circumstances, be viewed as don tions.)

7.10 Deciding on the best financing option

The aim of the financing decision is to decide on the best financing pti n for a proposed investment. In choosing this several factors have to be considered, including:

Financing options – what are the available options, including asset-specific finance (e.g. leasing)?

- **Capital structure** – does the business have capacity for ore debt? How close is the business to its optimal (or target) capital structure? Is there an opportunity to ove closer to the target level?

Cost considerations – which viable financing option is the most cost effective?

Impact – what is the impact of each viable choice in finance on the business? (E.g., the impact on control, and the impact of debt covenants.)

Matching – is there a proper match between expected investment cash inflows and finance cash outflows?

The available **financing options** will depend on the exact circumstances; Appendix 1 summarises many of the possible forms of finance. The learning outcomes and content relating to **capital structure** is addressed in chapter 4 (*Capital structure and the cost of capital*).

The financing of a project must be considered in relation to the existing market value of equity and debt in comparison to the market mix. When a company is already over-geared, it does not matter that the company would like to finance through cheaper debt or lease. The company has no alternative but to use equity finance so that it can bring the debt to equity (:E) ratio more in line with the target ratio.

Example: The financing decision

The current market capitalisation of a company is as follows:

Equity	R6 000 000
Debt	R8 000 000

The company wishes to invest R3 000 000 in a new project. It has evaluated the project at the target WACC, which showed a positive NPV. The company now wishes to know how it should finance the project given that the target D:E ratio is 50:50.

Required:

Determine h w the project should be financed.

Solution:

Current value of the company	R14 000 000
New investment	R3 000 000
Company capitalisation after investment	R17 000 000

Desired D:E ratio 50:50.

	Debt	Equity	Total
	R	R	R
New capitalisation	8 500 000	8 500 000	17 000 000
Existing capitalisation	8 000 000	6 000 000	
Finance	500 000	2 500 000	

The above calculations show that the company should consider financing the new project using equity finance, or a mix that moves towards the desired D:E ratio.

Note: ***This is not a science. The above calculation serves to indicate the capacity for debt financing, but does not prescribe the exact financing proportions.***

7.11 Interaction between the finance and investment decisions

The financing decision normally takes place *after* a capital investment appraisal, where the investment appraisal indicated that a particular investment should be made (usually acc mpanied by a positive net present value or an internal rate of return in excess of the weighted average cost of capital).

The only exception is where there is a particular cheap form of finance available *and* this form of finance is directly linked to the particular investment (e.g. a favourable leasing option of a particular asset). In this case the financing decision can influence the outcome of an invest ent decision, because here the cheap finance and asset are intricately linked. In such a case the favourable ass t-specific finance could provide an additional advantage (this extra benefit may, e.g., turn a capital-inv stm nt decision's negative net present value, into a positive).

This principle can be explained by the following analogy: certain automobile manufacturers entice buyers to purchase their vehicles by offering exceptionally low interest rates on their financing options. Say you originally established that you can just afford a new vehicle with a purchase price of R200 000; with the associated cheap finance however, you now consider 'investing' in a vehicle with a higher purchase price, say R220 000.

7.11.1 Differences between the investment decision and the financing decision

The major differences between the investment and financing decisions are summarised below.

The investment decision:

The net present value of cashflows associated with the investment is calculated.

The discount rate to be employed is the weighted average after-tax cost of capital, adjusted for risk.

All cashflows associated with the investment are included in the cashflow projection.

Financing-relat d cashflows are *excluded* from the cashflow projection. One therefore excludes *e.g.* interest, capital r paym nts, and lease payments.

It follows that, the tax benefits related to each financing option are also *excluded.*

The tax advantage of wear-and-tear (and not the wear-and-tear itself) is to be included in the cashflow projection. In other words, it is assumed that the asset will be acquired for cash.

The financing decision (which will not affect ownership):

The calculation normally compares the after-tax yields to maturity (internal rates of return) of various financing ptions. This calculation requires a present value (initial funds to be received) and future cashflows linked to each financing option.

As an alternative, the net present cost of various financing options could be calculated and compared, using the after-tax cost of new debt as the discount rate (unless risk profile linked to the various financing options vary to a significant degree). This ignores the initial funds received, but discounts all other projected financing-related cashflows, linked to each financing option.

All cashflows associated with the investment are *excluded* from in the cashflow projection.

It follows that the tax benefits associated with the investment are also *excluded* (*e.g*. the tax advantage of wear-and-tear).

Financing-related cashflows are included in the cashflow projection. One therefore includes the relevant cashflow linked to the specific financing option, which could include *e.g.* interest and capital repayments. It follows that, the tax benefits related to each financing option must also be included.

Forms of finance affecting ownership

Certain forms of finance, such as finance leases, would affect ownership. It would thus also affect the associated tax benefit of ownership incorporated in the investment decision (*e.g.* wear and tear allowances). As a result, these forms of finance cannot be compared directly to forms of finance where ownership is obtained. These forms of finance would therefore require the application of different princip es. Refer to section 7.14.

7.11.2 General principles

It is customary to separate the investment and financing decisions, as these are in fact two different considerations.

- The first decision is whether to invest or not, ***after*** which ne decides (second decision) how to finance the investment, if applicable. The purchase cost of an asset is **n t** dependent on how it is financed. Alternatively, one could view this in the context that the investment decision should be considered irrespective of how the asset should be financed.

Depreciation is not a cashflow in itself and is therefore not included in cashflow statements.

Due to the nature of the financing cashflows (initial positive, where after negative), the greater the internal rate of return linked to a financing option, the more expensive it would be.

Similarly, the greater the net present cost of the financing option, the more expensive it would be.

The financing decision

The amount which is financed, the repayments thereof, interest payable and the taxation benefits thereof only appear in the cashflow projection of the financing decision.

The investment decision

The cost of the investment; income and operating expenditure and associated changes in working capital; and the taxation implications of wear-and-tear, only appear in the cashflow projection of the investment decision.

7.12 Determining the most cost-effective form of finance

When comparing the cost of several viable financing options, it is important to compare like with like. Therefore, a financial manag r should attempt to compare the cost of different financing options where these have similar conditions, s curity requirements and covenants. If the options are not directly comparable in this way, these factors should be adjusted in the calculation (which may involve a great deal of subjective adjustment, whi h in turn, will reduce the reliability of the results).

In deciding on the most cost-effective form of finance, you should calculate and compare the following for each viable finance option –

the internal rate of return (IRR) per annum of the associated finance-related cashflows (*including* the implications of taxation linked to the financing option); or

the net present cost (NPC) (also known as the net present value (NPV) method) of the associated finance-related cashflows (*including* the implications of taxation linked to the financing option), using an appropriate risk-adjusted rate that is usually based on the business entity's after-tax cost of new debt.

Due to the pecialised nature of taxation and the different effects this may have on various businesses, analysts in practice frequently choose to perform a financing decision on a pre -tax basis (*i.e.* to determine the IRR nd/or NPC using pre -tax cashflows and where relevant a pre -tax rate). Following this approach, it is in fact possible to achieve, in most instances, an answer leading to the same outcome as when using an approach that does incorporate the effects of taxation. However, for purposes of this course you should be able to incorporate the effect of taxation, as described in the following section.

The differences between the two methods

The **internal rate of return method** (IRR) assumes that –

the cashflow can be re-invested at the internal rate of return;

percentages are compared; and

the percentage internal rate of return is quantified, but not the monetary advantage or disadvantage of the alternative.

The **net present cost method** (NPC) assumes that –

the cashflow can be re-invested at the fair rate of return which was used for discounting;

Rand values are compared; and

the monetary advantage or disadvantage is quantified, but not the rate of return percentage.

7.13 Impact of section 24J of the Income Tax Act n the financing decision

When incorporating the effects of taxation (applicable to a business) into the financing decision, we have to incorporate the effect of taxation into the financing related cashflows (when determining the NPC or IRR) and/or the discount rate (when determining the NPC).

An intricate knowledge of taxation, including all exceptions and rules, is not within the scope of this textbook. However, it is important for a student to be able to int grate the important sections of taxation, specifically where these have a direct bearing on the topics includ d in *Managerial Finance*. For purposes of the financing decision, the student should be able to integrate the effects of section 24J.

In terms of current South African tax law, interest is normally deductible by the debtor (borrower) and represents income in the hands of the creditor (lender). In this regard, section 24J of the Income Tax Act is important, as it is the main section under which interest will be either deductible or included in income.

Stiglingh, Koekemoer and Wilcocks, (2013:742*)* describes the role of section 24J of the Income Tax Act, as follows:

> *Section 24J regulates the timing of the accrual and incurral of interest. In general terms, it spreads the interest (and any premium or discount) over the period or term of the financial arrangement by compounding the interest over fixed accrual periods using a predetermined rate referred to as the 'yield to maturity'. The section also governs the inclusion of interest accrued in a taxpayer's gross income and the deduction of interest incurred from income.*

Section 24J identifi s thr diff rent methods to calculate the spread of the interest, but for purposes of this chapter *only* the principl , yi ld to maturity method is considered.

Yield to maturity method

The yield to matu ity method helps to prevent tax avoidance and is also known as the accrual method. Yield to maturity method sp eads the full interest over the full term (therefore also considering any premium or discount), by compo nding the interest over fixed accrual periods using a predetermined rate referred to as the 'yield to mat rity' (Stiglingh, 2013).

The f ll wing f rmula has to be applied per section 24J of the Income Tax Act:

A = B × C

Where:

= the accrual amount to be included in the taxation calculation (apportioned on a day-to-day basis, if not for a full year);

=the yield to maturity on the instrument on a pre-tax basis; and

= the adjusted initial amount (issue price plus prior accrual amounts, less prior interest payments made).

During the term of the debt, if there are changes that would affect the yield to maturity, such as changes in the interest rate or the term, the calculation will have to be performed again.

Example (1): Impact of section 24J of the Income Tax Act on the cost of debt (Fundamental to Intermediate)

A company is intending to raise additional capital and is currently considering various financing options. One alternative is to issue medium-term notes.

The medium-term notes will be issued with the following terms and conditions:

The notes have a face value of R1000 each.

The notes pay a variable coupon rate equal to 10% per annum at year-end te coinciding with the company's ye r). (this is similar to interest, which accrues and is payable once

The maturity date will be in four years' time.

The notes will be redeemed at face value.

It is expected that there will only be sufficient demand f r the n tes if they are issued at a discount of 10%.

Required:

Determine the cost of the notes, using two steps:

Step 1 Determining the yield to maturity on the instrum nt on a pre-tax basis (variable 'B' of section 24J) (Fundamental)

Step 2 Determining the after-tax cost of the debt (incorporating the effects of section 24J) (Intermediate)

Assume the following:

The company has a marginal income tax rate equal to 28%.

The bond qualifies as an instrument per section 24J of the Income Tax Act (the yield to maturity method will apply).

The formula to be applied per section 24J of the Income Tax Act is:

A = B × C

Where:

A = the accrual amount;

B = the yield to maturity on a pre-tax basis; and

C = the adjust d initial amount.

Solution:

Part (a)(i)

Step 1

Determine the yield to maturity on the instrument on a pre-tax basis

	0	**1**	**2**	**3**	**4**
Present value [R1 000 × (100%-10%)]	900				
Coupon payment (10% of R1 000)		(100)	(100)	(100)	(100)
Redemption					(1 000)
Finance-related cash flows before-tax	900	(100)	(100)	(100)	(1 100)

IRR (pre-tax) 13,3892%

(This percentage will be used as the pre-tax YTM [variable "B" in the formula of section 24J]).

Or using calculator inputs:

PV =	900	
PMT =	(100)	
FV =	(1 000)	
P/YR =	1	
N =	4	
Determine I/YR	13,3892	
Or	900	CFj (0)
	(100)	CFj (1)
	(100)	CFj (2)
	(100)	CFj (3)
	(1 100)	CFj (4)
	13,3892	Calc IRR

(Refer to your calculator manual if these steps are unclear.)

Step 2

Determining the after-tax cost of the debt (incorporating the effects of section 24J)

	0	**1**	**2**	**3**	**4**
Present value [R1 000 × (100%-10%)]	900				
Coupon payment (10% of R1 000)		(100)	(100)	(100)	(100)
Redemption					(1 000)
	900	(100)	(100)	(100)	(1 100)
Taxation at 28% (A × 28%)		34	35	35	36
Accrual amount (**A**) (A = B × C) (**N2**)		120,50	123,25	126,36	129,89
Pre-tax YTM (B) =		13,3892%	13,3892%	13,3892%	13,3892%
Adjusted initial amount (**C**) =		900,00	920,50	943,75	970,11
Initial amount		900,00	900,00	900,00	900,00
Plus: prior accrual amounts		0,00	120,50	243,75	370,11
Period 0		0,00	0,00	0,00	0,00
Period 1			120,50	120,50	120,50
Period 2				123,25	123,25
Period 3					126,36
Less: prior payments		0,00	(100,00)	(200,00)	(300,00)
Period 0		0,00	0,00	0,00	0,00
Period 1			(100,00)	(100,00)	(100,00)
Period 2				(100,00)	(100,00)
Period 3					(100,00)
Finance-related cash flows after-tax	900	(66)	(65)	(65)	(1 064)
IRR (after-tax)	9,640%				

Notes:

Figures may not total due to rounding.

The accrual amount (A) could also be determined using the amortisation-function on a financial calculator.
Calculator inputs

PV =		900
PMT =		–100
FV =		–1000
P/YR =		1
N =		4
I/YR =		13,3892
1	Input Amort (Period 1-1)	
	Interest	120,50
2	Input Amort (Period 2-2)	
	Interest	123,25
3	Input Amort (Period 3-3)	
	Interest	126,36
4	Input Amort (Period 4-4)	
	Interest	129,89

(Refer to your calculator manual if these steps are uncl ar.)

Example (2): Calculating the cost of debt *(Fundamental to Intermediate)*

A company is intending to raise additional capital and is currently considering various financing options. One alternative is to issue medium-term notes.

The medium-term notes will be issued with the following terms and conditions:

The notes will have a face value of R1000 each.

The notes will pay a variable coupon rate equal to 12% per annum at a date coinciding with the company's year-end.

The maturity date will be in four years' time.

Transaction costs will equal 3% of the face value (payable on issue).

Based on current market conditions, the company expects that there will be a demand for the notes only if issued at a 9% discount.

Required:

Determine the annual percentage cost of the medium-term note in order to compare the cost of the note with other finan ing options, by calculating:

The after-tax IRR using only pre-tax finance-related cashflows. ***(Fundamental)***

The after-tax Internal Rate of Return (IRR) based on post-tax finance-related cashflows. ***(Intermediate)*** Ass me the following:

- The company has a marginal income tax rate equal to 28%.
- The bond qualifies as an instrument per section 24J of the Income Tax Act (the yield to maturity method will apply).
- The formula to be applied per section 24J of the Income Tax Act is:

A = B × C

Where:

A = the accrual amount;

B = the yield to maturity on a pre-tax basis; and

C = the adjusted initial amount.

Explain the reason for the difference obtained in **(a)(i)** and **(ii)** and motivate which option provides the more accurate answer. ***(Fundamental)***

Solution:

Part (a)(i)

Determine after-tax YTM by calculating the Internal Rate of Return (IRR) based on pre-tax finance-related cashflows

Step 1

Determine the yield to maturity on the instrument on a *pre-tax* basis (incl. ll fin nce-related cashflows)

Amounts in Rand	**0**	**1**	**2**	**3**	**4**
Note market value (R1000 × [100% – 9% discount])	910				
Issue costs (3% of R1 000)	(30)				
Coupon payment ([12% × R1 000)		(120)	(120)	(120)	(120)
Redemption					(1 000)
Finance-related cashflows before-tax	880	(120)	(120)	(120)	(1 120)
IRR (pre-tax)					16,316%

Note the inclusion of transaction cost here.

Calculator steps

880	CFj (0)
(120)	CFj (1)
(120)	CFj (2)
(120)	CFj (3)
(1 120)	CFj (4)
16,316	Calc IRR

(Refer to your calculator manual if these steps are unclear.)

Step 2

Multiply by (1 – marginal tax rate)

16,316% × (1–28%)

11,748%

Conclusion:

Using this simplified approa h, the after-tax YTM of the medium-term note equals **11,748%** per annum.

Part (a) (ii)

Determine after-tax YTM by calculating the Internal Rate of Return (IRR) based on post-tax finance-related cashflows

Step 1

Determine the yield to maturity on the instrument on a *pre-tax* basis (incl. all finance-related cashflows falling within the ambit of section 24J; thus *excluding* upfront transaction costs)

Amounts in Rand	0	1	2	3	4
Present value (R1000 × [100% – 9%])	910				
Coupon payment (12% × R1 000)		(120)	(120)	(120)	(120)
Redemption					(1 000)
Finance-related cashflows before tax	910	(120)	(120)	(120)	(1 120)

IRR (pre-tax) 15,163% (Refer to your calculator manual for the steps)

Note the *exclusion* of transaction cost for purposes of determining the YTM as intended by section 24J (transaction cost does not fall within the ambit of section 24J).

(This percentage will be used as the pre-tax YTM (variable '**B**' in the formula of section 24J))

Step 2

Determine the *after-tax* YTM (by incl. all finance-related cashfl ws; thus incl. upfront transaction costs and taxation)

Amounts in Rand	0	1	2	3	4
Present value (R1000 × [100% — 9%])	910,00				
Issue costs (3% of R1 000)	(30,00)				
Coupon payment (12% × R1 000)		(120,00)	(120,00)	(120,00)	(120,00)
Redemption					(1 000,00)
	880,00	(120,00)	(120,00)	(120,00)	(1 120,00
Taxation at 28% on issue costs (28% × R30)		8,40			
Taxation effect of section 24J at 28% (**A** × 28%)		38,64	39,40	40,28	41,29
Section 24J accrual amount (**A**) (A = B × C) (**N1**)		137,98	140,71	143,85	147,47
Finance-related cashflows after tax	880,00	(72,96)	(80,60)	(79,72)	(1078,71)
IRR (after tax)	11,702%				

Note the inclusion of transaction cost here.

Note the tax treatment of transaction costs, separate from section 24J

Calculator steps

880,00	CFj (0)
(72,96)	CFj (1)
(80,60)	CFj (2)
(79,72)	CFj (3)
(1 078,71)	CFj (4)
11,702	Calc IRR

(Refer to your calculator manual if these steps are unclear.)

Notes:

In this case a financial calculator was used to determine the accrual amounts (A). Refer to example (1) in this section for an illustration of the full calculation using the long method.

Calculator inputs:

PV =		910
PMT =		(120)
FV =		(1 000)
P/YR =		1
N =		4
I/YR =		15,163
1	Input Amort (Period 1-1)	
	Interest	137,98
2	Input Amort (Period 2-2)	
	Interest	140,71
3	Input Amort (Period 3-3)	
	Interest	143,85
4	Input Amort (Period 4-4)	
	Interest	147,47

(Refer to your calculator manual if these steps are unclear.) **2** Figures may not total due to rounding.

Conclusion: The after-tax YTM of the medium-term note equals **11,702%** per annum.

Part (b) Reason for the difference and superior approach

The reason for the difference is the tax effect of the upfront *transaction fees*. If there were no such fees, or if these were insignificant, the answers per section (a)(i) and (ii) would have been identical or very close to each other.

The superior approach, when there is a transaction fee involved, is the long approach per section (a)(ii), which includes the taxation cashflows. (This approach takes all the variables and cashflow timing effects into account.)

7.14 The lease or buy decision

The lease or buy decision is a most controversial subject in the investment and finance area.

Leases are a form of finance affecting ownership. Since the default assumption in making an investment decision is that the firm would take ownership and enjoy the associated tax benefits (e.g. wear and tear allowances), the de ision to lease (here the firm does not obtain legal ownership) could therefore *not* be compared dire tly to a de ision to finance the asset using e.g. a loan (here the firm obtains legal ownership).

In other wo ds, the default finance decision principles, as described earlier in this chapter, cannot be applied in the case of leases.

7.14.1 Types of leases

The classificati n as either a finance lease or operating lease is, likewise, a matter of contention.

The exi ting accounting models for leases require lessees and lessors to classify their leases as either a finance (capital) lea e or an operating lease, and account for those leases differently. At present, accounting models norma y classify a lease as a **finance lease** if substantially, all the risks and rewards of ownership are transferred (e.g. covers most of the asset's life). All other leases are classified as **operating leases**. These models then require an asset and liability to be recognised for a finance lease, but not so for an operating le se.

However, these accounting models have been criticised for failing to meet the needs of users of financial statements because they allow financing liabilities to remain hidden in certain cases (so-called 'off-balance

sheet financing') . As a result, the Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB) have issued a joint Exposure Draft (2013) revisiting the accounting treatment of leases. At present, the matter remains unresolved.

In recent decades, there has been an increasing trend in the leasing of certain assets, such as aircraft and ships, as opposed to outright purchase. Even though **leasing is generally more expensive** than outright purchase – if assets are kept for most of their expected life – leasing is often preferred because it helps to mitigate risk. However, leasing could also be beneficial for purposes of tax planning.

Airlines, in particular, are increasingly using operating leases to in effect rent aircraft for a few years at a time, with a leasing company bearing the risks of ownership, such as a reduction in second-hand values. Industry specialists explain that this is mainly due to the high risk, short-term nature of the modern airline business; large, stable airlines remain better off buying aircraft and then keeping them for their full lifespan (*The Economist*, 2012).

7.14.2 The financing decision for leases

Due to the controversial nature of the lease vs buy decision, there is also wide ranging treatment of leases when performing an associated financing decision.

No single approach seems to be ideal. However, should one choose not to tamper with the existing investment decision principles as already explained in chapter 6 and as revised in this chapter, then the following sequence is suggested:

Perform an investment decision as described (this assum s ownership and incorporates the tax benefits of wear and tear allowances).

If the investment decision indicates that investment would be beneficial, then perform a financing decision by calculating the internal rates of return of the various financing options available:

For financing that does not affect ownership: apply the financing decision principles as explained in section 7.10.

For leases: apply the financing decision principles as explained in section 7.10, but add back the tax benefits of ownership forfeited in this case.

Example: Lease vs buy decision

A company is considering a new investment in machinery which has the following associated cashflows:

Cash price today R10 000 000

Wear-and-tear allowances for taxation purposes are 50% in Year 1, 30% in Year 2, and 20% in Year 3.

The machinery is expected to have no value at the end of three years.

The cashflows from the inv stm nt, excluding wear-and-tear, are:

Year 1	R6 000 000
Year 2	R7 000 000
Year 3	R5 000 000

The company has two financing options:

A new loan sec red over the machinery bearing interest at 12% per annum, repayable in three an annual payments of R4 163 490.

A finance lease at an annual cost of R4 000 000 payable over three years.

Assume the f ll wing:

The company has a marginal income tax rate equal to 28%.

The company has a weighted average cost of capital equal to 20%.

Additional debt would not result in a significant deviation in the company's target capital structure.

All cashflows during a year take place at the end of the financial year.

The loan will qualify as an instrument per section 24J of the Income Tax Act (the yield to maturity method will apply).

The formula to be applied per section 24J of the Income Tax Act is:

A = B × C

Where:

A = the accrual amount;

B = the yield to maturity on a pre-tax basis; and

C = the adjusted initial amount.

From an Income Tax perspective, ownership of the leased asset will vests in the essor. The lessee will be allowed to deduct the finance lease payments in terms of section 11 (a).

Required:

Determine whether the company should invest in the new machinery.

Which financing option would be the most cost efficient.

Describe other matters which could affect the choice in finance.

Solution:

Part (a)

Investment decision

		Year:	**0**	**1**	**2**	**3**
			R'000	**R'000**	**R'000**	**R'000**
Investment			(10 000)			
Net cashflow				6 000	7 000	5 000
Cash tax effect at 28%				(1 400)	(840)	(560)
Effective net tax income / (deduction)				1 000	4 000	3 000
Net income				6 000	7 000	5 000
Wear-and-tear allowance (50/30/20)				(5 000)	(3 000)	(2 000)
			(10 000)	4 600	6 160	4 440
Discount factors	16%		1,0000	0,8621	0,7432	0,6407
Net present value (NPV)	1 388		(10 000)	3 966	4 578	2 84

Conclusion: The investment will be beneficial as it yields a positive NPV of R1 388 000.

Part (b)

Financing decision (loan)

In the case of a simple loan agreement, without transaction costs, the IRR after tax would simply represent the interest rate × (1 – tax ate).

In this case, IRR after tax equals 12% × (1 – 0,28)

= **8,64%**

Alternative: Financing decision (loan) – long method incorporating the effect of section 24J of the Income Tax Act

Step 1

Determine the yield to maturity on the instrument on a pre-tax basis

	0 R'000	1 R'000	2 R'000	3 R'000
Present value	10 000			
Payments		(4 163,49)	(4 163,49)	(4 163,49)
Finance-related cash flows before-tax	10 000	(4 163,49)	(4 163,49)	(4 163,49)
IRR (pre-tax)	12%			

(This percentage will be used as the pre-tax YTM [variable "B" in the formula of Section 24J])

Step 2

Determine the expected after-tax cash flows

	0 R'000	1 R'000	2 R'000	3 R'000
Present value	10 000,00			
Payments		(4 163,49)	(4 163,49)	(4 163,49)
Taxation benefit of interest at 28% (24J: A × 28%)		336,00	236,43	124,91
Accrual amount (A) (A = B × C) (N1)		1 200,00	844,38	446,09
Finance-related cash flows after-tax	10 000,00	(3 827,49)	(3 927,06)	(4 038,58)
Note: Figures may not total due to rounding.				
IRR (after-tax)	8,640%			

N1

Calculator inputs:	
PV =	10000,00
PMT =	(4163,49)
FV =	0,00
P/YR =	1
I/YR =	12%
1 Input Amort (Period 1-1)	
Interest	1200,00
2 Input Amort (Period 2-2)	
Interest	844,38
3 Input Amort (P riod 3-3)	
Interest	446,09

(Refer to your al ulator manual if these steps are unclear.)

Financing decision: Finance lease

	0 R'000	1 R'000	2 R'000	3 R'000
Present val e	10 000,00			
Lease payments		(4 000,00)	(4 000,00)	(4 000,00)
Cash tax effect at 28%		(280,00)	280,00	560,00
Effective net tax income / (deduction)		1 000,00	(1 000,00)	(2 000,00)
Lea e payments		(4 000,00)	(4 000,00)	(4 000,00)
Wear-and-tear forfeited[1]		5 000,00	3 000,00	2 000,00
Fin nce-related cash flows after-tax	10 000,00	(3 280,00)	(4 720,00)	(5 440,00)
Note: Figures may not total due to rounding,				
IRR (after-tax)	14,989%			

Note

Only where the financing option has an impact on ownership, such as in the case of this finance lease, will this adjustment be required.

Conclusion

The loan will be the most cost efficient as it bears a lower effective cost of finance (IRR after tax) of 8,640% versus 14,989% linked to the finance lease.

Part (c)

Security offered: As the loan would be secured over the asset, it would be comparable to the finance lease. In both cases failure to meet payment terms might result in the asset being reclaimed.

Flexibility: Depending on the detail clauses included in the contract, the finance lease might be more flexible by allowing the company to cancel the contract bef re the end f the three years. This could help f mitigate risks where the company is unsure of the success the business venture and/or the use of the asset for its full life expectancy.

Other benefits included in the finance lease: If the finance lease includes other benefits such as repairs and maintenance, or insurance (which is not included if the asset is purchased using the loan), then the associated (after-tax) benefits should be incorporated in the projected cashflows linked to the finance lease in part (b). (The example specified no such b n fits and these are therefore excluded here.)

Cashflow timing: The associated cashflows will differ between the two financing options and should be compared with the company's overall cashflow situation in order to see if one would be more beneficial than the other.

Cheap finance

When a company has an opportunity to finance a project using cheaper than normal debt financing, it should still consider its existing D:E ratio in comparison to the target before evaluating the project. In other words, if the company already has too much debt, it will not be in a position to borrow further, even if it is offered the finance at a cheaper rate. Cheap finance is highly exceptional and should not be seen as the norm.

7.16 Foreign finance

A business entity might consider foreign finance where these offer financing opportunities not available locally, or where these off r (an xp ct d) lower cost.

Usually only larger busin ss ntities have access to foreign finance (with a few exceptions, such as crowdfunding). Appendix 1 to this chapter lists several sources and forms of foreign finance.

However, the pitfall of foreign finance is frequently linked to the additional foreign currency risk linked to it such as inte est and capital repayable in a foreign currency. Usually these are factored into the finance decision by making ass mptions on future exchange rates.

Alternatively, foreign exchange risks (linked to future cash outflows in foreign currency) might automatically be hedged in the case of the entity earning foreign currency income, or might specifically be hedged using one of several hedging techniques (*e.g.* forward exchange contracts, options and futures), which would give greater certainty f the future financing-related cashflows. Specific hedging techniques would, however, drastically increa e the effective cost of the finance.

The ri ks linked to foreign finance is especially evident when there is a strong, unexpected devaluation in the ocal currency, as opposed to a gradual change predicted by measures such as purchasing power parity (PPP). The r nd recently showed such a devaluation, in depreciating by nearly 25% against the US dollar and nearly 30% gainst the Euro during the course of 2013. As a result, several South African companies refinanced their foreign debt during the course of 2013 and 2014.

Appendix 1

Sources and forms of new finance: An overview of typical characteristics and elements in the SA business context

Forms of new finance available to the SA business (a selection)	Term[1]	Typically used by the following entities: Up-start (seed / early stage)	BEE	SMME[2] incl. develop-ment (with track record)	Large en-tity (un-list-ed)	En-tity listed on JSE	Typical source of finance / investor (South African, unless indic ted otherwise)	Typical requirements / purpose / detail
DEBT								
Secured (typically)								
Debtor finance, e.g. factoring or invoice discounting	S			✓	✓	✓	C mmercial banks	Secured over debtors. Numerous requirements and options.
Short-term loan	S			✓	✓	✓	Co ercial banks, DFIs[3]	
Revolving credit	S, M			✓	✓	✓	Commercial banks	A facility allowing repeated use due to automatic renewal following repayment of a portion of capital.
Vehicle and asset finance, e.g. leases, hire purchase	M			✓	✓	✓	Commercial banks, dedicated companies	Secured over the asset financed.
Medium/ long-term loan	M, L		✓				Investment banks (often combined with a small equity stake in the BEE entity)	BEE entity uses the finance to obtain shares in a company (often at a discount); these shares serve as security for the loan. Interest may not be tax deductible.
	M, L			✓	✓		Commercial banks, DFIs,[3] private equity funds	
	M, L					✓	Banks	
Foreign currency loan	M, L			✓	✓		DFIs,[3] foreign DFIs,[3] foreign banks	Numerous requirements, also by the SARB. Implies foreign exchange risk.
	M, L					✓	Foreign banks	SARB requirements. Implies foreign exchange risk.
Mortgage loan	L			✓	✓	✓	Commercial banks	Secured over fixed property.
Unsec red (typically)								
Customer finance, e.g. advances	S			✓	✓	✓	Clients	Advance for product to be manufactured, interest free.
Accruals and trade credit	S			✓	✓	✓	Employees, SARS, trade creditors	Spontaneous finance, interest free (but trade credit may have high effective cost if settlement discounts not taken).
Banker acceptance (a company's bill of exchange is sold to bank which then agrees to honour it)	S				✓	✓	Commercial banks	Strict credit criteria. Mainly for seasonal working capital requirements. To diversify sources of finance.

Forms of new finance available to the SA business (a selection)	Term[1]	Typically used by the following entities: Up- BEE start (seed / early stage)	SMME[2] incl. develop- ment (with track record)	Large en- tity (un- list- ed)	En- tity listed on JSE	Typical source of finance / investor (South African, unless indicated otherwise)	Typical requirements / purpose / detail
Bill of exchange	S			✓	✓	Institutional and retail investors,[8] corporations	In simp ified terms, a bill of exchange is similar to a cheque.
Commercial paper	S			✓	✓	Institutional nd retail in estors,[8] corporations	A short-term promissory note.
Bank overdraft (also often secured)	S, M[a]		✓	✓	✓	C mmercial banks	For unforeseen expenses, working capital requirements.
Medium term notes, incl. promissory notes (also often secured) (issued on the primary market[10])	M			✓	✓	Institutional and retail investors,[8] underwriter[6] if under subscribed	In simplified terms, a promissory note is a note promising to pay, similar to a R200 note issued by the SARB. Credit rating by rating agency required. May be listed on BESA.[9]
Foreign, medium term notes (also often secured) (issued on the primary market[10])	M			✓	✓	Foreign institutional and retail investors[8], underwriter[6] if under subscribed	Credit rating by rating agency required. May be listed on a foreign securities exchange, e.g. London Stock Exchange (LSE). Implies foreign exchange risk.
Crowdfunding (credit-based)	M	✓				Internationally, from a large number of people and non-banks via the Internet	The 'crowd' provides credit to fund a creative project, service, product or cause, through a crowdfunding platform such as the Lending Club.
Debenture (also often secured)	L		✓	✓	✓	Institutional and retail investors[8]	Often with restrictive covenants.
Bonds (also secured) (issued on the primary market[10])	L			✓	✓	Institutional and retail investors,[8] underwriter[6] if under subscribed	Credit rating by rating agency required. Bonds may be listed on BESA.[9]
Foreign bonds (also secured) (issued on the primary market[10])	L			✓	✓	Foreign institutional and retail investors,[8] underwriter[6] if under subscribed	Credit rating by rating agency required. Foreign bonds are denominated in the currency of the foreign country of issue (e.g. USD[11] if issued in the USA). May be listed on a foreign securities exchange. Implies foreign exchange risk. SARB requirements.
Eur b nds (also secured) (issued on the primary market[10])	L			✓	✓	Foreign institutional investors,[8] underwriter[6] if under subscribed	Credit rating by rating agency required. May be listed on a foreign securities exchange, e.g. London Stock Exchange. Eurobonds are denominated in a foreign currency that is not used in the country of issue (e.g. in EUR[12] or USD,[11] if issued in the UK). Implies foreign exchange risk. SARB requirements.

Forms of new finance available to the SA business (a selection)	Term[1]	Typically used by the following entities: Up-start (seed / early stage)	BEE	SMME[2] incl. develop-ment (with track record)	Large en-tity (un-list-ed)	En-tity listed on JSE	Typical source of finance / investor (South African, unless indicated otherwise)	Typical requirements / purpose / detail
MEZZANINE CAPITAL								
Unsecured, subordinated loan	M, L	✓					Venture capit l houses	L rge equity interest held by m n gement.
	M, L		✓				Vendor financing,[5] banks	BEE entity uses this finance to obtain shareholding in a company seeking BEE shareholding.
	M, L			✓			Shareh lders, private equity houses, DFIs[3]	
Preference shares	M, L	✓					Venture capital houses	Large equity interest held by management.
	M, L		✓				V ndor financing,[5] banks	BEE entity uses this finance to obtain shareholding in a company seeking BEE shareholding.
	M, L			✓	✓		Private equity houses, merchant banks	Large equity interest held by management.
	M, L					✓	Institutional and retail investors[8]	
Unsecured, subordinated, convertible debt	M, L	✓					Venture capital houses	Large equity interest held by management. Growth potential.
	M, L		✓				Vendor financing,[5] banks	BEE entity uses this finance to obtain shareholding in a company seeking BEE shareholding.
	M, L			✓			Private equity houses	Large equity interest held by management. Growth potential.
HYBRID CAPITAL								
Shareholders loan	M, L	Refer to unsecured subordinated loan under mezzanine finance						
Preference sha es	M, L	Refer to preference shares under mezzanine finance						
Convertible debent res or loan	M, L	✓					Venture capital houses, DFIs[3]	Large equity interest held by management, growth potential.
Royalty financing	M, L	✓					Venture capital funds	Royalty is payable based on % of turnover (therefore linked to equity). Sometimes combined with other forms of finance.
Convertible preference shares	M, L			✓	✓		Private equity houses, merchant banks	Large equity interest held by management, growth potential.
Crowdfunding (reward-based)	M, L	✓					Internationally, from a large number of people and non-banks via the Internet	The 'crowd' funds a creative project, service, product or cause, through a crowdfunding platform such as Kickstarter, in return for rewards such as discounted products.

Forms of new finance available to the SA business (a selection)	Term[1]	Typically used by the following entities: Up-start (seed / early stage)	BEE	SMME[2] incl. develop-ment (with track record)	Large en-tity (un-list-ed)	En-tity listed on JSE	Typical source of finance / investor (South African, unless indicated otherwise)	Typical requirements / purpose / detail
EQUITY								
New ordinary shares issued	L	✓					Entrepreneur (personal investment), friends, family, angel investors, enture capital funds	Growth potential, strong m n gement team.
	L		✓				Investment banks, merchant banks. (S all shareholding in BEE entity, often acco panied by loan finance)	Growth potential, strong management team.
	L			✓			Existing owners, mployees, clients, merchant banks, private equity funds, DFIs[3], foreign direct investors[7]	Growth potential, strong management team, available exit routes.
	L				✓	✓	Existing owners, directors, employees, clients, institutional and retail investors,[8] foreign direct investors,[7] underwriter[6] if under subscribed	(Differentiate between primary and secondary markets,[10] and listing on local or foreign stock exchanges).
Rights issue	L			✓	✓	✓	Existing shareholders	
Initial Public Offering (IPO)	L		✓		✓		Institutional and retail investors,[8] corporates, [6] underwriter if under subscribed	To obtain a listing on the JSE – conditions to be met.
Crowdfunding (equity-based)	L	✓					Internationally, from a large number of people and non-banks via the Internet	The 'crowd' provides equity to fund a creative project, service, product or cause, through a crowdfunding platform such as Kickstarter.

NOTES

1 Sh rt-term finance (S) is normally repayable or has a maturity date of less than one year, or less than one operating cycle of the business. Medium-term finance (M) may be repayable or may have a maturity date of on year up to roughly ten years; long-term finance typically more than ten years, or is not repayable. (Oftentimes the exact year-di tinction between S, M and L is not clear-cut).

2 SMME is an acronym for Small-, Medium- and Micro-sized Entities.

3 DFI is an acronym for Development Finance Institution. South African DFIs include the Industrial Development Corporation (IDC) and the Development Bank of South Africa (DBSA). DFIs normally have specific mandates and several qualifying criteria coupled to development goals for empowerment, entrepreneurship, and specific industries.

5 In this context, the vendor represents the company seeking a BEE shareholder; vendor financing is where the financing (in whatever form) is provided by the vendor to a BEE entity.

continued

An underwriter (usually an investment bank or a syndicate of banks) pursues investors on behalf of entities issuing new debt or equity, and takes up self-ownership in the case of under subscription.
Foreign direct investors are investors from beyond the borders of South Africa investing in (e.g.) the ordinary shares of the South African entity.
Institutional investors represent organisations investing funds on behalf of other parties. These organisations include banks, pension funds, insurance companies, and investment funds. Retail investors represent individual investors.
BESA is an acronym for the Bond Exchange of South Africa, a subsidiary of the JSE Limited.
A primary market is where *new* securities (debt or equity) are sold on the capital market, often with the help of an underwriter. The secondary market is not a source of new finance, but the market where *existing* securities are sold by one investor to another; this is facilitated by a securities exchange, such as BESA or JSE, or over the counter (OTC) trading.
USD is an acronym for the United States dollar currency.
EUR is an acronym for the euro currency.
a Sometimes used also as medium-term finance, especially by SMMEs.

Practice questi ns

Question 7–1 *(Intermediate)* *15 marks 22 minutes*

ElectriBolt Ltd ('ElectriBolt') is an independent electricity supplier with various power-generation operations throughout South Africa. ElectriBolt is listed on the main board of the Johannesburg Securities Exchange. The company's most recent financial reporting date was 31 D c mb r 2011.

On 31 December 2011 Electribolt acquired the Augrabies division of PowerSmart Ltd ('PowerSmart'), a large electricity supplier, for R16 million. The Augrabies division operates a hydro-electricity plant and has a contract to continue for another 4 years. The division was acquired by Electribolt as a going concern, including all assets and liabilities except for cash and cash equivalents and taxation liabilities. The Augrabies division is expected to receive constant cash inflows and to incur constant operating cash outflows for the remainder of its contract. No significant further capital expenditure is expected. However, the Augrabies division is required to rehabilitate the site where the hydro-electricity is generated, in 4 years' time.

ElectriBolt is currently considering the following financing alternatives for the transaction:

Obtaining a R16 million medium-term loan from ElectriBolt's bankers. The loan is to bear interest at 1% above the prevailing prime overdraft rate. The loan is to be repaid in one bullet payment at the end of four years. Interest is to be calculated and compounded annually in arrear, and capitalised into the outstanding loan balance. Transaction costs of 1% of the principal amount will be payable at the inception of the medium-term loan. The interest to be incurred on such a long-term loan is deductible for taxation purposes in terms of section 24J of the Income Tax Act; or

The issue of compulsory convertible preference shares with a par value of R16 million. Preference shareholders will be ntitl d to an annual dividend calculated as 88% of the prevailing prime overdraft rate multipli d by the par value of shares held. ElectriBolt is required to pay preference dividends annually in arrear and has no discretion with regard to declaring these dividends. Each preference share will automati ally onvert into one ordinary share after four years. Analysts predict that the value of the conve ted sha es at the end of year four will amount to R17 800 000.

The current prime overdraft rate is 9% per annum (nominal and pre-tax) and this rate is not expected to change significantly over the next couple of years.

(Assume the current date is 1 January 2012 and that the choice in finance should be finalised on this same date. Further assume that the financing amount will also be received on this date in order to pay the purchase considerati n to PowerSmart.)

(Ignore econdary tax on companies, dividend tax and any possible impact of section 8 of the Income Tax Act.)

Required:

( ) With regard to ElectriBolt Ltd evaluating the financing of the acquisition of the Augrabies division of PowerSmart Ltd through obtaining the medium-term loan or through the issue of the preference shares:

(i) Calculate and determine which instrument will be more cost effective for ElectriBolt Ltd to use; and **(*10 marks*) (ii)** Discuss any other factors ElectriBolt Ltd should consider in deciding which instrument to use. **(*5 marks*)**

(Extract from 2010 Qualifying Examination Part 1, updated and slightly adapted (SAICA, 2010))

Solution:

Part (a)(i)

	1 January: Year:	2012 0	2013 1	2014 2	2015 3	2016 4
Medium-term loan	**% / R'000**	**R'000**	**R'000**	**R'000**	**R'000**	**R'000**
Calculate the internal rate of return (IRR):						
Initial advance		16 000,0				
Transaction fees		(160,0)				
Tax on transaction fees (R160k × 28%)			44,8			
Tax effect of section 24J at 28% (**A** [Calc. 1] × 28%)			448,0	492,8	542,1	596,3
Bullet payment *(PV = 16 000; I/YR = 10% (9% + 1%); N = 4; Calculate FV)*						(23 425,6)
		15 840,0	492,8	492,8	542,1	(22 829,3)
IRR per annum	7,39%	(This equals the after tax cost of new debt [k_d].)				

Calculation 1: Section 24J effect				
24J accrual amount (**A** = B × C)	1 600,0	1 760,0	1 936,0	2 129,6
Pre-tax YTM (**B**) should equal the variable interest rate =	10%	10%	10%	10%

Test

Determine all cashflows that fall within the ambit of Section 24J (thus ignore transaction fees):

Calculate bullet payment amount: PV = 16 000; I/YR = 10% (9% + 1%); N = 4; Calculate FV (this should equal 23 425,60). Now calculate the IRR: CF0 = 16 000; CF4 = – 23 425,60; Calculate IRR/YR (this should equal 10,00%)

Adjusted initial amount (**C**)	16 000,0	17 600,0	19 360,0	21 296,0
Initial amount	16 000,0	16 000,0	16 000,0	16 000,0
Plus: prior accrual amounts	0,0	1 600,0	3 360,0	5 296,0
Period 1 (e.g. 16 000 × 10%)		1 600,0	1 600,0	1 600,0
Period 2 (e.g. 16 000 × 10%)			1 760,0	1 760,0
Period 3 (e.g. 16 000 × 10%)				1 936,0
Less: prior interest payments	0,0	0,0	0,0	0,0

In this case we do not have to calculate a net present cost (NPC) using k_d, as it will result in a NPC equal to the initial advance (but n gativ). The calculation is shown for the sake of illustration only:

Net cashflows above, ex luding initial advance		(160,0)	492,8	492,8	542,1	(22 829,3)
Factors		1,000	0,931	0,867	0,807	0,752
NPC, discounted at k_d	7,39% (16 000,0)	(160,0)	458,9	427,3	437,7	(17 163,9)

Preference shares

Calculate the internal rate of return (IRR):					
Preference share issue	16 000,0				
Preference share dividends		(1 267,2)	(1 267,2)	(1 267,2)	(1 267,2)
C nversi n into equity					(17 800,0)
	16 000,0	(1 267,2)	(1 267,2)	(1 267,2)	(19 067,2)
IRR per annum	10,33%				

Or lternatively,					
Net cashflows above, excluding initial advance	0,0	(1 267,2)	(1 267,2)	(1 267,2)	(19 067,2)
Factors	1,000	0,931	0,867	0,807	0,752
NPC, discounted at k_d 7,39% (17 637,3)	0,0	(1 180,0)	(1 098,8)	(1 023,1)	(14 335,4)

Note: figures may not total correctly due to rounding.

Discussion of the value of equity at end of Year 4: amount is an estimate of the value of the share on that date only – sensitivity analysis should be performed.

Conclusion:

Cost of medium term loan is much cheaper than preference share based on info provided. (Candidate compared like with like [IRR with IRR, or NPC with NPC] and offered a conclusion in line with this.)

Chapter 8

Analysis of financial and non-financial information

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- describe the various financial reports used to communicate basic financial information;
- identify the objectives of financial and non-financial analysis;
- identify the different users (stakeholders);
- describe the different analysis areas and information requirements each user is typically interested in;
- describe the different techniques used for financial and non-financial analysis (*comparative financial statements, indexed financial statements, common size statements, financial analysis, non-financial analysis and balanced scorecard);*
- perform financial analysis calculations for each financial analysis area (*profitability, capital structure and solvency, liquidity, return on invested capital, financial market / investor, cashflow related and performance related)* based on user needs;
- provide users with insightful comments based on financial analysis comparisons between historical, budgeted, industry or competitor financial information at a fundamental, intermediate or advanced difficulty level;
- perform non-financial analysis calculations for social, environmental and other entity specific analysis area;
- provide users with insightful comments relating to the non-financial comparisons between historical, budgeted, industry or competitor non-financial information;
- describe the purpose of a balanced scorecard;
- tabulate a balance scor card worksheet;
- describe the limitations of accounting data; and
- describe the limitations of ratio analysis.

Evaluating an entity's financial position and performance is critical in ensuring the financial sustainability of the organization. Historically, the main emphasis has been on the financial information, but with the advent of the integrated report, this has been extensively broadened to include non-financial information as well. The purp se f this chapter is to provide a comprehensive overview of how this information should be analysed, for wh m and m st importantly how it should be interpreted.

8.1 Financial reports

An nnual **integrated report** is arguably the single most important report that entities provide to their users (st keholders). An integrated report is a concise communication about how an organisation's strategy (*refer to S rategy and risk in Chapter 2)*, governance, performance and prospects, in the context of its external environment, leads to the creation of value in the short, medium and long term (IIRC, 2014) . It reports on the financial and sustainability performance within the business process of the entity. In addition to the

all-important annual financial statement performance, users are also interested in the entity's non-financial performance such as environmental impact, governance practices and social outcomes. Integrated reporting is recommended for all entities, however, it is only mandatory for those entities listed on the Johannesburg Securities Exchange of South Africa in terms of King III's "apply or explain" basis.

The annual **financial statements** of an entity should be in compliance with International Financial Reporting Standards (IFRS), fairly present the state of affairs of the entity and the results of its operations for the financial year. The annual financial statement of an entity will include the **Statement of financial position**, **Statement of profit or loss and other comprehensive income**, **Statement of changes in equity, Statement of cash flows** and **Notes** (summary of accounting policies and other explanatory information).

8.2 Objectives and users of financial and non-financi l n lysis

An analysis provides users with meaningful information and enables users (stakeholders) to interpret the financial and non-financial information provided and make informed decisions. The process of analysis and interpretation is aimed at establishing trends for the particular enterprise **over a period**. By comparing the results and trends revealed by the analysis with those of **c mpetit rs** and the benchmarking against the **industry,** current strengths and weaknesses as well as appropriate measures to enhance those strengths and correct any weaknesses are identified. It may also provide a basis to consider opportunities and threats, consistent with a SWOT analysis.

The objective of analysing financial statements and non -financial information is to determine the entity's performance, future prospects and financial structure. Th obj ctives of financial and non-financial analysis are closely related to the needs of the users of the financial stat m nts and non-financial information, which will now be discussed in more detail.

Users of financial information

In reality, users (stakeholders) of financial and non-financial information have different information requirements. Typical users include investors / shareholders, financiers, creditors, employees, management, auditors, government agencies, customers, general public, etc.

- *Investors / shareholders (current and potential)*

Current investors

Shareholders will receive dividends only after loan providers' claims (interest) have been met. They would therefore be interested in the **risk** involved in retaining their investments as opposed to liquidating it, the entity's current profitability and the expected earnings and capital value growth. These investors are typically interested in the **Return on Invested Capital ratios** *(refer to box **IV** in the Financial analysis outline presented in section 8.3.4.1)* amongst others.

This group of users include anoth r type of investor / shareholder, namely the **potential investor**. Whether the object is a small inv stm nt, a total buy-out, a merger or a take- over, the basic requirement is the same as for the current shareholder, which is to determine a value for the business based on the determination of **risk, profitability and growth.** A valuation of a business cannot be performed until the soundness of the business has been dete mined th ough the use of various analysis techniques. These investors are typically interested in the **Financial ma ket / investor ratios** *(refer to box **V** in 8.3.4.1 Financial analysis outline)* amongst others.

Financiers

Financiers (loan providers) are interested in ratios analysing whether their investment (loan) will be repaid in full and n time. Financiers utilise these ratios to perform an initial assessment of the entity's **finance risk**, which affects the interest charged on the loan and loan covenants imposed. Loan providers are typically intere ted in the **Capital structure and solvency ratios** *(refer to box **II** in 8.3.4.1 Financial analysis outline*) among t others.

Creditors

Tr de creditors are concerned about the short-term liquidity of the firm and are typically interested in the **Liquidity ratios (**box ***III*)**, especially working capital ratios, **Cash flow-related ratios** (box ***VI***) and especially cash flow projections *(refer to boxes III and VI respectively in 8.3.4.1 Financial analysis outline)* amongst others.

Employees

Employees are concerned about the profitability of the entity as this impacts their future job security. In addition they will be interested in operational performance (such as divisional or product performance), as well as retirement benefits and remuneration. Trade unions would perform an analysis to determine whether they consider that their members are being fairly compensated or not. They are particularly interested in the relationship between profits, payments to shareholders, senior management and employees and non-financial information such as number of equity appointments, amongst others. An increasingly contentious issue is the pay disparity between the highest and lowest paid employees of the entity.

Management

Management is concerned with analysing and interpreting the financial and non-financial information that becomes available in order to exercise control. These users typically include the board of directors, the members, partners, sole owners, management accountants and the m n gers of the various departments. All areas of financial and non-financial analysis are required due to the interrelationships of all the various business aspects, as it helps management to identify changes in operations timeously and take appropriate action.

It is important to note that the financial statements often identify sympt ms as opposed to causes. A good example is the impact of increased debtors' days. The symptoms of this would be increased strain on short-term borrowings (i.e. access to overdraft facility). This sy ptom would have to be investigated to discover that the cause is ineffective credit-control policies being enforced.

Auditors

The external auditor's role is to express an opinion on the fair pr sentation of the annual financial statements (which in the case of integrated reporting includes non-financial information). Analysis and interpretation of financial statements, coupled with the auditor's knowledge of the firm under review and the industry in which it operates, would place the auditor in a better position to detect material errors and reportable irregularities allowing them to express an opinion of whether or not the financial statements present an accurate picture of the entity's financial state. With the implementation of the Companies Act 71 of 2008, the importance of financial analysis was emphasised as many smaller entities may only require an independent review which is less costly but provides limited assurance. The independent review focusses on inquiry and analytical procedures which include financial analysis. It is also important to acknowledge the ever increasing role and importance of the internal auditor from a risk management perspective.

Other interested parties

There are various other stakeholders such as government agencies, customers and the general public who may have an interest in the entity's financial and non-financial information. The South African Revenue Service (SARS) will use financial statement analysis to assess the reasonableness of income tax and VAT returns. Customers with limited suppliers may be interested in the entity's financial information to the extent it will influence future business continuance. Perhaps one of the most influential users is the general public and specifically environm ntalists who are specifically interested in social and environmental aspects typically disclosed in an annual int grat d report.

8.3 Techniques used for financial and non-financial analysis

There are vario s techniques that can be utilised to arrive at a conclusion about financial and non-financial results and s ch conclusions *are always based on comparison*. Whether the comparison is with industry averages, other similar firms, past results or budgeted (projected) results, financial and non-financial analysis can never be d ne in isolation.

The vari us techniques used in financial analysis are the following:

Comparative financial statements;
Indexed financial statements;
Common size statements;
Financial analysis;
Non-financial analysis; and
Balanced scorecard.

The first three techniques are concerned with redrafting the financial statements in slightly different formats in order to achieve meaningful comparisons, the fourth and fifth comprise a fundamental analysis of financial and

non-financial data in order to produce meaningful insights into comparative financial and non-financial information and the sixth measures performance against strategic objectives. Whichever technique is utilized though, it is essential that the financial manager is able to interpret what this information is conveying. It is not enough to just 'do the numbers' and leave the users to interpret this for themselves. Consequently interpreting is just as important as calculating.

Comparative financial statements

The comparison of financial statements over a period of five to ten years is carried out to establish a trend and to project future income, expenditure and statement of financial position. An entity simply tabulates its financial results over the desired period and then reviews the changes over the years, identifying trends and making future forecasts.

Indexed financial statements

This involves setting one year as the base year which should preferably be at the beginning of the period. This provides the best overview of the results, but any other year can be ch sen to suit a particular need. The figures for the base year are all shown in the tabulated financial statements as 100 and all prior and / or subsequent figures are shown as percentages of that year.

Common size statements

These statements are also sometimes referred to as normalis d statements. This analytical technique redrafts the statement of financial position to express each it m on the statement of financial position as a percentage of total assets. In the common size statement of profit or loss and other comprehensive income, all items are expressed as a percentage of sales revenue.

Financial analysis

Financial analysis is largely based on the financial statements of entities. It is therefore useful to examine the basic information available from these statements. In addition to calculating and commenting on these ratios over a period of time, it is important to compare the entity's performance with industry norms and its competitors. To provide insightful comments it is necessary for the analyst to have a basic knowledge of the local and global economic and political environment within which the entity operates.

One of the challenges that financial managers and students often encounter is the inconsistency in utilisation of ratios in different texts and used by different entities. It is therefore important to be consistent in an analysis**.** Even more important is the interpretation of the ratios that are calculated. A common problem is to simply state that a certain ratio has increased (or decreased) from one year to the next which is insufficient, as **value adding comments** should be provided. This includes an explanation of *why* this has happened and *what* impact this is likely to hav , as w ll as *what* remedial action may be required to address it.

Finan ial analysis outline

The outline is intended as an overall guideline to the different, specific ratios and other analysis calculations belonging to the diffe ent areas of financial analysis. This outline should form the foundation of your financial analysis knowledge which will be built on throughout this Chapter.

This o tline sho ld nonetheless not be taken as being complete or absolute (different ratios or calculations could be included in each area of analysis; in practice, business enterprises frequently use different variations, or permutati ns f ratios and other analysis calculations, to best serve an intended purpose). In addition, other sources frequently list different formulas to the ratios or calculations indicated here.

FINANCIAL ANALYSIS OUTLINE[1]

Key financial analysis ratios and other calculations – per area of analysis

[1]**Note formula/method for ratio/calculation are shown in 8.3.4.2**

(I) PROFITABILITY:

These ratios/calculations analyse the entity's ability to generate income, to effectively control its expenses and to generate an acceptable profit compared to the performance of the prior year, budget, the industry and competitors.

Ratios / calculations (in usual order of preference):

Specific ratios based on supplied information (you have to determine this based on the scenario)
l Change in Revenue (%) l
Gross Profit margin (%)
l Change in gross profit (GP) (%) l
Operating Profit margin (%)
l Earnings Before Interest and Tax (EBIT) margin (%)
l Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA) margin (%)
l Operating costs as percentage of revenue (%)
Major operating expenses as percentage of revenue (%) *(segregate into fixed and variable cost components, if possible)*
l Change in operating expenses (%)
l Operating cashflow to operating profit (x:1) l
Degree of operating leverage (x:1)
l Change in other income, expenditure items (%) l
Effective interest rate (%)
l Net Profit margin (%) l
Change in net profit (%)
l Earnings per share (cents)
l Headline Earnings Per Share (HEPS) (cents)
Common size statement of profit and loss and other comprehensive income

(II) CAPITAL STRUCTURE AND SOLVENCY:

The capital structure refers to the composition of an entity's capital. Forms of capital include ordinary shares, interest-bearing debt and hybrid capital.

An entity also frequently uses other forms of finance that arise in the routine course of business – such as trade accounts payable – which do *not* constitute capital and is therefore not considered here. Solvency is a measure of an entity's ability to meet its long -term expenses, and to accomplish long-term expansion and growth.

Ratios / calculations (in usual ord of preference):

l Specific ratios based on supplied information (you have to determine this based on the scenario)
l Capital gearing ratio (x:1)
l Interest-bearing debt to equity ratio (x:1)
Net interest-bearing debt to equity ratio (x:1)
l Comparison of capital structure of the entity to the target structure (considering the industry/competitors)
l Net interest-bearing debt to EBITDA (x:1) l
Total debt ratio (%)
l Interest cover (x:1) or times interest earned

(III) LIQUIDITY:

In this context, liquidity measures the entity's ability to pay its debts as and when they fall due.

As an entity's working capital directly affects its short- term cash flow from the ordinary course of business, it is closely linked to liquidity.

Ratios / calculations (in usual order of preference):

l Specific ratios based on supplied information (you have to determine this based on the scenario)
l Current ratio (x:1)
l Acid-test (quick) ratio (x:1)
l Inventory turnover (times)
l entoryIn-days (days)
l Trade and other receivables-days (days) l
Trade and other payables-days(days)
Operating cyce or Cash conversion cycle (days)
l Cash ratio (x:1)
Operating csh fow to current liabilities (x:1)

Key financial analysis ratios and other calculations – per area of analysis (continued)

(IV) RETURN ON INVESTED CAPITAL:

These ratios/calculations analyse *the entity's ability to generate a return relative to an investment base (e.g. invested capital, equity, or assets) and to minimise non-essential payments.*

Ratios / calculations:

Specific ratios based on supplied information (you have to determine this based on the scenario)
l Return on Invested Capital (ROIC) (%) l
Compare ROIC to WACC over time l Return on Equity (ROE) (%)
l Return on capital employed (ROCE) (%) l
Return on total assets (%)
l Asset turnover
l Dividend payout ratio (%) l
Effective tax rate (%)

(V) FINANCIAL MARKET / INVESTOR:

These ratios/calculations analyse *the performance of the entity from the perspective of the financial market, and could also indicate capital investment potential.*

Ratios / calculations:

l Specific ratios based on supplied information (you have to determine this based on the scenario)
P/E-multiple over time or Earnings-yield over time
Enterprise value (EV)/EBITDA-multiple over time
l ROIC vs. WACC over time
l Economic Value Added (EVA®) l
Change in share price (%)
l Price / Sales multiple l
EV / Sales multiple
l Price / Book value multiple l
Dividend yield over time (%)
Dividend cover over time (times)

(VI) CASH FLOW-RELATED:

For this area of analysis you should customise other ratios and calculations in order to highlight a specific cash flow effect. In addition, focus on information in the statement of cash flows.

No entity is able to operate as a viable going concern if it is not generating cash (positive cash flows). If turnover is not efficiently converted into cash, the entity will have to increase its financial risk by borrowing, until the day of reckoning arrives and it is called upon to repay the debt. Hence, **'Cash is king'** .

Ratios / calculations:

l Specific ratios based on supplied information (you have to determine this based on the scenario)
Refer to the statement of cash flows to assess whether there are specific areas to be analysed further.
Ratis and calculations from other areas of analysis (these may be customised using a cash-fcus, and will frequently include the area of liquidity)

In additin, you may:

Compare likely csh inflows to likely non-discretionary csh outfows (including cash interest and cpitl repayable on debt)
Further analyse operating activities
– Operating cash flows to income
– Operating cash flows to total debt
– Cash revenue to reported revenue l
Further analyse financing activities
– Cash interest cover
– Cash dividend cover

(VII) PERFORMANCE-RELATED:

This area of analysis depends on the specific area of performance to be analysed. It draws heavily from the other areas indicated in this table and could therefore include several ratios or calculations specified there.
It could also refer to divisional performance measurement.
Business failure prediction models such as the Z-score and the A-score incorporates various other areas of analysis.
l DuPont analysis incorporates operational efficiency, asset utilisation and financial leverage.

When performing a financial analysis and commentary based on your interpretation, it is important to always apply the information provided in the scenario.

Formulae to financial analysis calculations

(i) PROFITABILITY:

The ratios covered in this area focus on measuring the entity's ability to generate income, to effectively control its expenses and to generate an acceptable profit. Most other sources, however, include Return on Assets (ROA), Return on Equity (ROE) and Return on Capital Employed (ROCE) as part of profitability as these ratios measure the entity's ability to generate a return relative to an investment or asset. In this Chapter, these ratios are covered separately as part of IV) Return on Invested Capital, but should you be tested on profitability **only** these ratios should be **included here**.

a	Change in Revenue (%)	= (Current year Revenue – Prior year Revenue) / Prior year Revenue
b	Gross Profit margin (%)	= (Revenue – Cost of s les) / Revenue
c	Change in gross profit (GP) (%)	= (GP current year – GP prior year) / GP prior year
d	Operating Profit margin (%)	= Operating pr fit / Revenue
e	Earnings Before Interest and Tax (EBIT) margin (%)	= EBIT / Revenue
f	Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA) margin (%)	= EBITDA [a] / Revenue A ortisation
g	Operating costs as percentage of revenue (%)	= Op rating Cost / Revenue
h	Major operating expenses as percentage of revenue (%)	For ach major operating expense: = Operating expense / Revenue
i	Change in operating expenses (%)	For each major operating expense: = (Expense current year – Expense prior year) / Expense Prior year
j	Operating cash flow to operating profit (x:1)	= Net cash flows from operating activities / Operating profit
k	Degree of operating leverage (x:1)	= Total contribution / Operating profit *or* = % Change in operating profit / % Change in revenue
l	Change in other income, expenditure items (%)	For each major other income and expenditure item: = (Figure current year – Figure prior year) / Figure Prior year
m	Effective inter st rate (%)	= Total finance cost / Total interest-bearing debt at **end of previous period** (or average)
n	Net Profit margin (%)	= Total net profit for the year / Revenue
o	Change in net p ofit (%)	= (Net profit current year – Net profit prior year) / Net profit prior year
p	Earnings per share (cents)	= Profit attributable to equity holders / Weighted Average number of ordinary shares x 100 *(to convert rand to cents)*
q	Headline Earnings Per Share (HEPS) (cents)	= Headline Earnings / Weighted average number of ordinary shares × 100 *(to convert rand to cents)*
r	Common size statement of profit and loss and other comprehensive income	All items are expressed as a percentage of sales revenue

Note:

EBIT or EBITDA does not include other income as this normally does not form part of the operating activities.

(II) CAPITAL STRUCTURE AND SOLVENCY RATIOS:

These ratios assess how much debt an entity is carrying, relative to its ability to repay the interest expense as well as the capital. One therefore considers the amount of debt in the statement of financial position and the entity's repayment ability in the statement of profit or loss and other comprehensive income.

Shareholders can achieve the following through debt financing:

Obtain finance without losing control of the entity.

Leverage the return on owners' equity if the entity derives a higher return on borrowed funds than it pays in interest.

Financial leverage or gearing can sometimes cause financial distress for an entity experiencing poor business conditions such as lower sales and higher costs than expected. The cost of lo n is contractually fixed and has to be repaid, which could cause financial distress for an entity with limited c sh vailable. Entities should therefore be careful in balancing their desire **for higher expected returns** against the increased **financial risk** associated with debt.

Note: **Where fair market values of assets / liabilities / any form f capital are available or could be calculated this should be used instead of carrying amounts.**

a	Capital gearing ratio (x:1)	= Total Interest bearing debt [a] (short – and long-term) / (Total shareholder's equity (including reserves) + Total Interest bearing debt)
b	Interest-bearing debt to equity ratio (x:1)	= Total int rest-bearing debt [a] (short – and long-term) / Total shareholder's equity (including reserves)
c	Net interest-bearing debt to equity ratio (x:1)	= (Total interest-bearing debt [a] (short – and long-term) – Cash and cash equivalents) / Total shareholder's equity (including reserves)
d	Comparison of capital structure of the entity to the target structure	Compare the actual capital composition to the target structure
e	Net interest-bearing debt to EBITDA (x:1)	= (Total interest-bearing debt [a] (short – and long-term) – Cash and cash equivalents) / EBITDA
f	Total debt ratio (%)	= Total debt / Total assets
g	Interest cover (x:1) or times interest earned	= EBIT / Total finance cost

Note:

Bank overdraft is normally utilised for short-term working capital purposes and does not form part of an entity's perman nt source of funding (unless stated or implied otherwise) and is thus excluded from total interest bearing d bt for the purpose of capital structure ratios.

(III) LIQUIDITY:

An entity de ives cash p imarily from converting its current assets (inventory and receivables) in order to meet its current obligations. Current assets are more liquid (easily converted to cash) than long-term assets. Working capital represents ***operating liquidity*** available to a business and working capital management involves the management of trade debtors, creditors, inventory and cash and thus evaluates management's efficiency.

a	Current ratio (x:1)	= Current assets / Current liabilities
b	Acid-test (quick) ratio (x:1)	= (Current assets – Inventory [a]) / Current liabilities
c	Inventory turnover (times)	= Cost of sales / Inventory [b]
d	Inventory-days (days)	= Inventory [b] / Cost of sales × 365 [c]
e	Trade and other receivables [f]-days (days)	= Trade and other receivables [b] / Credit sales [d] × 365 [c]
f	Trade and other payables [f]-days (days)	= Trade and other payables [b] / Credit purchases [e] × 365 [c]
g	Operating cycle or Cash conversion cycle (days)	= Trade and other receivable-days + Inventory-days – Trade and other payables-days

continued

h	Cash ratio (x:1)	= (Cash and Cash equivalents + Marketable securities) / Current liabilities
i	Operating cash flow to current liabilities (x:1)	= Net cash flows from operating activities / Current liabilities

Note:

Based on current assets less inventory and less any other illiquid current asset.
In practice the use of average balances is recommended, however, for the purpose of this chapter you should use closing balances, unless otherwise stated.
Average balances = (Opening balance + Closing balance) / 2
In practice 360 days is often used, however for the purpose of this ch pter you should use 365 days per year, unless otherwise stated.
For the purpose of this chapter use total sales if there is insufficient credit sales details available.
For the purpose of this chapter use total cost of sales if there is insufficient credit purchase details available.
Alternatively analyse trade account balances.

(IV) RETURN ON INVESTED CAPITAL:

Note: Where fair market values of assets / liabilities / any form of capital are available or could be calculated this should be used instead of carrying amounts.

a	Return on Invested Capital (ROIC) (%) <u>Where:</u> NOPLAT [a] Invested Capital =	N t op rating profit less adjusted taxes (NOPLAT [a]) / Inv st d Capital = Operating profit less recalculated operating taxes (excluding the effect of interest and non-operating items) [giving operating profit available to all investors] *When viewed from a perspective of **where** the capital has been invested in operations:* = Operating assets – operating liabilities = (Property, plant and equipment + (current assets – excess cash) + goodwill + intangible assets [b]) – current liabilities [b] *Or when viewed from a perspective of **what** capital has been invested in operations:* = (Debt capital + equity and equity equivalents + preference share capital) – (excess cash – non-operating assets and investments) = (Interest-bearing debt (short and long-term) + equity capital (including reserves and retained earnings [c]) + preference share capital) – (excess cash – non-operating assets and investments)
b	Compa e ROIC to Weighted Average Cost of Capital (WACC) over time	If correctly calculated ROIC is comparable to the entity's WACC
c	Ret rn on Eq ity (ROE) (%)	= Profit attributable to equity holders / Shareholders' funds [d] *or* = EPS / Market price per share *or* = HEPS / Market price per share
d	Return on capital employed (ROCE) (%)	= EBIT / Capital employed [e]
e	Return on total assets (%)	= EBIT / Total assets [f]
f	Asset turnover	= Revenue / Total assets [f]
g	Dividend payout ratio (%)	= Dividend per share / Earnings per share
h	Effective tax rate (%)	= Income tax expense / Earnings before income tax

Other references may use the acronym 'NOPAT' for the same concept.
Deferred tax could be removed here when viewed as an equity-equivalent (advanced).
Deferred tax could be added here as an equity-equivalent (advanced).

Shareholders' funds = Normal share capital + reserves.
Capital employed = Shareholders' funds + interest-bearing debt (or = Total Assets – Current Liabilities).
Averages can be used in practice however for this Chapter you should use closing balance figures.

Note: **ROE only analyses profitability related to an entity's shareholders' funds whereas ROCE considers shareholders' funds and interest-bearing debt as well, thus providing a better indication of financial performance for entities with significant interest-bearing debt.**

(V) FINANCIAL MARKET / INVESTOR:

Financial market value ratios reflect investors' perception of future prospects. The market value ratios relate the entity's share price to its earnings and book value per share. These ratios will be high for a financially sound entity and the share price will reflect this.

Note: This area has strong overlap with the topic of valuations (*refer to Business and equity valuations in Chapter 11 for more detail).*

a	P / E multiple	= Market price per share / HEPS (This multiple c uld be calculated in several other ways)
b	Earnings-yield (%)	= HEPS / Market price per share
c	EV / EBITDA multiple	= (Current full arket capitalisation [a] + estimated value of debt capital) / EBITDA for one year
d	ROIC vs. WACC over time	Compare ROIC vs. WACC over time
e	EVA® (Economic Value Added)	= Adjust d NOPLAT – (Adjusted Invested capital × WACC)
f	Change in share price (%)	= (Current – prior year share price) / Prior year share price
g	Price / Sales multiple	= Current full market capitalisation [a] / Revenue for one year
h	EV / Sales multiple	= (Current full market capitalisation [a] + estimated value of debt capital) / Revenue for one year
i	Price / Book value multiple	= Current full market capitalisation [a] / carrying value of shareholders' equity
j	Dividend yield (%)	= Dividend per share [b] / Market price per share
k	Dividend cover (times)	= Earnings per share / Dividend per share [b]

Note:

Full market capitalisation = Total number of issued shares × Market price per share. It is important to r m mb r that this **replaces capital and reserves**.

In terms of divid nd p r share, shares are classified *cum div* in the period between declaration of the dividend and the last day to register for the dividend. If sold *cum div* **the right to the next dividend** is passed to the buyer. A person who purchases shares listed as *ex div* will **not** receive the *next* dividend payment if the dividend has been declared but not yet paid.

Financial analysis example

Ratios are dealt with under the following analysis areas:

Pr fitability;
Capital structure and solvency ratios;
Liquidity;
Return On Invested Capital;
Financial market / Investor;
Cash flow-related; and
Performance-related.

The financial analysis example below covers in detail, ratio analysis areas I) to V), which is based on extracts of he consolidated financial statements of Funky Junk Ltd Group. The Cashflow- related analysis is only dealt with in part and Performance – related analysis draws heavily from the other areas indicated in the financial analysis outline and could therefore include several ratios or calculations included under categories I) to VI).

This example will indicate three difficulty levels namely: ***Fundamental, Intermediate and Advanced***. Students who are at a ***Fundamental*** level are expected to comment only on a ***Fundamental*** level, students who are at an ***Intermediate*** level are expected to comment on a ***Fundamental and Intermediate*** level and students at an ***Advanced*** level are expected to comment on a ***Fundamental, Intermediate and Advanced*** level.

At an *advanced difficulty level* ***you should be able to*** *calculate all market values* **(refer to Chapter 10 for Valuations of preference shares and debt and to Chapter 11 for Business and equity valuations).** ***Furthermore a financial analysis question of this nature requires students to manipulate the financial information in a meaningful manner and provide*** *insightful comments* ***(simply indicating an increase or decrease is*** *not sufficient****).***

Funky Junk financial analysis example:

The following are extracts of the consolidated financial statements of Funky Junk Ltd Group for the year ended 30 June 20X4:

EXTRACT OF THE CONSOLIDATED STATEMENT OF FINANCIAL POSITION AS AT 30 JUNE 20X4

	20X4 R'000	20X3 R'000
ASSETS		
Non-current assets		
Property, plant and equipment	183 700	109 000
Intangible assets	30 200	26 800
Listed investment (marketable securities)	10 000	10 000
Financial asset	28 000	0
Goodwill	0	7 000
Investment in associate	0	20 230
	251 900	173 030
Current assets		
Inventories	94 000	65 600
Trade and other receivables	131 000	98 000
Cash and cash equivalents	4 590	10 220
	229 590	173 820
Total assets	481 490	346 850
EQUITY AND LIABILITIES		
Equity attributable to owners of the parent		
Share capital	180 000	150 000
Retained earnings	166 310	92 100
Revaluation surplus	14 400	0
Total equity	360 710	242 100
Non-current liabilities		
Long-term loan	100 700	92 400
Total non-cu ent liabilities	100 700	92 400
Current liabilities		
Trade and other payables	9 500	4 000
Short-term portion of long-term loan	9 780	7 350
Pr visi n	800	1 000
Total current liabilities	20 080	12 350
Total liabilities	120 780	104 750
Total equity and liabilities	481 490	346 850

EXTRACT OF THE CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEAR ENDED 30 JUNE 20X4

	20X4 R'000	20X3 R'000
Revenue	916 440	783 282
Cost of sales	(537 600)	(425 870)
Gross profit	378 840	357 412
Other income	2 600	1 800
Other expenses (assume operating)	(249 000)	(200 000)
Finance costs	(17 000)	(12 000)
Share of profit of associate	2 320	2 000
Profit before tax	117 760	149 212
Income tax expense	(29 600)	(34 397)
PROFIT FOR THE YEAR	88 160	114 815
Other comprehensive income		
Items that will not be reclassified to profit or loss		
Revaluation surplus	20 000	0
Tax on revaluation surplus	(5 600)	0
Other comprehensive income for the year, net of tax	14 400	0
TOTAL COMPREHENSIVE INCOME FOR THE YEAR	102 560	114 815

EXTRACTS OF THE CONSOLIDATED STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 30 JUNE 20X4

	Share Capital R	Revaluation surplus R	Retained earnings R	Total R
Balance at 1 July 20X3	150 000	0	92 100	242 100
Changes in equity for 20X4				
Total comprehensive income for the year	0	14 400	88 160	102 560
Profit for the year	0	0	88 160	88 160
Other comprehensive income	0	14 400	0	14 400
Dividends	0	0	(13 950)	(13 950)
Issue of shares	30 000	0	0	30 000
Balance at 30 June 20X4	180 000	14 400	166 310	360 710

EXTRACT OF THE CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 30 JUNE 20X4

	R'000 20X4
Net cash from ope ating activities	10 190
Net (decrease) in cash and cash equivalents	(5 630)
Cash and cash eq ivalents at beginning of period	10 220
Cash and cash eq ivalents at end of period	4 590

Industry averages and comparatives for the 20X4 financial year:

Revenue increase from previous year	12%
Gross profit margin	43%
Operating profit margin	18%
E rnings growth over the past two years	15%

continued

Price earnings multiple	10
Enterprise Value / EBITDA multiple	6
Dividend cover	8 times
Current ratio	4:1
Quick ratio	2,5:1
Inventory days	55 days
Debtor days	38 days
Creditor days	62 days

Assumptions:

The inflation rate is 6%.

The prime interest rate is 9%.

- For all debt, other investments and intangible assets their b k value approximates their market value.

Funky Junk's target debt to equity ratio is 23:77 or 0,30:1.

Funky Junk's WACC is 30%.

Additional information:

- At the end of 20X3 there were 100 000 shar s in issue and from the beginning of 20X4 there were 120 000 shares in issue. The 20X3 closing share price was R3,30 per share while the 20X4 closing share price was R2,50 per share. Assume that the additional shares issued at the beginning of 20X4 were issued at a discount and that the issue price was 1,50 per share.

  Note that Funky Junk doesn't have any non- controlling interests per the statement of financial position or statement of profit or loss and other comprehensive income as it owns 100% of its subsidiary.

  All amounts per the analysis below are in R'000 and rounding differences may occur.

You are required to calculate the various ratios and provide insightful comments to the following analysis areas:

Profitability ratios;
Capital structure and solvency;
Liquidity;
Return on invested capital;
Financial mark t / inv stor;
Cashflow-r lat d; and
Performan e-related.

Solution to Funky Junk example:

(1) PROFITABILITY

Change in revenue (%)

(916 440 – 783 282) / 783 282
17% increase

Advanced calculation

Real growth rate (Based on the Fisher equation):

1 + nominal rate = (1 + inflation rate) × (1 + real rate) 1 + 0,17 = (1 + 0,06) × (1 + real) 1,17 = (1,06) × (1 + real rate)

Real growth rate = 10%

Difficulty level	*Comment*
Intermediate	Funky Junk showed a ***good growth*** in revenue of 17% from 20X3 to 20X4.
	Revenue also grew at a **faster / better** rate than industry's growth of 12%.
	Increase in Funky Junk's revenue could be due to **increased market share or effective marketing** of the sales department.
	This is **good** considering that revenue grew in excess of **inflation of 6%** and
Advanced	with a real growth per *annum equal to* ***10 %.***

Gross profit margin (%)

20X4	**20X3**
= (916 440 – 537 600) / 916 440	= 357 412 / 783 282
= 41%	= 46%

(c) Change in gross profit (%)

= (378 840 – 357 412) / 357 412
= 6% increase

Difficulty level	*Comment (b and c)*
Fundamental	Funky Junk's gross profit margin is expected to **remain fairly constant** from year to year and **revenue increases** are expected to result in other cost of sales **efficiencies such as bulk discounts,** tc. Th se bulk discounts are as a result of **economies of scale**.
Intermediate	Funky Junk's gross profit margin **worsened** from 46% (20X3) to 41% (20X4) and the 20X4 results are also **inferior** compared to the industry average of 43%.
Advanced	Cost of sales or gross profit margin **did not display the expected improvement** due to the **increase in scale of operations**. Revenue increased and with that we would expect greater quantity discounts, lower inventory holding cost per unit, etc. This could **indicate improper inventory management / weaknesses in the purchasing department** and / or that the **mark-up on sales was reduced in an effort to drive sales.**
	To fully understand the reason for this weakening in gross profit margin, additional information such as inventory valuation method, allocation of overhead costs, discounts and wastage, etc. should be investigated.

(d), (e) and (f)

For the purpose of this example operating profit = EBIT. As no additional information regarding depreciation or amortisation was provided EBIT = EBITDA. All three ratios therefore provide the same answer.

Operating profit margin (%)

Earnings Befo e Interest and Tax (EBIT) margin (%)

Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA) margin (%)

20X4	**20X3**
= (378 840 – 249 000) / 916 440	= (357 412 – 200 000) / 783 282
= 14%	= 20%

Difficulty level	*Comment (d, e and f)*
Intermediate	It is **concerning** that operating profit margin **decreased** from 20% (20X3) to 14% (20X4) **despite the increase in revenue**.

Operating profit results are also **inferior** to the industry operating margin of 18%.

Additional comments relating to operating profit margin are integrated with operating expenses ratios below.

Operating costs as percentage of revenue (%)

20X4	**20X3**
= 249 000 / 916 440	= 200 000 / 783 282
= 27%	= 26%

Comments relating to g) are provided with the comments to i) below.

Operating expenses as percentage of revenue (%) – for each major operating expense

For the purpose of this example no additional information was provided to segregate operating expenses into fixed or variable cost components and no additional information was provided to identify major operating expenses within total operating costs.

Change in operating expenses (%)

(249 000 – 200 000) / 200 000
25% increase

Difficulty level	***Comment (g and i)***
Intermediate	Its **concerning** to observe operating c sts as a percentage of sales increase from 26% (20X3) to 27% (20X4) **despite the increase in sales**.
Advanced	Once again we would expect a decrease in Funky Junk's operating costs or an increase in operating profit argin as percentage of sales due to **economies of scale**, but this was not the case here. This could indicate a gr at r **l v l of inefficiencies** in Funky Junk's management of operations. Operating costs increased (25%) at a **faster** rate than sales (17%) – this explains the decline in operating profit, EBIT and EBITDA margins. This may also be as a result of **lower murk-up in an effort to drive sales.**

Operating cash flows to operating profit (x:1)

20X4	**20X3**
= 10 190 / (378 840 – 249 000)	Comparatives not provided
= 0,08 :1	

Difficulty level	***Comment***
Fundamental	Funky Junk's operating cash flows indicate whether they were able to generate sufficient cash flow to maintain and grow their operations, or whether external financing will be necessary.
Advanced	This ratio is **not good** as it indicates that only 8% of Funky Junk's operating profit was converted into operating cash flows in 20X4. Industry and previous year should also be compared.

(k) Degree of operating leverage (x:1)

The example below is only applicable to k) and illustrates the degree of operating leverage.

Note: This example does not form part of the Funky Junk example, which is continued in ratio l) below.

Entity A (model car shop):

	Number of units	**Rand per unit**	**R**
Sales	100 000	120	12 000 000
Variable cost		10	(1 000 000)
Contribution			**11 000 000**
Fixed Cost			(9 000 000)
Operating profit			**2 000 000**

Entity B (refreshment shop):

	Number of units	Rand per unit	R
Sales	1 000 000	12	12 000 000
Variable cost		9	(9 000 000)
Contribution			**3 000 000**
Fixed Cost			(1 000 000)
Operating profit			**2 000 000**

Calculation of the degree of operating leverage (x:1)

Entity A
= 11 000 000 / 2 000 000
= 5,5:1 or 550%

Entity B
= 3 000 000 / 2 000 000
= 1,5:1 or 150%

Difficulty level	***Comment***
Fundamental	Operating leverage measures the extent to which an entity (or project) incurs a mixture of fixed and variable costs. By comparing two similar co panies within the same industry (unlike Entity A, a model car shop, and Entity B, a refresh ent shop) the entity with the **lower operating leverage** (higher variable portion and lower fixed cost) will be **less strained to achieve break v n point.**
Intermediate	**Entity A** sells fewer units (100 000), with each sale providing a very **high contribution margin** of 92%. It is therefore very important for Entity A to correctly forecast its sales to ensure sufficient cash, etc. Entity A has a **higher proportion of fixed** costs (R 9 000 000) and a **lower proportion of variable costs** (R 1 000 000) and thus has a **high operating leverage**. **Entity B** sells more units (1 000 000), with each sale contributing a very **low contribution margin** of 25% and thus Entity B has a **low operating leverage** / Entity B has a **lower fixed costs** (R 1 000 000) and **higher variable costs** (R9 000 000) and thus has a **low operating leverage**. Entity A has a **higher operating leverage** than entity B.

Change in other income (%)

(2 600 – 1 800) / 1 800
44% increase

Difficulty lev l	***Comment***
Intermediate	Other income has **improved** significantly from 20X4 with a 44% growth rate.
Advanced	More information should be obtained to determine the reason, however Funky Junk's other income forms an insignificant portion of the net profit.

Effective inte est ate (%)

17 000 / (92 400 + 7 350)
17%

Difficulty level	***Comment***
Intermediate	The effective interest rate of 17% indicates a **high (expensive) finance cost** as this rate is far above the current prime rate of 9%.
Advanced	This is an indication of a **high finance risk** as financiers want to be compensated for their risk in Funky Junk *(refer to II) Capital structure for a discussion of the finance risk).*

Net Profit margin (%)

20X4
= 88 160 / 916 440
= 10%

20X3
= 114 815 / 783 282
= 15%

Change in net profit (%)

(88 160 – 114 815) / 114 815
Negative 23%

Difficulty level	*Comment (n and o)*
Fundamental	Net profit margin is a **poor financial indicator** as different accounting policies are used by different entities, etc. which complicates and compromises its comparability. Between the gross profit and the net profit there is a lot of 'noise', that is expenditure or income items that vary from year to year or that do not relate to operating profits. Entity growth, for instance, can be financed by either debt or equity. If it is financed by equity, there wi be no effect on expenditure between the gross profit figure and the net profit figure. However, if it is financed by debt, there will be a major effect on the interest cost nd a subsequent effect on the net profit margin. The net profit margin ratio is hard to analyse or discuss because of the 'noise' factor.
Intermediate	The 23% decline in the net profit ratio indicates **poor performance** (many of the reasons for this poor performance was already identified and discussed above).

Earnings per share (cents)

20X4	**20X3**
= 88 160 / 120 000 × 100	= 114 815 / 100 000 × 100
=74 cents	= 115 cents

Earnings decline rate

(88 160 –114 815) / 114 815
– 23% decline

Difficulty level	*Comment*
Fundamental	This ratio indicates the profits available for distribution or generated per share. Shareholders will refer to this ratio to determine the performance of their shares in terms of earnings.
Intermediate	Overall earnings performance has **weakened** from 20X3 to 20X4 with a R26 655 or a 23% decline. Earnings growth is **inferior** to the industry growth of 15% and is even **inferior** to inflation growth of 6%.
Advanced	The **comparison of EPS is complicated** as the number of shares increased from 100 000 in 20X3 to 120 000 at the beginning of 20X4 this is called **earnings dilution.** Since earnings have declined with 23% compared to the number of shares which incr ased with 20% (100 000 to 120 000), the **money raised from the share issue was not applied successfully**. *For additional comments relating to share price value dilution refer to V) Financial Market / Investor ratios commentary. Also refer to IAS 33 for the detailed calculation of earnings per share including the weighted average number of ordinary shares.*

Headline Earnings Per Share (HEPS) (cents)

Difficulty level	*Comment*
Fundamental	In South Africa entities listed on the Johannesburg Securities Exchange are required to provide headline earnings per share information in accordance to SAICA's Circular 2 / 2013. Additional information is required to calculate HEPS and where insufficient information is provided earnings per share should be used. *Also refer to Business and equity valuations in Chapter 11 – Valuation method based on a P / E multiple for Headline earnings discussion.*

Common size statement of profit and loss and other comprehensive income

Extract of the Common size statement of profit or loss and other comprehensive income to indicate the simplicity in which it demonstrates how revenue was utilised.

	20X4	20X3
Revenue	100%	100%
Cost of sales	(59%)	(54%)
Gross profit	41%	46%
Other income	0%	0%
Other expenses (assume operating)	(27%)	(26%)
Finance costs	(2%)	(2%)
Profit before tax	13%	19%
Income tax expense	(3%)	(4%)
PROFIT FOR THE YEAR	10%	15%

(2) CAPITAL STRUCTURE AND SOLVENCY RATIOS:

Calculation of market capitalisation (Market value of equity which includes reserves)

20X4
= R2,5 × 120 000
= R 300 000

20X3
= R3,30 × 100 000
= R 330 000

Comments to ratio a), b) and c) are included with ratio d) b low.

Capital gearing ratio (x:1)

Intermediate – Book value

20X4
= (100 700 + 9 780) / (360 710 + 100 700 + 9 780)
= 0,23:1

20X3
= (92 400 + 7 350) / (242 100 + 92 400 + 7 350)
= 0,29:1

Advanced – Market value

20X4
= (100 700 + 9 780) / (300 000 + 100 700 + 9 780)
= 0,27:1 = 0,23:1

20X3
= (92 400 + 7 350) / (330 000 + 92 400 + 7 350)

Interest-bearing debt to equity ratio (x:1)

Intermediate – Book value

20X4
= (100 700 + 9 780) / 360 710)
= 0,31:1

20X3
= (92 400 + 7 350) / 242 100
= 0,41:1

Advanced – Market value

20X4
= (100 700 + 9 780) / 300 000
= 0,37:1

20X3
= (92 400 + 7 350) / 330 000
= 0,30:1

Net interest-bearing debt to equity ratio (x:1)

Intermediate –Book value

20X4
= (100 700 + 9 780 – 4 590) / 360 710
= 0,29:1

20X3
= (92 400 + 7 350 – 10 220) / 242 100
= 0,37:1

Advanced – Market value

20X4
= (100 700 + 9 780 – 4 590) / 300 000
= 0,35:1

20X3
= (92 400 + 7 350 – 10 220) / 330 000
= 0,27:1

Comparison of capital structure of Funky Junk to the target structure

Difficulty level	*Comment (relating to a, b, c and d)*
Fundamental	The capital structure usually refers to the debt-to-equity ratio, which serves as a risk indicator. If an entity is heavily financed with debt, it generally indicates a **greater financial risk** or a **higher gearing.** An entity's target (optimum) capital structure balances **business and finance risk** and is based on industry averages. **Gearing** shows the degree to which an entity's activities are funded by the **owners' (equity) funds versus loan providers.**
Intermediate	Based on book values Funky Junk's interest-be ring debt to equity ratio of 0,31:1 (20X4) is moving closer to its target debt to equity r tio of 0,30:1 from 0,41:1 (20X3) and has thus showed an **improvement**. The decrease in Funky Junk's market capitalisation is **concerning** as the value has decreased from R 330 000 (20X3) to R 300 000 (20X4), which is an indication of the market's lack of confidence in Funky Junk's **future growth prospects and indicates an increase in risk** of investment.
Advanced	Based on market values Funky Junk's interest-bearing debt to equity ratio (similarly its gearing and net interest-bearing debt ratio) has **worsened** from 0,30:1 (20X3) to 0,37:1 (20X4). Funky Junk's capital structure is also **moving further away** from its target capital structure of 30:1. This is an indication of **higher gearing** and **increased financial risk** which leads **to a higher finance cost.** When analysing an entity's capital structure the proportion of short and long-term debt must also be considered. This will indicate issues such as inappropriate financing policy where short-term debt is utilised to finance non-current assets.

Net interest-bearing debt to EBITDA (x:1)

20X4	**20X3**
= (100 700 + 9 780 – 4 590) / (378 840 – 249 000) = 0,82:1	= (92 400 + 7 350 – 10 220) / (357 412 – 200 000) = 0,57:1

Difficulty level	*Comment*
Fundamental	The net interest-bearing debt to EBITDA ratio is especially important to financiers as it considers the entity's ability to repay its debt. Generally a **high ratio** of above 4 indicates that an entity is **less likely** to repay its d bt, however current loan covenants and industry averages should be considered.
Advanced	This ratio has **worsened** from 0,57:1 to 0,82:1 as a combined effect of Funky Junk's net interest-bearing debt increasing and its EBITDA decreasing from the previous year, indicating that it will take **longer** to repay their debt. This will increase Funky Junk's **finance risk** for which financiers may want to receive compensation through **increased finance costs** and financiers may impose **additional loan covenants**.

T tal debt ratio %

Intermediate – Book value

20X4	**20X3**
= 120 780 / 481 490 = 25%	= 104 750 / 346 850 = 30%

Advanced – Market value

Market value of Assets = Market value of Equity + Market Value of Liabilities

20X4	**20X3**
Market value of Assets:	
= 300 000 + 120 780	= 330 000 + 104 750
= 420 780	= 434 750
20X4	**20X3**
= 120 780 / 420 780	= 104 750 / 434 750
= 29%	= 24%

Difficulty level	***Comment***
Fundamental	This ratio measures the percentage of assets financed by borrowings. Generally a low debt ratio is preferred as it reduces the risk of potential losses in the event of liquidation. A high debt ratio there against indic tes **too much debt** which leads to an **increase of the finance risk.**
Intermediate	Based on book value Funky Junk's debt ratio seems to have **improved** from 30% (20X3) to 25% (20X4).
Advanced	Based on market value Funky Junk's debt ratio has actually **worsened** from 24% (20X3) to 29% (20X4). It is **concerning** that alm st a third of Funky Junk's assets are financed by debt. This is also an indication **of higher gearing and increased financial risk**.

(g) Interest cover (x:1)

20X4	**20X3**
= (378 840 – 249 000) / 17 000	= (357 412 – 200 000) / 12 000
= 7.64	= 13,12

Difficulty level	***Comment***
Fundamental	The times interest earned ratio indicates the likelihood of the entity to default on loan interest payments. A **high** ratio shows that the entity can **easily** repay its loan obligations. A **low** ratio indicates an **increased risk** of defaulting on interest repayment. The times interest earned must also be viewed in conjunction with the cash flow statement as it is possible to have a high ratio but a negative cash flow, indicating that the entity is unable repay its interest commitment.
Intermediate	The interest cover has **deteriorated** from 13,12 (20X3) to 7,64 (20X4) indicating that Funky Junk is now more likely to default on their loan interest repayment than in 20X3. This can be attributed to the increases in long-term loans and finance charges and decrease in EBIT. D spite the decrease, an interest cover of 7,64 indicates that Funky Junk can still cover the finance cost with relative ease.
Advanced	This, combined with the overall increase in **finance risk,** probably **led to the greater premium charged** for the **finance rate** *(refer to effective interest rate per I) Profitability analysis).*

(3) LIQUIDITY:

(a) Current ratio (x:1)

20X4	**20X3**
= 229 590 / 20 080	= 173 820 / 12 350
= 11,43: 1	= 14,07: 1

Difficulty level	***Comment***
Fundamental	This ratio indicates the entity's ability to utilise current assets to repay current liabilities. Trade and other payables (creditors), bank managers, etc. will utilise this ratio to determine if an entity may have **difficulty meeting its short-term obligations.** An indication of **concern** will be if the current ratio is **too low** or current liabilities exceed current assets (current ratio is below 1). Acceptable current ratios vary from **industry** to industry and are generally between 1,5:1 and 3:1.

As an example of deviation from this norm, supermarket stores have low ratios of 0,7:1 and creditors are still prepared to finance these stores because of its high cash flow.

On the other hand, if the current ratio is **too high** it may indicate **inefficient utilisation of current assets or short-term financing facilities** which indicates **inefficient** working capital management.

Intermediate / Advanced

When compared to industry norm of 4:1 Funky Junk's current ratio of 11:1 (20X4) is considered **too high**.

This ratio has **improved** slightly from 14:1 (20X3) to 11:1 (20X4) as it is now **more in-line** with the industry norm of 4:1.

This is an indication of **ineffective working c pit l m n gement** as creditors are not willing to provide Funky Junk with sufficient short-term financing. This may be an indication that Funky Junk has a **poor credit history** or a **poor credit rating** *(refer to trade and other payables below)* or **ineffecti e use of current assets**.

Acid-test (quick) ratio (x:1)

20X4	**20X3**
= (229 590 – 94 000) / 20 080	= (173 820 – 65 600) / 12 350
= 6,75:1	= 8,76:1

Difficulty level ***Comment***

Fundamental

This short-term liquidity ratio indicat s whether Funky Junk's will be able to repay its current liabilities out of "quick" assets. These assets are either cash or quickly convertible into cash. This ratio is inappropriate for service entities with limited inventory.

The quick ratio should be compared with industry average.

A quick ratio below 1:1 may indicate that the entity **relies too much on inventory** (or other illiquid current assets) to pay its short-term liabilities.

If the quick ratio is **higher** than industry average, Funky Junk's cash on hand may be **too high** and Funky Junk may be experiencing difficulty with debtors' collection or obtaining credit from suppliers.

Intermediate / Advanced

When compared to industry norm of 2,5:1, Funky Junk's quick ratio of 6,75:1 is considered **too high.**

This ratio has **improved** slightly from 8,76:1 (20X3) to 6,75:1 (20X4) as it is now **more in-line** with the industry norm of 2,5:1.

Funky Junk's acid ratio remains **too high** which indicates that Funky Junk's management is experiencing **debtors' collection difficulty** (with high trade and other receivable balances) and **difficulty obtaining credit from suppliers** (with low trade and other payable balances).

Also refer to Trade and other receivables-days and Trade and other payable days below.

Inventory t rnover (times)

20X4	**20X3**
= 537 600 / 94 000	= 425 870 / 65 600
= 5,7 times	= 6,5 times

Difficulty level ***Comment (c and d)***

Fundamental

Inventory turnover indicates the number of times an entity's inventory is sold and replaced over a period.

As sales increase an increase in inventory holding is expected to ensure that the entity doesn't incur inventory shortages. The problem with holding inventory is that holding costs must be financed. An entity should thus aim to hold just enough inventory to meet its sales. The difficulty with this **Just in Time** strategy is that if inventory shortages occur, sales may be lost.

Intermediate / Advanced

Inventory turnover has **worsened** from 6,5 times (20X3) to 5,7 times (20X4) and should be compared to industry averages.

This lower turnover implies relatively poor sales compared to inventory and therefore **poor inventory management** as excess inventory leads to additional holding and financing costs and represent a poor investment (providing a no or low return). Excess inventory may also lead to **obsolete inventory** and thus Funky Junk's inventory policy requires attention.

Also refer to comment d) below.

Inventory-days

20X4	**20X3**
= 94 000 / 537 600 × 365	= 65 600 / 425 870 × 365
= 64 days	= 56 days

Difficulty level ***Comment (c and d)***

Fundamental

Inventory days indicate the number f days it takes Funky Junk to turn its inventory (including work in progress) from purchase to sales.

The **shorter** the number of days, or the higher the turnover rate, the more **efficient** the inventory management process.

However **a too short** period can be an indication of **insufficient inventory** and inventory shortages.

Intermediate / Advanced

Inventory days have **wors n d** from 56 days (20X3) to 64 days (20X4) and it moved **even further** away from the industry average of 55 days.

Evidently managements' strategy to move inventory through increase sales has **not had the desired effect** *(also refer to I) Profitability).*

Funky Junk is now holding inventory for a longer period which **increases their holding and finance costs.**

This ratio indicates that Funky Junk is experiencing **difficulties in selling their inventory or ineffective inventory purchasing**. This raises the concern of **obsolete inventory** included in closing inventory.

Trade and other receivables-days (debtors' collection period)

20X4	**20X3**
= 131 000 / 916 440 × 365	= 98 000 / 783 282 × 365
= 52 days	= 46 days

Note: For the purpose of this example total sales was used as there is insufficient credit sales details available.

Increase in trade and other receivables balance

(131 000 – 98 000) / 98 000
34%

Difficulty level ***Comment***

F ndamental

This ratio indicates the time it takes Funky Junk's debtors to pay their accounts or the time it takes for credit sales to be transformed into cash. In general the shorter the debtors' collection period the better.

There is no norm for this ratio as it will vary considerably from industry to industry. A retail business will have a period of around 30 days as customers pay as they receive their monthly statements. Where credit cards are used it takes around 60 days. Manufacturers would usually only be paid at around 90 days.

Taking **longer than industry averages** may become challenging, as it implies that debtors may become **irrecoverable,** meaning that debtors default on payment and a **bad debt** is incurred.

In general the positive side to increased credit sales is increased profit (earnings per share). The negative side is that increased credit sales lead to increased debtors

	which reduces the cash available from sales and may be expensive to collect. The percentage increase in accounts receivable should match the percentage increase in sales or cost of sales.
Intermediate / Advanced	In an effort to increase sales with 17% **additional credit was provided to debtors** (34% increase), which has resulted in a **deterioration** of debtors' days from 46 days (20X3) to 52 days (20X4). Funky Junk also performed **worse** than industry average of 38 days in both years. Debtors where allowed **excessive credit** and **debtors management** seems **ineffective** as debtors may become **irrecoverab e.** This increase in the debtors' days may lead to Funky Junk having to finance debtors with debt such as an **overdraft**.

Trade and other payables-days

20X4	**20X3**
= 9 500 / 537 600 × 365	= 4 000 / 425 870 × 365
= 6 days	= 3 days

Note: For the purpose of this example total cost of sales are assu ed to be on credit as insufficient credit purchase details are available.

Difficulty level	***Comment***
Fundamental	This ratio indicates the time it tak s an entity to pay its creditors. There is no norm, but creditors are usually paid at b tween 30 and 90 days and industry averages should be considered. The **higher** the creditors' days, the longer the entity takes to pay its creditors, the more cash they have on hand, which is generally considered good for **working capital** and **cash flow purposes**. However, if the entity takes **too long** to pay its creditors, the creditors will become dissatisfied. Creditors may **be reluctant to extend credit in the future,** or they may offer **more expensive credit terms. Early settlement discounts** may also be forfeited and the **cost of lost discount** should be considered. This is not the case for Funky Junk as their creditors' days are considered **too short.**
Intermediate / Advanced	Funky Junk's creditors have to wait 3 days **longer** for their money than during the previous year, making it only **slightly more in-line** with industry creditors' days of 62. espite this **slight improvement** from the prior year from 3 days to 6 days, it **remains far too short** compared to industry's creditors' days of 62. This increase of 3 days from 20x3 is **less** than expected as inventory days increased with 8 days and debtors days increased with 6 days. This indicates **ineffective creditors' management** and may be an indication of suppliers' hesitance to extend Funky Junk's credit terms as a result of Funky Junk's **poor credit history and poor credit rating.** Funky Junk should consider negotiations with creditors to delay payment as this may **improve Funky Junk's cash flow**, especially as the current cash balance of R 4 590 is considered low. If Funky Junk pays its suppliers a little later, they could use the cash to invest in the business and generate more profits. Simultaneous consideration should be given to the effect on **cost of lost discount, increased credit costs** and the **relationship** with their creditors (suppliers).

Operating cycle or Cash conversion cycle (days)

20X4	**20X3**
= 64 days + 52 days – 6 days	= 56 days + 46 days – 3 days
= 110 days	= 99 days

Industry cash conversion cycle (days)
55 days + 38 days – 62 days
31 days

Difficulty level	*Comment*
Fundamental	The operating cycle indicates the time it takes cash to circulate through the business operating activities until it is converted into cash again. Funky Junk's inventory is purchased, and lies in the warehouse for 6 days after which creditors are paid (cash outflow). It takes Funky Junk 64 days to sell the inventory and after that debtors take a further 52 days before paying (cash inflow). Cash has therefore been out of the business for 110 days in 20X4. Generally when the operating cycle decreases, it appears that to be **positive** as it takes less time for goods to be purchased, so d and converted into cash than before. However, should the debtors' days and inventory days remain unchanged and only the creditors' days increase, the oper ting cycle will decrease, but this decrease will generally **be undesirable.** Note, however, that Funky Junk's situation is different as their creditors' days are **already too short and should be extended**. In general when the decrease in the operating cycle is due to a decrease in the debtors' days or inventory days, this is a **p sitive occurrence** which leads to improved cash flow and a possible decrease in creditors or debts.
Intermediate / Advanced	The cash conversion cycle has **worsened** from 99 days (20X3) days to 110 days (20X4) and is even further **out of line** with industry average of 31 days. *other payables days above for the co ents provided).*

Cash ratio (x:1)

20X4	**20X3**
= (4 590 + 10 000) / 20 080 = 0,73: 1	= (10 220 + 10 000) / 12 350 = 1,65:1

Difficulty level	*Comment*
Fundamental	This short-term liquidity ratio measures Funky Junk's ability to utilise its cash and cash equivalents to pay its current financial obligations. Creditors are typically interested in this ratio before providing credit.
Intermediate / Advanced	The cash ratio has **worsened** from 1,65:1 (20X3) to 0,73:1 (20X4) as a result of decreased cash and cash equivalents combined with an increase in current liabilities. As a result of this **poor liquidity indicator** creditors may not be willing to provide Funky Junk with **additional credit or improved credit terms** *(as discussed above per trade and other payable days).*

Operating cash flow to curr nt liabilities (x:1)

20X4	**20X3**
= 10 190 / 20 080 = 0,51: 1	Comparatives not provided

Difficulty level	*Comment*
F ndamental	This measures the ease with which current liabilities are covered by net cash flow from operating activities. Additional commentary is not possible as cash flow comparatives and industry averages were not provided.

(4) RETURN ON INVESTED CAPITAL:

Return on Invested Capital (ROIC)

(%) I NOPLAT:

20X4	**20X3**
= (378 840 – 249 000) × 0,72 = 93 485	= (357 412 – 200 000) × 0,72 = 113 337

Invested capital:

Intermediate – Book value

20X4
= 100 700 + 9 780 + 360 710 – 4 590 – 10 000 – 30 200 – 28 000
= 398 400

20X3
= 92 400 + 7 350 + 242 100 – 10 220 –10 000 – 26 800 – 7 000 – 20 230
= 267 600

Advanced – Market value

20X4
= 100 700 + 9 780 + 300 000 – 4 590 – 10 000 – 30 200 – 28 000
= 337 690

20X3
= 92 400 + 7 350 + 330 000 – 10 220 – 10 000 – 26 800 – 7 000 – 20 230
= 355 500

ROIC – Book value:

20X4
= 93 485 / 398 400
= 23%

20X3
= 113 337 / 267 600
= 42%

ROIC – Market value:

20X4
= 93 485 / 337 690
= 28%

20X3
= 113 337 / 355 500
= 32%

(b) Compare ROIC to WACC over time

Difficulty level	***Comment (a and b)***
Fundamental	Return On Invested Capital (OIC) provides an indication of how **efficiently** Funky Junk **has invested the capital under their control.** The WACC represents the minimum rate of return to compensate for risk at which Funky Junk creates value for its investors *(refer to WACC per Capital structure and the cost of capital in Chapter 4).* Comparing Funky Junk's ROIC with its WACC indicates whether an appropriate return on invested capital was generated for the year.
Intermediate	Based on book values, Funky Junk's ROIC **deteriorated** from 42% (20X3) to 23% (20X4), thus indicating that their invested capital (excluding cash and non-operating assets and investments) was utilised **ineffectively.**
Advanced	Based on market values, Funky Junk's ROIC **deteriorated** from 32% (20X3) to 28% (20X4), thus indicating that their invested capital (excluding cash and non-operating ass ts and investments) was utilised **ineffectively.** In 20X3 the ROIC of 32% was **superior** to Funky Junk's WACC of 30% indicating that Funky Junk was creating value for their investors. However, from 20X4 their ROIC of 28% is below its WACC of 30% indicating that Funky Junk's **value is being depleted** and investors may seek other investment opportunities. Funky Junk's WACC rate of 30% is also **considered high** as this may indicate a decrease in value and an increase in risks.

Return n Equity (ROE) (%)

20X4
Alternative 1

Intermediate – Book value
= 88 160 / 360 710
= 24%

20X3
= 114 815 / 242 100
= 47%

Advanced – Market value
= 88 160 / 300 000
= 29%

= 114 815 / 330 000
= 35%

Alternative 2 – Market value

= 74 cents / 250 cents	= 115 cents / 330 cents
= 30% *(rounding difference)*	= 35%

Difficulty level	***Comment***
Fundamental	Return on equity (ROE) provides an indication of how effective shareholders utilised gearing (debt) to increase their own returns or how effective the entity utilised its shareholders' investment to generate a profit. Simplified, the return on equity indicates the portion of profit generated by Funky Junk which is allocated to its shareholders.
Intermediate	Based on book values, the ROE indicates that Funky Junk's **growth has deteriorated** as it declined from 47% (20X3) to 24% (20X4) nd th t Funky Junk's shareholders are receiving a lower profit on their investment. Some shareholders may find the **risk** of their investment in Funky Junk **now exceeds their return**.
Advanced	Based on market values, the ROE indicates that Funky Junk's **growth has deteriorated** as it declined from 35% (20X3) to 29% *or 30%* (20X4) and that Funky Junk's shareholders are receiving a l wer pr fit n their investment. This is as a result of **lower earnings attributable** to shareholders and poor market perception affecting Funky Junk's share price. Some shareholders may find the risk of their investment in Funky Junk now exceeds their return.

Return on capital employed (ROCE) (%)

Intermediate – Book value

20X4	**20X3**
= (378 840 – 249 000) (360 710 + 100 700 + 9 780)	= (357 412 – 200 000) (242 100 + 92 400 + 7 350)
= 28%	= 46%

Advanced – Market value

20X4	**20X3**
= (378 840 – 249 000) / (300 000 + 100 700 + 9 780)	= (357 412 – 200 000) / (330 000 + 92 400 + 7 350)
= 32%	= 37%

Difficulty level	***Comment***
Fundamental	Return on capital employed (ROCE) provides an indication of how effective Funky Junk's **capital was employed or assets were utilised**.
Intermediate	Bas d on book values, the ROCE declined from 46% (20X3) to 28% (20X4) indicating that **capital or assets were utilised less efficiently** than in 20X3. Investors may prefer other investment opportunities with steady or increasing ROCE as opposed to the Funky Junks volatile ROCE.
Advanced	Based on market values, the ROCE declined from 37% (20X3) to 32% (20X4) indicating that **capital or assets were utilised less efficiently** than in 20X3. Investors may prefer other investment opportunities with steady or increasing ROCE as opposed to the Funky Junks volatile ROCE.

Return n total assets

20X4	**20X3**
= (378 840 – 249 000) / 481 490	= (357 412 – 200 000) / 346 850
= 27%	= 45%

Difficulty level	***Comment***
Fundamental	This ratio examines how **effective assets have been utilised to generate a profit (EBIT)**. A **high ratio** generally indicates that the entity has managed to increase its revenue without investing in assets (or increasing the fixed cost expenditure). Therefore, an

entity can increase its profits (EBIT) by increasing its revenue without increasing its asset base. The problem with this ratio is that an entity with an older deteriorated asset base may have a high ratio, but may require significant maintenance and improvements.

Intermediate	Funky Junk's ROA has **deteriorated** from 45% (20X3) to 27% (20X4). This decline is an indication that managements **utilisation of assets to generate EBIT** has become **inefficient**. This ratio must be compared to competitors and industry as it will vary significantly depending on the industry.
Advanced	Since 20X4 Funky Junk either has **unutilised c p city**, or it has **over-invested** in total assets as the increase in total assets of R 134 640 resulted in a decrease in profit (EBIT) of R 27 572. To improve this ratio, Funky Junk must increase its profit by **effectively managing its costs**, or reduce the level of assets invested by **identifying and selling assets which are inefficient**.

(f) Asset turnover

20X4	**20X3**
= 916 440 / 481 490 = 1,9	= 783 282 / 346 850 = 2,3

Difficulty level	***Comment***
Fundamental	Asset turnover indicat s how ff ctive assets have been utilised to generate **revenue.**
Intermediate / Advanced	Asset turnover has **deteriorated** from 2,3 (20X3) to 1,9 (20X4) as a result of total assets increasing with 39% and revenue with only 17%, indicating that assets are being utilised **less effectively** for revenue generation purposes. This ratio must be compared to competitors and industry as it will vary significantly depending on the industry.

Dividend payout ratio (%)

20X4	**20X3**
Dividend per share in cents: = 13 950 / 120 000 × 100 = 12 cents	Dividends not available
Dividend payout ratio = 12 / 74 = 16%	Dividends not available

Dividend over (times)

Note: Dividend over is the inverse of dividend payout ratio and also forms part *of V) Financial market / Investor atios.* It is however discussed here as the commentary is the same.

20X4	**20X3**
= 74 / 12 = 6,17 times	Dividends not available

Difficulty level	***Comment (Dividend payout ratio and dividend cover)***
Fundamental	l **Dividend payout ratio** measures the percentage of earnings that is being paid out as dividends. **Dividend cover** indicates the ease with which dividends can be covered by earnings generated in the year. A high **dividend cover** indicates a high earnings retention rate. Thus instead of paying a high percentage of earnings out as a dividend, it is retained and reinvested in the entity's operations for future growth purposes. The opposite is true for a low dividend cover.

Return consists of **dividend and / or capital growth** and management should decide which portion of earnings to **reinvest for future expansion purposes** and which portion to **distribute as a dividend** as the **markets perception** will affect their **share price** *(refer to Chapter 14 – The dividend decision).*

Traditionally shareholders believe that an entity's **earnings and growth potential must be confirmed by its dividend payout** (also known as the **information content** or **signalling effect**).

In reality shareholders are **not indifferent** to the form of return and thus **shareholder preference** needs to be considered.

Intermediate

Funky Junk **distributed** 16% of its earnings as dividends to shareholders in 20X4 and **retained** the remaining 84% for operating and reinvestment purposes.

A dividend cover of 6,17 is considered safe and indicates that **dividends can be covered with ease by earnings generated** in the year. This doesn't, however, guarantee that Funky Junk will always ha e sufficient cash available to maintain the dividend.

Advanced

Funky Junk's dividend cover of 6,17 is bel w the 8 of industry and although a high dividend payment will benefit shareholders in the short-term, over the longer term it will **compromise Funky Junk's growth prospects**.

Funky Junk may have used debt to pay the ost recent dividend, which may create a need to raise additional d bt (which will **increase financial risk**) or equity to fund its operations.

As Funky Junk's **profits are volatile, dividends** are also expected to be more **irregular** than those of steady dividend policies and thus a long-term trend needs to be analysed.

As Funky Junk's earnings have declined with 23% the dividend paid may **not be sustainable.** However an earnings growth and dividend growth trend should also be established to determine if the dividend paid is **sustainable**.

Given Funky Junk's poor overall performance management should consider **reinvesting for capital growth, cash flow and other purposes and should not pay out any dividend.**

This may however cause a **negative dividend signalling or information content effect** and cause the **share price to decline.**

Effective tax rate (%)

20X4	**20X3**
= 29 600 / 117 760	= 34 397 / 149 212
= 25%	= 23%

Difficulty level	***Comment***
Intermediate / Advanced	In both years Funky Junk's effective tax rate is below the marginal tax rate of 28% which indicates possible **effective tax planning or tax savings**.
	Unfortunately this rate has increased from 23% (20X3) to 25% (20X4), however to be analysed further, Funky Junk's income tax return must be scrutinised.

(5) FINANCIAL MARKET / INVESTOR:

(a) P / E multiple

20X4	**20X3**
= 2,50 / 0,74	= 3,30 / 1,15
= 3,4	= 2,9
Or	
= 300 000 / 88 160	= 330 000 / 114 815
= 3,4	= 2,9

Earnings-yield (%)

Note: Earnings-yield (%) is the inverse of the P / E **multiple**

20X4	**20X3**
= 0,74 / 2,50	= 1,15 / 3,30
= 30%	= 35%

Difficulty level	***Comment (a and b)***
Fundamental	The Price / Earnings (P / E) ratio reflects the amount investors are willing to pay for Funky Junk's shares per rand of reported profits. Entities with **high growth prospects** have higher P / E ratios than the **riskier** entities, thus incorporating growth and risk factors. Increase in P / E may indicate that investors h ve been influenced by the **signalling effect / information content** of a possible increase in dividend per share / earnings per share or expected future earnings.
Intermediate	The P / E multiple indicates that invest rs are **willing to pay 3,4 times the** most recent historical **EPS**, for a Funky Junk share. At first glance it appears as though the P / E multiple has strengthened from 2,9 (20X4) to 3,4 (20X4) *(also refer to advanced comment below*),* but remains significantly **inferior** to the industry P / E of 10. Generally an increased P / E indicates that investors are likely to expect **higher relative-growth in future** arnings and / or that an investment risk has reduced relative to the previous period. This is, however, highly **unlikely for Funky Junk**.
Advanced	Overall Funky Junk's P / E of 3,4 is performing far **worse** than industry P / E of 10 which indicates **higher risk and lower growth expectations** than industry. In addition industry's earnings grew with 15% whereas Funky Junk's earnings **diminished** with 23% indicating **inferior growth and growth prospects**. In reality Funky Junk's P / E increased as a result of **total earnings declining** with 23% which is more than the **full market capitalisation decrease** of 9% ((300 000 – 330 000) / 330 000) and **doesn't** reflect higher future growth or lower risk and may indicate that its shares may be **over-priced***. Valuation methods are often based on a P / E multiple or a forward P / E multiple *(refer to Business and equity valuations in Chapter 11).*

EV / EBITDA multiple

Advanced – Market value

20X4	**20X3**
= (300 000 + 100 700 + 9 780) / (378 840 – 249 000)	= (330 000 + 92 400 + 7 350) / (357 412 – 200 000)
= 410 480 / 129 840	= 429 750 / 157 412
= 3,2	= 2,7

Diffic lty level	***Comment***
F ndamental	Enterprise value includes the equity (current full market capitalisation) and debt (estimated current value of debt capital) which an acquirer will take over, thus an entity with a low EV / EBITDA multiple becomes susceptible to take overs.
Advanced	At first glance Funky Junk's EV / EBITDA multiple has improved from 2,7 (20X3) to 3,2 (20X4). However the increased EV / EBITDA is as a result of Funky Junk's enterprise value decline (5%) trailing the decline in EBITDA (18%) , thus indicating that Funky Junk may be **overvalued** or that shareholders are expecting improved future earnings growth.

Compared to industry EV / EBITDA multiple of 6 indicates that Funky Junk has **more risk** and **lower future expected growth**.

Valuation methods are often based on an EV / EBITDA multiple or a forward EV / EBITDA multiple *(refer to Business and equity valuations in Chapter 11*).

ROIC vs. WACC over time

Refer to IV) Return on Invested Capital ratios above.

EVA®

***Note:* This example illustrates only some of the basic principles of EVA®. Adjustments such as accounting distortions, reclassifying expenses as investments, etc. is not incorporated for simplicity reasons.**

I **NOPLAT:**

20X4	**20X3**
= (378 840 – 249 000) × 0,72	= (357 412 – 200 000) × 0,72
= 93 485	= 113 337

Invested capital – Book value

20X4	**20X3**
= 100 700 + 9 780 + 360 710	= 92 400 + 7 350 + 242 100
= 471 190	= 341 850

Alternative – Book value

Invested capital = Total assets less non-interest-bearing current liabilities

20X4	**20X3**
= 481 490 – 9 500 – 800	= 346 850 – 4 000 – 1 000
= 471 190	= 341 850

Invested capital– Market value

20X4	**20X3**
= 100 700 + 9 780 + 300 000	= 92 400 + 7 350 + 330 000
= 410 480	= 429 750

Alternative – Market value

Market value of Total assets = Market value of Equity + Market Value of Liabilities

20X4	**20X3**
= 300 000 + 120 780	= 330 000 + 104 750
= 420 780	= 434 750

Invested capital = Total assets less non-interest-bearing current liabilities

20X4	**20X3**
= 420 780 – 9 500 – 800	= 434 750 – 4 000 – 1 000
= 410 480	= 429 750

EVA® – Book value:

20X4	**20X3**
= 93 485 – (471 190 × 30%)	= 113 337 – (341 850 × 30%)
= – 47 872	= 10 782

EVA®– Market value:

20X4	**20X3**
= 93 485 – (410 480 × 30%)	= 113 337 – (429 750 × 30%)
= – 29 659	= – 15 588

Difficulty level	***Comment***
Fundamental	Economic Value Added (EVA®) is the intellectual property of Stern Stewart & Co and is a registered trademark. It is interesting to note that when top management is setting corporate strategies or evaluating performance, value created is almost

never part of the measurement indicators. Traditional accounting-based decision-making tools, for example earnings per share (EPS), return on equity (ROE), return on assets (ROA), or return on sales, are always present when performance is evaluated. The EVA® however, focuses on creation of shareholder wealth over time. EVA® differs from the accounting profit as the **cost of equity capital is also deducted (not only cost of debt,** as in accounting profit) and thus EVA® estimates pure economic profit and thus the economic value added.

EVA® directs managers' attention to both **earnings** (NOPLAT) and **investment**.

Advanced — Based on market values, Funky Junk's management has **not been able to add economic value** in 20X3 or 20X4 as both years have a negative EVA® which indicates that Funky Junk is **unable to cover its WACC of 30%.**

Management of Funky Junk should identify **fewer ssets** which can generate the **same level of earnings (NOPLAT).** This will reduce capital required and WACC which will create value in terms of EVA®.

Managers will therefore focus on **assets and earnings** (NOPLAT) to increase EVA®.

Change in share price (%)

(2,50 – 3,30) / 3,30
24% decline

Difficulty level	***Comment***
Fundamental	An entity's share price will change as a result of **supply and demand** which is affected by the **market's perception** based on earnings growth and earnings growth prospects, etc.
Intermediate	Funky Junk's share price is not performing well as it declined with 24% from 20X3 to 20X4, this is however not directly comparable as the number of shares increased from 100 000 (20X3) to 120 000 (20X4). When comparing the **full market capitalisation it decreased with** 9% ((300 000 – 330 000) / 330 000) indicating that **value** was not created during 20X4, but **diminished.**
Advanced	The share price has declined as a result of **value dilution** due to the increase in number of shares and the **market's negative perception** of Funky Junk's **future growth and earnings**.

Price / Sales multiple

20X4	**20X3**
= 300 000 / 916 440	= 330 000 / 783 282
= 0,33	= 0,42

(h) EV / Sales multiple

20X4	**20X3**
= (300 000 + 100 700 + 9 780) / 916 440	= (330 000 + 92 400 + 7 350) / 783 282
= 0,45	= 0,55

Diffic lty level	***Comment (g and h)***
Advanced	These multiples are often used for comparing the valuation of early-stage entities that have revenues but are not yet profitable and should be compared to industry to determine possible over or undervaluation. The Price / sales multiple and the EV / sales multiple valuation methods are often used as reasonability checks *(refer to Business and equity valuations in Chapter 11).*

Price / Book value multiple

20X4	**20X3**
= 300 000 / 360 710	= 330 000 / 242 100
= 0,83	= 1,36

Difficulty level	*Comment*
Fundamental	The market to book value multiple is similar to the P / E ratio as it gives an indication of the market's perception of the entity. High growth entities will sell at higher Price / Book value multiples.
Advanced	Funky Junk's Price / Book value multiple has declined from 1,36 (20X3) to 0,83 (20X4) indicating that there is something fundamentally wrong and that this has affected the market's perception. The Price / Book multiple is often used as a reasonabi ity check *(refer to Business and equity valuations in Chapter 11).*

(j) Dividend yield (%)

20X4	**20X3**
= 17 cents / 250 cents = 6,8%	Not available

Difficulty level	*Comment*
Fundamental	This ratio indicates the return that invest rs derive on their investment and investors **preference towards dividend or capital growth** should be considered as investors preferring high cash flow from dividends will require a higher dividend yield.
Intermediate Advanced	*It is important to refer to IV) R turn on Invested Capital for dividend payout ratio and dividend cover for r lat d comm nts and also refer to The dividend decision in Chapter 14.*

Dividend cover (times)

Refer to (IV) Return on Invested Capital ratios and comments.

(6) CASH FLOW-RELATED

Cash flow to total debt

This ratio measures the entity's ability to generate cash flow from its operations in relation to its total debt.

$$= \frac{\text{Cash flow from operations}}{\text{Total debt}}$$

20X4	**20X3**
$= \frac{10\ 190}{120\ 780}$ = 8%	Not available

Difficulty level	*Comment*
Fundamental	This **financial distress indicator** indicates the entity's ability to cover its total debt with cash flow derived from its operations. A high ratio indicates that the entity will be able to cover its total debt.
Advanced	This ratio shows that Funky Junk has **not generated sufficient cash flow** in relation to its total debt in 20X4. This ratio further suggests that Funky Junk may suffer from potential **financial distress** in future, as reflected by *II) Capital structure and solvency ratios.* This ratio should also be compared to historic ratios to determine a trend and identify distress signs.

Operating cash flow to operating profit (x:1)

Refer to (I) Profitability for ratio and comment.

(7) PERFORMANCE-RELATED

This area of analysis depends on the specific area of performance to be analysed (r*efer to several other analysis areas I) to VI) already dealt with above).* The Z-score, the A-score and DuPont analysis below rely on various performance-related areas of the financial analysis. The Z-score incorporates profitability, capital structure, liquidity (working capital) and return on invested capital, the A- score incorporates qualitative factors associated with business failure and the DuPont analysis incorporates operational efficiency, asset utilisation and financial leverage.

Business

Failure prediction models

Although the failure prediction models go a long way towards elimin ting void which had existed and although they should occupy an important place in the "tool box" of the n lyst (being a management "tool"), **sole reliance should not be placed** on a model alone, but all other aspects of analysis should also be considered. A model should be used as **an early warning device** which directs attention towards the potential for bankruptcy so **that more thorough and detailed analysis can be carried out** and **corrective measures can be taken.**

The Z-score model

The Z-score is a multivariate predictor developed in the late '60s and early '70s by Edward Altman, an author on failure prediction. The **multivariate discriminate analysis** (MDA), a statistical technique based on regression analysis is used to classify certain variables (financial ratios in the case of financial statements analysis) as either failed or non-failed (bankrupt or non-bankrupt). It furth r establishes coefficients for the ratios that reduce misclassification.

Altman selected five ratios that appear to have the best overall significance in predicting whether an entity faces possible bankruptcy. The equation reads as follows:

$$Z = 0{,}012a + 0{,}014b + 0{,}033c + 0{,}006d + 0{,}999e$$

Where:

= working capital / total assets
= retained earnings / total assets
= earnings before interest and taxes (EBIT) / total assets
= market value of equity / total liabilities
= sales / total assets.

The resulting Z scores are interpreted as follows:

Z < 1,81 shows a high risk of short-term failure
Z > 2,99 shows a low risk of failure
1,8 < Z < 2,99: is known as the grey area in which the entity is potentially at risk.

The accuracy of this Z-s ore model is 96% on data one year before bankruptcy and 72% on data two years before bank uptcy. Any period longer than two years before bankruptcy is too inaccurate to consider. A later (1977) refinement of this model, the ZETA-model, proved to have far higher accuracy over a longer period.

You are required to calculate the Z-score and provide insightful comments.

The Z-sc re f r Funky Junk is calculated as follows:

= working capital / total assets
(229 590 – 20 080) / 481 490
43,5%

= retained earnings / total assets
166 310 / 481 490
34,5%

= earnings before interest and taxes (EBIT) / total assets
(378 840 – 249 000) / 481 490
27%

= market value of equity / total liabilities
300 000 / 120 780
248%

= sales / total assets
916 440 / 481 490
1,903 times

= 0,012a + 0,014b + 0,033c + 0,006d + 0,999e
0,012(43,5) + 0,014(34,5) + 0,033(27) + 0,006(248) + 0,999(1,903)
0,522 + 0,483 + 0,891 + 1,488 + 1,901
5,285

Difficulty level	*Comment*
Advanced	Despite Funky Junk's generally negative perform nce based on historical and industry comparisons, Funky Junk's Z score of 5,277 is considered safe with a **low risk of business failure.**
	Sole reliance should not be placed n this m del, but all other aspects of analysis should be considered. This model sh uld be used as **an early warning device.**

The A-score model

The A-score model was developed by John Argenti and exa ines qualitative factors that lead to corporate failure. Argenti identified style and competence as important factors in addition to accounting systems and responses to change. He also identified the three bigg st mistakes that often contributed to failure, namely overtrading, gearing and taking on big projects. One of the criticisms of the Argenti system is that it requires a subjective assessment of the key areas considered. Errors in judgement will lead to invalid conclusions.

A-score analysis:

	Possible score	**Actual score**
Management		
Autocratic chief executive	8	
Chief executive is also chairman	4	
Passive, weak Board of Directors	2	
Unbalanced skills / knowledge of Board	2	
Weak finance director	2	
Lack of management depth	1	
Accounting		
Lack of budgetary control	3	
No cash flow plans	3	
No costing syst ms	3	
Ineffective response to change in markets, produ ts, employees, etc.	15	
Total	43	
*Positive esult 10 or less		
Mistakes		
High level of loan borrowing	15	
Expanding too fast (overtrading)	15	
Failure f big project	15	
T tal	45	
*P sitive result 15 or less		
Failure symptoms		
Deteriorating Z-scores	4	
Financial accounting window-dressing	4	
Declining quality, morale, market share	3	
Resignations and rumours of failure	1	
Total	12	
Grand total	100	
*Overall positive result 25 or less		

How to score:

If the observer can see any of the above features in the entity being evaluated, he must award full marks. If they are not observed, he awards a score of 0. There are no intermediate scores.

How to interpret results:

If the overall score is 25 or less, then the entity is not in danger of failing.

If the score is higher than 25, then the entity is likely to fail. The higher the score, the faster the failure will occur.

If the score for management / accounting is greater than 10, then the entity is under threat due to poor management.

If the entity scores less than 10 for management / accounting but more th n 15 for mistakes, it means that the management is competent but at some risk.

DuPont analysis

The DuPont analysis was created by the DuPont Corporation in the 1920's. This analysis **examines the *return on equity (ROE)* by analysing its:**

operational efficiency (as measured by profit attributable to equity holders = net profit after tax / revenue);

asset use efficiency (as measured by total asset turnover = revenue / total assets); and

financial leverage (as measured by the equity multipli r = total assets / shareholders' equity).

The DuPont system is based on the assumption that w akn ss s in operating assets and / or inefficient asset use will yield diminished returns on assets, resulting in a lower ROE. By increasing the debt, the lower ROE can be leveraged up. However, an increase in debt leads to an increase in interest payments which reduces profit margins, thereby lowering ROE. This therefore means that these two factors, namely the return on assets and the financial leverage constitute the return on equity. This relationship can be illustrated by the following formula:

$$\text{Return on Equity (ROE)} = \frac{\text{Profit attributable to equity holders}}{\text{Shareholders' funds}}$$

You are required to calculate the 20X4 OE of Funky Junk based on market values utilising the DuPont analysis.

20X4

Return on Equity (ROE)
88 160 / 300 000
29%

The above formula breaks down further to:

$$\text{ROE} = \frac{\text{Net p ofit after tax}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Shareholders' Equity}}$$

Operational efficiency Asset utilisation Financial leverage

$$\text{ROE} = \frac{88\,160}{916\,440} \times \frac{916\,440}{481\,490} \times \frac{481\,490}{300\,000}$$

Operational efficiency Asset utilisation Financial leverage

$$\text{ROE} = 0{,}0962 \times 1{,}903 \times 1{,}605$$

Operational efficiency Asset utilisation Financial leverage

$$\text{ROE} = 29\%$$

For comments provided on ROE refer to *(IV) Return on Invested Capital* , for operational efficiency comments refer to *(I) Profitability ratios*, for asset utilisation comments refer to *(IV) Return on Invested Capital ratio* (asset turnover) and for financial leverage comments refer to *(II) Capital structure ratios*.

Non-financial analysis

In addition to insight provided by financial analysis and its comments, stakeholders are interested in the entity's governance practices and its environmental and social performance.

Non-financial analysis example

This example illustrates a few of the environmental and social issues which stakeholders are generally interested in.

Non-financial information of Hoi Polloi	**20X4**	**20X3**
Production volume (units '000)	350	390
Number of injuries	10	10
Total amount spent on corporate social responsibility (R'000)	95 000	100 000
Total carbon emissions (tons)	19	20
Total sales (R'000)	2 000 000	2 200 000

You are required to calculate and provide insightful co ents based on the non-financial performance of Hoi Polloi

Calculations:

Decrease in production volume of 40 000 units or 10%.

Total number of injuries remained unchanged.

Injuries per production volume:

20X4
= 10 / 350'
= 0,029'

20X3
= 10 / 390'
= 0,026'

Total spent on corporate social responsibility decreased with R 5 000' or 5%.

Total spent on corporate social responsibility as a percentage of sales:

20X4
= 95 000 / 2 000 000
= 4,8%

20X3
= 100 000 / 2 200 000
= 4,5%

- Total carbon missions (tons) decreased with 1 ton.

Carbon emission per production volume :

20X4
= 19 / 350'
= 0,054'

20X3
= 20 / 390'
= 0,051'

Diffic lty level	***Comment***
Advanced	**Number of injuries** remained unchanged at 10, however as production volume has decreased with 10% one would expect a decrease in the number of injuries. The increase of injuries per production volume from 0,026' (20X3) to 0,029' (20X4) indicates Hoi Polloi's **poor** safety measures. Hoi Polloi should improve its safety procedures perhaps by employing a safety officer and training staff on safety measures. Total spent on corporate social responsibility **decreased** with R 5 000' or 5% from 20X3 to 20X4. **A decline is expected** as Hoi Polloi produced and sold fewer units and thus have less profit available to distribute to social projects. Hoi Polloi's corporate social responsibility contribution as a percentage of sales of 4,8% is higher than the previous year's contribution of 4,5%, indicating that Hoi Polloi **cares about its social impact** and is **socially responsible**.

Total **carbon emissions** decreased with 1 ton. Although the overall negative impact on the environment has decreased one would expect a larger decrease due to the decrease in production units of 10%. Carbon emissions per product volume has increased from 0,051' (20X3) to 0,054' (20X4) indicating **less efficient production processes** as Hoi Polloi is polluting more per unit.

The balanced scorecard

The balanced scorecard was developed by Robert Norton and David Kaplan (1996) as a strategic measurement and management system to assist entities in aligning their business activities with the entity's vision, mission and strategy by measuring its performance against its strategic goals. By inc uding non-financial performance measures this framework provides a "balanced" view of the entity's fin nci l nd non-financial performance. The balanced scorecard consists of the following four balanced perspectives:

Financial;

Customers;

Internal business processes; and

Learning and growth.

In addition to assessing the entity's financial performance, this system enables an entity to monitor its progress in creating and acquiring intangible assets required for future growth.

Example of a balanced scorecard worksheet:

Customer	Objectives	M asur s	Targets	Initiatives
To achieve our vision of customer excellence, we should:	Deliver on time, with correct quality and price	1 Delivery time 2 Quality specifications, lead time, etc.	1 95% delivery rate 2 Zero defects	1 Customer engagement 2 Quality reports

This management system assists in matching the entity's short-term actions with its long-term strategy.

The processes are:

Objectives and measures which defines the entity's success drivers are set based on its vision, mission and strategy.

Communicating strategies up and down the business hierarchy by the different managers. This helps to link departmental and individual objectives with the long-term strategy of the entity.

This scorecard enables managers to ensure that the whole entity understands its long-term strategic objectives.

The business planning proc ss enables the entity to combine its business and financial plans.

Feedback and learning processes are enhanced by the scorecard because short-term results can now be monitored and imp oved based on what has been learned. Changes can be implemented.

8.4 Limitations of accounting data

As a result f the limitations inherent to accounting data.

The maj r limitations can be listed as follows:

Inflation: Financial statements are prepared on a historical basis, and inflation is seldom (if ever) accounted for. As a result, the market value of owner's equity, long-term debt, fixed assets and investments might not be anywhere near the value disclosed in the statement of financial position. Any ratio or assessment based on the historical value of statement of financial position items will be incorrect nd distort the analysis.

Inflation causes a reduction in the purchasing power and so reduces the value of the domestic currency against other countries with a lower inflation rate.

Advanced: To overcome this limitation the financial analysis should be based on **market values** instead of book values *(refer to Valuations of preference shares and debt in Chapter 10 and Business and equity valuations in Chapter 11)* and profitability ratios should compare the actual growth rate to the **inflation and real growth rate**.

Non-monetary items: Financial statements often do not reflect the value of non-monetary items such as goodwill, patents, brands, trademarks, technology, breadth of product range, management, etc which may be substantial. These items may, to a large extent, be discounted by market forces when arriving at the market value of equity shares, but they are certainly ignored in the financial statements. Hence the problem of using ratios that rely on historical statement of financial position va ues alone.

Advanced: IFRS deals with the valuation of intangible assets such as goodwi , trademarks, etc. Ensuring that your annual financial statements are in compliance with IFRS will en ble more realistic analysis.

Market forces: The statement of profit or loss and other comprehensive income and statement of financial position do not disclose future expectations in the market. One cannot know whether next year's market share will increase or decrease, whether a competitor is likely to take away part of the current sales, or whether a substitute product will erode the entity's current market share. Labour union militancy is not reflected; neither are economic conditi ns such as f reign exchange factors. The future management team may change, and this is also not reflected.

Advanced: The entity's integrated report will include forecast projections, allowing users to draw a conclusion on its future prospects.

Accounting policies: The analysis of financial state ents often relies on the comparison of an entity's performance with that of other similar entiti s in the industry. The problem is that not only are two similar entities structured differently, but th ir accounting policies, such as depreciation policy and inventory valuation methods are likely to differ. Comparisons that are taken for granted on the basis of published industry averages could therefore be meaningless.

Advanced: When comparing the results of different entities, any differences in their accounting policies in this regard will have to be taken into consideration. Preferably the financial analysis should be based on **market values** instead of book values *(refer to Valuations of preference shares and debt in Chapter 10 and Business and equity valuations in Chapter 11).*

8.5 Limitations of ratio analysis

Financial ratio analysis are as follows:

Ratio analysis is more useful when analysing small focused entities instead of large diversified entities. The latter operates in different industries which makes it difficult to determine comparative industry averages.

The industry av rage may not be the best measure for a high performing entity. In this situation an analyst will be b st advis d to consider the industry leaders' ratios.

Inflationary effe ts on the statement of financial position amounts may distort the ratios as these amounts a e on historic basis. Profits may be affected as well because inflation impacts both depreciation and invento y costs. For instance, it might be meaningless to compare the ROA of an entity with old and depreciated fixed assets to an entity with newer assets which still have higher book values.

Application of different accounting policies can render the comparisons between and amongst entities meaningless.

It is difficult to tell whether a ratio is good or bad as this is subjective. One analyst may consider a high ROA 'bad' as it reflects the inability of the entity to replace its old fixed assets and is thus under-capitalised. Another may consider it 'good' because it is showing superior returns. It is always important that in this instance the analyst attempt to show 'both sides of the story'.

Firms can manipulate their financial statements just to reflect a strong financial position at year end. This is often referred to as '*window-dressing' or 'creative accounting'.*

Practice questions

Question 8 – 1 *(Advanced)* *32 marks 48 minutes*

Ithemba Engineering (Pty) Ltd

(Source: SAICA June 2013 ITC paper 2 – adapted and extracted)

Ithemba Engineering (Pty) Ltd ('Ithemba') manufactures and distributes specialised products to customers in the construction industry. Every year, Ithemba invests significantly in research and development to improve existing product designs and to develop new products. Many of its products and designs have been patented to protect the company's intellectual property.

Ithemba focuses on supplying South African customers. It has supported customers' expansion into the rest of Africa and the Middle East and exports represent approximately 10% of annual re enue. Foreign subsidiaries of South African groups are invoiced in US dollar.

The construction industry in South Africa has been under significant pressure in recent years due to the slowdown in the global economy and limited infrastructure spend by the g vernment. As a result, Ithemba has struggled to grow revenue during the past three financial years. Steel is the major raw material used by Ithemba in its manufacturing processes. The volatility of this co odity's price in recent years has placed additional pressure on the company's gross profit margin.

Because of this situation working capital management has become increasingly important for Ithemba. More and more customers are placing orders at the last mom nt, which is forcing Ithemba to hold larger inventories. Customers are also delaying payment of accounts b cause of cash flow pressures. All sales are on credit and Ithemba allows customers 60 days from invoice to pay amounts due. The result is that Ithemba's overdraft balance has steadily increased in recent years, to the extent that this has become a permanent source of finance. Ithemba currently pays interest on its overdraft at 10% per annum, compounded monthly.

Apart from the overdraft, Ithemba has had no other debt facilities since 20X9. Bankers are reluctant to grant Ithemba longer term finance due to concerns about the company's cash flow generation and the negative outlook for the construction industry in general.

The following are extracts from the annual financial statements of Ithemba for the year ended 30 November 20Y2:

EXTRACT FROM THE STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEAR ENDED 30 NOVEMBER 20Y2

	20Y2 R'000	20Y1 R'000
Revenue	248 230	241 000
Cost of sales	(157 580)	(144 400)
Gross profit	90 650	96 600
Bad debts	(5 100)	(4 500)
Depreciation	(19 800)	(20 100)
Resea ch and development costs	(10 200)	(11 100)
Other operating costs	(28 750)	(26 700)
Operating profit	26 800	34 200
Finance charges	(12 750)	(10 800)
Pr fit bef re tax	14 050	23 400

EXTRACTS FROM THE STATEMENT OF FINANCIAL POSITION AS AT 30 NOVEMBER 20Y2

	20Y2 R'000	20Y1 R'000
Trade receivables	51 000	42 900
Total assets	279 900	264 900
Shareholders' equity	152 200	142 100
Bank overdraft	127 500	102 800
Inventory	28 060	21 750

REQUIRED	Marks	
	Sub-total	Total
Analyse and discuss the profitability and working capital management of Ithemba during the financial years ended 30 November 20Y1 and 20Y2. Support your answer with relevant calculations and ratios.	(30)	
(Mark allocation: 10 for analysis and 20 for discussion)	(2)	
Communication skills – layout and structure; clarity of expression		(32)
Note:		
Bank overdraft must be included in your analysis and discussion as it norma y forms part of working capital.		
Assume 365 days in a year and round all days up to the next whole day.		

Solution 8 – 1

Analyse and discuss the profitability and working capital management f Ithemba during the financial years ended 30 November 20Y1 and 20Y2, supported with calculati ns and rati s.

Summary of ratios	Calculation	20Y2	20Y1 [a]	
Revenue growth	1	3,0%		(½)
Gross profit margin	2	36,5%	40,1%	(1)
Bad debts / Revenue	3	2,1%	1,9%	(1)
Operating costs / Revenue	4	11,6%	11,1%	(1)
Change in operating costs:				
Research and Development	5	(8,1%) [b]		(½)
Depreciation		(1,5%) [b]		(½)
Other operating costs	6	7,7%		(½)
Total operating costs	7	2,3%		(½)
EBITDA / Revenue	8	18,8%	22,5%	(1)
Change in EBITDA	9	(14,2%) [b]		(½)
Effective interest rate (%)[c]	10	10,0%	10,5%	(1)
Change in profit before tax		(40%) [b]		(½)
Inventory days	11	65 days	55 days	(1)
Or inventory turnover		5,6 times	6,6 times	
Trade receivable days	12	75 days	65 days	(1)
Return on total assets [d]	13	9,6%	12,9%	(1)
ROE [d]	14	6,6%	11,9%	(1)
ROCE [d; e]	15	9,6%	14,0%	(1)
Calculation – maximum				(10)

Note:

Extracts from Ithemba's financial statements allow you to calculate comparative ratios which you must utilise in your discussion.
Direction (signs(+ / –)) must be correct to earn marks.
Effective interest was not based on the total interest-bearing debt at *end of previous period (or average)* as interest on bank overdraft is charged on a fluctuating balance.
Return on Assets (ROA), Return on Equity (ROE) and Return on Capital Employed (ROCE) are included as part f pr fitability ratios as these ratios measure the Ithemba's ability to generate a return relative to an investment r asset and Return on Invested Capital ratios were not required specifically.

Ba ed on Ithemba's scenario, assume that bank overdraft deviates from the norm and forms a permanent part of Ithemba's financing and capital structure.

Supporting calculations – %'s rounded to once decimal

		20Y2	20Y1
1.	Revenue growth	$\frac{248\,230 - 241\,000}{241\,000}$	
		= 3,0%	

2	Gross profit margin	$\frac{90\,650}{248\,230}$	$\frac{96\,600}{241\,000}$
		= 36,5%	40,1%
3	Bad debt / Revenue	$\frac{5\,100}{248\,230}$	$\frac{4\,500}{241\,000}$
		= 2,1%	1,9%
4	Other operating costs / Revenue	= $\frac{28\,750}{248\,230}$	$\frac{26\,700}{241\,000}$
		= 11,6%	11,1%
5	Change in Research and development costs	= $\frac{10\,200 - 11\,100}{11\,100}$	
		= – 8,1%	
6	Change in other operating costs	= $\frac{28\,750 - 26\,700}{26\,700}$	
		= 7,7%	
	Change in total operating costs	= $\frac{(90\,650 - 26\,800) - (96\,600 - 34\,200)}{96\,600 - 34\,200}$	
		= $\frac{63\,850 - 62\,400}{62\,400}$	
		= 2,3%	
	EBITDA / Revenue	= $\frac{(26\,800 + 19\,800)^*}{248\,230}$	$\frac{(34\,200 + 20\,100)^{**}}{241\,000}$
		= 18,8%	22,5%
	Change in EBITDA	= $\frac{46\,600^* - 54\,300^{**}}{54\,300^{**}}$	
		= – 14,2%	
	Effective inter st rate (%)	= $\frac{12\,750}{127\,500}$	$\frac{10\,800}{102\,800}$
		= 10%	10,5%
	Invento y days	= $\frac{28\,060}{157\,580 \times 365}$	$\frac{21\,750}{144\,400 \times 365}$
		= 65 days	55 days
	Or Invent ry turnover	= $\frac{157\,580}{28\,060}$	$\frac{144\,400}{21\,750}$
		5,6 times	6,6 times
	Trade receivables	$\frac{51\,000}{248\,230 \times 365}$	$\frac{42\,900}{241\,000 \times}$
		75 days	365 = 65 days
13	Return (EBIT) on total assets =	$\frac{26\,800}{279\,900}$	$\frac{34\,200}{900}$
		= 9,6%	12,9%

14 ROE (Equity given) = $\frac{14\,050 \times 0{,}72}{152\,200}$ $\frac{23\,400 \times 0{,}72}{142\,100}$

Assuming a 28% tax rate = 6,6% = 11,9%

15 ROCE = $\frac{26\,800}{152\,200 + 127\,500}$ $\frac{34\,200}{142\,100 + 102\,800}$

= 9,6% = 14,0%

Note: Showing calculations are necessary to earn part marks (if applicable) and characterises good examination technique.

Discussion

Revenue

A growth rate of 3% in 20Y2 indicates a **slowdown** in the construction industry, global economy and limited spending of government on infrastructure. (1)

- It is **concerning** that this growth rate is also below the Consumer Price Index (or inflation rate). (1)

Invoicing in US dollar may contribute to reduced revenue if the price is set in US dollar and the **Rand strengthens**. (1)

Gross profit margin

- The decline from 40,1% to 36,5% is a **concern,** giv n the limited revenue growth. (1)
- There is a possibility that **steel price volatility** played a role in declining margins. (1)
- Decline in Gross Profit margin due to Ithemba's **lack of economies of scale**. (1)

*(Ithemba's gross profit margin is expected to **remain fairly constant** from year to year and **revenue increases** are expected to result in other cost of sales **efficiencies such as bulk discounts,** etc. These bulk discounts are as a result of **economy of scale**, which did not occur in Ithemba's case. This could indicate improper inventory management or a weakness in the purchasing department which will be investigated under working capital below.)*

Operating costs

The 8,1% decline in spending on research and development is a **concern**, as Ithemba should continue investing to boost future revenue growth through improved product design and new product development. (1)

Bad debts have increased relative to revenue from 1,9% (20Y1) to 21% (20Y2), which is indicative of **credit issues** within ith r the customer base or construction industry, or both. (1)

Depreciation has also d clined, which could be indicative of **less investment** in infrastructure and / or **older asset base.** (1)

Other ope ating osts increased by 7,7%, which may reflect **wage pressure** and **inflationary increases**. (1)

Total operating costs increased with 2,3% which is **marginally better** than the revenue increase of 3%, indicating operating cost **efficiencies** / Total operating cost to revenue remained **constant** at 26% from 20Y1 to 20Y2. (1)

Financing

- The overdraft has increased, which indicates that there was **negative cash flow** generation in 20Y2. (1)

This is supported by the decline in EBITDA (which excludes non-cash items such as depreciation and amortisation). (1)

Based on Ithemba's scenario bank overdraft is considered a permanent source of finance, and thus the **gearing** (or debt; equity) of Ithemba has **deteriorated,** which indicates a **higher finance risk profile**. (1)

The totals for equity plus overdraft amounts to 279 700 (20Y2) and 244 900 (20Y1) compared to total assets 279 900 (20Y2) and 264 900 (20Y1), would indicate **high settlement of trade creditors, contributing to the increase in the bank overdraft**. (1)

Operating profit has decreased by 22% while Profit Before Tax declined by 40% indicating the large extent to which **finance costs is depleting** profits. (1)

The large finance costs could be attributed to the fact that Ithemba makes use of short term debt only, which indicates an **inappropriate financing policy**. (1)

- Overdraft is costly due to **less security offered** and also as a result of their **increased finance risk.** (1)

Working capital

Inventory days have **worsened** from 55 days (20Y1) to 65 days (20Y2) as a resu t of the pressure from customers to hold more inventory. (1)

- Increasing inventory days increases Ithemba's **inventory holding and fin nce costs**. (1)

The issue of obsolete inventory is less of a concern in the construction industry due to the nature of products. (1)

Trade receivable days has **worsened** from 65 days to 75 days, reflecting **cash flow pressures** faced in the construction industry. (1)

This together with the increase in bad debt relative to revenue raises the concern of **irrecoverable debt as a result of excessive credit** to Ithemba's clients due to pressures in the construction industry. (1)

In both periods receivable days (75 and 65 days) exceeds the allowed **credit period of 60 days** which is an indication of **inefficient debtors management**. (1)

Return on assets / equity

ROE has worsened which indicates that Ithemba's **growth has deteriorated** as it declined from 11.9% (20Y1) to 6,6% (20Y2) and that their shareholders are receiving a lower profit on their investment. Some shareholders may find the **risk** of their investment in Ithemba **now exceeds their return**. (1)

Both Return on total assets and ROCE **deteriorated** indicating that **capital and assets were utilised less efficiently** than in 20Y1. Investors may prefer other investment opportunities with steady or increasing Return on total assets or ROCE. (1)

The decline in profit before tax of 40% is the key reason for the low return on investment and asset base. (1)

Discussion max (20)

Communication skills (2)

Question 8 – 2 *(Advanced)* *16 marks 24 minutes*

Tip Top Transport Limit d

(Source: SAICA Jan 2013 ITC Paper 3 Question 2 –adapted and extracted)

Tip Top Transpo t Ltd ('TTT') is a logistics group listed on the Johannesburg Securities Exchange. TTT has the following ope ating divisions:

Division	Focus area
Commercial Goods	This division services the retail industry and is responsible for the transport of fast moving consumable goods.
Fuel L gistics	This division transports petrol and diesel from refineries and oil depots to forecourts of fuel retailers.
Agricu tural Logistics	This division services the agricultural industry by transporting wheat, maize, rice, sunflower seeds, sugar and flour.
F stLiner	This division operates a fleet of luxury buses which transports paying customers between major cities in South Africa.
Servicing and Maintenance	This division is responsible for all servicing and maintenance of TTT's trucks and buses.

Return on investment (ROI) is one of the group's key performance measures and divisional management is incentivised on the basis of divisional ROI. TTT's overall ROI has declined in recent years mainly as a result of the challenging economic conditions and operating cost increases. The operating divisions have been asked to propose initiatives to improve ROI as part of the group's efforts to enhance shareholder value and returns.

TTT expects each operating division to generate a ROI in excess of 25% on a before tax basis. TTT's operating divisions are also expected to generate returns in excess of the group's adjusted weighted average cost of capital (WACC) of 20% when making capital investments. TTT's actual WACC is lower than 20%. The operating divisions do not have control over the payment of income tax and therefore tax cash flows are ignored when evaluating returns. As a result, operating divisions are given a higher hurdle rate to compensate for ignoring income tax in capital investment decision making.

Commercial Goods Division: Replacement of truck fleet and budgeted perform nce

The Commercial Goods Division ('CGD') is planning to replace its entire fleet of 70 trucks in the financial year commencing on 1 January 20X4. The fleet is standardised and each new truck is forecast to cost R900 000.

The proposed acquisition of the 70 trucks is a significant capital investment for CGD and the TTT group. CGD has prepared an analysis of the proposed capital expenditure and the average operating performance of each truck, which is summarised in the table below, for considerati n and approval by TTT's Board of Directors.

You may assume that the mathematical calculations in the average profitability analysis table below are correct.

Year ending 31 December		**20X4**	**20X5**	**20X6**	**20X7**	**20X8**
Average profitability analysis per truck	**Note**	**R**	**R**	**R**	**R**	**R**
Total revenue		1 404 000	1 466 600	1 609 200	1 701 000	1 792 800
Revenue	1	1 080 000	1 115 600	1 231 200	1 296 000	1 360 800
Fuel recovery charges	2	324 000	351 000	378 000	405 000	432 000
Operating costs		(1 312 741)	(1 380 207)	(1 446 172)	(1 511 807)	(1 579 084)
Fuel costs	3	(360 000)	(390 000)	(420 000)	(450 000)	(480 000)
Insurance – vehicles	4	(45 000)	(47 250)	(49 615)	(52 095)	(54 700)
Other insurance costs	4	(65 000)	(68 250)	(71 665)	(75 250)	(79 015)
Driver costs	5	(120 000)	(128 400)	(137 400)	(147 000)	(157 200)
Back-up driver costs	5	(60 000)	(64 200)	(68 700)	(73 500)	(78 500)
Servicing and maintenance	6	(180 000)	(192 000)	(203 000)	(213 000)	(223 000)
Allocated overheads	7	(125 000)	(135 000)	(145 800)	(157 500)	(170 100)
Other operating costs	8	(156 000)	(165 600)	(174 000)	(182 400)	(192 000)
Depreciation	9	(135 000)	(135 000)	(135 000)	(135 000)	(135 000)
Financing costs	10	(66 741)	(54 507)	(40 992)	(26 062)	(9 569)
Operating profit per truck	11	91 259	86 393	163 028	189 193	213 716

Notes:

Each tr ck travels on average 108 000 km per annum transporting customer goods ('productive km'). It is budgeted that c stomers will pay a fixed fee of R10 per km, excluding fuel costs, to CGD in the 20X4 financial year for the transportation of goods. Although the fee per km will escalate in future years, the average pr ductive km per truck travelled is assumed to be 108 000 km in each year of the budgeted peri d.

Fuel co ts incurred are billed separately to customers. All routes have been mapped and standard distances agreed with customers. The average fuel consumed per km travelled by trucks on each route is also agreed with customers. CGD invoices customers the prevailing fuel cost per litre, multiplied by the pre-agreed number of litres consumed per km on routes. CGD does not mark up fuel costs when invoicing customers.

For a variety of reasons, fuel costs are forecast to be higher than that invoiced to customers. The most common reason is that drivers deviate from pre-agreed routes or take detours. In addition trucks have to travel from CGD depots to the TTT Servicing and Maintenance Division's workshops on a regular basis for servicing, repairs and maintenance. Each truck is forecast to travel an average of 120 000 km annually, which is consistent with distances travelled during prior years.

CGD insures trucks against theft and accident damage which is budgeted to cost R45 000 per truck in the 20X4 financial year. In line with customer requirements, CGD also insures itself against potential liability in the event of environmental damage as well as third party claims for injury and consequential losses suffered as a result of negligence of truck drivers, mechanical breakdown or truck malfunction. This insurance is estimated to amount to R65 000 per truck in the 20X4 financial year.

Drivers are budgeted to be paid R120 000 per annum on a cost to company basis in the 20X4 financial year. Their salaries are expected to increase by approximately 7% per annum thereafter. There is a pool of back-up drivers on standby, in the event that any of the primary drivers become ill or to accompany drivers on long-distance trips. Back-up drivers are full-time employees of CGD.

Each truck is required to be serviced after every 10 000 km travelled. The Servicing and Maintenance Division marks up the costs of servicing and maintaining the CGD trucks by 50% in order to generate a reasonable return on its assets and efforts.

CGD analyses costs and allocates these to trucks using activity based costing principles. The allocated costs in the budget represent divisional expenses incurred in dealing with customers (e.g. scheduling deliveries, customer service, complaints and queries), invoicing and c llecting amounts from customers, human resource management, and general management and contr l f perati ns.

Other operating costs relating to the operation of trucks are variable in nature.

The acquisition costs of trucks less estimated residual values are depreciated evenly over five years.

10 Financing costs have been correctly calculated on a onthly basis for the period 20X4 to 20X8 based on the proposed agreement with VIS.

11 Operating profit is analysed before taxation as CGD has no control over group tax planning.

REQUIRED		**Marks**	
		Sub-total	**Total**
(a)	Calculate the forecast ROI per truck used by CGD for each year over the period 20X4 to 20X8 and the average ROI over the period, assuming that the division acquires the 70 trucks.	(6)	(6)
(b)	Identify and explain the potential merits and pitfalls of using ROI as a measure to evaluate the performance of management.	(9)	
	Communication skills – clarity of expression	(1)	(10)

Solution 8 – 2

Part (a)

	20X4	**20X5**	**20X6**	**20X7**	**20X8**	
Operating profit	91 259	86 393	163 028	189 193	213 716	(1)
Financing costs[a]	66 741	54 507	40 992	26 062	9 569	(1)
Adjusted Ope ating P ofit[b]	158 000	140 900	204 020	215 255	223 285	
Truck balance (year-end)	765 000	630 000	495 000	360 000	225 000	(1)
Truck balance (average)[c]	*832 500**	*697 500*	*562 500*	*427 500*	*292 500*	(1)
**(R 900 000 + R 765 000) / 2*						
ROI (year-end)	20,7%	22,4%	41,2%	59,8%	99,2%	(1)
ROI (average)[c]	*19%*	*20,2%*	*36,3%*	*50,4%*	*76,3%*	(1)
Average ROI ver period	[(158 000 + 140 900 + 204 020 + 215 255 + 223 258) / 5] / [(765 000 + 630 000 + 495 000 + 360 000 + 225 000) / 5] = 38,0%					(1)
					Maximum	(6)

Note:

All costs except financing costs form part of the operating profit per truck calculation and thus only financing costs are added back.

Taxation for TTT is not considered as CGD has no control over group tax planning.

Average ROI was specifically required.

Part (b)

Merits

- Non accountants are able to understand this ratio as it is ***user friendly.*** (1)
- Enables easy ***comparison of performance*** between divisions and external benchmarking. (1)

  Linked to assets under control of division which may be more informative than simply evaluating profits and cash flows in isolation. (1)
- Widely used in practice. (1)

Pitfalls

ROI results can vary depending on which ***valuation basis is used f r assets*** (opening or average or closing balances). (1)

- ***Accounting treatment*** of assets may impact on ROI eg. i pair ent of assets could lead to higher ROI in future. (1)

  ROI as an evaluation tool may lead to ***non-congruent behaviour***; CGD may not act in best interests of the TTT group as a whole. (1)

  Positive NPV projects may be rejected for example wh re ROI doesn't exceed 25% but does exceed WACC of 20%. Where the ROI exceeds WACC value is being added and these projects should be undertaken. (1)

  Many projects take time to deliver attractive returns. Focusing on ROI in the ***short term*** may result in viable long term projects being rejected. During 20X4 and 20X5 the ROI was below 25% and would be rejected. Subsequently (20X6 to 20X8) ROI did exceed the required 25% indicating that invested capital was **utilised more effectively in the long-term**. (1)
- Purely a financial measure and ***ignores qualitative issues***. (1)

  ROI does not take into account the ***risks*** of a division / project in measurement / evaluation of performance. (1)

  ROI is not suited to ***service based industries or divisions such as CGD*** as capital investment may be limited. (1)
- Divisions may be evaluated based on ***non-controllable costs*** if these are included in ROI. (1)

  Clarity of expression (1)

  Maximum (10)

Question 8 – 3 *(Advan ed)* *70 marks 105 minutes*

Catcon (Pty) Ltd

(Source: SAICA 2011 QE II Question 1 – adapted and extracted)

CatCon (Proprietary) Limited ('CatCon') manufactures ceramic catalytic converters for use in petrol and diesel-powered passenger vehicles and light-duty commercial vehicles. Catalytic converters are able to destroy most harmful substances produced by vehicle engines, such as carbon monoxide, unburnt hydrocarbons and nitr gen xides, which are present in vehicle exhaust emissions.

Ba ically, catalytic converters consist of a ceramic structure coated with a metal catalyst which is attached to a vehic e's exhaust system. Metal catalysts generally consist of a combination of the platinum group metals (PGMs), namely platinum, palladium and rhodium.

C tCon is based in Port Elizabeth and sources the majority of the components required for the manufacture nd ssembly of catalytic converters from suppliers in close proximity to its operations. CatCon derives the vast majority of its revenue from exporting its converters to European-based automotive assemblers. Exports of catalytic converters are a significant revenue stream for South Africa, generating almost as much revenue as the export of passenger vehicles.

The South African government introduced the Motor Industry Development Programme (MIDP) in 1995 to stimulate the local manufacture and export of vehicles and automotive components. The MIDP provided the springboard for the rapid expansion of the South African catalytic converter industry, as these components have a relatively high value. South Africa's rich platinum resources also assisted in developing the catalytic converter industry, for it provided an opportunity for local manufacturers to add value to this precious metal prior to it being exported.

The local catalytic converter industry experienced significant growth in production volumes in the period from 20W0 to the middle of 20W8. The industry produced a record 17,3 million catalytic converters for export in the 20W8 calendar year. However, the financial crisis which started in ate 20W8 had a significant adverse impact on passenger vehicle sales globally. Demand for cata ytic converters decreased by approximately 40% in 20W9. Although sales of new passenger vehicles recovered in 20X0 and 20X1, global volumes have still not equalled the peak levels reached in 20W8.

CatCon spent R150 million in 20W6 on the expansion of its manufacturing facilities to cater for an anticipated growth in demand. The company raised a foreign loan of US $60 million in 20W6 to fund not only this capital expenditure but also expected future working capital requirements. The foreign loan, which bears interest at a fixed rate of 7% per annum, is repayable in equal annual instalments, payable in arrears. The first instalment was paid on 1 July 20W7 and the final instalment is due n 1 July 20X3.

Manufacturing operations

CatCon manufactured 4,5 million catalytic converters in the financial year ended 30 June 20X1. The production capacity is eight million units per annum, and hence the co pany is currently operating well below capacity. In the financial year ended 30 June 20W8, CatCon manufactured 5,5 million catalytic converters and the decision to expand operations during 20W6 app ar d to be sound.

Despite the significant reduction in production and sales of catalytic converters in the 20W9 financial year, CatCon was able to report earnings before interest and taxation (EBIT) of R555 million. Profitability has been declining since 20W9 and management is concerned about this trend. There have been many challenges for CatCon management over the past three years including the following:

- Production was increased in 20X0 to meet resurging demand. Inventory levels were low at the time and management was stretched to ensure that production and inventory levels rapidly increased to meet the higher demand;
- Platinum prices have been very volatile over the period from January 20W8 to June 20X1. In May 20W8 the price of platinum was US $2 060 an ounce. This price declined to approximately US $850 in December 20W8 following fears that demand for this precious metal would decline as a result of the state of the global economy. Platinum prices slowly recovered during 20W9 and 20X0, and by June 20X1 the prevailing platinum price was US $1 830 an ounce;
- PGMs used by CatCon in the manufacture of catalytic converters represent between 60% and 70% of total manufacturing costs; and
- CatCon retrench d 20% of its manufacturing work force in early 20W9 in response to the declining demand for atalytic onverters. Employee morale suffered following the retrenchments and relations between workers and management remain strained.

Revenues

Global passenger vehicle sales declined in 20W9 following the economic crisis in late 20W8. Lower demand was driven by limited access to vehicle finance and nervousness regarding economic conditions by consumers.

CatC n's sales v lumes declined from a high of 5,2 million units in the 20W8 financial year to 3,6 million units in 20W9. Unit sales in the 20X0 financial year were 3,9 million and 4,4 million in the 20X1 financial year. Ongoing challenges facing CatCon include –

- pricing pressure from European customers who are reluctant to accept price increases in line with the increasing input costs (mainly PGM costs); and
- the strength of the rand against the US dollar. The prices of exported catalytic converters are quoted in US dollar and a strengthening rand has an adverse impact on CatCon's revenues.

Financial performance

Extracts from CatCon's recent annual financial statements and further details are set out below:

CATCON (PROPRIETARY) LIMITED
EXTRACTS FROM STATEMENTS OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEARS ENDED 30 JUNE

	Notes	20X1	20X0
		R mi ion	R million
Revenue	1	5 852	5 039
Cost of sales	2	(5 389)	(4 354)
Gross profit		463	685
Operating costs		(350)	(345)
Profit from operating activities	3	113	340
Finance costs	4	(39)	(31)
Profit before taxation		74	309
Taxation		(21)	(89)
Profit attributable to shareholders		53	220

Notes:

The average selling price per catalytic converter was US $170 in 20X0 and US $190 in 20X1. The average R : US $ exchange rate during 20X1 was 7,00 : 1,00 (20X0: 7,60 : 1,00).

Cost of sales comprised the following:

	20X1	20X0
	R million	R million
Opening inventories (raw materials, work in progress and finished goods)	839	406
PGM costs	3 812	3 288
Other manufacturing costs	1 726	1 479
Depreciation of manufacturing plant and equipment	25	20
Closing inventories (raw materials, work in progress and finished goods)	(1 013)	(839)
Cost of sales	5 389	4 354

PGM costs are pric d in US dollar. All other manufacturing costs are priced in rand.

Inventories of finished goods and units manufactured:

	20X1	20X0
	Units	Units
Opening inventories	700 000	400 000
Units man fact red	4 500 000	4 200 000
Units s ld	(4 400 000)	(3 900 000)
Cl sing inventories	800 000	700 000

CatCon used a consistent quantity and mix of PGMs per unit in the manufacture of catalytic converters in the 20X0 and 20X1 financial years.

C tCon uses the first-in-first-out (FIFO) basis to record inventories in its enterprise management system nd accounting records.

The R : US $ exchange rate at 30 June 20X1 was 6,80 : 1,00 (20X0: 7,65 : 1,00).

3 Profits from operating activities were arrived at after (crediting) / charging the following:

	20X1	20X0
	R million	R million
Movement in provisions	5	10
Total depreciation (including manufacturing plant and equipment)	32	26
Foreign currency translation gain: Foreign loan	(25)	(13)

4 Finance charges comprise the following:

	20X1	20X0
	R million	R million
Interest on foreign loan	14	20
Interest on bank overdraft	25	11
	39	31

The bank overdraft bears interest at the prevailing prime verdraft interest rate (assume 9%).

CATCON (PROPRIETARY) LIMITED
EXTRACTS FROM STATEMENTS OF FINANCIAL POSITION AS AT 30 JUNE

	20X1	20X0
	R million	R million
Non-current assets	195	170
Property	15	15
Plant and equipment (manufacturing and non-manufacturing)	180	155
Current assets	1 895	1 667
Inventories	1 013	839
Trade receivables	882	828
Total assets	2 090	1 837
Issued ordinary share capital	100	100
Retained income	707	654
Equity attributable to shareholders	807	754

	20X1	20X0
Non-current liabiliti s	R million	R million
Interest-bearing liabilities	52	123
Current liabilities	1 231	960
Trade payables	759	587
Provisions	45	40
Taxation	3	13
C rrent portion of interest-bearing liabilities	85	101
Bank verdraft	339	219
T tal equity and liabilities	2 090	1 837

Rai ing of capital

AZN Bank has been CatCon's commercial bank since the latter's inception. On 31 July 20X1 the account executive at AZN Bank responsible for the CatCon account, Ms Beezbubble, informed the directors of CatCon h t the overdraft facility would be reduced to R50 million with effect from 31 December 20X1. According o Ms Beezbubble, her credit committee was uncomfortable with various issues, including the following:

The fact that AZN Bank financed the repayments of the foreign loan, as CatCon is not generating sufficient cash flows to service this themselves;

The debt : equity ratio of CatCon is far too high in the current economic climate; and

The declining gross profit margin of CatCon, which is placing the business at risk.

REQUIRED		Marks	
		Sub-total	Total
(a)	Prepare a pro forma statement of cash flows for the financial year ended 30 June 20X1 and state whether AZN Bank's contention that it is financing the repayment of the foreign loan is correct or not.	(14)	(14)
(b)	Debate and conclude whether you believe CatCon's gearing leve s were too high at 30 June 20X1.	(10)	(10)
(c)	Discuss possible reasons for the deterioration of CatCon's gross profit margin percentage during the financial year ended 30 June 20X1. You should perform detailed calculations to support your arguments including – l an analysis of revenue and the components f c st f sales on a per unit basis for the 20X0 and 20X1 financial years; and l an analysis of the components of cost of sales as a percentage of revenue on a per unit basis for the 20X0 and 20X1 financial years.	(10) (20)	(30)
(d)	Outline possible actions that CatCon could take to i prove the company's financial performance and cash flow generation.	(12)	(12)
Presentation marks: Arrangement and layout, clarity of xplanation, logical argument and language usage.		(4)	(4)

Solution 8 – 3

Part (a)

Pro forma statement of cash flows for the year ended 30 June 20X1	**R million**	
Profit before taxation	74	
Add back non-cash items:		
l Depreciation	32	(1)
l Movement in provision (45 – 40) increase Cr = inflow	5	(1)
l Foreign loan translation differences	(25)	(1)
Taxation paid [–21 **SCI tax** + (3 – 13 **SFP** decrease Cr = outflow)]	(31)	(2)
Working capital mov m nts		
l Inventories (1013 – 839) increase Dr = outflow	(174)	(1)
l Depreciation movement through inventories	1	(2)
[(R25m / 4,5m units) × 0,8m units] –[(R20m / 4,2) × 0,7m units]		
l Trade receivables (882 – 828) increase Dr = outflow	(54)	(1)
l Trade payables (759 – 587) increase Cr = inflow	172	(1)
Capital expenditure [180 + 32 – 155] increase Dr = outflow	(57)	(2)
Repayment of interest bearing debt [(52 + 85 + 25) – (123 + 101)]	(62)	(2)
decrea e Cr = outflow		
Net increase in bank overdraft (*assume: rounding difference)	(119)*	(1)
Conclusion: Yes, AZN Bank is correct, it is financing the repayment of the foreign loan.		(1)
	Maximum	(14)

Note: Direction of cash flows (signs (+ / –)) must be correct to earn marks.

Part (b)

	20X1	**20X0**	
Interest cover (113 / 39); (340 / 31)	2,9:1	11:1	(1)
Interest bearing debt to equity ratio (including bank overdraft**)	59%	59%	(1)
[(52 + 85 + 339) / 807]; [(123 + 101 + 219) / 754]			
Or capital gearing ratio	37%	37%	
[(52 + 85 + 339) / (52 + 85 + 339 + 807)];			
[(123 + 101 + 219) / (123 + 101 + 219 + 754]			
Total debt ratio [(52 + 1231) / 2 090]; [(123 + 960) / 1 837]	61%	59%	(1)

- Interest cover ratio **worsened** mostly due to decrease in profitability. (1)
- This raises a major **concern** re the declining profitability, especially the **gross profit margin**. (1)

  Interest bearing debt to equity (or gearing) ratio remained c nstant because foreign loan payments are funded by bank overdraft (refer to part (a) above). (1)
- CatCon is **not generating positive cash flow** which indicates a ajor **liquidity problem** (refer part (a) above). (1)
- **Foreign loan** is repayable within the next 2 years which will free up cash flow for other uses. (1)

  Initially utilising foreign loan for working capital r quir ments and now utilising bank overdraft as a permanent source of finance indicates an **inappropriate financing policy** as a non-current loan should be utilised to finance non-current assets. (1)

  The interest charged on the bank overdraft (9%) is more expensive than the interest charged on the foreign loan (7%) due to **less security offered** and also as a result of their **increased finance risk**. (1)
- Total debt ratio remains fairly stable due to overdraft funding **asset increase**. (1)
- Overdraft can be **revoked** at any time. CatCon should thus not be overly reliant. (1)
- Ratios at face value don't indicate **major gearing issue**. (1)
- Bankers have however **raised concerns** re gearing (3rd party confirmation). (1)
- **Conclusion:** Consistent with analysis and appropriate. (1)

Maximum (10)

Note**: Bank overdraft should be included under the interest bearing debt as it is used to finance more than just working capital as indicated by Ms Beezbubble that "AZN Bank financed the repayments of the foreign loan, as CatCon is not g n rating sufficient cash flows to service this themselves".

Part (c)

Per Unit	**20X1 R million**	**20X0 R million**	
Revenue (5 852 / 4,4); (5 039 / 3,9)	1 330,00	1 292,05	(1)
COS per unit including inventory movement (5 389 / 4,4); (4 354 / 3,9)	(1 224,77)	(1 116,41)	(1)
COS per unit manufactured (3 812 + 1 726 + 25) / 4,5); (3 288 + 1 479 + 20) / 4,2)	(1 236,23)	(1 139,76)	(1)
PGM costs (3 812 / 4,5); (3 288 / 4,2)	*(847,11)*	*(782,86)*	(1)
Other manufacturing costs (1726 / 4,5); (1 479 / 4,2)	*(383,56)*	*(352,14)*	(1)
Depreciation (25 / 4,5); (20 / 4,2)	*(5,56)*	*(4,76)*	(1)
Inventory movements (balancing figure*) (1 224,77 – 1 236,23); (1 116,41 – 1 139,76)	11,46*	23,35*	(1)
Gross profit per unit sold including inventory (463 / 4,4); (685 / 3,9)	105,23	175,64	(1)
Alt: GP excluding inventory movements (1 330 – 1 236,23); (1 292,05 – 1 139,76)	93,77	152,29	(1)
Opening inventory cost per unit (839 / 0,7); (406 / 0,4)	1 198,57	1 015,00	(1)
Closing inventory cost per unit (1 013 / 0,8); (839 / 0,7)	1 266,25	1 198,57	(1)

Gross profit % (105,23 / 1330,00); (175,64 / 1 292,05)	7,9%	13,6%	(1)
Alt: Cost of sales as a % of revenue per unit (incl. inventory movements) (1 224,77 / 1 330,00);(1 116,41 / 1 292,05)	92,1%	86,4%	
% increase in **total** revenue (5 852 – 5 039) / 5 039	16,1%		(½)
% increase in **total** COS (5 389 – 4 354) / 4 354	23,8%		(½)
% increase in **total** PGM costs (3 812 – 3 288) / 3 288	15,9%		(½)
% Increase units sold (4,4m-3,9m) / 3,9m	12,8%		(½)
% change per unit:			
Revenue increase (1 330 – 1 292,05) / 1 292,05	2,9%		(½)
PGM costs increase (847,11 – 782,86) / 782,86	8,2%		(½)
Other manufacturing costs increase (383,56 – 352,14) / 352,14	8,9%		(½)
Gross profit per unit sold decrease (105,23 – 175,64) / 175,64	(40,1%)		(½)
COS as a % of per unit revenue			
Revenue	100,0%	100,0%	
PGM costs (847,11 / 1 330); (782,86 / 1 292,05)	(63,7%)	(60,6%)	(1)
Other manufacturing costs (383,56 / 1 330);(352,14 / 1 292,05)	(28,8%)	(27,3%)	(1)
Depreciation (5,56 / 1 330); (4,76 / 1 292,05)	(0,4%)	(0,4%)	(1)
Change in inventory levels (11,46 / 1 330); (23,35 / 1 292,05)	0,9%	1,8%	(1)
Gross profit (105,23 / 1 330); (175,64 / 1 292,05)	7,9%	13,6%	(1)
Cost of sales as a % of evenue per unit (excluding inventory) (1 236,23 / 1 330); (1 139,76 / 1 292,05)	92,9%	88,2%	(1)
Strengthening of Rand against US $ (7,00 – 7,60) / 7,60	7,9%		(½)
US $ terms: Reven e per unit ((1 330 / 7) – (1 292,05 / 7,6)) / (1 292,05 / 7,6)	11,8%		(½)
US$ increase: PGM costs p.u. manufactured (847 / 7 – 783 / 7,6) / (783 / 7,6)	17,4%		(½)
		Maximum	(20)

Note:

Limited rounding differences may occur.

Direction ito increase or decrease (signs (+ / –)) must be correct to earn marks.

Discussion

- 20X1 revenue levels are **worse** due to strengthening Rand as prices are quoted in US$. (1)

  It is **concerning** that cost of sales in total increased with 23,8% [(5 389 – 4 354) / 4354] which exceeds the 16% **increase in revenue** increase. (1)

  This indicates **lack of economy of scale** and **inventory inefficiencies** which lead to the 32% [(463 – 685) / 685] decrease in **total** gross profit. (1)

  CatCon is **unable to recover cost increases from customers** which is the key reason for decrease in GP%. (1)

  PGM costs per units increased with 8,2% (or 17,4% in US$ terms) while revenue increased with **only** 2,9% (or 11,8% in US$ terms). (1)

- Thus PGM cost increases were at least partly off-set by **strengthening rand**. (1)

  PGM quantities and mix were consistent over the 2 years indicating **no PGM production inefficiencies** or **mix variance** occurred. (1)

- **Other manufacturing costs** are Rand-based thus no impact f changing exchange rates.
- The 8,9% increase in **Other manufacturing costs** above CPI (or inflation) is concerning. (1)

  Increase in Other manufacturing costs may indicate **wage pressure, high electricity increases** and **inflationary increases**. (1)

  Increase in inventory levels increases the Gross profit which **defers fixed cost to the next year**. (1)

- In terms of the **FIFO system** cheap inventory is sold first which increased the gross profit margin. (1)
- CatCon is **operating below capacity** making it **difficult to recover overheads**. (1)

Maximum (10)

Part (d)

- Increasing **selling price** may not be possible due to pricing pressures from European customers. (1)

  General cost control (improve efficiencies) to reduce spending in an effort to increase cash flows and profit. (1)

- Pass **PGM cost increases onto customers**. (1)

  Hedge commodity prices by setting a price for PGM thus reducing losses from price fluctuations. (1)

- Find ways to limit Other manufacturing cost increases by cost cutting or outsourcing. (1)
- **Use LED lights** to r duce l ctricity costs. (1)
- Explore ways to **improve mployee morale** which leads to higher productivity and innovation in the work place. (1)
- **Improve design of onverters** by using a different mix of PGMs. (1)
- **Use spa e capacity** to manufacture another product and **diversify their operations**. (1)
- Sell **s rpl s assets**, if any. (1)
- **Sale and leaseback** of property plant and equipment. (1)
- **Impr ve inventory management** to reduce inventory-holding cost (e.g. use JIT). (1)
- **Factor debtors** to increase cash flows and to redirect focus on production. (1)

  Providing settlement discounts to improve cash flow. Operating profit margins may however be affected. (1)

Maximum (12)

(Source: IIRC 2014. About <IR>. Available from: http://www.theiirc.org/about/(accessed 19 May 2014).)

Chapter 9

Working capital man gement

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- describe how a company should manage cash;
- explain the advantages and disadvantages of s lling on cr dit and how debtors should be managed;
- calculate the advantages of increasing credit terms;
- calculate the Economic Order Quantity (EOQ) with and without discount allowances, and the economic safety inventory level; and
- discuss the meaning of Just in Time (JIT) inventory holding.

Managing a company's working capital (liquidity) involves the simultaneous matching of decisions about current assets and current liabilities. Working capital is the Rand amount of a company's current assets and includes cash and short-term investments, accounts receivable and inventories. Hence, these are of short-term duration.

The choice available to financial managers is to finance working capital through long- term finance (such as debt or equity) or through short-term financing. The use of short-term finance increases the insolvency risk, as the ability to borrow is restricted. Long-term financing limits the insolvency risk, as interest payment on debt is only periodic and the capital amount is not repayable until maturity. However, using long-term finance to finance working capital is not always seen to be prudent as the firm's permanent sources of capital are then being utilised to finance short-t rm activities thereby compromising the ability of the firm to acquire investments for long-term growth and comp titiveness.

Current assets an represent a significant proportion of total assets (e.g., a retailer who leases premises may find their total assets being almost solely current assets); therefore it is important that careful planning is car-ried out, especially because of the volatile nature of the assets involved. An important consideration in setting a financial policy is the relationship between the growth in sales and the growth in working capital. As sales increase, the need to hold a higher level of inventory also increases, as does the investment in debtors. This could lead to a negative cash-flow situation as the inventory and debtors have to be financed until converted into cash. Unless the firm accesses a facility to cover the negative cash flow, the situation could prove disas-tr us, especially for a fast-growing business. Firms that grow too quickly are characterised as 'overtrading' and the resultant cash-flow deficit has seen the demise of many promising entities!

9.1 Levels of working capital

Different levels of working capital can exist in companies, depending on their attitude to risk, access to resources and industry dynamics.

Permanent working capital

Permanent working capital is the Rand amount that persists over time, regardless of fluctuations in sales.

Temporary working capital

Temporary working capital is the additional current assets required to meet the variations in sales above the permanent level.

Net working capital

Net working capital is the difference between current assets and current liabilities. It is a financial indicator that should be used in conjunction with other financial indicators, such as the current ratio (current assets ÷ current liabilities), to gauge the liquidity of business concerns.

The matching principle of equating the cash flow generating characteristics of an asset with the maturity of the source of financing used to finance its acquisition is known as ***hedging***. Most comp nies experience seasonal demand, requiring an expansion in inventories which should be financed by short-term loan or current liabilities. For example in the build-up to the December period, a retailer will ha e to 'stock up' to take advantage of anticipated increased sales volumes. Funds are needed for a limited period of time and when that time has passed, the cash needed to repay the loan facility will be generated by the sale of finished inventory (refer Example: Bidvest below).

If the deficit is financed from a long-term source, the company will have excess liquidity until the seasonal demand occurs again. This may result in the overall lowering of profits, as the long-term interest payments are likely to be higher that the short-term interest receipts.

The idea of maturity-matching in the hedging principle is clarified by looking at the distinction between permanent and temporary investment in assets. A perman nt inv stment in an asset takes place when a company expects to hold that asset for a period of longer than one y ar. Permanent investments include not only fixed assets, but also the company's minimum level of current assets. Temporary asset investments, by contrast, comprise of current assets that will be liquidated and not replaced within the current year.

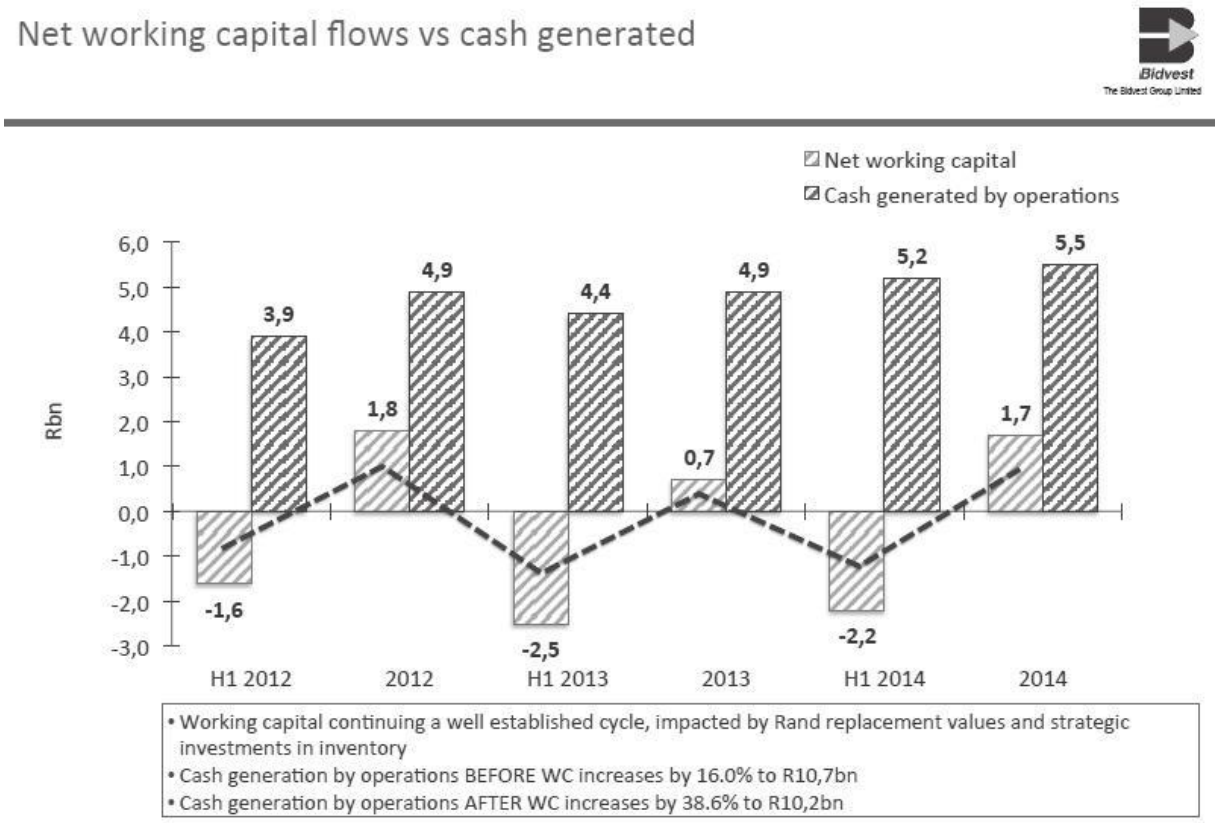


Figure 9.1: Net working capital versus cash generated

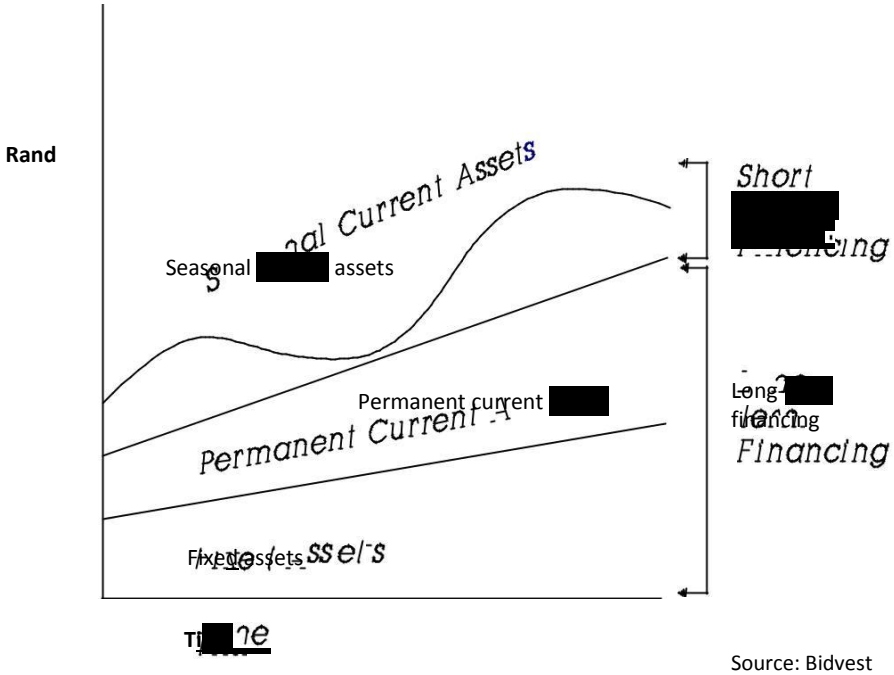
Source: Bidvest

9.2 Hedging or matching finance

The term **hedging** as used here means matching expected cash inflows from assets with outflows from their respective sources of financing.

Perfect hedge

The perfect hedge consists of financing temporary current assets with short-term sources of funds and fixed assets, and permanent current assets with long-term sources of funds. The basic strategy of the perfect hedge is to match the expected inflows and outflows of funds. This method is considered sound financing, because the inflows of funds from the sale of assets are being used to repay the loans that financed their acquisition.



Source: Bidvest

Figure 9.2: Diagrammatic representation of a perfect hedge

Conservative hedge

All of the fixed assets, permanent current assets, and part of the temporary current assets are financed with long-term sources of funds. This method is considered conservative, because the firm only needs to finance a small portion of its temporary current assets with short -term funds. The major advantage of this method is that during periods of credit restraint, the firm already has most of the funds that it needs to finance its activities. Hopefully, the long-term funds were obtained at a time when their cost was favourable to the firm.

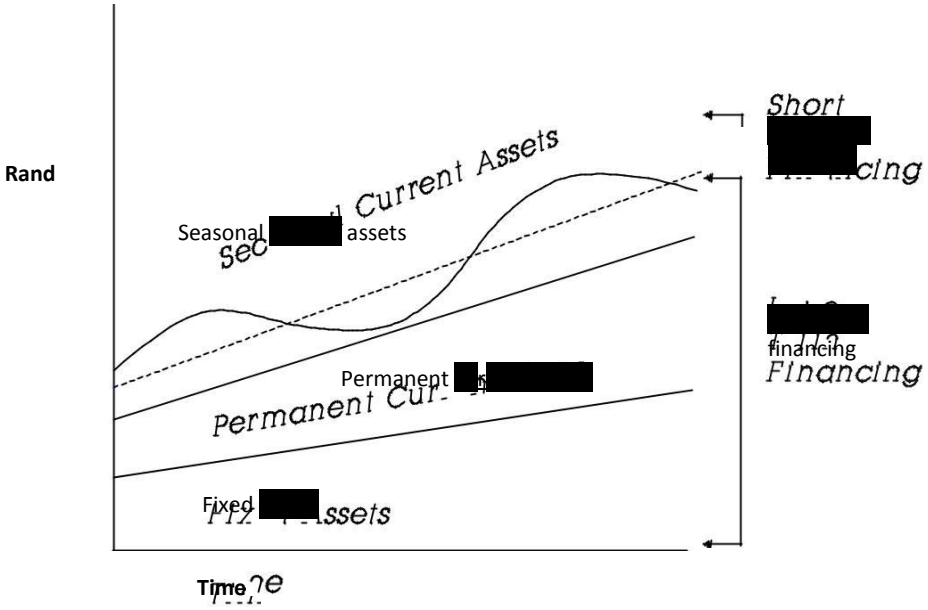


Figure 9.3: Diagrammatic representation of a conservative hedge

Appropriate forms of finance

The conservative hedge implies that there will be surplus cash available over peak seasonal fluctuations, and little or no cash borrowing during trough or down periods. The problem with this strategy is that there will be a high cost of borrowing and low earning potential on short- term investments. The perfect hedge strategy means that short-term assets will be financed using short- term borrowing. This type of financing strategy requires frequent borrowing adjustments and is risky because short-term rates are more volatile than long-term rates.

It is important, however, to bear in mind that, on average, short-term interest rates are lower than longer term rates (normal yield curve) which means that a firm will maximise returns by using more short-term finance. The firm must also assess the risk associated with the various financing strategies when deciding which method suits its needs.

The effects of conservative and aggressive financing

Conservative financing takes place where financing is of a permanent long-term nature.

Aggressive financing exists where a permanent reliance is placed n sh rt-term funds. Under a normal yield curve (short-term rates lower than long -term rates), the company will maximise profits by using short-term finance. However, a change in the yield curve to inverse will result in the company incurring heavy interest charges.

Example:

Assets	**R**
Current assets	100
Fixed assets	100
Total assets	200

Financing

	Conservative R	**Aggressive** R
Short-term debt (7%)	25	100
Long-term debt (12%)	125	50
Equity	50	50
Total liabilities and equity	200	200

Income and expenses

	Conservative	**Aggressive**
Earnings before interest and tax	50,00	50,00
Interest	16,75	13,00
Taxes (28%)	9,31	10,36
Net income	R23,94	R26,64

Financial indicato s

Current ratio (CA : s/t debt)	4 : 1	1 : 1
Net working capital (CA **less** s/t debt)	R75	R0
Rate of ret rn on eq ity (Net Y : Equity)	47,9%	53,3%

N te: The trade -off should be kept in mind when firms change their financing patterns as they respond to changing business conditions. For example, aggressive hedging should be used when firms are expanding their working capital during the recovery and prosperity phases of a business cycle.

9.3 Cash management

Liquidity preference

Uncertainty about interest rates and investor psychology are important determinants of the amount of liquid assets one holds. Liquidity preference depends on:

Transaction motive

Cash to carry out day-to-day transactions. The amount of cash held also depends on the regularity of receipts and disbursements.
A retail business is likely to have a high cash to sales ratio or cash to total assets ratio, as sales are random and possible seasonal fluctuations increase the cash required.

Precautionary motive

Precautionary balances are those set aside because cash inflows and outflows are not synchronised. They are required to meet unanticipated expenses.

The amount required for the precautionary motive is influenced by a company's ability to borrow on short notice. Companies will often hold assets that can easily be liquidated, such as Treasury Bills or Bankers' Acceptances. It must, however, be noted that such assets are expensive, as their return is usually well below the company's cost of capital.

Speculative motive

Some firms hold practically no speculative balanc s, while others hold large speculative balances because they are aggressively seeking acquisitions or 'good buying opportunities' for commodities that they use in their operations.

The firm expects to pay out cash for its inputs/manufacturing process and to receive cash for its output sales. The cash operating cycle is descriptive of the time elapsed between the payment for raw material and the final receipt of cash for items sold. The longer the cycle, the more cash (liquidity) the company will require to finance the day-to-day running of the business. It is important to analyse the firm's turnover rates, to determine the number of days lag between cash out and cash in.

Cash operating cycle/business cycle

Debtors' time-lag

The average number of days that elapse between the sale of output goods and the resulting cash inflow: $\frac{\text{Debtors' balance} \times 365}{\text{Total sales r v nue}}$

Raw material time-lag

The average length of time that raw material is kept in inventory before being used in the production process:

$$\frac{\text{Raw mate ials inventory} \times 365}{\text{Total p rchases}}$$

Creditors' time-lag

The number of days between the receipt of inputs and the cash payment:

$$\frac{\text{Creditors' balance} \times 365}{\text{Total purchases}}$$

Work-in-progress time-lag

The average length of production:

$$\frac{\text{Work-in-progress} \times 365}{\text{Total production costs}}$$

(e) Fini she d g oo ds time -la g

Ave rage time tha t output is h eld in i nve ntory b efo re bei ng sold:

$$\frac{\text{Finish ed goods} \times 36\,5}{\text{C ost of sale s}}$$

The cash operating cycle i s de fin ed as the ove rall tim e-lag betwe en the cash paym ent fo r in pu ts and the cas h re ceipts for ou tpu t, a nd is e qual to **(b) + (d) + (e) + (a) (c).**

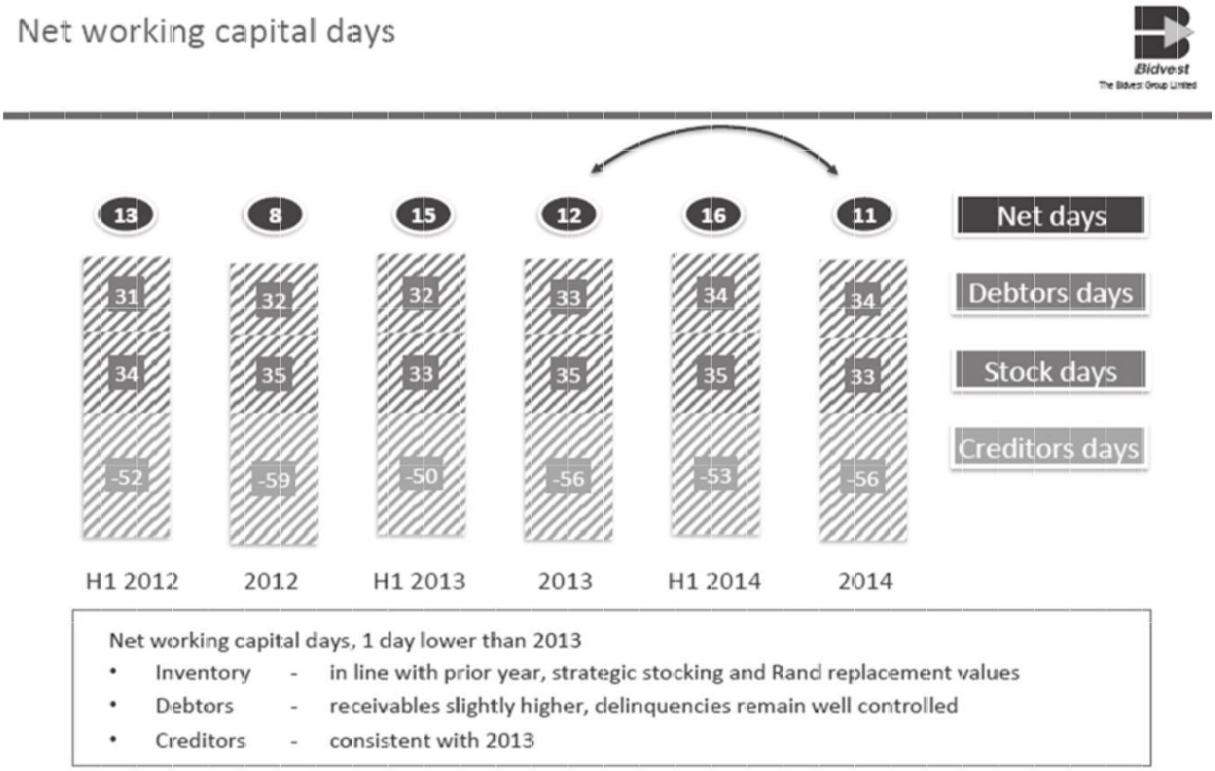


Fig ur 9.4: N et wo rking c apital d ays

So urce: Bidve st

9.3.3 Fo recas in g – asset requireme nt s

As sales increase, i t is reasonabl e to assum e that wo rki ng c apital requir eme nts will also increase. A n i ncr eas e in cr edit sal es will lea d to an in cre ase in de bto rs, inve nt ry and credi tors . If a compan y i s at full ca pa city , it will re quir e an in jectio n of new capit al – either d ebt or equ ity, or retain ed inco me, to inc rea se the fix ed asse t base and s ubsequ ent ly incr as sa l s.

Company gr owt h t hus impacts o n the liquidity re qu ire men ts o f a co mp any an d it is nece ssary for a co mp an y to m onit or the eff e ts on wo rki ng api tal when sales in crease.

There is no sing le mo del that a com pany ma y us e to a ccu rate ly f ore cas t working ca pital re quirem en ts as s ales inc rea se. A s im ple model is to determine a fa ir o r opti mal level o f fi xed as sets pl us curr ent ass ets to sal es, and based on this re lations hip, to cal culate workin g capi tal req uire ments as sale s in cre ase .

Exam ple : F r ecasti ng

The f ollowin g stat em nt of fina ncial p ositio n of Ca ble Lt d, a m anufac tur er o f electron ic om po nen ts, is p re-ented:

Fun ds employed	**R'000**
Sha re capital	4 80
Distributable reserves	5 20
Sha reh old ers' in tere st	1 0 00
Lon g-term lo ans	3 00
	R 1 3 00

	R'000
Represented by	
Non-current assets	800
Inventory	500
Debtors	250
Cash	50
	1 600
Current liabilities	
Creditors	300
	R1 300

The annual sales are R5 000 000 spread evenly over the year. The after-t x profit margin on sales is 6%, of which 50% is retained within the company.

The company plans to increase its sales to R8 000 000 in the forthcoming year.

Required:

Estimate the additional working capital required to support the increased sales.

Assuming that the company has no spare capacity, calculate how much the company needs to invest in both fixed and current assets.

Solution:

Working capital requirements

An increase in sales from R5 million to R8 million will lead to an increase in debtors, inventory holding and creditors.

Assumption – current sales are all credit sales and the increase in sales will also be on

credit. **Debtors –** current ratio of debtors:sales

Debtors	=	R250 000	
Sales	=	5 000 000	
Ratio	=	250 000 / 5 000 000	= 5%

An increase in sales by R3 000 000 should increase debtors by the same ratio.

	=	R3 000 000 × 5%	= R150 000 increase in debtors

Inventory – the calculation is the same as for debtors

Current ratio	=	500 000 / 5 000 000	= 10%
Increase in sal s	=	R3 000 000	
Increase in inventory	=	R3 000 000 × 10%	= R300 000

Cash – is an inc ease in cash needed? The question states that part of the profit is retained in the company, that is cash.

Therefore, retained income	=	R3 000 000 × 6% × 50%	= R90 000

Cash will therefore increase from R50 000 to R140 000

Credit rs

Current ratio	=	300 000 / 5 000 000	= 6%
Increa e in sales	=	R3 000 000	
Increase in creditors	=	R3 000 000 × 6%	= R180 000

Net working capital required

Debtors + Inventory – Creditors – Retained income (cash)

= R150 000 + R300 000 – R180 000 – R90 000 = R180 000

Investment in non-current assets and current assets Non-current assets

If the company does not have sufficient capacity to generate more sales, it will need to increase its non-current asset requirements. It is impossible to calculate the non-current asset increase required, as it does not necessarily follow that the existing ratio of non-current assets:sales will continue. The current non-current asset value also represents the Net Book Value (NBV) and it is possible that at current costs, the non-current assets required will be considerably higher.

Assumption: Non-current assets and current assets increase will remain at the current ratio of fixed assets:sales.

Existing non-current assets				R800 000
Sales				R5 000 000
Ratio	=	800 000 / 5 000 000	=	16%
Required		R3 000 000 × 16%	=	R480 000

Current assets

Working capital required will be as per (a) above.

Strategies to reduce the duration of cash cycles

Delay paying the accounts payable, but still take advantage of cash discounts on purchased goods.

The practice of stretching accounts payable may damage the company's credit reputation. These costs are difficult to quantify, but could result in the suppli r increasing future costs of goods supplied. A second cost of delaying the payment of accounts is the loss of discounts offered. These costs can be high and are experienced as follows:

Annual cost of missed discount

$$= \frac{\text{Cash discount\%}}{100 - \text{cash discount \%}} \times \frac{360 \text{ days}}{\text{number of days payment made after the discount period}} \times \frac{100}{1}$$

Collect accounts receivable as soon as possible.

Increase inventory turnover: This can be achieved by increasing sales or reducing the amount of inventory that is held.

Operations: Operating decisions to expand, contract, change product mix, etc. will have a direct effect on cash flow.

Capital expenditure: The acquisition or disposal of plant, equipment or other assets of a long-lasting nature will have an immediate effect on cash, resulting in a depreciation (non-cash) charge against future profits.

Tax on profits: Tax on profits or income payable at certain dates is predetermined by law, but may be influenced, to some extent, by management.

Financial obligations: Interest and dividend payments, plus any contractual repayments of capital arising from past financial decisions. Managers should be aware of the impact of these decisions on the cash flow of the gro p, and develop cash reporting systems to ensure that their effect is properly recognised and planned for.

There are a number of procedures that can be employed by a company to reduce the cost of holding cash. H wever, a company should compare the cost of reducing cash to the marginal savings in holding a l wer cash balance. Economies of scale are present, and it is likely that only large companies will benefit from ophisticated cash-control systems.

The Baumol model for cash management

Investments in cash and marketable short-term assets are the same in practice as investing in inventory. Both require a minimum level of inventory/cash holding to balance outflows. Safety inventory is required to meet unexpected demand, and additional amounts may be required for future growth.

Example: Mr Price – Liquidity management

The Group manages liquidity risk by maintaining adequate reserves, banking facilities and by continuously monitoring forecast and actual cash flows. The Group has significant cash reserves and minimal borrowing which will enable it to borrow funds externally should it require to do so to meet any working capital or possible expansion requirements.

In managing cash, a minimum amount is required to meet the transaction requirements. Marketable assets are held as a safety inventory against cash requirements or investment opportunities. If a high level of cash is held, the cost will equal the opportunity cost of investing the funds to yield a return equal to the cost of capital. The cost of holding too low an amount of cash will equal the opportunity foregone of taking discounts, borrowing funds or converting assets into cash.

The opportunity cost of holding cash rises as cash is held. If insufficient c sh is held, the transaction costs of converting assets to cash will rise. There is an optimal level of holding c sh versus converting assets to cash that will yield a minimum cost of managing cash.

The Baumol model was developed in 1952, and is very similar to the Economic Order Quantity (EOQ) model used for inventory models.

The model establishes the annual cash required by a firm, and assumes that the cash requirement will be used up by withdrawing an economic amount as needed over the year. The firm would pay a fixed transaction cost and forego the interest rate on the marketable securities (opportunity cost of holding cash).

Total cost of holding cash = Ordering cost + Opportunity cost

$$\frac{B(T)}{Q} + \frac{I(Q)}{2}$$

Where: B = Fixed transaction cost of converting marketable securities into cash
T = The annual cash demand (or period demand)
Q = The optimal withdrawal size
I = The opportunity cost of holding cash, that is the interest rate on marketable securities.

The optimal withdrawal size that minimises the total cost is determined by:

$$Q = \sqrt{\frac{2BT}{I}}$$

Example: Baumol model

Merton Company knows that the total demand for cash (T) next month will be R300 000 and that the fixed cost per order of converting marketable securities into cash (B) is R50. The interest rate on short-term marketable securities (I) is 20% per annum.

Required:

Calculate the optimal withdrawal size.

Solution:

As a one-month period is specified, the equivalent monthly interest rate (I) will be determined as follows:

20% ÷ 12 months = 1,67 %

The ptimal withdrawal size is:

$$\sqrt{\frac{2\,(50 \times 300\,000)}{0{,}01667}} = \text{R42 427}$$

Limitations of the Baumol model

The model assumes that a firm will have a constant cash requirement; this is not necessarily the case in practice.

Cash inflows are not accounted for in the model.

The model does not cater for uncertainty in cash flows.

The Miller-Orr model

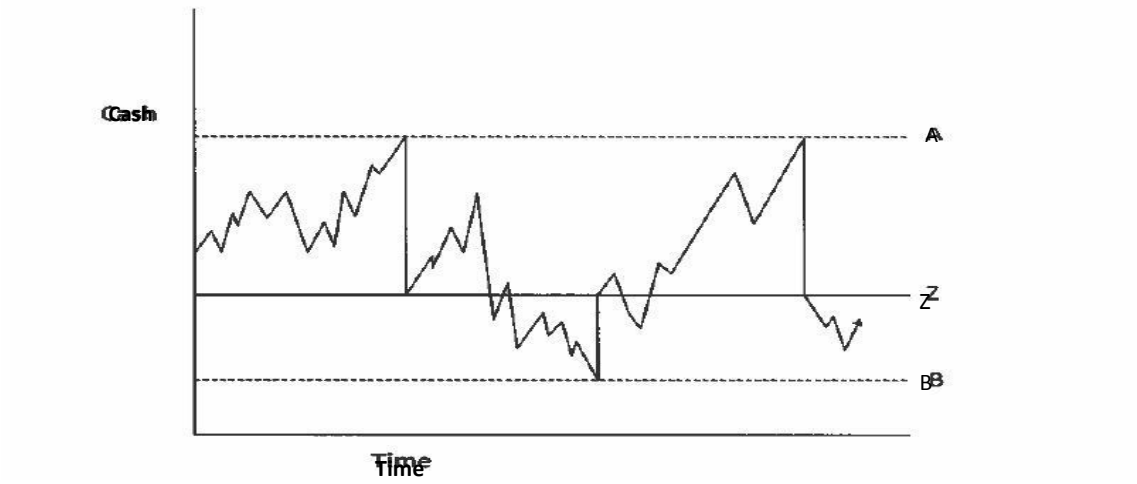


Figure 9.5: The Miller-Orr model

The Miller-Orr model accounts for fluctuating cash inflows and outflows over time. The model assumes a normal distribution of daily net cash flows. The above diagram represents the Miller-Orr model, and sets a target cash level of Z and allows for cash fluctuation between points A and B.

When the cash flows reach the upper limit line (A), the firm will invest an amount equal to AZ in marketable securities such as Treasury Bills or Bankers' Acceptanc s, and hold a cash balance equal to Z. When cash balances reach the lower limit of B, the firm will sell securities to generate sufficient funds to return the cash holding to the target level Z. The lower limit of cash is a function of the firm's attitude to risk.

The model assumes that the transaction costs of buying and selling investments are fixed, and that the opportunity cost of holding cash is equal to the short-term investment rate. The Miller-Orr model is based on a cost function similar to the Baumol model.

The model assumes that the transaction costs of buying and selling investments are fixed, and that the opportunity cost of holding cash is equal to the short-term investment rate. The Miller-Orr model is based on a cost function similar to the Baumol model.

$$Z = \frac{\sqrt{3b\sigma^2}}{4i} + B$$

Upper Limit = 3Z – 2B

$$\text{Average cash balance} = \frac{4Z - B}{3}$$

Where:

Z = Optimal return point
b = Cost per o der of converting marketable securities into cash or cash into marketable securities
σ^2 = The va iance of daily cash balances
i = The daily interest rate on short-term marketable securities
B = The lower cash limit

Example: Miller-Orr model

Company A invests all its surplus cash at an annual rate of 20% and incurs costs of R50 per buying and selling tran action. The expected daily balances and probability distributions are estimated as follows:

Cash	Probability
R8 000	10%
R9 000	20%
R10 000	40%
R11 000	20%
R12 000	10%

The acceptable lower limit of cash holding is R2 000.

Required:

Determine the target cash level Z and the average cash balance.

Solution:

	Cash × P	Cash-mean	$(\text{Cash-mean})^2$	$P(\text{Cash-mean})^2$
	800	– 2 000	4 000 000	400 000
	1 800	– 1 000	1 000 000	200 000
	4 000	–	–	–
	2 200	1 000	1 000 000	200 000
	1 200	2 000	4 000 000	400 000
Mean =	10 000			σ^2 1 200 000

$$Z = \sqrt[3]{\frac{3 \times 50 \times 1\,200\,000}{4 \times 0{,}00055}} + 2\,000$$

Z = 4 341 + 2 000 = 6 341

A = (3 × 6 341) – (2 × 2 000) = 15 023

B = 2 000

Note: ***The daily interest rate is arrived at by 20% / 365 = 0,00055***

Average cash balance $= \frac{(4 \times 4\,015) - 2\,000}{3} = 4\,687$

9.4 Debtors' management

In general terms, the granting of credit to customers leads to an increase in sales and hence, increased profits. The granting of credit has the same effect as giving the customer an interest-free loan. The cost to the lending firm will equal the cost of borrowing such funds that may be used to extend credit facilities to customers. Generally, the level of debtors should be determined on the basis of the volume of credit sales and the average period between sales and collections.

Credit policies

Credit policies are management guidelines concerning the extension of trade credit and the management of accounts receivable. Cr dit policies influence the level of sales, profits, and the form of assets. The long- term objective of credit polici s is to increase shareholder wealth. In the short-term, however, credit policies may focus on maximising sales, increasing collections, or something else.

Example: Mr P i e – C edit management

Before accepting any new credit customer, the Group uses an external credit scoring system to assess the potential c stomer's credit quality and defines credit limits by customer, while ensuring compliance with the requirements of the National Credit Act 34 of 2005 (NCA). Limits and scoring are reviewed at least annually in accordance with the requirements of the NCA and upon request by a customer. Due to the nature of the business, there are no customers that represent more than 5% of the total balance of trade receivables. The Group d es n t have any balances which are past due date and have not been provided for, as the provisioning methodology applied takes the entire debtor population into consideration.

Examp e: Truworths – Credit enabling sales growth

The Group uses credit as an enabler of retail sales. Customer behaviour patterns have shown that if the right f shion merchandise is available, customers will pay their accounts to be able to purchase more merchandise on credit. Managing the risk of credit is therefore closely aligned with managing the risk of fashion. Credit in the Group is offered to customers in South Africa, Namibia and Swaziland, but is not currently offered in the other African countries in which the Group operates. Three credit payment plans are offered across the

portfolio: 6 months interest free (unless in arrears and only available to Truworths customers) and 9 and 12 months interest- bearing. During the reporting period customers have continued to move, at their choice, to the longer term 12-month payment plans, which make their purchases more affordable in terms of lower monthly instalments. This trend, which is supported by national credit data, further indicates that credit affordability is under pressure for consumers in South Africa.

The decision may involve a trade-off between increased credit sales and profits. The extension of credit to boost sales and so keep the sales people happy may have an adverse effect on profit if the sales result in 'bad debt' losses. Overly restrictive credit policies may result in lost sales and foregone profits.

The granting of credit can be thought of as a trade-off between holding inventory and holding accounts receivable. Similarly, the collection of credit can be thought of as a trade-off between holding cash and holding accounts receivable.

Credit decisions and trade-offs

	Decisions	Trade-offs
1	Level and risk of accounts receivable	Credit sales versus profit
2	Form of assets Grant credit	Inventory versus accounts receivable
	Collect credit	Cash versus accounts receivable

Credit terms and elasticity

The extent to which sales will increase as a result of the price (net discount) depends on the elasticity of demand for the product. Price elasticity measures the r sponsiv n ss of the demand for a product to a change in price. If, for example, the price of suits was reduced by 15% and as a result the demand increased by 20%, the demand for suits is said to be **elastic**. However, if the price of toothpicks was reduced by 15% and the demand remained the same, then the demand for that product is said to be **inelastic**.

Credit terms and profit

Does an increase in sales necessarily lead to an increase in profit?

Example: Mr Price – Trade receivables

	20X2 R'000	20X1 R'000
Gross trade receivables	1 223 831	835 187
Impairment provision	(113 879)	(74 270)
Net trade receivables	1 109 952	760 917

The aging of the gross trade receivables is as follows:	Days from transaction		
Current	30	893 395	631 053
Status 1	60	170 902	108 509
Status 2	90	68 030	42 695
Stat s 3	120	44 522	25 576
Stat s 4	150	31 193	17 784
Status 5	180	15 789	9 570
		1 223 831	835 187

Intere t is charged on outstanding accounts in accordance with the National Credit Act (NCA) and has fluctuated in accordance with legislated changes to the repo rate.

The Group has provided for receivables in all ageing status levels based on estimated irrecoverable amounts from the sale of merchandise, determined by reference to past default experience.

Comment: Higher interest income on debtors' accounts should be compared to charges related to the provision of credit.

Analysts note: Gross debtors book up 9% year on year credit in SA: mortgages 4%, secured 12% and unsecured 53% (Source – NCR).

Example: Truworths – Impact of interest rates

The 18% increase in interest income on the debtors' book is attributable to more customers selecting longer term interest-bearing payment options and a higher proportion of the portfolio moving to the South African National Credit Act (NCA) regulated interest rate, which is higher than the former Usury Act 73 of 1968 regulated accounts. The maximum usury interest rate for accounts of R10 000 or less is 18% compared to the maximum NCA rate of 22,1% (based on the repo rate of 5,5%).

Companies correctly target sales as a means to increase profitability. When sales increase and are paid for in cash, the company benefits from an increase in profit. The only down-side is that the inventory of goods sold increases due to increased sales.

However, when an increase in sales occurs as a result of increased credit terms, the gains in sales revenue will be off-set by:

increased debtors–cost of holding debtors

– cost of financing debtors

bad debts that are incurred

increased inventory holding costs

cash effect which may require additional borrowing

increase in creditors.

Comparing the impact of cash, 30 days net, 2% discount if paid within 10 days, or 30 days net:

$$P = Sn – Cn – ARC$$

Where: P = gross profit
S = selling price per unit
C = cost of goods sold per unit
n = number of units
ARC = cost of accounts receivable.

Example: Impact on profit

A company is budgeting to sell 1 000 units of a product at a selling price of R50 per unit. The manufacturing cost is R25 per unit.

When a sale is made on credit, the company will incur a collection cost of approximately R1 per unit sold. The Weighted Average Cost of Capital (WACC) for the company is 15%.

Required:

Calculate the profit to the company if –

all sales are for ash;

sales a e made on credit and accounts are paid in 30 days; and

sales are made on credit and a 2% discount is granted if accounts are paid in ten days. 50% of debtors take advantage of the discount.

S luti n:

(a)

Selling price	=	R50	
Co t	=	R25	
Sa es	=	1 000 units	
Profit	=	(R50 – R25) × 1 000	= R25 000

(b) Gross profit = (R50 – R25) × 1 000 = R25 000

Cost of carrying debtors

(i) Holding cost = 1 000 × R1 = R1 000

(ii) Finance cost @ 15%

= R50 × 1 000 × 15 / 100 × 30 / 365 = R616,44

Net profit = R25 000 – R1 000 – R616 = R23 384

Note: ***The cost of carrying the debtors has been calculated on the se ing price as the profit has been recognised in the income statement. It could be argued that the cost of carrying the debtors for 30 days is equal to the cost of goods sold, that is R25 per unit.***

(c) Gross profit = R25 000

Sales where debtors pay in 10 days

Discount allowed = R50 × 50% × 2% × 1 000 = R500

Cost of carrying debtors 1 / 2 for 10 days
1 / 2 for 30 days
= (R50 × 500 × 15 / 100 × 10 / 365) + (R50 × 500 × 15 / 100 × 30 / 365)
= R102,74 + R308,22 = R410,96

Holding costs = R1 × 1 000 = R1 000

Net profit = R25 000 – R500 – R411 – R1 000 = R23 089

Collection policy

As a general rule, the more quickly accounts receivable are converted into cash, the greater the profits will be. However, if collection policies are too harsh, some potential customers may deal elsewhere. Therefore, financial managers must consider the trade-offs of increased sales versus profit, and holding accounts receivable instead of cash when establishing collection policies. A collection policy is important for the following reasons:

Delinquent accounts become increasingly difficult and costly to collect as time passes.

Sales to slow-paying customers are inhibited by slow collections.

The reputation for stringent credit policies discourages some customers from becoming delinquent.

Delinquent receivables add to the volume of working capital that must be financed.

Evaluating cr dit on a Net Present Value (NPV) approach

The granting of credit can be vi wed as an investment decision where a company makes an investment in inventory, debtors and a ruals in return for an increased cash flow from extra sales. The NPV formula is:

$$NPV = \frac{\text{After-tax ash flow}}{\text{WACC}} - \text{Investment (I)}$$

where a positive NPV would indicate an acceptable decision. The above formula assumes that the after-tax cash flow is constant and continues into perpetuity, hence a discount rate at WACC.

The new credit decision will result in incremental investments (I) equal to –

increased debtors associated with original sales (i.e. increased payment period);

incremental investment in debtors as a result of new sales; increased investment in inventory; and

increase in creditors (i.e. reduction in funds required);

Example: Changing credit policy

A company is considering a change in credit terms that should increase sales. At present, no discounts are offered, and debtors are granted 30 days credit. There are no bad debts. The new proposal is to grant credit on 2/15 net 60 (i.e. 2% discount if pay on or before 15 days, otherwise pay 60 days). Current annual credit sales are R1,5 million and debtors take 40 days on average to pay their accounts. The company anticipates that under the new terms, 60% of current debtors will take the discount and the balance will pay in 60 days.

The company anticipates that sales will increase by R500 000 to new customers. The new sales will result in 50% taking the discount and the balance paying within 75 days. Inventory is expected to increase by R80 000, while creditors and accrual expenses will increase by R30 000. Bad debts amounting to R50 000 are expected from the increased sales. The contribution ratio is 30%, the tax rate is 28%, and WACC is 20%.

Required:

Calculate the annual before-tax and after-tax cash flow benefit of changing the credit policy.

Solution:

'Credit 2/15 net 60' means that a 2% discount is granted if the acc unt is paid in 15 days. If not, the account must be paid in 60 days.

Calculation before tax

		Current	New policy	Increased sales
Sales		R1 500 000	R1 500 000	R500 000
Cash		Nil	Nil	Nil
Discount		Nil	2% on 60% of sales	2% on 50% of sales
Pay in	15 days	–	60%	50%
	40 days	100%	–	–
	60 days	–	40%	–
	75 days	–	–	50%
Bad debts		Nil	Nil	R50 000

WACC = 20%
Contribution = 30%

Note		Current	New policy		Increased sales
1	Contribution	450 000	450 000		150 000
2	Discount	Nil	(18 000)		(5 000)
	Bad debt	Nil	Nil		(50 000)
3	Holding cost	(32 877)	(7 397)		(2 055)
	Holding cost		(19 726)		(10 274)
4	Inventory holding	Nil	Nil		(16 000)
5	Creditors	Nil	Nil	+	6 000
		417 123	404 877		72 671
					R477 548

Net benefit R477 548 – R417 123 = R60 425

Note 1	Contrib tion 30%				
	Current	=	R1 500 000 × 30%	=	R450 000
	Increased sales	=	R500 000 × 30%	=	R150 000
Note 2	Discount 2%				
	New policy		1 500 000 × 60% × 2%	=	18 000
	Increased sales		500 000 × 50% × 2%	=	5 000
Note 3	Holding cost				
	Existing		1 500 000 × 40 / 365 × 20%	=	R32 877
	New		1 500 000 × 60% × 15 / 365 × 20%	=	R7 397
			1 500 000 × 40% × 60 / 365 × 20%	=	R19 726
	Extra		500 000 × 50% × 15 / 365 × 20%	=	R2 055
			500 000 × 50% × 75 / 365 × 20%	=	R10 274

Note 4	Inventory holding Increase	Cost @ 20% WACC for one year 80 000 × 20%	=	R16 000
Note 5	Creditors Increase	Cost @ 20% WACC for one year 30 000 × 20%	=	R6 000

After tax

The only figures that are affected in the calculations after tax are the contribution, the discount and the bad debt.

Current after tax

Existing	(450 000 × 72%) – 32 877	=	R291 123
New option			
Contribution	(450 000 + 150 000) × 72%	=	+ 432 000
Discount	(18 000 + 5 000) × 72%	=	– 16560
Bad debt	50 000 × 72%	=	– 36 000
Holding cost	(7 397 + 19 726 + 2 055 + 10 274)	=	– 39 452
Inventory holding		=	– 16 000
Creditors		=	+ 6 000
			R329 988
Net benefit	R329 988 – R291 123	=	R38 865

Debtor factoring

Factoring is essentially a debtor administration and collection facility providing a source of short-term finance. The factor and the client agree on credit limits for each customer and on the average collection period. The client then notifies each customer that the factor has purchased the debt. Thereafter, a copy of the invoice is sent to the factor. The client pays the factor directly and the factor pays the client as follows:

On day of acquisition of invoice	
Net invoice value before settlement discount	100%
Less: Service charge (up to 2,5%) assume	(2%)
Less: Retention held until invoice is settled (between 20–25%)	(25%)
Payment to client	73%
On invoice settlement date	
Payment of retention	25%
Less:	
Discount charge (the discount charge is based on the funds advanced to the cli nt and is normally 2% above overdraft rate)	
Assuming the overdraft rate is 14% and the debt is settled after 90 days:	
$16\% \times \frac{90}{365} \times 75\%$	(3%)
Total net amo nt received by client	95%

Most South African factoring contracts are on a **with- recourse** basis, which means that the ultimate bad-debt risk remains with the client. The factor has recourse to sell back to the client any debt it considers uncollectible.

9.5 Inventory management

There are three kinds of inventory, namely raw materials, work-in-progress and finished goods. The holding of **r w materials** is dependent on the sources of supply and production scheduling. **Work- in-progress** is regulated by the production run. A decrease in production time will increase inventory turnover. The control of **finished goods** is governed by the link between production and sales. An increase in credit sales will transfer inventory to debtors. Direct sales will reduce inventory holding. However, the level of inventory holding is governed, to a large extent, by the level of sales. Increased sales normally require a higher holding of all levels of inventory.

The amount of materials that a firm holds depends on the following factors –

frequency of use;

sources of supply;

lead time;

physical characteristics;

cost; and

technical considerations.

Example: Mr Price – Long-term project to reduce country risk

Reduce dependence on China in favour of Bangladesh, Cambodia, Vietn m, M uritius and RSA.

Increased factory direct imports by 72% in last year.

Pre-season briefing and collaboration with certain key suppliers reduced their lead times from 4 to 3 months and improving on time in full deliveries.

Strengthened relationship with RSA manufacturers –

- Increased locally purchased units by 21% in last year;
- R10m enterprise development loan to key supplier to expand operations.

Cycles

The level of sales generally conforms to the level of business activity. Therefore, one strategy for managing inventories is to increase or decrease inventories as sales rise or fall. This strategy results in a constant inventory to sales ratio, which means that inventory is (say) 170% of sales.

In general, the inventory to sales ratio is low at cyclical peaks because sales increase relatively more than inventory. It is high at the trough for the opposite reason.

Investment

Managing inventories means keeping the total investment in inventory at the lowest possible levels to enhance the long-run profitability of the firm and shareholder wealth.

Example: Shoprite – Inventories

Trading inventories are stated at the lower of cost, using the weighted average cost formula, and net realisable value. The weighted average cost formula is determined by applying the retail inventory method. The cost of merchandise is the n t of invoice price of merchandise; insurance; freight; customs duties; and appropriate allocation of distribution costs; trade discounts; rebates and settlement discounts. The retail method approximates the weighted average cost and is determined by reducing the sales value of the inventory by the appropriate percentage gross margin. The percentage used takes into account inventory that has been marked down below original selling p i e. An average percentage per retail department is used. Net realisable value is the estimated selling p ice in the ordinary course of business.

Example: Different Inventory turns

	20X2/X1	**20X1/X0**
Sh prite	8,4 times	8,8 times
Mr Price	6,5 times	6,6 times
Truworths	6,4 times (11)	6,9 times (10)
Be equipment	1,9 times (11)	2,0 times (10)

Comment: Inventory turn is dependent on the type of product being sold and its associated profit margins.

The Economic Order Quantity (EOQ)

Assumptions

Annual demand for the inventory item is known and constant over the period.

No time-lag between the placing of the order and the arrival of the inventory.

The cost of ordering can be quantified and is constant regardless of order size.

The cost of holding one unit of inventory per period is constant. Costs include warehousing costs and cost of capital employed.

The cost per purchase item is constant (no discounts).

Relevant costs for inventory decisions include:

Acquisition costs

Ordering costs –

- cost of placing order or production set-up costs;
- shipping and handling costs; and
- quantity discounts taken or lost.

Carrying costs –

- storage costs;
- insurance;
- cost of capital; and
- depreciation and obsolescence.

Costs related to safety inventory –

loss of sales;

loss of customer goodwill; and

production disruptions.

Order costs = O(D) ÷E

Carrying costs = H(E) ÷2

Where:

O = fixed cost per order

= quantity used in units per period (annum)

= quantity of units p r order (economic order quantity)

H = annual cost of carrying one unit of inventory for one year.

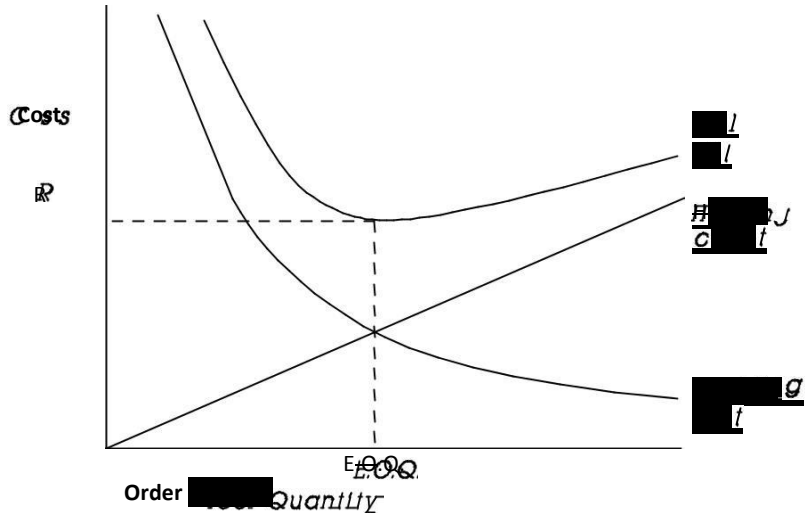


Figure 9.6: The Economic Order Quantity

The EOQ is determined at the level where order costs equal carrying costs:

$$\frac{OD}{E} + \frac{HE}{2}$$

Solving: $E = \sqrt{\frac{2OD}{H}}$

EOQ in production

The EOQ can be used effectively to determine the optimal length of production runs. The objective is to determine how many units must be produced per production run. The equation would re d as follows:

$$EOQ = \sqrt{\frac{2DS}{H}}$$

Where:

D = **S** = annual demand of units

set-up costs such as incremental labour, material, achine downtime and other costs related to setting up a production run

H = holding costs

Quantity discounts

When a firm is able to purchase goods in large quantities and thereby receive a quantity discount it will save through –

purchase price reductions; and

lower ordering costs.

However, as the firm is ordering higher quantities, the holding costs will increase.

Example: Calculating EOQ

The following information is provided:

Annual demand	80 000 units
Unit cost	R3,60
Fixed cost per order	R18
Annual carrying cost p r unit	15% of unit cost

The supplier announc s a discount scheme, as follows:

Discount	**Order size**
Nil	0– 4 000
5%	4 001– 8 000
6%	8 001– 40 000
7%	40 001

Required:

Determine –

(i) the EOQ; and

(ii) the EOQ where discounts are available.

Solution:

(i) EOQ $= \sqrt{\frac{2OD}{H}}$

EOQ $= \sqrt{\frac{2 \times 18 \times 80\,000}{0{,}54}}$

= 2 309 units

1 At 5% discount

E' (new order quantity) = 4 001
E (EOQ) = 2 309
H (Holding cost) = (3,60 × 0,15) = 0,54
H' (Holding cost) = (3,60 × 0,95 × 0,15) = 0,513
O (Order cost) = 18
D (Demand) = 80 000

(a) Marginal holding cost $= \frac{E'H'}{2} - \frac{EH}{2}$

$= \frac{4001 \times 0{,}513}{2} - \frac{2309 \times 0{,}54}{2}$

= R402,83

(b) Savings in ordering costs $= \frac{O(D)}{E} - \frac{O(D)}{E'}$ = R263,74

$\frac{18\,(80\,000)}{2\,309} - \frac{18\,(80\,000)}{4\,001}$

(c) Discount savings = 80 000 × (3,60 × 5%) = R14 400

(d) Net saving = R14 400 + R264 – R403 = R14 261

2 At 6% discount

(a)	Marginal holding cost	(1 407,22)
(b)	Savings in ordering cost	443,65
(c)	Discount savings	17 280,00
	Net	R16 316,43

3 At 7% discount

(a)	Marginal holding cost	(9 420,82)
(b)	Savings in ordering cost	587,65
(c)	Dis ount savings	20 160,00
	Net	R11 326,83

The greatest benefit will accrue if the company takes advantage of the 6% discount and purchases in batches of 8 001 nits.

Re- rder point and safety inventory

Where a firm knows with certainty the number of units it uses or sells on a daily basis, the re-order point will equa :

Aver ge lead time × Average daily usage,

where lead time is the number of days required for goods to be delivered.

Where uncertainty exists and a firm is unable to accurately determine the daily usage, it runs the risk of being out of inventory and thus incurring the opportunity cost of lost sales and customers.

In such a situation, a firm will hold a safety inventory to counteract the possibility of being out of inventory. The re-order point will in such a situation equal:

Average lead time × Average daily usage + Safety inventory.

The following illustrative example shows how a firm can determine the most economic level of safety inventory that will maximise profits.

Example: Safety inventories

Company A is situated in Durban, while its supplier is in Johannesburg. The company has an agreement with the supplier that all goods will be delivered within a period of ten days.

The daily demand for the product has been estimated by Company A as follows:

Daily demand	50	70	100	130	150
Probability	0,10	0,20	0,40	0,20	0,10

The estimated 'stock-out' cost is R10 per unit.

Holding cost is R2 per unit over the ten-day period.

Required:

Determine the most cost-effective level of holding saf ty inv ntories.

Solution:

The expected demand over the ten-day lead time is:

Usage	R500	R700	R1 000	R1 300	R1 500
Probability	0,10	0,20	0,40	0,20	0,10

Average demand is thus 1 000 units, and the re-order point will be equal to average demand plus safety inventory.

The following tabulation shows the stock-out cost versus the holding cost at various levels of safety inventory:

Average usage	Safety inventory	Re-order point	Inventory-out	Inventory-out cost	Probability	Expected inventory-out cost	Holding cost	Total cost
1 000	0	1 000	300	3 000	0,20	600	0	
			500	5 000	0,10	500	0	
						1 100		1 100
1 000	300	1 300	200	2 000	0,10	200	600	800
1 000	500	1 500	Nil	Nil	Nil	Nil	1 000	1 000

In this example, the company should hold a safety inventory of 300 units to minimise its costs. It is important, however, to unde stand that it is impossible in practice to assess the opportunity cost of lost future orders resulting from dissatisfied customers. This cost could be considerably higher than the estimated stock-out cost per unit.

Just in Time (JIT) inventory and manufacturing

The traditional manufacturing environment is symbolised by companies producing products in large batches and with high set-up costs.

High inventory levels of raw materials, work-in-progress and finished goods are considered vital in order to –

satisfy customer demand;

avoid shutting down manufacturing facilities;

take advantage of discounts; and

hedge against future price increases.

High inventory levels of finished goods are seen as necessary to counteract the possibility of demand exceeding supply, or possible machine breakdowns. Inventory is necessary as a buffer that provides customers and manufacturing facilities with the required products that may otherwise not have been available.

Technological advances in the last 10 to 15 years have been such that companies are now required to increase product diversity, shorten product life-cycles, improve quality and lower production costs. **Just in Time** (JIT) is best described as a management philosophy in pursuit of the elimination of all non-value- added activities to reduce cost and time. JIT focuses on the principle that products should be pulled through the system by demand, rather than pushed through, where workers are encouraged to manufacture as much as possible and rewarded accordingly. JIT is a simple theory that is not easily applied in practice.

The main objection to JIT is the possibility of a problem occurring with the order of raw materials, production or labour problems. It is therefore important, when a company uses such system, that all potential problems are eliminated. It is necessary to redesign the production facilities so th t b tch size reduces to a single unit. Labour needs to be able to handle a greater number of related tasks and w ste needs to be eliminated. Suppliers are required to supply defect-free materials at the precise time that they are required. Recent non-controllable events have led to a derivative form of JIT incorporating buffer or safety stock.

JIT process

JIT offers increased cost-efficiency and has the flexibility to resp and nd to cust mer demand for improved quality variety. Quality, flexibility and cost-efficiency are the require ents for success in the international market.

JIT can only succeed where:

(i) Non -value-added activities are eliminated. The anufacturing of a product involves the cost of holding raw materials in inventory; transferring those mat rials to production; queuing a batch for production; transferring a product to inventory, and som tim s re-working a particular product. With the exception of the manufacturing process (which adds value to a product), all other activities simply add cost.

JIT changes the production process by re-arranging the manufacturing facilities from a batch set-up to a single product set-up. In other words, the ideal batch size is one unit. This requires companies to switch from a departmental, functional layout with centralised stores, to a cellular manufacturing layout with materials located next to the work area itself. Products manufactured are grouped into families of similar products. These product families are then manufactured on a flow-line. For each product line, the machines required are arranged in a manner that reduces flow time and work-in- progress lead times. Products are produced with zero defect and are not returned to storage until they are complete. JIT directly addresses plant layout, process design, quality standards and inventory. The plant layout must be simple and efficient. No product is to be re-worked and inventory must be reduced to insignificant levels.

Zero inventory

Inventory is normally held to avoid being out of inventory, to take advantage of discounts, and as a hedge against price increases. JIT requires that long-term contracts be negotiated with a few suppliers that are located close to the manufacturing facilities and are able to offer quality and delivery. The benefits from long-t rm contracts are –

- suppliers are s n as partners;
- confiden e and trust are established;
- p ices a e p e-negotiated and quality ensured;
- order costs are reduced;
- red ction in supplier base; and
- c st of poor input material is reduced or eliminated.

The quest for zero defect

Defective products cost the company a lot of money, as the production flow is interrupted and reworking is required. The need to eliminate defects is strongly emphasised and encouraged. Machines are a so maintained on a preventative maintenance principle that encourages a zero break-down policy. The nature of a pull-through philosophy means that there will be times when workers are idle. Workers are encouraged and trained to carry out preventative maintenance on the machines under their control during idle periods.

Producing the single unit

One of the problems of producing large batches is that products often have to be stored for long periods of time at a high cost. By contrast, the production of small batches is expensive, due to the high cost of setting up the machines, cleaning and re-setting for the next batch. JIT encourages a change in layout that reduces set-up costs or totally eliminates them. As set-up time approaches zero, there is no advantage in producing large batches that are stored at a high cost. A system that is able to manufacture one unit at a time is able to react more easily to changes in product specifications and demand.

Customer delivery service

Traditional systems encourage a high inventory holding to ensure that customers receive their products on time. High inventory holding is also an insurance against the production faci ities breaking down for whatever reason and causing an inventory shortage. The JIT solution is to reduce lead times. Shorter lead times increase the company's ability to meet a delivery date and lso to respond to changes in market needs, thus improving competitiveness. Lead times are reduced by reducing set-up times, improving quality and using cellular manufacturing. Research has shown that many companies have experienced a reduction in lead time of up to 90% by implementing JIT manufacturing.

Accounting for JIT

JIT emphasises total quality control, total customer satisfaction, continuous improvement, cellular manufacturing, zero inventory and employee involvement. Assuming that current anagement control systems were designed to deal with traditional manufacturing systems, does it stand to reason that they are inappropriate for a JIT system? Does the current management system in fact motivate behaviour that is not consistent with the JIT philosophy?

Consider a conventional, standard costing system. It has been stated that efficiency reporting and variance analysis are impediments to continuous improvement. For example, it is argued that the material price variance encourages low quality and large purchase quantities, in contravention of the JIT philosophy of quality-control and zero inventory. As workers become more multi-disciplinary and are trained to do a variety of tasks, labour standards become less meaningful. The labour efficiency variance encourages over-production, as workers are rewarded for quantity, not quality. The materials usage variance provides an incentive for low quality rather than total quality control. Currently attainable standards encourage inefficiencies instead of continuous improvement, zero inventories, total quality control and total preventative maintenance. It is argued that pressure to meet standards will create dysfunctional behaviour.

Now consider the absorption costing system. It has been stated that managers who are rewarded on a profit basis will seek to increase inventory rather than reduce it, as company profits increase as inventory levels increase. In this situation, the accounting system will be in direct opposition to JIT. Traditional management accounting systems have been criticised as they fail to report on important issues such as quality, lead times, reliability or customer satisfaction.

The problem with conv ntional management accounting systems such as standard costing is not that they are dysfunctional in relation to a JIT system, but that they can be a hindrance if used in an inappropriate manner. JIT does not eliminate the need to plan a budget. In fact, it makes planning and budgeting easier and more meaningful. However, it is important to understand that financial statements and standards are more relevant to upper management than to line management.

Line management and workers should be motivated and rewarded more on qualitative and quantitative factors such as n mber of nits required and the quality thereof, rather than on the financial cost aspects of whether JIT is used. Standard costing systems have never been successful when used as the basis of employee rewards and motivation, but they have enabled financial managers to identify possible problems that require investiga-ti n.

It is correct to argue that workers should be set standards, and that performance should be evaluated on simple non-financial measures that are directly related to what is being manufactured and provide effective feedback. Greater emphasis is required on control through direct observation, by training workers to monitor quality, production flow and set-up times.

Practice questions

Question 9–1 *(Fundamental and Intermediate)* *40 marks 60 minutes*

Runswick Ltd is a company that purchases toys from abroad for resale to retail stores. The company is concerned about its inventory management operations. It is considering adopting an inventory management system based upon the EOQ model.

The company's estimates of its inventory management costs are shown below:

Percentage of purchase cost of toys per year

Storage costs	3
Insurance	1
Handling	1
Obsolescence	3
Opportunity costs of funds invested in inventory	10

'Fixed' costs associated with placing each order for inventory are R311,54.

The purchase price of the toys to Runswick Ltd is R4,50 per unit. There is a two-week delay between the time that new inventory is ordered from suppliers and the ti e that it arrives.

The toys are sold by Runswick at a unit price of R6,30. The variable cost to Runswick of selling the toys is R0,30 per unit. Demand from Runswick's customers for the toys averages 10 000 units per week, but recently this has varied from 6 000 to 14 000 units per week. On the basis of r c nt evidence, the probability of unit sales in any two-week period has been estimated as follows:

Sales (units)	Probability
12 000	0,05
16 000	0,20
20 000	0,50
24 000	0,20
28 000	0,05

If adequate inventory is not available when demanded by Runswick's customers in any two-week period, approximately 25% of orders that cannot be satisfied in that period will be lost, and approximately 75% of customers will be willing to wait until new inventory arrives.

Required:

Ignoring taxation, calculate the optimum order level of inventory over a one-year planning period using the EOQ model *(Fundamental)*

$$EOQ = \sqrt{\frac{2OD}{H}}$$

Where: O is the fixed cost per order
D is the annual sales
H is the cost of carrying a unit of inventory per period expressed as a percentage of its purchase cost multiplied by the purchase price per unit of inventory. **(*5 marks*)**

(b) Estimate the level of safety inventory that should be carried by Runswick Ltd. **(*9 marks*)**

If Runswick Ltd were to be offered a quantity discount by its suppliers of 1% for orders of 30 000 units or m re, evaluate whether it would be beneficial for the company to take advantage of the quantity discount. Assume for this calculation that no safety inventory is carried. **(*6 marks*)**

E timate the expected total annual costs of inventory management if the EOQ had been **(i)** 50% higher, and **(ii)** 50% lower than its actual level. Comment upon the sensitivity of total annual costs to changes in the economic order quantity. Assume for this calculation that no safety inventory is carried. **(*7 marks*)**

Discuss briefly how the effect of seasonal sales variations might be incorporated within the model. **(*5 marks*)**

(f) Assess the practical value of this model in the management of inventory. **(*8 marks*)**

ACCA

Solution:

Expected demand per two-week period

Sales	Probability	Total
12 000	0,05	600
16 000	0,20	3 200
20 000	0,50	10 000
24 000	0,20	4 800
28 000	0,05	1 400
		20 000

Annual demand 20 000 × 26 (two-week periods) = 520 000 units
Holding cost per unit = 18% × R4,50 = R0,81
Percentage holding cost = 3% + 1% + 1% + 3% + 10% = 18%

Economic order quantity

$$EOQ = \sqrt{\frac{2 \times 520\,000 \times 311{,}54}{0{,}81}}$$

20 000 units

The EOQ is 20 000 units. The lead time is two w ks, which means that if weekly demand remained constant at the average usage of 10 000 units per w k, the re-order point would be 20 000 units, and inventory would be replenished when the inventory l v l had fall n to zero.

However, as demand varies between 12 000 and 28 000 units per two-week period, there is a 25% chance that a stock-out will occur.

Holding costs per unit per week

R0,81 ÷ 52 = R0,01558

As the lead time is two weeks, the holding costs per unit over this period would be

R0,01558 × 2 = R0,03116

Stock-out cost per unit

R6,30 – R4,50 – R0,30 = R1,50

Optimal safety inventory (2-week period)

Safety Stock	Re-order point	Stock-out	25% stock-out	Stock-out cost	Probability	Expected stock-out cost	Holding cost	Total cost
0	20 000	4 000	1 000	1 500	0,20	R300	R0	
		8 000	2 000	3 000	0,05	R150	R0	
						R450		R450
4 000	24 000	4 000	1 000	1 500	0,05	R75	R125	R200
8 000	28 000	0	0	0	0	0	R249	R249

Recommended level of safety inventory is 4 000 units.

(c) Purchase saving 520 000 units per annum × R4,50 × 1% = R23 400

Savings in order costs

Order costs at an EOQ of 20 000 units

= 520 000 ÷ 20 000 = 26 orders × R311,54 = R8 100,04

Order costs at an order level of 30 000 units

= 520 000 ÷ 30 000 = 17,333 × R311,54 = R5 400,03

Saving in order costs = R8 100,03 – R5 400,02 = R2 700

Holding costs

Holding cost at 20 000 unit order
10 000 average inventory × R4,50 × 18% = R8 100

Holding cost at 30 000 unit order
Revised purchase price = R4,50 × 99% = R4,455
15 000 average inventory × R4,455 × 18% = R12 028
Incremental holding cost = R12 028 – R8 100 = R3 928

Overall saving

R23 400 + R2 700 – R3 928 = R22 172

It would therefore be beneficial to take advantage of the quantity discount.

Total relevant costs would be as follows:

50% higher (30 000 units) = R0,81 × (30 000 / 2) + R311,54 × (520 000 / 30 000)
= R17 550

50% lower (10 000 units) = R0,81 × (10 000 / 2) + R311,54 × (520 000 / 10 000)
= R20 250

Original EOQ (20 000 units) = R0,81 × (20 000 / 2) + R311,54 × (520 000 / 20 000)
= R16 200

Total annual costs are 8,3% higher than the original EOQ at the 30 000 units order level, and 25% higher at the 10 000 units order level. Therefore, inventory management costs are relatively insensitive to substantial changes in the EOQ.

It would be necessary to establish seasonal periods where sales are fairly constant throughout each period. A separate EOQ would then be established for each distinct season throughout the year.

The EOQ model is a model that enables the costs of inventory management to be minimised. The model is based on the following assumptions:

1 Annual demand for the inventory item is known and constant over the period.

2 There is no time-lag between the placing of the order and the arrival of the inventory.

3 The purchase price remains constant.

4 The cost of ordering can be quantified and is constant regardless of order size.

5 The cost of holding one unit of inventory per period is constant.

Recently, some compani s have adopted Just in Time (JIT) purchasing techniques, enabling them to negotiate reliable and fr qu nt deliveries. This has been accompanied by the issue of blanket long-term purchase orders and a substantial reduction in ordering costs. The overall effect of applying the EOQ formula in this situation ties in with the JIT philosophy, that is more frequent purchases of smaller quantities.

Question 9–2 *(Intermediate)* *40 marks 60 minutes*

Beach is a wholly-owned subsidiary of Adams and currently depends entirely on Adams for any necessary finance.

Adams, h wever, has its own cash-flow problems and cannot permit Beach temporary loan facilities in excess of R50 000 at any time, even though the business of Beach is highly seasonal and is in a period of growth.

Beach has just prepared its cash budget for the year ahead, details of which are as follows:

All figures are in R'000s

Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Debtors' payments	230	250	120	50	60	75	80	90	110	150	220	320
Dividend on investment							45					
Cash inflows	230	250	120	50	60	75	125	90	110	150	220	320
Payments to creditors		80		80		88		88		88		92
Wages and other expenses	102	77	58	103	79	59	105	80	62	108	83	63
Payments for fixed assets				70	10		15				5	
Dividend payable			80									
Company tax									120			
Cash outflows	102	157	138	253	89	147	120	168	182	196	88	155
Net in or (out)	128	93	(18)	(203)	(29)	(72)	5	(78)	(72)	(46)	132	165
Bank balance/(overdraft)												
Opening	30	158	251	233	30	1	(71)	(66)	(144)	(216)	(262)	(130)
Closing	158	251	233	30	1	(71)	(66)	(144)	(216)	(262)	(130)	35

The following additional information is provided:

Two months' credit (on average) is granted to d btors.

Production is scheduled evenly throughout the y ar. Y ar- nd inventory of finished goods are forecast to be R114 000 higher than at the beginning of the year.

Purchases of raw materials are made at two -monthly intervals. Three months' credit, on average, is taken from suppliers.

The capital expenditure budget is as follows:

New equipment for planned production	Month 4	R70 000
Routine replacement of motor vehicles	Month 5	R10 000
Progress payment on building extensions	Month 6	R15 000
Office furniture and equipment	Month 11	R5 000

Required:

Review this information and advise the management of Beach on possible actions it might take to improve its budgeted cash-flow for the year and avoid any difficulties that can be foreseen.

Solution:

It should be fairly lear from the figures in the question that Beach has a very serious cash-flow problem, and that there are no easy or ready- made solutions to the problem. One might think that the question ought to be answered by w iting down brief ideas about what should be done and then producing a revised cash-flow forecast with an ove d aft limit never higher than R50 000. It would probably be more appropriate, however, to discuss vario s options at some length, suggest whether these options might work, and then (if there is time), re-draft a cash b dget to see whether Beach's problems would be overcome.

It w uld seem that Beach relies entirely on Adams for finance, and so cannot raise money from a bank loan or overdraft. The maximum loan from Adams is R50 000, but the cash budget projects an 'overdraft' of up to R262 000 (m nth 10).

Beach would appear to be profitable and growing. A very rough estimate of profits in the year could be made by preparing a sketchy funds flow statement in reverse.

	R'000
Increase in bank balance (35 – 30)	5
Increase in finished goods inventory	114
Net increase in debtors and raw materials inventory less creditors	X
Purchases of fixed assets (70 + 10 + 15 + 5)	100
Dividend paid	80
Tax paid	120
	419 + X
Less: Depreciation	Y
Profit before tax	419 + X – Y

A combination of seasonal business, growth in trading and fixed asset purchases would appear to be the reason why Beach is only expected to increase its cash balance by R5 000 ver the whole year, in spite of these profits.

The options for reducing the overdraft which might be possible are:

(a) Do not pay the dividend to Adams in Month 3. However, Ada s is short of cash, and is probably relying on the dividend income. It would therefore seem likely that Ada s would agree either to cancel the divi-dend or to lend more than R50 000.

Delay the payment of company tax from Month 9. The SARS might allow Beach to do this, although there may be a penalty 'interest' charge for the delay.

Inventory control. The total quantity of finished goods is unknown, but inventory levels will rise by R144 000 in the year. Clearly, the increase in inventory is expected because of the company's sales growth. However, some reductions in the investment in inventory might be possible without prejudice to sales, in which case the cash-flow position would be eased by the amount of the value of the stores re-duction.

Creditors' control. Three months' credit is taken from suppliers, but raw material purchases are every two months. The credit period already seems generous, and some suppliers are probably making a second de-livery of materials before they are paid for the first. Taking longer credit would be difficult to negotiate. However, if Beach is on very good terms with its suppliers, and is a valued customer of those suppliers, it might be possible to defer payment of amounts payable in Month 6, 8 and 10 by a further one month, which covers the cash-crisis period.

Debtors' control. Two months' credit is allowed to customers. If all sales are on credit, customers are like-ly to be commercial or industrial buyers, who expect reasonable credit terms. A shortening of the credit period is probably not possible without damaging goodwill and sales prospects, unless an incentive is of-fered for early paym nts in the form of a discount. The discount would have to be sufficiently large to persuade ustomers to take it. Suppose, for example, that from Month 5's sales onwards, a 10% discount were offered for payments inside a month. (10% would be very generous and unrealistic perhaps, but is used he e for illust ation). If all customers accepted the offer, this would affect cash flows from Month 6 on, as follows:

Month	Original budget R'000		Revised budget R'000	Net change R'000
6	75	+ (90% of 80)	147	+ 72
7	80	– 80 + (90% of 90)	81	+ 1
8	90	– 90 + (90% of 110)	99	+ 9
9	110	– 110 + (90% of 150)	135	+ 25
10	150	– 150 + (90% of 220)	198	+ 48
11	220	– 220 + (90% of 320)	288	+ 68
12	320	?	?	?

The effects on cash flow would then be substantial, although the cost of the discounts would reduce prof-its by a substantial amount too.

Postponing capital expenditure. Since the company is growing, the option to postpone capital expenditures on new equipment, building extensions and office furniture is probably unrealistic. The routine replacement of motor vehicles should be deferred, but this would only ease the cash situation by R10 000.

Beach has an investment which will pay a dividend of R45 000 in Month 7. This is obviously a fairly large investment. If Beach's cash-flow problems are insuperable by any other means, the company's Directors might have to consider whether this investment could be sold to raise funds.

Summary:

Beach is a profitable company, but is faced with serious cash- flow problems which would seem to be difficult to overcome without drastic measures being taken. Because Beach is profit ble, closure of the company is unthinkable, and it would be against the company's long-term interests to b ndon its plans for growth. Adams is acting as a serious constraining influence on Beach.

However, the sort of radical action and response outlined above for debtors, coupled with a postponement of the tax payment by three months or so, and a deferral of R10 000 in m t r vehicle purchases until next year, would be virtually sufficient to overcome the firm's cash-flow pr blems in the year, with a slight problem still in Month 8 – see workings below.

	Month							
	5	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Postpone purchase of vehicles	10							
Defer tax payment					120			(120)
Discounts for early payment by debtors – possible effect		72	1	9	25	48	68	?
Change	10	72	1	9	145	48	68	?
Cumulative change	10	82	83	92	237	285	353	?
Original cash budget	1	– 71	– 66	– 144	– 216	– 262	– 130	35
Revised cash budget balances	11	11	17	–52	21	23	223	?

If Beach is to overcome its problems within the constraints set by Adam's financial policy, it is likely that action on debtors is the key to a practical solution.

Question 9–3 *(Advanced)* *50 marks 75 minutes*

Squeezy Toys Ltd manufactures toys which it sells to the retail market. It has been expanding very rapidly and has been forced to use expensive overdraft financing for most of its working capital needs. The annual overdraft rate paid by the company is 18%. In order to relieve the need for overdraft financing and to improve profitability, the manag m nt accountant has prepared a package of proposals. You have been asked to evaluate the proposals and have b n presented with the following information:

Extract from the statement of financial position as at 31 December 20X2

	R
Current assets	
Trade receivables **1**	22 365 000
Inventory: Raw materials (the raw materials comprise 40% of the total cost of sales)	3 408 000
Work-in-progress	4 260 000
Finished g ds	12 780 000
Current liabilities	
Trade payables (purchases on credit average 50% of the total cost of sales)	4 260 000
Extract from the statement of comprehensive income for the year ended 31 December 20X2	
Sa es **2**	85 200 000
Cost of sales	51 120 000

Notes:

Trade receivables

10% of the sales are cash sales to retailers with poor payment records. The balance of the sales are on credit. At present, bad debts amount to 5% of the credit sales (on average). No discounts are offered.

Sales

Although the company has been expanding rapidly, it does not anticipate any growth in sales quantities in future at the current selling prices.

In an effort to improve the profitability and liquidity of the company, the management accountant has put forward the following proposals and related estimates:

- Enter into an agreement with the suppliers of raw materials to shorten the lead time for delivery of raw materials. This would have the effect of decreasing the average raw material holding period by 75%. In return, these suppliers will insist on payment within 30 days.
- Improve production scheduling at an annual cost of R320 000, which wi result in a decrease of 75% in the work-in-process cycle.

  Improve the inventory handling system at an annual cost of R480 000, which will result in the finished goods inventory turnover rate trebling.

  Employ an additional debtor's clerk at a salary of R180 000 per annum to improve the collection of receivables. At the same time, offer a discount of 3% f r payment within ten days and try to enforce a 30-day payment period for customers not taking advantage f the discount. Customers who were previously paying cash will be allowed to pay within ten days – these customers will not be granted any early settlement discount however. The anticipated effect of this will be as follows:
  - Sales should increase by 1% as a result of the discount offered.

  A further 20% of customers will take advantage of the discount and pay on the tenth day after purchase.
  - The bad debts will decrease to 3% of the **total** sales.
  - The rest of the customers will pay as follows:

    Payment on the 30th day after purchase: 55%
    Payment on the 60th day after purchase: 12%

Required:

Evaluate the effect on profitability and liquidity of adopting all the recommendations of the management accountant. Use a 360-day year in your calculations, and assume a tax rate of 28%. **(*34 marks*)**

Squeezy Toys Ltd has traditionally paid dividends based on a cover of three times. Management has decided to increase the cover to five times due to the current troubled financial times. Based on the old working capital and historical dividend polices versus the new working capital and dividend policies, illustrate the impact on Squeezy Toys Ltd. **(*6 marks*)**

Companies frequently have large amounts of capital invested in net working capital. Reducing the working capital cycle can r duce this investment. Discuss ways in which the working capital, with specific reference to debtors, work-in-progress and creditors, can be reduced, and the advantages and disadvantages of such a reduction. Your discussion should be **brief** and done under the headings: 'Strategy' and 'Effect of strategy'. **(*10 marks*)**

(Rhodes Unive sity: adapted)

Solution:

(a) Reconstruction for year ended/ending 31 December	**No**	**Days**	**20X2 0 R**	**20X3 1 R**	**Change R**	**assumptions**	
Sales(85 200kx 1,01)			85 200 000	86 052 000	852 000		(1)
Cost of sales		60,00%	(51 120 000)	(51 631 200)	(511 200)	Assume same GP%	(1)
Gross profit			34 080 000	34 420 800	340 800		(1)
Bad debts	5, 11		(3 834 000)	(2 581 560)	1 252 440		(1)
Production scheduling	8		0	(320 000)	(320 000)		(1)
Improve inventory handling system			0	(480 000)	(480 000)		(1)
Debtors clerk			0	(180 000)	(180 000)		(1)
Debtors discount			0	(516 312)	(516 312)		(1)
PBIT	12		30 246 000	30 342 928	96 928		(1)
Interest saving (C1) @ 18%					4 691 732	Assume stay in overdraft	(1)
PBT					4 788 660		
Taxation @ 28%					(1 340 825)	Assume has taxable income (Any tax)	(1)
PAT					3 447 835		

(Refer to calculation 11)

Debtors		**Debtors balance**		**Sales**	
Total sales increase by 1% (all now on credit)				86 052 000	
To receive discount 20% of sale		478 067	10	17 210 400	½ each max
Bad debts 3% of total sales		2 581 560	360	2 581 560	
Sales to debtors with poor payments record 10% of sales		239 033	10	8 605 200	
Pay on 30th day	55%	3 944 050	30	47 328 600	
Pay on 60th day	12%	1 721 040	60	10 326 240	
Ave debtor		8 963 750			

Change in wo king capital:		**Balance 2008**	**Balance 2009**			
Trade receivables	11	22 365 000	8 963 750	13 401 250	Inflow	(1)
Raw materials (25%)	6	3 408 000	852 000	2 556 000	Inflow	(1)
WIP (25%)	9	4 260 000	1 065 000	3 195 000	Inflow	(1)
Finished g ds(x4/12)	10	12 780 000	4 260 000	8 520 000	Inflow	(1)
Trade payables relating to raw material purchases	7	*3 408 000	1 704 000	(1 704 000)	Outflow	(1)
Other (3 408+852)	11	852 000	852 000	0	No change	(1)
				25 968 250		
Effect on cash flow				29 416 085	Improvement	(1)

Calculations

1	C1 Interest assume stay in overdraft 4 691 732 Interest @ 18%				
	On R26 065 178 (25 968 250+ 96 928) × 18%)				
	Creditors				
	Total credit 50% of total COS (R51,12m)		(25 560 000)		
	Current creditor payment				(1)
	days = 4 260 000 / credit purchases	60,00			(1)
	Creditors' balance		4 260 000	*	(1)
3	WIP		4 260 000		
4	Finished goods				
	Current inventory days	90,00			
	Turnover (times per year) [Given]	4,00			
	[51 120 ÷ 12 780]				
5	Debtors		22 365 000		
	Sales		85 200 000		
	Cash sales 10%		8 520 000		
	Credit sales	105,00	76 680 000		
	Bad debts 5% of credit sales		3 834 000		
	Effect of supplier agreement		**R**		**R**
6	Shorten delivery time of raw material purchases Holding period and investment reduced by 75% (R3 408 000 × 0,75)				2 556 000
7	Creditor balance relating to raw material purchas s		3 408 000		
	Current creditor days	60,00			
	Now:	30,00			
	Effect on ash flow				(1 704 000)
8	Production scheduling – Cost				(320 000)
9	WIP Cycle Holding period and Investment reduced by 75% (4 260 000 × 0,75)				3 195 000
10	Invent ry Finished goods – Co t				(480 000)
	Turnover trebling	New bal	4 260 000		
	(i.e. now 12 times)	Old bal	12 780 000		8 520 000

11 Debtor

		Debtor balance		Sales			
Clerk – Cost						(180 000)	
Total sales increase by 1% (all now on credit)				86 052 000		852 000	
To receive discount		478 067	10	17 210 400		(516 312)	Not assume previous
20% of sale							Sales re
Bad debts 3% of total sales		2 581 560	360	2 581 560		1 252 440	Decrease
Sales to debtors with poor payment record					½ each		
10% of sales		239 033	10	8 605 200	Max		
Pay on 30th day	55%	3 944 050	30	47 328 600			
Pay on 60th day	12%	1 721 040	60	10 326 240			
Ave debtor balance		8 963 750				13 401 250	Decrease
Increase in cost of sales due to 1% increase in sales						(511 200)	
						26 065 178	Increase in cash flow for next year
							Max 34

Improving cash flow

For every R3m (assumed) in existing profit after tax, a change in cover from 3 to 5 will decrease the dividend (R1m to R0,6m) by 40%. (2)

This impact will also apply to the additional profit (R3,4m) generated by the new policy and will be sustainable for as long as the high cover is retained. (2)

The working capital has resulted in a net improvement of R29,4m in cash flow; this is however a once-off improvement which will not be sustainable to the same extent. (2)

Max 6

Reduction of net working capital

Category	**Strategy**	**Effect**	
Debtors	Off r discounts	Reduces profitability	(2)
	Strict r credit policy	May lose sales	(2)
	Switch to cash sales	Improve cash flow	(2)
		Clients may not afford this and fall away	(1)
W-I-P	Delivery Just in Time	May have stock-out	(2)
	Build time lag in process	May lose order/customers	(2)
Creditors	Extend payment period	Lose discount, get higher price	(2)
	Supply JIT	Production schedules must match, higher cost?	(2)
		Interruption impact	(1)
			Max 10

Question 9–4 *(Advanced)* *50 marks 75 minutes*

Buyers Incorporated Limited (BIL) trades in the retail clothing sector and is listed on the general retail sector of the JSE Securities Exchange SA. The company focuses on the youth market. Their unaudited results for the year ended 31 August 20X9 are shown below:

Statement of comprehensive income for the years ending 31 August

	Note	20X9 R'000	20X8 R'000
Turnover	1	613 450	528 836
Cost of sales		364 340	310 916
Opening inventory		140 820	135 800
Purchases	2	373 870	315 936
Closing inventory		(150 350)	(140 820)
Gross profit		249 110	217 920
Operating expenses		199 370	175 050
Operating profit		49 740	42 870
Dividend received	5	3 000	3 000
Finance charges (net)	3	(3 640)	(6 210)
Profit before tax		49 100	39 660
Taxation	4	16 115	13 950
Profit after tax		32 985	25 710
Number of issued shares		50 000 000	50 000 000
Closing share price (cents)		840	560
Dividends (cents per share)			
Interim – paid		10	10
Final – paid		–	10

Statement of financial position at 31 August

Assets			
Non-current assets	5	189 760	202 020
Current assets		284 415	258 190
Inventory		150 350	140 820
Trade receivables		25 230	16 520
Cash balances and investments		108 835	100 850
Total assets		474 175	460 210
Equity and liabilities			
Equity	7	175 745	147 760
Share capital and premium		71 000	71 000
Accum lated reserves		104 745	76 760
Non-current liabilities L ng-term l	6	100 000	120 000
an Current liabilities		198 430	192 450
Trade payables		184 960	176 025
Other payables and provisions		13 470	16 425
Total equity and liabilities		474 175	460 210

Notes

60% of the turnover in 20X9 was cash sales, down from 70% in 20X8. Management has taken a conscious decision to extend their credit facilities, as they believe that is the future growth area. The intention is to bring cash sales down to a 50% level from 20X0 onwards.

All inventory purchases are made on credit.

Finance charges are made up as follows:

	R'000
Interest paid on long-term loans (Note 6)	13 000
Interest paid – other	452
Interest received	(9 812)
	3 640

The company tax rate is 28%. STC is provided at 10%. No STC credits were brought forward from 20X8.

As part of its strategy and youth focus BIL took up 18% of the shares in Music Distributors Ltd (MDL). MDL owns a CD manufacturing press and several music retail outlets. BIL h s been receiving dividends from this investment for the last four years. The investment is included in non-current assets.

6 The R5 long-term loan bears interest at prime plus 2%. All interest is paid up to date. On 1 September 20X8, R20 million of the loan was repaid.

BIL has a stated return on equity of 16% per annum.

The budgeted turnover for 20X10 is R705 550 000.

9 Prima Ltd is a major player in the retail clothing sector. Pri a Ltd's shares currently trade on the JSE Securities Exchange SA at 12 000 cents per share and a P/E ratio of 15. Prima Ltd's earnings have grown at 20% per annum over the last ten years.

The average PE for the general retail sector on the JSE S curities Exchange SA has come down from 14,8 on 31 May 20X9 to 11,6 on 31 August 20X9.

Required:

Assess Buyers Incorporated Limited's performance in respect of –

(i) profitability **(*8 marks*)**

(ii) financial structure. **(*2 marks*)**

The final dividend for 20X9 has not yet been declared. Assume the dividend cover for 20X8 remains intact for 20X9. Calculate the final dividend per share for 20X9. (Round to the nearest cent). **(*5 marks*)**

Use your answer for **(b)** above, linked to the question information, to calculate the additional STC as a result of the final dividend. **(*5 marks*)**

Buyers Incorporated Ltd generates a fair amount of cash per annum. Recommend with supporting motivation, **two** uses for the cash balances held by Buyers Incorporated Ltd. **(*4 marks*)**

(e) Evaluate Buy rs Incorporat d Ltd's share assessment. **(*4 marks*)**

Estimate the additional working capital required to support the increased sales budgeted for 20X10. **(*8 marks*)**

Prima Ltd has publicly offered the shareholders of Buyers Incorporated Ltd 8 (eight) Prima shares for every 100 sha es held in Buyers Incorporated Ltd. Advise the shareholders of Buyers Incorporated Ltd as to the reasonability of the offer. List all issues to be considered. **(*10 marks*)**

(h) List the **specific** factors that make Buyers Incorporated Ltd attractive for take-overs. **(*4 marks*)**

Solution:

(a) (i) Profitability

	20X9	20X8	
Gross profit %	$\frac{249\ 110}{613\ 450}$	$\frac{217\ 920}{528\ 836}$	
	= 40,6%	= 41,2%	(2)
Operating profit %	$\frac{49\ 740}{613\ 450}$	$\frac{42\ 870}{528\ 836}$	
	= 8,1%	= 8,1%	(2)
Net profit %	$\frac{32\ 985}{613\ 450}$	$\frac{25\ 710}{528\ 836}$	
	= 5,4%	= 4,9%	(2)
Change in turnover	$\frac{613\ 450 - 528\ 836}{528\ 836}$		(1)
Return on equity = $\frac{PAT}{Equity}$	= 16,0%		(1)
		Ratios max	5

Turnover increased by more than inflation targ t range which is acceptable (industry growth?). (1)

- Although GP margin weakened, the operating margin is unchanged. (1)
- Net profit improved as a result of much lower finance charge – due to interest earned. (1)
- Bulk of the profit will be of a cash nature, which lowers risk profile. (1)

Max **8**

(ii) Financial structure

- Debt to equity improved [or for calc]. (1)
- In terms of book values fairly secure as debt only (100/275) 36%. (1)
- WACC will be between 9,36% (cost of debt) and 16% (cost of equity).
  [General comment without %'s = 1] (2)

$\frac{13m}{100m} \times 0,72$
= 9,36%
or
Prime (10,5%+2%) × 0,72
= 9%

In te ms of market values, market capitalisation is 50m × 8,40 = 420m with low debt, thus debt to equity will decline.↓ (2)

Max 2

	Debt	Equity	D:E
31/08/X8	120	280	0,43
31/08/X9	100	420	0,23
31/08/09	100	420	0,23

20X8

Earnings per share $\frac{25\ 710}{000}$

51,4 cps (1)

Total dividend declared ∴ Cover

20,0 cps [Rounding will cause 2,6 times difference below] (1)

2,57

20X9					
Earnings per share		32 985			
		50 000			
		= 66,0 cps			(1)
Cover		2,6 times			
Total dividend	[OR R12,3m]	25 cps	OR	R12 500 000	(1)
Interim dividend	[R7,83m]	10 cps			
Final dividend		15 cps	OR	R 7 500 000	(1)
					5

(c)	Dividends – ordinaries (25c × 50m) OR [12,69]	12 500 000	[m rk for b number]	(1)
	Dividends received	(3 000 000)		(1)
		9 500 000		
	STC @ 10%	950 000	[mark for 10% calc]	(1)
	Tax per I/S	16 115 000		
	Company tax 29% × 49 100 000	13 748 000		(1)
	Already provided	2 367 000		
	Overprovided	1 417 000		(1)
				5

Note: STC is now replaced by Dividends Tax at 15%. Investigate the use of STC credits in the new dispensation.

(d)	l Buyback of shares		(1)
	– Shares to be bought on open market will support/improve share price; shares held can be used for corporate transactions, for example take-over, incentive scheme; form of dividend payment to sellers		(1)
	l For corporate transaction, for example take-over, investment, expansion		(1)
	– Cash is a good bargaining tool; BIL already has investment showing returns, niche market		(1)
	l Repayment of capital		(1)
	– Strong balance sheet, continued profitability and cash generation		(1)
	l Dividend payout already low – paying high dividend		(1)
	l Special divid nd only when attacked		(1)
	l Stick to long-term loan repayment terms		(1)
	∴ Market assessment fair to good	Max	4

(e)			**2009**	**2008**		
	l Earnings per share (per b)	(1)	66,0	51,4		
	Share price	(2)	840	560		
	PE ratio (2 ÷ 1)		12,7	10,9		(1)
	B k value per share (cps)		351	296	OR	(1)
	Market to book (840 ÷ 351) (560 ÷296)		2,4	1,9		(1)
	l Share price (closing) rose by 50% due to favourable history and prospects					(1)
	PE ratio slightly ahead of sector average					(1)
	Market to book ratio however not too high, although increasing					(1)
	∴ Market assessment fair to good				Max	4

Working capital requirement:

Trade receivables (debtors)		25 230	
Credit sales 613 450 × 40%		245 380	
Ratio 25 230 / 245 380 = 10,3%			(1)
New credit sales 705 550 × 50%		352 775	(1)
Increased debtors (352 775 – 245 380) × 10,3%	=	11 061	(1)
Inventory:			
Current ratio (150 350 / 613 450) = 24,5%			(1)
Increase (705 550 – 613 450) × 24,5%	=	22 564	(1)
Cash:			
(Cash profit % (a(i))5,4%			(1)
Profit retained (66 – 25) / 66 = 60%			(1)
∴ Additional 92 100 × 5,4% × 0,6	=	2 984	(1)
Creditors:			
Ratio 184 960 / 613 450 = 30,1%			(1)
Additional 92 100 × 30,1%	=	(27 722)	(1)
Net working capital		8 887	(1)
		Max	8

Advice should deal with an improvement or not for BIL shareholders. To be considered:

Share value:	8 × 12 000	→ 100 × 840	OR R1,20 per share OR R120		
	96 000	→ 84 000	= 12 000	Cents	(2)
P/E ratio:	15	→ 12,7	+		(1)
EPS:	6 400	→ 6 600	– 214		(1)
Growth:	20%	→ 16%	+		(1)

Unknown

- Is Prima Ltd a strategic investment choice for BIL shareholders? (do they want out of BIL?) (1)
- Dividend policy of Prima Ltd (1)
- Underlying asset value of Prima Ltd (1)
- Value of BIL's investment (1)
- How sustainable are the growth rates/cash flows (1)
- Synergi s to be cr at d by such a take-over (1)

Offer is reasonable BUT (1)

The offer be omes a choice between the *capital value* in Prima Ltd versus the *earnings* (dividends) generated by BIL and the *needs* of the individual shareholder (3)

Max 10

(h) Specific factors

- Cash balances / cash generation (1)
- Access to debt or good (low) gearing (1)
- Low number of issued shares (1)

Growth (1)

- Profitability (1)
- Niche market (1)
- Low share price / PE (1)

Max 4

Question 9–5 *(Advanced)* *100 marks*

Kasbian Ltd ('Kasbian') operates steel foundries in the Gauteng Province of South Africa. The manufacturing processes involve melting scrap steel and other alloys in furnaces and then pouring the melted product into casting moulds. Thereafter the resultant castings are cleaned and heat-treated. Castings produced by Kasbian include pumps, valves and pipes, which are supplied to mining customers who use these products in platinum and gold mining operations.

Scrap steel is purchased from various scrap metal dealers in Gauteng. Scrap steel prices vary according to the quality of the material and the prevailing steel commodity prices. Scrap metal dealers supply the South African market and also export to foreign customers. They determine the selling price of scrap steel in US dollars and then convert this into Rand, based on the exchange rate on the date of sale to South African customers. Scrap steel prices increased in 20X7 and 20X8 due to the high demand for steel glob lly.

Listing on the Johannesburg Securities Exchange

Kasbian listed on the Alternative Exchange (AltX) of the Johannesburg Securities Exchange in October 20X6. The company raised R50 million prior to listing through a private placement f two million shares with a par value of 1c each, issued at a premium of R24,99 per share. Upon listing, Kasbian had ten million shares in issue. At the end of October 20X6 the share price had increased from the listing price of R25 per share to R27 per share.

Acquisition of Solar Foundries (Pty) Ltd

Kasbian acquired the business of Solar Foundries (Pty) Ltd ('Solar Foundries') as a going concern with effect from 1 October 20X7 for a purchase consideration of R49 900 000. Kasbian settled the purchase price through a cash payment of R40 million and the issue of 360 000 shar s at the prevailing market price of R27,50. Goodwill arising on the purchase of Solar Foundries amounted to 17 500 000. On 1 October 20X7 Kasbian obtained a R40 million loan from RBZ Bank to fund the cash portion of the purchase consideration. The loan from RBZ Bank is repayable annually in arrears in four equal instalments. The first instalment of R13 587 727,60 was paid on 30 September 20X8. The loan bears interest at a fixed rate of 13,5% per annum.

Global economic crisis

The global economic crisis in late 20X8 precipitated a slowdown in consumer demand. Mining output dropped in the fourth quarter of 20X8 and this trend has continued in 20X9. Steel commodity prices declined as demand for this base metal product decreased among most industrialised nations.

While gold mining production declined during the period October 20X8 to September 20X9, the gold price has risen during this period mainly as a result of the perception of gold as a 'safe haven' investment. Unfortunately the platinum mining sector did not escape as lightly as the gold mining industry. Platinum is used mainly in the automotive and jewellery industries and there was a significant decline in demand for this precious metal dur-ing the past year, which has led to a decline in platinum mining activities.

Kasbian's revenue for the y ar nded 30 September 20X9 dropped by 36% from the prior year, as the lower mining production translated into lower demand for castings.

Trial balances

The trial balances of Kasbian for the financial years ended 30 September 20X8 and 20X9, together with explanatory notes, are set out on the next page.

Kasbian Ltd Trial Balances at 30 September					
		20X9		20X8	
	Notes	Dr R'000	Cr R'000	Dr R'000	Cr R'000
Revenue – South African customers	2		144 000		240 000
Revenue – exports	2		67 200		90 000
Cost of sales		188 304		223 916	
Opening inventories of finished goods and raw materials	5	69 630		49 936	
Scrap steel purchases	3, 7	98 880		152 475	
Other raw material purchases	7	15 960		21 535	
Direct labour expenses	8	37 500		41 250	
Electricity	9	15 444		14 850	
Depreciation: Manufacturing plant and equipment		6 100		6 000	
Other overheads		6 500		7 500	
Closing inventories of finished goods and raw materials	6		61 710		69 630
Other income	11		650		3 250
Selling and administrative expenses		34 900		38 600	
Retrenchment costs	8	1 800		–	
Depreciation: Non-manufacturing equipment		2 180		2 200	
Interest paid: RBZ Bank		4 295		5 400	
Interest on bank overdraft		3 616		2 450	
Normal income tax		0		16 992	
Secondary tax on companies		0		1 500	
Net loss/profit for the year		23 245			42 192
Share capital			104		104
Share premium			59 876		59 876
Retained earnings – beginning of the year			78 801		51 609
Dividends declared	12			15 000	
Loan from RBZ Bank			22 520		31 812
Trade payables	13		25 729		16 686
Tax owing to SARS			0		5 748
Shareholders for dividends			0		15 000
Bank overdraft	14		40 614		17 500
Plant and equipment	15				
Furnaces, moulding lin s and oth r manufacturing equipment		72 600		75 500	
Non-manufacturing equipment		15 520		16 500	
Goodwill		17 500		17 500	
Inventory					
Finished goods		42 570		52 080	
Raw materials		19 140		17 550	
Trade receivables		34 719		43 397	
Other receivables		2 350		2 250	
Cash and cash equivalents		0		750	
		227 644	227 644	240 527	240 527

Notes

The above trial balances do not include any adjustments and entries to appropriately account for the impairment of assets (IAS 36) and financial instruments (IAS 39). No provisions have been raised against inventories either. Any such entries are processed after year-end for the purposes of Kasbian's annual reports.

2 Tonnages of castings sold and related sales prices are summarised in the table below:

	20X9	20X8
Tonnes of castings sold		
South African customers	30 000	40 000
Export customers	12 500	15 000
Average price per tonne sold		
South African customers	R4 800	R6 000
Export customers	US $640	US $750
Exchange rates	**US $1 = ZAR**	
Average rate during the financial year	R8,40	R8,00
Exchange rate at year end	R7,70	R8,05

Kasbian experienced increased competition from certain Chinese foundries in the latter part of the 20X9 financial year. These Chinese foundries targeted Kasbian's international customer base and offered them discounted prices to secure their business.

Kasbian entered into a two-year supply agreement with EDC Scrap Metal (Pty) Ltd (EDC Scrap Metal) with effect from 1 October 20X7. The company undertook to purchase a minimum of 15 000 tonnes of scrap steel annually from EDC Scrap Metal at a fixed price of US $350 per tonne (to be invoiced in rand, based on the prevailing exchange rate at the date of supply). EDC Scrap Metal is a South African based company. Kasbian entered into the agreement in 20X7, as it was concerned about escalating scrap steel prices.

Manufacturing volumes and utilisation of raw mat rials during the 20X8 and 20X9 financial years are summarised below:

	20X9 Tonnes	20X8 Tonnes
Finished goods (castings) manufactured	40 000	60 000
Raw materials used in manufacturing processes	40 000	60 000
Scrap steel purchased from EDC Scrap etal	12 500	13 500
Scrap steel purchased from other local suppliers	23 500	40 500
Other raw materials	4 000	6 000

Manufacturing volumes were evenly spread throughout the 20X8 financial year. In the 20X9 financial year, Kasbian manufactured 13 000 tonnes of castings in the first quarter and 9 000 tonnes in each of the next three quarters.

5 Opening inventories comprised the following:

	20X9 Tonnes	20X8 Tonnes
Finished goods	12 400	7 400
Scrap steel: EDC S rap Metal	1 500	0
Scrap steel: Other lo al s rap steel suppliers	3 700	6 700
Other aw mate ials	600	700
Cost of opening inventories per tonne	**R**	**R**
Finished goods	4 200	3 900
Scrap steel: EDC Scrap Metal	2 800	0
Scrap steel: Other local scrap steel suppliers	3 000	2 780
Other raw materials	3 750	3 500
C st f inventories reflected in trial balances		
Finished goods	52 080	28 860
Scrap teel: EDC Scrap Metal	4 200	0
Scrap teel: Other local scrap steel suppliers	11 100	18 626
Other raw materials	2 250	2 450
	69 630	49 936

6 Closing inventories comprised the following:

	20X9 Tonnes	20X8 Tonnes
Finished goods	9 900	12 400
Scrap steel: EDC Scrap Metal	4 000	1 500
Scrap steel: Other local scrap steel suppliers	2 200	3 700
Other raw materials	800	600
Average cost of inventories per tonne	**R**	**R**
Finished goods	4 300	4 200
Scrap steel: EDC Scrap Metal	2 750	2 800
Scrap steel: Other local scrap steel suppliers	2 300	3 000
Other raw materials	3 850	3 750
Cost of inventories reflected in trial balances	**R'000**	**R'000**
Finished goods	42 570	52 080
Scrap steel: EDC Scrap Metal	11 000	4 200
Scrap steel: Other local scrap steel suppliers	5 060	11 100
Other raw materials	3 080	2 250
	61 710	69 630

Kasbian uses a first-in, first-out system with regard to all categories of inventories.

7 Raw material purchases during the 20X8 and 20X9 financial years are summarised in the table below:

Raw materials purchased during the year	20X9 Tonnes	20X8 Tonnes
Scrap steel purchased from EDC Scrap Metal	15 000	15 000
Scrap steel purchased from other local suppliers	22 000	37 500
Other raw materials	4 200	5 900
Average purchase cost per tonne of raw materials	**R**	**R**
Scrap steel purchased from EDC Scrap etal	2 940	2 765
Scrap steel purchased from other local suppliers	2 490	2 960
Other raw materials	3 800	3 650
Purchases reflected in trial balances	**R'000**	**R'000**
Scrap steel purchased from EDC Scrap Metal	44 100	41 475
Scrap steel purchased from other local suppliers	54 780	111 000
	98 880	152 475
Other raw materials	15 960	21 535

Kasbian retrenched 10% of its direct labour force at the end of December 20X8 in response to the declining production and sales volumes. The once-off cost of retrenching these employees amounted to R1 800 000.

The company used 20% less electricity for the purposes of manufacturing in the 20X9 financial year. Despite this edu tion in electricity consumption, the electricity expense for the year was higher than in 20X8 because of Eskom's 30% tariff increase.

The costs per tonne of finished product manufactured in the 20X8 and 20X9 financial years are set out in the table below:

	20X9 R	20X8 R
Scrap steel	2 453,00	2 596,68
Other raw materials	378,25	362,25
Direct labour	937,50	687,50
E ectricity	386,10	247,50
Depreciation	152,50	100,00
Other overheads	162,50	125,00
	4 469,85	4 118,93

Other income represents settlement discounts received from suppliers. Kasbian is entitled to a 2,5% settlement discount from all raw material suppliers if it pays amounts owing within 30 days of the date of the statement.

Kasbian declared a R15 million dividend to all registered shareholders on 15 September 20X8. The dividend was paid to shareholders on 30 November 20X8.

Kasbian experienced significant cash-flow difficulties during the 20X9 financial year. The company has been stretching the trade creditor repayment period by delaying payments to them. A number of Kasbian's raw-material suppliers have expressed concern about overdue amounts as they are also experiencing cash-flow pressures.

Africa Commerce Bank has been Kasbian's commercial bankers for ten years. Africa Commerce Bank increased the company's overdraft facility limit to R45 million on a tempor ry b sis during 20X9. However, they are concerned about Kasbian's operating losses and poor cash-flow gener tion and, in a letter dated 27 September 20X9 addressed to the Chief Executive Officer of Kasbian, ga e the company an ultimatum to reduce the amount owing on overdraft to R20 million by 15 December 20X9. It further stated that the bank would withdraw the entire overdraft facility if Kasbian Ltd did n t meet this target.

Interest on the overdraft is charged at the prevailing prime verdraft interest rate, which was 10,5% on 30 September 20X9 (30 September 20X8: 13,5%).

15 There were no disposals of plant and equipment during the 20X9 financial year.

Banking facilities and potential recapitalisation

The board of directors of Kasbian is concerned about the ability of the company to trade out of its current predicament. The directors believe that sales volumes will increase significantly in the 20X10 financial year, based on feedback from their major customers. It is difficult to predict commodity prices but Kasbian's directors have noticed that steel prices have stabilised recently, which is indicative of the end of the current trend of declining prices.

In view of the threat by Africa Commerce Bank and the potential threat that certain creditors may demand immediate repayment of outstanding amounts, the major concern of the directors of Kasbian is whether the company will be able to continue trading until volumes increase.

Kasbian is presently negotiating with Dinkum Partners, a hedge fund based in London. Dinkum Partners has expressed interest in investing in Kasbian on the following terms and conditions:

Dinkum Partners will advance a loan of US $6 million to Kasbian bearing interest at a fixed rate of 8% per annum. The loan is repayable annually in arrears in equal instalments over a three-year period.

Dinkum Partners will be entitled to appoint a director to the board of Kasbian for the duration of the loan agreement.

Kasbian will be r quir d to pay Dinkum Partners an annual fee of US $200 000 for the next three years.

Kasbian is to grant Dinkum Partners an American call option to subscribe for two million Kasbian ordinary shares at a strike pri e of R4,50 per share. The call option is exercisable at any time during the next three years.

No dividends may be declared or paid to shareholders until Kasbian has repaid the loan in full.

The weighted average share price of Kasbian over the 30-day period ended 31 October 20X9 was R4 per share.

The board of directors has approached various banks for funding facilities to replace those of Africa Commerce Bank. All f the banks approached expressed reluctance to extend an overdraft and/or medium-term facilities to Kasbian in view of the company's exposure to the mining industry.

The major hareholders of Kasbian are its executive directors, who do not at present have the financial ability to ub cribe for new shares in the company and/or to advance monies to the company.

The board of directors believes that it may not have any other option in the short term but to enter into the rr ngement with Dinkum Partners outlined above.

Required:

Calculate the annual change in revenue derived from sales to South African customers and export revenue for the year ended 30 September 20X9 in volume terms, price per tonne and overall change **(*6 marks*)**

Calculate and estimate the impact of entering into the supply arrangement with EDC Scrap Metals (Pty) Ltd on the profits and cash flows of Kasbian Ltd for the year ended 30 September 20X9 **(*9 marks*)**

Identify, with the necessary calculations, and explain the key reasons for the lower profitability of Kasbian Ltd for the year ended 30 September 20X9 **(*15 marks*)**

Calculate the relevant working capital ratios of Kasbian Ltd at 30 September20X8 and 20X9. You should base your calculations of the relevant ratios for finished goods and c tegories of raw materials on –

volumes and not Rand amounts; and

- year-end inventories as opposed to average inventories during the period **(*15 marks*)**

Critically comment on the management of inventories by Kasbian Ltd during the 20X9 financial year **(*5 marks*)**

Identify and discuss the potential adverse consequences that delaying payments to trade creditors could have for Kasbian Ltd **(*10 marks*)**

Critically analyse and discuss the terms of investment proposed by Dinkum Partners from the perspective of the shareholders of Kasbian Ltd **(*14 marks*)**

Identify and discuss the critical factors which may influ nce the future cash-flow generation of Kasbian Ltd **(*15 marks*)**

Critically discuss the actions of the directors of Kasbian Ltd in declaring and paying a dividend in 20X8 **(*6 marks*)**

Presentation: Arrangement and layout, clarity of explanation, logical argument and language usage **(*5 marks*)**

(SAICA FQE2)

Solution:

(a)	**20X8 R'000**	**20X9 R'000**	**Change**	
Revenue volumes				
– SA customers	40 000	30 000	(25,0%)	
– exports	15 000	12 500	(16,7%)	
Average price per tonne				
– SA customers	R6 000	R4 800	(20,0%)	(1)
– export price	US$750	US$640	(14,7%)	(1)
– exports (ex hange rate effect)	8,00	8,40	5,0%	
– overall export pri e	R6 000	R5 376	(10,4%)	(1)
Total evenue (R000s)				(1)
– SA custome s	240 000	144 000	(40,0%)	(1)
– exports	90 000	67 200	(25,3%)	(1)
			Available	(1)
			Maximum	(1)

(b)

	EDC	Other	Difference	
Unit cost per tonne				
– opening inventories	2 800	3 000	200	(1)
– purchases	2 940	2 490	(450)	(1)
– closing inventories	2 750	2 300	(450)	(1)
Volumes				
– opening inventories	1 500			(1)
– purchases	15 000			(1)
– closing inventories	(4 000)			(1)
COS impact				
– opening inventories [1500 × 200]				(1)
– purchases [15000 × -450]				
– closing inventories [4000 × 450]				(2)
Cash flow impact [15000 × R450]				
	R'000	**R'000**		
Revenue volumes				
– SA customers	40 000	30 000	(25,0%)	
– exports	15 000	12 500	(16,7%)	
Average price per tonne	R6 000	R4 800	(20,0%)	
– SA customers	US$750	US$640	(14,7%)	
– export price	8,00	8,40	5,0%	
– exports (exchange rate effect)	R6 000	R5 376	(10,4%)	
				9

(c)

	20X8	20X9	Change	
Revenue				
– lower volumes sold			(22,7%)	(1)
– lower unit selling price			(17,2%)	(1)
Total change in revenue			(36,0%)	(1)
Impact on EBIT				
– lower volumes (GP terms)			(24 110)	(1)
– lower average selling price			(14 080)	(1)
			(38 190)	
Gross profit				
Calculation of gross profit amount	106 084	22 896	(78,4%)	
Gross profit %	32,2%	10,8%	(66,3%)	
Decline in GP amount			(44 998)	
Decline in av rage GP p r unit sold				
Impact on EBIT of low r GP margin				
Manufacturing ost per tonne				
– scrap steel	(2 597)	(2 453)	(5,5%)	(1)
– other aw mate ials	(362)	(378)	4,4%	(1)
– labour	(688)	(938)	36,3%	(1)
– electricity	(248)	(386)	55,7%	(1)
– depreciation	(100)	(153)	53,0%	(1)
– ther verheads	(125)	(162)	29,6%	(1)
	(4 120)	(4 470)	8,5%	(2)

	20X8	20X9	Change	
Selling and administration costs			(80,0%)	(1)
Other income			(9,6%)	(1)
Finance charges			0,8%	(1)
EBIT			(122,4%)	(1)
Profit before tax			(138,3%)	
Overall impact on FY20X9 profits				
Lower revenue			(38 190)	
Declining GP%			(44 998)	(1)
Other income			(2 600)	
Retrenchment costs			(1 800)	(1)
Selling and administration costs			3 700	
Other (depreciation and finance charges)			(41)	
Lower PBT in FY20X9 compared to FY20X8			(83 929)	(1)
			Maximum	9

Revenue

- Decline in revenue was a **major factor** in lower profits in FY20X9 (1)
- Decline attributable to **lower demand from mining customers** due to global economic crisis (1)
- **Lower selling prices** per unit a result of dropping commodity prices (scrap steel) (1)
- Increasing competition from **Chinese foundries** also affected export sales (1)
- **Export revenue prices declined by less** than local sales which mitigated overall revenue drop (1)

Gross profit margin

- **COS** declined by **15,9%** which is **much lower** than revenue drop of 36% (1)
- **Scrap steel costs** per tonne manufactured declined by 5,5% yet selling priced by 17,2% (1)
- **EDC supply contract** affected input costs (as calculated in **(b)** above) (1)
- **Direct labour costs** per tonne manufactured increased indicating largely fixed labour cost (1)
- Electricity tariff increases eroded margins (1)
- Retrenchments may have affected **employee morale** (1)

Other factors

- **Selling and administration expenses** declined softening blow of lower GP's (1)
- Other income (**s ttl ment discounts**) declined because of cash-flow constraints (1)
- **Retrenchm nt costs** of R1,8m reduced profits (1)

15

(d) – *1 mark* for co ect answer/*1 mark* for attempt	**20X8**	**20X9**	(2)
Inventory days (finished goods)			(3)
Calc lation: 9900 / 42500 × 365 [12400 / 55000*365]	82 days	85 days	
Annualised manufacturing in last quarter			
– scrap steel		32 400	
– other raw materials		3 600	
Inventory days (scrap steel)			
Calculation: 6200 / 32400 × 365 [5200 / 54000 × 365]	35 days	70 days	

Alternative 1:			
EDC	*41*	*117*	(1)
Other scrap metal suppliers	*33*	*34*	(1)
Alternative 2: Based on unit sales			
Scrap metal inventory days	*38*	*59*	(2)
Inventory days (other raw materials)			
Calculation: 800 / 3600 × 365 [600 / 6000 × 365]	37 days	81 days	(3)
Alternative: Based on unit sales	*46*	*52*	(2)
Trade receivables days	48 days	60 days	(2)
Calculation: 34719 / 211200 × 365 [43397 / 330000 × 365]			
Trade payables days			
Calculation: 25729 / 114840 × 365 [16686 / 174010 × 365]	35 days	82 days	(2)
Alternative: Based on total COS	*27*	*50*	(2)
Current ratio	2,1	1,5	(2)
Alternatives: Exclude O/D in current liabilities	*3,1*	*3,8*	(2)
Quick ratio	0,8	0,6	(2)
Alternative: Exclude OD from current liabilities	*1,2*	*1,4*	(2)
Quick ratio		Maximum	15

(e) – Inventory discussion

Inventory days of finished goods remained consistent in FY20X9 from FY20X8 which reflects lower manufacturing volumes	(1)
Management **should have reduced finished goods inventories** more given declining sales volumes	(2)
Inventory days of scrap steel increased from 35 days to 70 days at 20X9 year-end which indicates **poor management** as declining demand was evident in FY20X9	(1)
EDC supply contract may have forced Kasbian to purchase more than required	(1)
However, total raw materials used in manufacturing in FY20X9 was **36 000** tonnes significantly **more than 15000** fixed supply contract	(2)
Inventory days of **other raw materials** also increased significantly in FY20X9 – poor	(1)
Manufacturing volumes declined by 33% in FY20X9 **yet raw material inventory levels increased**!	(2)
Any **obsolete or slow moving** inventories giving rise to higher stock holdings?	(1)
	Maximum 5

(f) – Identification and explanation

l Produ t **quality and service** received from suppliers may **deteriorate** if not paid promptly	**(2)**
l No longer able to claim **discounts** for prompt settlement	(2)
l Suppliers may start to charge **higher prices** to compensate for perceived higher credit risk	(2)
l Risk of being placed into provisional/final **liquidation** if creditors insist on immediate payment	(2)
l Creditors may insist on **COD** thereby removing benefit of interest free funding	(2)
l Creditors may start to **charge interest** on overdue amounts	(2)
l **Increased time** spent by Kasbian staff in dealing with credit-control divisions of suppliers	(2)
l Suppliers could **discontinue supplying** Kasbian thereby crippling business	(2)
Credit rating of Kasbian may be deteriorate resulting in suppliers not doing business with them	(2)
l **Legal costs** incurred from defending legal action/summons	(2)
	Maximum 10

(g) – Amount of loan

- US$6m = R46,2m at year-end exchange rate (1)
  O/D needs to be reduced to R20m using R20,6m of loan advance leaving R25,6 to reduce creditors and fund operations (1)
- Dinkum loan appears sufficient to meet immediate needs and fund operations in the short term (1)

Interest rate

- Nominal annual rate = 12,7% including annual fees paid (2)
  Interest rate is high
  - Kasbian's current O/D rate is 10,5% (1)
  - Global interest rates currently much lower than 12,7% (1)
- Fixed interest rate means certainty re payments however, could be expensive if rates decline (1)

Exchange rate risks

- Hedging cost of repayments (interest + capital)? Three year hedging required (1)
  Failure to hedge exchange rate exposure could exp se Kasbian to significant risk given ZAR Volatility (1)
- Extent of natural hedging from Kasbian's export activities? (1)

Annual fee/non-executive director

- What will Kasbian receive in return for annual f ? (1)
- Any remuneration payable to Dinkum appoint d dir ctor? (1)
- Dinkum appointee be constructive or interfering and protecting their rights? (1)

Option

- Option entitles Dinkum to 16,2% shareholding interest post subscription (1)
- Strike price is very low compared to listing price and October 20X7 (R27,50) (1)
- Strike price is at 12,5% premium to weighted average 30-day period October 20X9 (1)
- Three years is an extended period to exercise option – could be valuable if Kasbian recovers (1)
- Kasbian should obtain independent advice re option price (value using Black Scholes etc.) (1)

Gearing levels

- Kasbian's debt equity ratio currently = 55% (1)
- Using part of loan advance to reduce creditors will increase debt equity ratio (1)
- Kasbian incurring operating loss therefore insufficient to meet interest payments (1)
- Will Kasbian be able to meet capital and interest repayments over next three years? (1)

Clarification of loan t rms

- Early settlement option possible? (1)
- Fu ther loan ovenants besides dividend restriction? (1)
- Secu ity for loan? (1)

Other considerations

- Tax ded ctibility of interest and annual fees? (1)
- Dividend restrictions for three years may unduly harsh on current shareholders (1)
- SARB approval required to enter into foreign loan agreement (1)
- Kasbian has no other funding alternatives so may be forced to accept Dinkum loan (1)

14

(h) – Revenue

FY 20X9 revenue **below break even** therefore increasing revenue in FY 20X10 critical

- **Increasing mining production** and hence, demand for Kasbian products (1)
- Reducing reliance on **platinum** mining customers or increasing demand for this precious metal (2)
- General **global economic recovery** will be NB to stimulate consumer demand for gold/platinum (1)
- Increasing competition from **Chinese** foundries may reduce revenues (1)
- **ZAR/US$** exchange rate fluctuations – 30% of revenue exports (1)
- **Steel commodity prices** – major input cost and higher prices = more revenue for Kasbian (2)

Gross profit margin

- **EDC Metal** contract terminated at end of FY20X9, Kasbian should improve GP as a result (1)
- Increased sales and production volumes NB to **cover fixed costs** (labour etc.) and improve GP% (2)
- Future **Eskom** tariff increases could GP margins (1)
- Generally, **improving GP% from 10,8% back to >30%** will have NB impact on cash flows (1)

Working capital

- **Reducing inventory levels** (particularly raw aterials) will release significant cash (1)
- **Trade debtors** days much higher in FY20X9, these will boost cash flows (1)
- **Creditors** stretched in FY20X9, Kasbian will need a ounts owed, using cash (1)
- Continued **support from creditors NB**, discontinuing supply etc. will have major impact (2)
- If demand increases, Kasbian will need to fund **working capital build up** (2)

Gearing

- **Interest rate movements** will affect cash-flow payments (1)
- **Equity injection** would affect debt repayments over next three years (1)

Other factors

- Reducing selling and admin overheads, fixed **costs** (1)

Maximum 15

(i) – Dividend impact

Dividend amount was reasonable in relation to reported profits (36% of PAT or **2,8 times cover**) (1)

Kasbian had >R49m debt in Oct 20X8 directors should **rather have reduced debt** than pay dividends (2)

Kasbian's **cash-flow g n ration** in FY20X7/20X8 **poor** so paying dividends exacerbated issue (1)

Debt to equity ratio after dividend declaration at 20X8 year end was 47%, not too high (1)

Impact of global slowdown was evident before dividends paid, directors should have reversed decision (2)

Directors sho ld have considered **solvency and liquidity** (over next 12 months as well) of Kasbian prior to declaring and paying dividends (2)

Failure to pay dividends may have had **signalling effect** (1)

Maximum 6

Chapter 10

Valuations of preference shares nd debt

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- outline reasons for undertaking valuations of pr f r nce shares or debt;
- identify and explain the various drivers of value and the int raction between them, when using a valuation method based on discounted cashflow;
- value different types of preference shares using a discounted cashflow method; and
- value different forms of debt using a discounted cashflow method.

This chapter introduces the interesting, although sometimes bewildering, topic of valuations. It aims to break down the uncertainty experienced by many students in this area by concentrating on core principles. This chapter focuses on the valuation of the main forms of capital used by South African entities, other than ordinary equity (which is covered in chapter 11) – that is, preference shares and debt.

This chapter further serves as both an introduction and precursor to chapter 11 (*Business and equity valuations*), which builds on the concepts introduced here. This chapter is also closely linked to chapter 7 (*The financing decision*), which evaluates different forms of finance from an associated, but slightly different perspective.

The chapter addresses a mix of topics with a difficulty level ranging from fundamental to intermediate. For convenience, the int rm diate areas are labelled as such. (Unlabelled areas therefore represent basic, fundamental knowledge ar as.)

This chapter explores valuations of preference shares and debt using a universal discounted cashflow valuation method. It fi st explains the various drivers of value – and the interaction between them – when using a discounted cashflow method.

As a second phase, it applies the discounted cash flow method to illustrate and explore the valuation of different types of preference shares, and different forms of debt. Throughout the chapter, the aim is to promote the understanding and application of sound valuation principles. This chapter does not address derivative financial instruments r specialised forms of finance, including Islamic finance structured in accordance to Shariah rules.

10.1 Reasons for undertaking valuations of preference shares or debt

Appraisers in South Africa may be called upon to perform valuations of debt or preference shares for many different reasons, including –

- valuations for taxation purposes;
- valuations for financial reporting purposes;

when determining the weights of debt and preference shares relative to the fair market value of total capital employed by a business enterprise, upon calculation of the current weighted average cost of capital of the firm;

when valuing debt and preference shares separately, as part of an encompassing business valuation (refer to chapter 11 (*Business and equity valuations*));

in case of a business rescue reorganisation; and

where a firm issues *new* preference shares or *new* debt in the form of securities directly to investors. (I.e., a bank does not serve as an intermediary and will thus not offer the service of inking the value of the form of finance to a fair return.) Investors will not invest in a new security un ess its future benefits will offer a fair, risk-adjusted return;

where an investor seeks to purchase from another investor *previously* issued, unlisted preference shares or debt securities. In this case, the valuation will indicate a fair market value at that point in time, given the specified future benefits, and a fair, risk-adjusted return.

10.2 The discounted cashflow method

This chapter makes exclusive use of a discounted cash-flow ethod to value preference shares and different forms of debt. This important valuation method belongs to the inco e approach and is but one of several methods; this and other valuation methods are discussed in chapter 11 (*Business and equity valuations*) along with other important valuation theories.

The discounted cashflow method is suitable to the valuation of most forms of debt and preference shares, since these forms of capital normally have specified amounts payable at specified intervals. Future cashflows could thus be projected accurately in a discounted cashflow analysis.

The risk associated with the cashflows could then be incorporated in the required return.

The fundamental principle when determining the fair market value of preference shares or debt, using a discounted cashflow method, is that the expected after-tax cashflows belonging to the specific form of capital should be discounted at a fair after-tax rate. This principle also predicts that there should be certain drivers of value when using this method of valuation.

10.2.1 Drivers of value when using the discounted cashflow method

Based on the fundamental principle, for each specific form of debt or preference share, there is an intricate link between its fair market value, the expected future cashflows and their timing, and the level of risk associated with the future cashflows incorporated in the required after-tax rate of return.

Note: ***For purpos s of this chapter, valuations are usually performed from the perspective of the entity using the pr f r nce shares or debt as finance (the debtor), unless specified that it should be from the perspective of the creditor. (Unqualified use of the terms 'issuer' and 'holder' are purposely ignored in the urrent chapter to avoid confusion with the somewhat contradictory terminology used in the taxation dis ipline.) This valuation perspective should be kept in mind when considering ex-pected cashflows and the required rate of return.***

Expected cashflows and timing

The cashflows expected to be paid (or sometimes received) at a certain time should consider three components:

the expected pre-tax cashflow and its expected timing;

a weighting of probabilities; and

the expected cashflow linked to the associated tax implication and its expected timing.

It is important to realise, however, that the associated tax treatment of preference shares and especially debt is specialised area, with a number of exceptions and with many changes in recent years. In depth knowledge of the tax treatment is normally not required for purposes of Financial Management and hence is beyond the scope of this book.

To promote a greater level of integrated knowledge, though, this chapter describes and illustrates the principle, basic tax treatment, regulated by the tax legislation current at the time of this publication.

The following examples illustrate the three components to be considered in determining an expected cashflow:

The directors of a company expect that there is a 60% probability that a non-cumulative dividend (see section 10.3.2 for definition of a non-cumulative preference share) of R1 000 will be declared and paid in one year's time. This means also, there is a 40% probability that it will be missed (i.e. won't be paid). Consequently, the probability-weighted expected cashflow in Year 1 of a discounted cashflow analysis is thus a pre-tax outflow of R600 ([60% × – R1 000] + [40% × R0]). Next, one should consider and incorporate the cashflow tax implication. (Normally in the case of dividends paid there wou d presently be no tax implication in the hands of the issuer of the shares.)

The directors of a company expect that a non-cumulative dividend of R1 000 per annum will be declared and paid for future periods. The probability-weighted expected c shflow in Ye r 1 of a discounted cashflow analysis is thus an outflow of R1 000 (100% × – R1 000). (For a case like this it is not necessary to show this calculation as the probability weighting is implicit.) Next, one should consider and incorporate the cashflow tax implication. (Again, there is unlikely to be a tax implication in the hands of the issuer of the shares.)

The required rate of return

The required rate of return equals a fair, after -tax rate of return which considers the risks inherent in the after-tax expected cashflows associated with either the preference share or form of debt being valued.

Note that there is a direct link between the differ nt driv rs of value: the higher the risk of not receiving or d being able to pay the specific cashflow, the higher the r quir rate of return.

10.2.2 Riskiness and the required rates of return on debt and preference shares.

The main risk that should be adjusted for in the required rate of return is credit risk – the risk that the investor/provider of debt will not receive the specified cashflows at the specified intervals.

Generally, preference shares are more risky than debt, but less risky than ordinary equity.

The reasons for this are, firstly, in the case of a liquidation of a firm, the claim of the holders of preference shares will rank in the middle, between ordinary equity (although sometimes also unsecured trade debt) and all other forms of finance – mainly interest-bearing debt. (Preference shares are normally classified as mezzanine finance; the term mezzanine, in turn, is associated with the Italian word for middle.) The preference shares will therefore usually rank, what is called, senior to ordinary equity, but junior to debt. This implies that, all other factors being equal, preference shares are more risky than debt.

Secondly, unlike interest on debt, the entity issuing preference shares is also not obligated to pay a dividend. This further increases the risk associated with preference shares.

Since preference shar s are normally more risky than debt, the required rate of return on preference shares should be higher than the required rate of return on debt. Furthermore, more risky debt should offer a higher return than less risky debt. In this regard one can compare the yields to maturity (similar to internal rates of return) of va ious listed preference shares and bonds.

The following actual examples were taken at roughly the end of the second quarter of 2012: Standard Bank has in issue non-redeemable, non-cumulative preference shares listed on the JSE, which yields **6,33%**. Standard bank f rther has in issue a listed bond due in 2019, offering a yield to maturity of roughly **8,8%**. The yield to maturity on the R207 government bond maturing in the beginning of 2020 is equal to **7,1%**.

Clearly, when c mparing only the pre-tax yields and ignoring the effect of tax, the risk-return relationship does not h ld f r this preference share. (Due to risk, the yield on the preference share should be higher than the yields on the Standard Bank bond and the government bond; the yield on the Standard Bank bond is, as expected, higher than that of the government bond.)

If one then adjusts for taxation, assuming a typical local company investor, the Standard Bank preference share will offer a rate of return equal to **6,33%** (6,33% × 100%, since no Dividends Tax would be payable); the Standrd B nk bond will offer a rate of return equal to **6,3%** (8,8% × [1 – 28%]); and the R207 government bond will offer a rate of return equal to **5,1%** (7,1% × [1 – 28%]). (Note: 28% is the current corporate tax rate.)

Assuming a typical local investor who is a natural person, paying the maximum marginal rate of Income Tax, the Standard Bank preference share will offer a rate of return equal to **5,38%** (6,33% × [1 – 15%], to account for

Dividends Tax); the Standard Bank bond will offer a rate of return equal to **5,3%** (8,8% × [1 – 40%]); and the R207 government bond will offer a rate of return equal to **4,3%** (7,1% × [1 – 40%]). (Note: 40% is currently the highest marginal tax rate for a natural person.)

Due to the different tax treatment of preference shares and debt in South Africa, one therefore preferably has to compare after-tax rates of return.

Still, things are not always what they seem; sometimes, and often by design, one form of capital could show characteristics of another. Under these circumstances, tax authorities may label it a 'hybrid instrument', in which case alternative tax treatment to the norm could be prescribed.

Several other factors could also influence the risk associated with preference shares or debt. These matters are discussed separately below for each form of capital.

10.3 Valuation of preference shares

As per the fundamental principle of discounted cashflow, the drivers of value of a preference share are the after-tax expected amounts, their intervals, and the after-tax expected rate f return.

10.3.1 Drivers of value

Amounts payable and their intervals are usually readily available as the dividends payable are specified in a prospectus and Memorandum of Incorporation of a co pany, for example. The *expected* amounts and their intervals will be based on the specified dividend amounts, but may have to be adjusted based on expectations. The taxation treatment is as per the current tax legislation.

When valuing unlisted preference shares, the expected rate of return is not readily available and hence normally has to be determined based on information available in the market place. Accordingly, this share's required rate of return is frequently determined based on the yields offered by preference shares listed on the JSE, with similar terms and conditions, and then adjusted for differences in risk between the comparator (i.e. listed) share and the unlisted share being valued.

Differences in risk that have to be adjusted for, either as part of the fair rate of return or as a separate discount, include: Differences in credit risk and the level of marketability of each share. (The concept of a valuation discount is merely introduced here. Examples below assume that risk is adjusted as part of the discount rate; a comprehensive description of valuation premiums and discounts can be found in chapter 11 (*Business and equity valuations*).)

Usually the date of selling a preference share does not exactly coincide with the date of the payment of a preference dividend. Furthermore the date that a dividend is declared also does not coincide with the date that it is paid. If a preference share is sold, the value of the share will be affected by whether or not the new owner will also receive the currently declared dividend.

In this regard a pr f r nce share may be classified 'ex-div' or 'without dividend' after a certain date, implying that if a new owner purchased the share ex-div, she would not be entitled to receive the currently declared dividend; it would be paid to the previous owner.

Furthermore, a p efe ence share may be classified 'cum- div' or 'with dividend' up to certain date, implying that if a new owner pu chased the share cum-div, she would be entitled to receive the currently declared dividend also.

10.3.2 Types of preference shares, rights and attributes

The type f preference shares, its associated rights, and its attributes may further affect its valuation.

Rights

The fo owing applies to most South African preference shares –

preference dividend does not have to be declared;

where a preference dividend is not declared, no ordinary dividends may be declared;

unless voting rights are specifically attached to the preference shares, holders of preference shares are only entitled to vote in cases where dividends declared remain in arrears for a certain period after the due date, or a resolution is proposed that affects the rights of the preference shareholders.

Attributes linked to the various types of preference shares

The following specific attributes (or a combination of them) may be attached to a preference share:

Non-cumulative preference shares, implying that if a dividend is missed (i.e. not paid) it is never paid (thereby increasing risk).

Cumulative preference shares, implying that if a dividend is missed it accumulates to be declared and paid in the future.

Non-redeemable (perpetual) preference shares, implying that there is no maturity date and that the entity issuing preference shares is not required to buy back the shares. (Depending on the marketability of the share, it may still be readily sold between investors.) Non-redeemab e preference shares are less common since, in an effort to limit credit risk, many funds and other investors have a policy to not invest in non-redeemable preference shares.

Preference shares may carry either a **fixed or variable dividend** (the latter linked to the prime interest rate, Johannesburg interbank agreed rate (JIBAR), or some other floating rate). When comparing a pref-erence share paying a fixed rate to a share paying a variable rate, the ariable option is likely to reflect less disparity over time between its fair market value and its issue c nsideration. (Over time market forc-es are likely to change the underlying floating rate to which a variable dividend is linked, and will there-fore help to better align the future benefits paid and its fair rate of return; differences can and probably will still exist, however.) For this reason many funds and other investors have a policy to not invest in preference shares paying a fixed dividend.

Convertible preference shares, implying that the preference shares are convertible in the future to, for example, ordinary equity. This may help to incr ase the attractiveness of the preference share. Shares may be convertible at the option of either the hold r of the shares or the entity issuing the shares.

10.3.3 Tax treatment and valuation inputs

Preference share attributes and its tax treatment will affect the inputs of a valuation based on discounted cashflow, some of which are illustrated in the following sections.

In terms of current South African tax law, dividends are not subject to income tax, but are subject to dividends tax instead. In basic terms, current legislation stipulates that dividends tax is borne by a shareholder at a rate of **15%**, but that the entity declaring the dividend must withhold the dividend tax on payment.

Moreover, in terms of current South African tax law, only individual shareholders (natural persons, as the final benefactors of the dividend) effectively pay dividends tax; local legal entities are exempted (with some exceptions). Tax on dividends *in specie* (*i.e.* not in cash), however, remains the liability of the entity declaring the dividend.

Furthermore, any capital gains tax (CGT) on the redemption or conversion of preference shares, if any, will be payable by the holder of the shares.

Note: As indicat d, for purpos s of this chapter, valuations are usually performed from the perspective of the entity using the preference shares or debt as finance (debtor). This implies that currently, when valuing preferen e shares, one normally does <u>not</u> make a specific adjustment for the effect of income tax (including CGT) or dividends tax. (The effect of any possible tax should already be incorporated in the equi ed ate of return.)

Hybrid instr ments for income tax purposes (Intermediate)

Sometimes preference shares may display characteristics of debt. At the date of this writing, section 8E of the Inc me Tax Act may label preference shares a 'hybrid instrument' in some cases, for example where:

the issuer of the share *must* redeem the share within three years of issue; or

the holder of the preference share has the right (option) to have the share redeemed within three years of issue, or

display a few other characteristics of debt as defined in the Act.

In b sic terms, section 8E then prescribes that a dividend on such an instrument be treated as interest for tax purposes, but only at the level of the recipient. The result is punitive, since the entity declaring the dividend shall not be entitled to a tax deduction on the dividend declared (as per the normal rules), but the recipient will be taxed on this amount as if it was interest income.

10.3.4 Valuing non-redeemable (perpetual) preference shares

Valuing non-redeemable preference shares is fairly simple: The perpetuity of future preference dividends is capitalised or discounted at a fair rate of return.

Example: Valuing non-redeemable preference shares *(Fundamental)*

A company has in issue 1 000 000 non-redeemable preference shares with a nominal value of 100c each. These shares carry a fixed dividend of 11%, which is payable annually in arrears. (A dividend has just been paid.) The required rate of return on these shares is equal to 8%.

Required:

Determine the current fair market value of the 1 000 000 non-redeem ble preference shares, whilst ignoring any potential impact of section 8 of the Income Tax Act.

Solution:

(Intermediate: Even if the impact of section 8E of the Income Tax Act had to be considered in this case, it would not apply as the shares do not display characteristics of debt, as described in the Act.)

Basic method

Expected perpetual future preference dividend: R110 000 (11% × 1 000 000 shares × R1 each)

Fair rate of return: 8%

Present cost of a R110 000 dividend, paid every year *ad infinitum*, at 8%:

(R110 000) / 8%

(R1 375 000)

Thus, the fair market value of the 10 000 non-redeemable preference shares is R1 375 000. One can further link this simple example to the Gordon Dividend Growth odel.

Gordon Dividend Growth Model

The model formulated by Gordon eloquently captures, in a single formula, the present value of a stream of future cashflows from the investment (in this case dividends), which are growing at a constant rate. (The Gordon Dividend Growth Model is merely introduced here, but comprehensively discussed in chapter 11 (*Business and equity valuations*).)

The Gordon Dividend Growth Model formula is:

$$P_0 = \frac{D_1}{r - g}$$

Where:

- **P_0** = the p esent value of the future dividends (date of valuation taken as 'year 0')
- **D_1** = the expected dividend at the end of Year 1, sometimes expressed as $D_0 (1 + g)$
- **r** = req ired rate of return
- **g** = the expected constant dividend growth rate.

C ntinuing with the earlier example, one can apply the Gordon Growth Model as follows:

$$P_0 = \frac{D_1}{r - g}$$

$$P_0 = \frac{R110\,000}{(8\% - 0\%)}$$ (as a dividend has just been paid this amount is expected in one year) (no growth in dividends is expected, therefore 0%)

$$P_0 = R1\,375\,000$$

10.3.5 Valuing redeemable preference shares

In valuing redeemable preference shares, the present value of the expected future preference dividends and preference capital are calculated by discounting these cashflows at a fair rate of return.

Example: Valuing redeemable preference shares *(Fundamental)*

A company has in issue 1 000 000 redeemable preference shares that have just paid a dividend. These shares have a nominal value of 100c each and carry a variable dividend equal to 70% of the prime interest rate, which is payable annually in arrears. The shares are redeemable in full in five years from today at the issue consideration. A fair rate of return on the shares is equal to 7,5%. The current prime interest rate is equal to 9%.

Required:

Determine the current fair market value of the 1 000 000 redeemable preference shares, whilst ignoring any potential impact of section 8 of the Income Tax Act.

Solution:

Year:	**0**	**1**	**2**	**3**	**4**	**5**
	(current date)	**R**	**R**	**R**	**R**	**R**
Expected dividend ([70% × 9%] × 1 000 000 × R1)		(63 000)	(63 000)	(63 000)	(63 000)	(63 000)
Redeem capital (1 000 000 × R1)						(1 000 000)
		(63 000)	(63 000)	(63 000)	(63 000)	(1 063 000)
Fair rate of return	7,5%	0,9302	0,8653	0,8050	0,7488	0,6966
	R					
Net present cost	(951 492)	(58 603)	(54 514)	(50 715)	(47 174)	(740 486)

General note: Figures may not total correctly due to rounding.

(*Intermediate*: Even if the impact of section 8E of the Income Tax Act had to be considered in this case, it would not apply as the shares are not redeemable within three years of issue and therefore do not display characteristics of debt, as described in the Act.)

Conclusion:

The current fair market value of the 1 000 000 redeemable preference shares is equal to R951 492. The reason why the fair market value (R951 492) is below the nominal value (R1 000 000) is because these preference shares have an exp ct d r turn (70% of 9% = 6,3%) that is lower than the required return (7,5%).

10.3.6 Valuing umulative non-redeemable preference shares

A cumulative p efe en e share means that any dividend that is missed must be paid at a later date.

When valuing cumulative non-redeemable preference shares, one again calculates the perpetuity of future preference dividends (where these are expected to be declared and paid), capitalised at a fair rate of return. However, one has to consider the probability that a dividend will be missed, and the expected period in which the missed dividend will be declared and paid.

Where dividends are missed, normal discounted cash-flow techniques are recommended for the periods of instability, with the Gordon Dividend Growth Model only used for the later periods once the normal dividend paying chedule is resumed.

Examp e: Valuing cumulative non-redeemable preference shares *(Intermediate)*

A company has in issue 100 000 non-redeemable preference shares, which were issued at R110 each. The shares carry a fixed, cumulative dividend of 7% of the issue consideration. (The shares have just paid a dividend.) Due to temporary financial difficulty the directors expect that the next year's dividend will be missed. Dividends for Year 2 onwards are expected to continue per the normal schedule. The required rate of return is equal to 9%.

Required:

Determine the current fair market value of the 100 000 cumulative non-redeemable preference shares, whilst ignoring any potential impact of section 8 of the Income Tax Act.

Solution:

	Year:	0	1	2	
Alternative 1		**(current date)**	**R**	**R**	
Year 1 dividend (not declared or paid)			0		
Year 1 dividend (paid in Year 2: 7% × 100 000 × R110)				(770 000)	**(N1)**
Present value of R770 000 per annum *ad infinitum*, at 9%					
Apply the Gordon Dividend Growth Model:					
Standard formula: $P_0 = D_1 / (r - g)$, but adjust for the appropriate year:					
$P_1 = D_{(1+1)} / (9\% - 0\%)$ **(N2)**					
$P_1 = D_2 / 9\%$					
= R770 000 / 9%			(8 555 556)		**(N3)**
			(8 555 556)	(770 000)	
Fair rate of return		9,0%	0,9174	0,8417	
		R			
Net present cost	**(N4)**	(8 496 976)	(7 848 867)	(648 109)	

Note: When using this model, always ensure that the timing of the price (Px) precedes the dividend (Dy) by one year

P1 implies inclusion in the column for Year 1

Alternative 2			**R**	**R**	
Year 1 dividend (not declared or paid)			0		
Year 1 dividend (paid in Year 2: 7% × 100 000 × R110)				(770 000)	**(N1)**
Year 2 dividend (7% × 100 000 × R110)				(770 000)	
Present value of R770 000 per annum *ad infinitum*, at 9%					
Apply the Gordon Dividend Growth Model:					
Standard formula: $P_0 = D_1 / (r - g)$, but adjust for the appropriate year:					
$P_2 = D_{(2+1)} / (9\% - 0\%)$ **(N2)**					
$P_2 = {}_3 / 9\%$					
= R770 000 / 9%				(8 555 556)	**(N3)**
			0	(10 095 556)	
Fair rate of return		9,0%	0,9174	0,8417	
		R			
Net present cost	**(N4)**	(8 497 429)	0	(8 497 429)	

Note: When using this model, always ensure that the timing of the price (Px) precedes the dividend (Dy) by one year

P2 implies inclusion in the column for Year 2

(The net present cost differs from that in Alternative 1 only due to rounding.)

General note: Figures may not total correctly due to rounding.

Intermediate: Even if the impact of section 8E of the Income Tax Act had to be considered in this case, it would not apply as the shares are non-redeemable and therefore do not display characteristics of debt, as described in the Act.)

Conclusion:

Assuming that the dividend is NOT missed, the value of the preference share ***today*** would be R770 000 / 9% = R8 555 556.

As the dividend is now to be missed in Year 1, the fair market value of the 100 000 cumulative redeemable preference shares is R8 496 976 (or R8 497 429 – again, the difference is due to rounding).

Specific notes:

N1 In the case of preference shares paying cumulative dividends, missed dividends accumulate, and are declared and paid later. (This is better understood in Alternative 2 above, which shows no dividend being paid in Year 1 and a double dividend being paid in Year 2.)

N2 In the Gordon Dividend Growth Model, the dividend represents the cashflow for one period *after* the date of valuation. If the valuation date equals P_0, then one uses D_1; if the valuation equals P_1, one uses D_2; and if the valuation date equals P_2, one uses D_3; etc.

N3 One places the value at the end of the indicated year per Gordon's model in the appropriate column, for example P_1 in the column representing the end of Year 1, P_2 in the co umn representing the end of Year 2, etc.

N4 The difference in value is merely due to rounding. (The answers should be ex ctly the same otherwise.)

10.3.7 Valuing non-cumulative redeemable preference shares

A non-cumulative preference share means that any dividend that is missed will not necessarily be paid or made up at a later date.

When valuing non-cumulative redeemable preference shares one again calculates the present value of the expected future preference dividends and preference capital, by discounting these cashflows at a fair rate of return. In this case however, one has to consider the probability that a dividend will be missed and incorporate this probability in the forecast expected dividends.

Example: Valuing non-cumulative redeemable pr f r nce shares *(Fundamental)*

A company has in issue 100 000 preference shares with a nominal value of R100 each that have just paid a dividend. The shares carry a fixed, non-cumulative, semi-annual dividend of 4,5% of the nominal value. The shares are redeemable in two years' time at the nominal value.

Due to expected financial difficulty in the future there is a 50% expected possibility that the second-last dividend will not be declared and a 25% possibility that final dividend will also not be declared. It is expected that the other dividends will be declared and paid, and that the shares will be redeemed at the specified date. The required rate of return is equal to 8% APR (an annual percentage rate).

Required:

Determine the current fair market value of the 100 000 non-cumulative preference shares, whilst ignoring any potential impact of section 8 of the Income Tax Act.

Solution:

Six-monthly intervals:	**0**	**1**	**2**	**3**	**4**
	(current date)	**R**	**R**	**R**	**R**
Period 1 and 2:					
Expected dividend (4,5% × 100 000 × R100)		(450 000)	(450 000)		
Period 3: Expe ted dividend ([1 – 50%] × 4,5% × 100 000 × R100)				(225 000)	
Period 4: Expected dividend ([1 – 25%] × 4,5% × 100 000 × R100)					(337 500)
Redeem capital (100 000 × R100)					(10 000 000)
		(450 000)	(450 000)	(225 000)	(10 337 500)
Fair rate f return (six-monthly rate)	4,0%	0,9615	0,9246	0,8890	0,8548
	(8% / 2) , in order to make the rate applicable to six-monthly intervals				
	R				
Net present cost	(9 885 265)	(432 675)	(416 070)	(200 025)	(8 836 495)

General note: Figures may not total correctly due to rounding.

(*Intermediate*: If section 8E of the Income Tax Act had to be considered in this case, the shares would have been classified as a hybrid instrument as these are redeemable within less than three years of issue. Nonetheless, it would not have a specific bearing on the net present cost indicated above as here it is determined from the perspective of the entity using the preference shares as finance (debtor). The effect of any possible tax should already be factored into the required rate of return which was provided.)

Conclusion:

The current fair market value of the 100 000 non-cumulative redeemable preference shares is R9 885 265.

10.4 Valuation of debt

As per the fundamental principle of discounted cashflow, the drivers of the value of debt are the after-tax expected amounts, their intervals, and the after-tax expected rate of return.

10.4.1 Drivers of value

The pre-tax amounts payable on debt and their intervals are usually re dily v il ble. (These are e.g. contractual amounts specified in bond and loan agreements.) The expected amounts nd their intervals will normally be based on the contractual amounts. The taxation treatment is as per the current tax legislation.

When valuing debt, the required rate of return is often not readily a ailable and normally has to be determined based on information available in the market place. Accordingly, the debt's after-tax required rate of return is frequently determined based on a risk-free rate, to which a premium is added for additional risk, and then adjusted for the effect of tax.

The additional risk consists mainly of *credit risk.* As the provider of debt finance, a bank usually assesses credit risk. However, the process of securitisation allows an entity to bypass a bank as intermediary in order to obtain debt finance directly through the issue of a marketable security – such as commercial paper, medium term notes or bonds – to investors. The credit risk linked to th se d bt securities are frequently assessed by a formal credit-rating agency, such as Standard & Poor's, Fitch or Moody's.

One way of determining the additional risk premium on bonds, for instance, is to refer to the published yield spreads between bonds with different formal credit ratings. For example, a bond with a 'BB+' credit rating (indicating a speculative grade, below investment grade) may reflect a spread of 900 basis points (or 9%) over a risk-free, rand-denominated bond with the same maturity date (such as a SA government bond).

If the yield to maturity on a SA government bond is equal to, say, 8% then a required rate of return on another bond, also denominated in rand, with a similar maturity date but with a 'BB+' credit rating, would be 17% (8% + 9%), before accounting for the effect of tax.

10.4.2 Forms of debt and their characteristics

The recent financial crisis that started in 2008 has not only restricted the access to finance for many business entities worldwide, but placed renewed focus on the risk inherent to debt finance. In South Africa, new legislation also affected both the providers and users of debt finance.

The National Credit Act 34 of 2005, which placed additional requirements on the provider of credit to the smaller business, may have discouraged unfair credit lending practises but, in this process, it further reduced the available sourc s of finance to the small business.

1 *Forms of debt*

Notwithstanding these effects, various different forms of debt finance exist in South Africa, ranging from secured sho t-te m loans, to mortgage loans, to long-term unsecured bonds. The most prominent forms of debt and their characteristics are described in chapter 7 (*The financing decision*).

An in-depth review of securitised debt, such as notes, bonds and debentures, is beyond the scope of this text b k. Its sc pe further excludes Islamic finance and other specialised forms of debt.

2 *Characteristics of debt*

A defining characteristic of debt is that it represents an obligation owed by a debtor to a creditor (or a borrower to a ender). Normally this allows the creditor a claim on a specified stream of cashflows, generally consisting of the original amount plus interest, with the claim being repayable regardless of the financial performance of the debtor. When these underlying characteristics do not hold, the finance should be classified as one of the o her forms, including mezzanine, hybrid or equity finance.

3 *Factors affecting the riskiness of debt*

Interest and interest-rate risk

Debt can be charged a fixed or floating rate of interest, exposing the debtor to interest-rate risk. As future interest rates are uncertain, debt bearing interest at a floating rate exposes the debtor to changes in future cash-flow obligations.

In comparison, when interest rates change, debt bearing interest at a fixed rate will still require the same cash-flow obligation, but this may affect the fair market value of the debt. For example, if interest rates should fall whilst holding fixed-rate debt, the fair market value of the debt will increase in va ue.

Debt bearing interest at a floating rate is expected to display less disparity over time between its fair market value and its outstanding principal amount, when compared to a fixed-r te lo n. (As discussed under preference shares, in this case market forces are again likely to change the underlying flo ting rate, and will therefore help to better align the future interest paid and its fair rate of return; again, differences can and probably will still exist.)

Security offered

The risk associated with debt finance and its impact on a required return can further be linked to the security offered on the debt. Security can take various forms, including surety offered by another related entity, the underlying asset(s) being financed with the debt, or other asset(s).

Even though the new business rescue procedure contained in the Co panies Act 71 of 2008 has to a certain extent reduced the benefit of security offered to cr ditors, uns cured debt is nonetheless viewed as more risky than secured debt. All other factors being equal, uns cur d d bt providers therefore require a higher return.

In the case of default on the repayment terms of unsecured debt, the holder will have to initiate cumbersome actions to recover a portion of outstanding debt, such as an application for the liquidation of the defaulter (further complicated by the new business rescue procedure).

In the case of default on secured debt, the holder will normally have the right to lay claim on the asset(s) offered as security, following the institution of legal proceedings relating to the default (although this, too, may be impacted by the business rescue procedure).

Debt covenants

The risk associated with debt finance and its impact on a required return is further impacted by the presence of debt covenants. Debt covenants are conditions stipulated in a debt contract, which may decrease the credit risk of the creditor. Debt covenants may include requirements to maintain certain ratios and clauses prohibit-ing certain actions, such as the payment of dividends to ordinary shareholders or the sale of certain assets.

Examples of ratios specified as debt covenants include (1) a *maximum* debt-to-equity ratio, (2) a *maximum* ratio of debt to Earnings B fore Tax, Depreciation and Amortisation ratio (Debt-to-EBITDA), and (3) a *minimum* ratio of EBITDA-to-N t-Int r st.

10.4.3 Tax treatment and valuation inputs

The characte istics of the debt and its tax treatment will also affect the inputs of a valuation based on discounted cashflow

To repeat, the tax treatment of interest is a specialised area with many complications. A detailed exploration of the tax treatment linked to interest is therefore beyond the scope of this publication. This chapter only describes and illustrates the principle, basic tax treatment of interest. It further provides a brief summary of the alternative tax treatment in the case of certain forms of debt.

The mo t important sections of the Income Tax Act affecting interest is described below.

1 *Section 24J of the Income Tax Act (Intermediate)*

In terms of current South African tax law, interest is normally deductible by the debtor (borrower) and represents income in the hands of the creditor (lender). In this regard, section 24J of the Income Tax Act is important, as it is the main section under which interest will be either deductible or included in income.

Stiglingh, Koekemoer and Wilcocks, (2013:742*)* describes the role of section 24J of the Income Tax Act, as follows:

> *Section 24J regulates the timing of the accrual and incurral of interest. In general terms, it spreads the interest (and any premium or discount) over the period or term of the financial arrangement by compounding the interest over fixed accrual periods using a predetermined rate referred to as the 'yield to maturity'. The section also governs the inclusion of interest accrued in a taxpayer's gross income and the deduction of interest incurred from income.*

Section 24J identifies three different methods to calculate the spread of the interest, but for purposes of this chapter *only* the principle, yield to maturity method is considered.

Yield to maturity method

The yield to maturity method helps to prevent tax avoidance and is also known as the accrual method. Yield to maturity method spreads the full interest over the full term (theref re also considering any premium or discount), by compounding the interest over fixed accrual periods using a predetermined rate referred to as the 'yield to maturity' (Stiglingh, 2013).

The following formula has to be applied per section 24J of the Inco e Tax Act:

A = B × C

Where:

= the accrual amount to be included in the taxation calculation (apportioned on a day-to-day ba-sis, if not for a full year);

=the yield to maturity on the instrument on a pre-tax basis; and

= the adjusted initial amount (issue price plus prior accrual amounts, less prior interest payments made).

During the term of the debt, if there are changes that would affect the yield to maturity, such as changes in the interest rate or the term, the calculation will have to be performed again.

Note: As indicated, for purposes of this chapter, valuations are usually performed from the perspective of the entity using the preference shares or debt as finance (debtor). (Unqualified use of the terms 'issuer' and 'holder' are purposely ignored in the current chapter to avoid confusion with the somewhat contradictory terminology used in the taxation discipline.) This implies that specific adjustment normally has to be made for the fact that interest may be deducted for purposes of income tax in terms of section 24J – affecting cashflows, and further for the tax-deductibility of interest at the required discount rate.

Example: Impa t of se tion 24J of the Income Tax Act on the valuation of debt *(Fundamental to Intermediate)*

As part of its capital st ucture a company has in issue medium-term notes with the following particulars:

The notes have a face value of R1000 each.

The notes pay a variable coupon rate equal to 10% per annum at a date coinciding with the company's year-end (this is similar to interest, which accrues and is payable once a year).

The maturity date will be in four years' time.

The notes will be redeemed at face value.

A market-related interest rate on notes with similar risk equals 13,3892% before tax.

Required

Determine the present fair market value of the notes by:

Determining the value of the instrument on a pre-tax basis. (Fundamental)

Determining the present value of the expected after-tax cash flows. (Intermediate)

Assume the following:

The company has a marginal income tax rate equal to 28%.

The bond qualifies as an instrument per section 24J of the Income Tax Act (the yield to maturity method will apply).

The formula to be applied per section 24J of the Income Tax Act is:

A = B × C

Where:

A = the accrual amount;

B = the yield to maturity on a pre-tax basis;

and **C** = the adjusted initial amount.

Solution

Part (a) Determine the value of the instrument on a pre-tax basis

Year:	**0 (Valuation date)**	**1**	**2**	**3**	**4**
Coupon payment (10% of R1 000)		(100)	(100)	(100)	(100)
Redemption					(1 000)
Finance-related cash flows before-tax		(100)	(100)	(100)	(1 100)
Fair rate of return	13,3892%	0,88192	0,77778	0,685938	0,604941
Net present cost	(900)	(88)	(78)	(69)	(665)

Or using calculator inputs:

I/YR	13,3892%
PMT =	(100)
FV =	(1 000)
P/YR =	1
Determine PV =	(900)

(Refer to your calculator manual if these steps are unclear.)

Note: **Pre-tax cashflows r quir s a pre-tax discount rate.**

Part (b) Determine the present value of expected after-tax cash flows

Year:	**0** (Valuation date)	**1**	**2**	**3**	**4**
Coupon payment (10% of R1 000)		(100)	(100)	(100)	(100)
Redemption					(1 000)
		(100)	(100)	(100)	(1 100)
Taxation at 28% (A × 28%)		34	35	35	36
Accrual amount (**A**) (A = B × C) (**N1**)		120,50	123,25	126,36	129,89
Pre-tax YTM (**B**) =		13,3892%	13,3892%	13,3892%	13,3892%
Adjusted initial amount (**C**) =		900,00	920,50	943,75	970,11
Initial amount		900,00	900,00	900,00	900,00
Plus: prior accrual amounts		0,00	120,50	243,75	370,11
Period 0		0,00	0,00	0,00	0,00
Period 1			120,50	120,50	120,50
Period 2				123,25	123,25
Period 3					126,36
Less: prior payments		0,00	(100,00)	(200,00)	(300,00)
Period 0		0,00	0,00	0,00	0,00
Period 1			(100,00)	(100,00)	(100,00)
Period 2				(100,00)	(100,00)
Period 3					(100,00)
Finance-related cash flows after-tax		(66)	(65)	(65)	(1 064)
Fair rate of return after tax	9,640%	1,09640	1,20209	1,31798	1,44503
	[0,133892 × (1-0,28)]				
Net present cost	(900)	(60)	(54)	(49)	(736)

Note:

After-tax cashflows requires an after-tax discount rate

Figures may not total due to rounding.

To better understand the different perspectives applied in the financing decision and as part of the valuation of debt, compare the methodology used above (to determine net present cost) with the example contained in chapt r 7, s ction 7.13 (to determine the internal rate of return)

N1 The accrual amount (**A**) could also be determined using the amortisation-function on a financial calculator

Calculator inputs:

PV =		900
PMT =		(100)
FV =		(1 000)
P/YR =		1
N =		4
I/YR =		13,3892
1	Input Amort (Period 1-1)	
	Interest	120,50
2	Input Amort (Period 2-2)	
	Interest	123,25
3	Input Amort (Period 3-3)	
	Interest	126,36
4	Input Amort (Period 4-4)	
	Interest	129,89

(Refer to your calculator manual if these steps are unclear.)

Note: ***In this case the answer to part (b) approximates the answer to part (a). However, In order to determine the exact treatment to be followed in a test or exam, a student should refer to the exact wording of the required-section and the number of marks awarded. It is generally better to make use of an approach as per part (b), since it will provide a more accurate answer in certain cases.***

2 ***Hybrid instruments for income tax purposes (Intermediate)***

On occasion, debt may also display characteristics of a share. The treatment of hybrid debt instruments and hybrid interest is regulated by sections 8F and 8FA of the Income Tax Act. Current tax legislation identifies hybrid debt instruments, including (but with exceptions):

debt convertible into shares at a predetermined ratio or by ignoring market va ues (thus *not* if the market value of shares is directly linked to the outstanding capital balance);

debt instruments paying dividend-like interest, such as interest linked to the debtor's profits or with a conditional obligation to pay (exceptions apply); and

debt instruments between connected persons with terms of 30 years or longer.

In terms of the current legislation, interest payable on hybrid debt instruments will be classified as a dividend *in specie* in the hands of both the debtor and creditor. This basically implies that the debtor (the borrower) will be *denied* an interest deduction *and* will be subject to 15% dividends tax. (The regular treatment of a dividend *in specie* was described in section 10.3.3.)

To reiterate, the examples in this chapter assume that section 8 of the Income Tax Act does *not* apply.

3 ***Limitation on interest deductions (Intermediat)***

Current South African tax law also specifies several circumstances that would limit the deductibility of an interest expense and is regulated by section 23 of the Income Tax Act. Currently interest deductions are limited in certain cases of:

Interest payable to connected persons who are not subject to tax; and

Interest payable in respect of reorganisation transactions (intra-group or liquidation transactions) and acquisition transactions (to acquire shares).

Valuing bonds

What is a bond?

A bond is a type of interest-bearing security. The worldwide market for bonds is enormous and forms one of the backbones of the modern economy. Bonds form part of the market for capital, with maturity rates in excess of one year, and is normally used as medium- to long-term finance.

Bonds encompass several securities which may be referred to as bonds, notes, debentures and other names. Bonds are typically *uns cur d* and are therefore normally issued by entities with stronger credit ratings, such as:

sovereign (self-determining) governments – for example the South African R186 government bond (although SA's edit ating was downgraded in recent years, with the main reasons cited as slow growth, protracted st ikes and concerns over political leadership);

- state-owned tilities – such as the ES26 bond issued by Eskom (although the electricity public utility's credit rating, too, was downgraded recently, mainly due to the country's downgrade and its inability to reco p operating losses due to a government-imposed limitation on higher increases in electricity tariffs);

l cal g vernments – such as a municipal bond issued by the City of Johannesburg; and

large c rp rations – such as a bond issued by Shoprite-Checkers.

Bonds may, however, also be *secured*.

In ear ier days, bonds used to pay fixed coupons (which are similar to interest) – thereby earning a name that stuck: fixed-income instruments. Nowadays, though, bonds offer fixed or floating rates of interest. Interest is not lways paid periodically, however, such as in the case of zero-coupon bonds. As the name implies, zero-coupon bonds pays no coupons, but are issued at a discount to its principle value and redeemed at the maturi-y date at the principle value – the difference representing interest. Many other exotic forms of bonds exist.

What is a security?

Securities are instruments issued directly to investors, called the primary market transaction, thereby bypassing a bank as an intermediary finance provider. Previously issued bonds may be traded between investors, called a secondary market transaction, a process which is usually facilitated by a securities exchange, such as the Bond Exchange of South Africa – a division of the JSE. Since a securities exchange will make trading a lot easier, aiding liquidity, numerous bonds are listed on these exchanges.

Investigating the process of valuing bonds will illustrate most of the considerations underlying the valuation of debt in general.

Sold with or without interest

The date of selling a bond usually does not coincide with the date of the p yment of coupon. If a bond is sold, the value of the bond will be affected by whether or not the new owner will lso receive the current coupon.

Similar to preference shares, the bond may be classified 'ex-coupon' or 'ex- interest' after a certain date, implying that if a new owner purchased the bond ex-interest, s/he would not be entitled to receive the current coupon; it would be paid to the previous owner.

Furthermore, a bond may be classified 'cum-interest' up to certain date, implying that if a new owner purchased the bond cum-interest, s/he would be entitled to receive the current coupon also.

Example: Valuing a fixed-rate bond *(Fundamental to Inter ediate)*

A company intends to raise additional debt capital through the issue of bonds. The bonds to be issued will be unsecured bonds with a total nominal value of R100 million, paying a fixed 8% coupon annually in arrears. The bonds will mature in five years' time. A market-related interest rate on bonds with similar risk is equal to 9% before tax.

Required:

Determine the price at which the bonds should be issued to ensure sufficient demand from investors, ignoring the effect of tax, whilst ignoring any potential impact of section 8 of the Income Tax Act. (Fundamental.)

Determine the price at which the bonds should be issued to ensure sufficient demand from investors, incorporating the effect of tax in the calculation, whilst ignoring any potential impact of section 8 of the Income Tax Act. (Intermediate.)

Assume the following:

- The company has a marginal income tax rate equal to 28%.

The bond qualifies as an instrument per section 24J of the Income Tax Act (the yield to maturity method will apply).

The formula to be applied per section 24J of the Income Tax Act

is: A = B × C

Whe e:

A = the accr al amount;

B = the yield to maturity on a pre-tax basis;

and **C** = the adjusted initial amount.

Solution:

(*Intermediate:* Even if the impact of section 8 of the Income Tax Act had to be considered in this case, it would not apply as the debt does not display characteristics of a share, as defined in the Act.)

Part (a)	**Year:**	**0 (issue date)**	**1 R'm**	**2 R'm**	**3 R'm**	**4 R'm**	**5 R'm**
Coupons			(8)	(8)	(8)	(8)	(8)
Amount redeemed							(100)
			(8)	(8)	(8)	(8)	(108)
Fair rate of return		9,00%	0,9174	0,8417	0,7722	0,7084	0,6499
		R'm					
Net present cost (NPC)		(96,11)	(7,34)	(6,73)	(6,18)	(5,67)	(70,19)

Note: Figures may not total correctly due to rounding.

Conclusion:

The bonds should be issued at a discount to its nominal value, equal to a consideration of R96,11 million, to ensure sufficient demand from investors.

Part (b)	**Year:**	**0 (issue date)**	**1 R'm**	**2 R'm**	**3 R'm**	**4 R'm**	**5 R'm**
Coupons			(8,00)	(8,00)	(8,00)	(8,00)	(8,00)
Amount redeemed							(100,00)
Tax effect of section 24J (**A** × 28%)			2,42	2,44	2,46	2,48	2,50
Section 24J Accrual amount (**A**) (A = B × C) **(N1)**			8,65	8,71	8,77	8,84	8,92
			(5,58)	(5,56)	(5,54)	(5,52)	(105,50)
Fair rate of return		6,48% =9% × (1 – 28%)	0,9391	0,8820	0,8283	0,7779	0,7306
		R'm					
Net present cost		(96,11)	(5,24)	(4,90)	(4,59)	(4,29)	(77,08)

General notes:

Figures may not total corr ctly due to rounding.

Part **(b)** requires inputs from the calculation performed in part **(a)**.

In this case the answer to part (b) approximates the answer to part (a). However, in order to determine the exact treatment to be followed in a test or exam, a student should refer to the exact wording of the required-section and the number of marks awarded. It is generally better to make use of an approach as per part (b), since it will provide a more accurate answer in certain cases.

C nclusi n:

The b nds sh uld be issued at a discount to its nominal value, equal to a consideration of R96,11 million (the ame value as that obtained in part **(a)**), to ensure sufficient demand from investors.

Specific notes:

N1 In this case a financial calculator was used to determine the accrual amounts (A). Refer to example included in section 10.4.3 for an illustration of the full calculation using the long method.

Calculator inputs:

PV =		96,11
PMT =		(8)
FV =		(100)
P/YR =		1
N =		5
I/YR		9
1	Input Amort (Period 1-1)	
	Interest	8,65
2	Input Amort (Period 2-2)	
	Interest	8,71
3	Input Amort (Period 3-3)	
	Interest	8,77
4	Input Amort (Period 4-4)	
	Interest	8,84
5	Input Amort (Period 5-5)	
	Interest	8,92

10.4.5 Valuing convertible debt

Certain forms of debt may be converted into, for instanc , ordinary equity at a future date. As for convertible preference shares, this may help to increase the attractiveness of the debt. The debt may be convertible at the option of either the debtor or the creditor.

Valuing convertible debt

To value convertible debt (or convertible preference shares for that matter), one follows the usual processes already described, but additionally, one has to determine the value of the most likely option linked to the conversion, and include this as part of the projected cashflows.

To determine the value of the most likely option, one first determines the value of each option linked to the conversion, such as –

Option 1 – the value of the equivalent number of shares that the debt could be converted into (using some appropriate valuation method); and

Option 2 – the value if the debt is redeemed.

The most likely option is the rational choice that would be followed by the holder of the conversion option, for example –

if the **creditor** has the option to convert the debt into, for example ordinary shares, and the value of this option is higher than the alternative options, then this would represent the most likely option that would be exer ised by said creditor; or

if the **debtor** has the option to convert the debt into, for example ordinary shares, and the value of this option is higher than the alternative options, then this would represent the least likely option to be ex-ercised by said debtor. The debtor will exercise the option with the lowest value, thereby minimising cost.

Example: Valuing convertible debt *(Fundamental)*

A company intends to raise additional debt capital through the issue of convertible bonds. The bonds to be i ued will be 1 000 000 unsecured bonds with a total nominal value of R1 each, paying a fixed 9% coupon annua y in arrears. The coupon rate is considered to be market-related.

The bonds will be convertible in four years' time at the option of the holder.

On the conversion date two options exist, namely:

Convert each bond into a single ordinary share at its then fair market value. (A cluster of ordinary shares recently traded at 90c per share between non-related parties. At present, there is a 50% probability allocated to a pessimistic scenario, where the ordinary shares show no growth in their fair market value over the next few years; with a 50% probability allocated to a more optimistic scenario, where the shares will show a 10% growth in fair market value, per annum.)

Redeem the bonds at their nominal value.

Required:

Determine the likely fair market value of the 1 000 000 convertible bonds on the issue date, ignoring the effect of tax, whilst ignoring any potential impact of section 8 of the Income T x Act.

Solution:

(*Intermediate:* Even if the impact of section 8 of the Income Tax Act had to be considered in this case, it would not apply as the convertible debt here is linked to the market value f a share, and therefore the debt does not display characteristics of a share, as defined in the Act.)

Step 1: Determine the likely value of each conversion option at the conversion date

Conversion option 1: Convert into ordinary shares

Determine the likely fair market value of 1 000 000 ordinary shar s in 4 years' time:

Present fair market value: 90 c × 1 000 000 = R900 000

Year:	**0 (issue date)**	**1**	**2**	**3**	**4**
	R	**R**	**R**	**R**	**R**
Pessimistic: fair market value	900 000	900 000	900 000	900 000	900 000
Optimistic: fair market value	900 000	990 000	1 089 000	1 197 900	1 317 690
		= 900 000 × 1,1	= 990 000 × 1,1	= 1 089 000 × 1,1	= 1 197 900 ×1,1

Year:			**4**
Probability weighted		**Probability**	**R**
Pessimistic: 50% × R900 000	(pessimistic scenario)	50%	450 000
Optimistic: 50% × R1 317 690	(more optimistic scenario)	50%	658 845
			1 108 845

Conversion option 2: R d m bonds at nominal value

Redeem bonds at nominal value

Year:	**4**
	R
R1 × 1 000 000	1 000 000

Step 2: Determine the appropriate value at the conversion date, to be included in discounted cashflow calculation

Since c nversi n is at the option of the entity holding the debt (creditor), the creditor will choose the option likely to pr vide the *greatest* cashflow benefit in Year 4: Option 1 – conversion into ordinary shares. (At this time the value is likely to equal R1 108 845, which is more than R1 000 000.)

Step 3: Determine the likely fair market value of the bonds from the perspective of the entity issuing the bonds (debtor), using a method based on discounted cashflow

Year:	0 (issue date)	1	2	3	4
		R	R	R	R
Coupons (1 000 000 × R1 × 9%)		(90 000)	(90 000)	(90 000)	(90 000)
Conversion value					(1 108 845)
		(90 000)	(90 000)	(90 000)	(1 198 845)
Fair rate of return	9,00%	0,9174	0,8417	0,7722	0,7084
	R				
Net present cost	(1 077 079)	(82 566)	(75 753)	(69 498)	(849 262)

Based on the likely choice of the entity holding the debt (creditor), the valuation from the perspective of the debtor will have to include the highest cost option

General note: Figures may not total correctly due to rounding.

Conclusion:

The likely fair market value of the 1 000 000 convertible bonds on the issue date is R1 077 079.

Practice qu stion

Question 10–1 *(Fundamental to Intermediate)* *25 marks* *38 minutes*

Sungura Limited ('Sungura') is a company that is listed on the JSE. Sungura plans to spend R100 million on expanding its existing business. It has been suggested that the money could be raised by issuing 9% loan notes redeemable in ten years' time. Current financial information on Sungura is as follows (not yet prepared on the basis of IFRS).

Condensed Statement of Profit/Loss and Other Comprehensive Income for the most recent financial year ended:

	R'm
Profit before interest and tax	70,0
Interest (actual expense)	(5,0)
Profit before tax	65,0
Tax	(19,5)
Profit for the p riod	45,5

Condensed Statement of Financial Position at the end of the most recent financial year

ASSETS	R'm
Non-cu ent assets	200
C rrent assets	200
TOTAL ASSETS	400
EQUITY and LIABILITIES	
Share capital and reserves	
Ordinary shares without par value issued at R10 each	50
Retained earnings	225
9% non-redeemable preference shares with a nominal consideration of R10 each	25
Interest bearing liabilities	
10% loan notes	50
Current liabilities	50
TOTAL EQUITY and LIABILITIES	400

The current ex- div (i.e. without dividend) ordinary share price is R45 per share. An ordinary dividend of 350 cents per share has just been paid and dividends are expected to increase by 4% per year for the foreseeable future. The current ex-div preference share price is 762 cents. The loan notes are secured on the existing non-current assets of Sungura and are redeemable at par in eight years' time. They have a current ex-interest market price of R1 050 per R1 000 loan note. Sungura pays tax on profits at an annual rate of 30%.

The expansion of business is expected to increase profit before interest and tax by 12% in the first year. Sungura has no overdraft.

Average sector ratios:

Interest coverage ratio: 12 times

Required:

Calculate the current weighted average cost of capital of Sungura Ltd using the fair market values of the different forms of capital as the weights. (Use a simplified method to determine the after-tax cost of debt, *without* incorporating the effects of section 24J of the Inc me Tax Act.) **(*14 marks*)**

Discuss whether financial management theory suggests that Sungura Ltd can reduce its weighted average cost of capital to a minimum level. **(*8 marks*)**

Evaluate and comment on the effects, after one year, of the loan-note issue and the expansion of business on the interest coverage ratio. **(*3 marks*)** (Source: ACCA, ACCA pilot paper, 2012 – slightly adapt d)

Solution:

Calculation of WACC

Note: figures may not total due to rounding.

Market values

Fair market value of ordinary shares	= 5m × R45 = R225 million
Fair market value of preference shares	= 2,5m × R7,62 = R19,05 million
Fair market value of 10% loan notes	= 50 000 × R1 050 = R52,5 million
Total fair market value	= 225m + 19,05m + 52,5m = R296,55 million

Required rates of return

Cost of equity using dividend growth model

The Gordon Dividend Growth Model formula is:

$$P_0 = \frac{D_1}{r - g} \text{ or}$$

$$P_0 = \frac{D_1}{k_e - g} \text{ now rearrange the variables}$$

$$P_0 \times \frac{1}{D_1} = \frac{D_1}{k_e - g} \times \frac{1}{D_1}$$

$$\frac{P_0}{D_1} = \frac{1}{K_e - g}$$

$$\frac{D_1}{P_0} = \frac{K_e - g}{1}$$

$$\frac{D_1}{P_0} + g = K_e - g + g$$

$$\frac{D_1}{P_0} + g = K_e$$

$$K_e = \frac{D_1}{P_0} + g$$

Thus:

$$K_e = \frac{R3{,}50 \times 1{,}04}{R45} + 4\%$$

$$K_e = 12{,}08\%$$

Cost of preference shares = (9% × R10) / 7,62 = 11,81%

Cost of the loan notes:

	0	1	2	3	4	5	6	7	8
		R'm	R'm	R'm	R'm	R'm	R'm	R'm	R'm
Current fair market value	52,5								
Interest		(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)
Redeemed (50 000 × R1 000)									(50,0)
	52,5	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(5,0)	(55,0)

Calculate IRR using a financial calculator

IRR = 9,09% Before tax
9,09% × (1 – 30%)
= 6,37% After tax

Calculation of WACC

Form of capital	Fair market value	Proportion	Required return	Weighted
	'm	%	%	%
Ordinary shares	225,00	75,9	12,08	9,17
Preference shares	19,05	6,4	11,81	0,76
Loan notes	52,50	17,7	6,37	1,13
	296,55	100,0		11,06

Part (b) discussion

Sungura Ltd has long-t rm finance provided by ordinary shares, preference shares and loan notes. The rate of return required by ea h sour e of finance depends on its risk from an investor point of view, with equity (ordinary shares) being seen as the most risky and debt (in this case loan notes) seen as the least risky. Ignoring taxation, the weighted average cost of capital (WACC) would therefore be expected to decrease as equity is replaced by debt, since debt is cheaper than equity – that is, the cost of debt is less than the cost of equity.

However, financial risk increases as equity is replaced by debt and so the cost of equity will increase as a company gears p, offsetting the effect of cheaper debt. At low and moderate levels of gearing, the before-tax cost of debt will be constant, but it will increase at high levels of gearing due to the possibility of bankruptcy. At high levels f gearing, the cost of equity will increase to reflect bankruptcy risk in addition to financial risk.

In the traditional view of capital structure, ordinary shareholders are relatively indifferent to the addition of mall amounts of debt in terms of increasing financial risk and so the WACC falls as a company gears up. As gearing up continues, the cost of equity increases to include a financial risk premium and the WACC reaches a minimum value. Beyond this minimum point, the WACC increases due to the effect of increasing financial risk on the cost of equity and, at higher levels of gearing, due to the effect of increasing bankruptcy risk on both the cost of equity and the cost of debt. On this traditional view, therefore, Sungura can gear up using debt and reduce its WACC to a minimum, at which point its market value (the present value of future corporate cash-flows) will be maximised.

In contrast to the traditional view, continuing to ignore taxation but assuming a perfect capital market, Miller and Modigliani demonstrated that the WACC remained constant as a company geared up, with the increase in the cost of equity due to financial risk exactly balancing the decrease in the WACC caused by the lower before-tax cost of debt. Since in a prefect capital market the possibility of bankruptcy risk does not arise, the WACC is constant at all gearing levels and the market value of the company is also constant. Miller and Modigliani showed, therefore, that the market value of a company depends on its business risk alone, and not on its financial risk. On this view, therefore, Sungura cannot reduce its WACC to a minimum.

When corporate tax was admitted into the analysis of Miller and Modigliani, a different picture emerged. The interest payments on debt reduced tax liability, which meant that the WACC fe as gearing increased, due to the tax shield given to profits. On this view, Sungura could reduce its WACC to a minimum by taking on as much debt as possible.

However, a perfect capital market is not available in the real world and t high levels of gearing the tax shield offered by interest payments is more than offset by the effects of bankruptcy risk and other costs associated with the need to service large amounts of debt. Sungura should therefore be able to reduce its WACC by gearing up, although it may be difficult to determine whether it has reached a capital structure giving a mini-mum WACC.

(c) Interest coverage ratio

Current interest coverage ratio = R70m / R5m = 14 ti es

Increased profit before interest and tax = R70m × 1,12 = R78,4m

Increased interest payment = (R100m × 9%) n w int rest + R5m existing interest = R14m

Interest coverage ratio after one year = R78,4/ R14 m = 5,6 times.

The current interest coverage of Sungura is higher than the sector average and can be regarded as fairly safe.

Following the new loan note issue, however, interest coverage is less than half of the sector average, perhaps indicating that Sungura may not find it easy to meet its interest payments.

(Source: ACCA, ACCA pilot paper, 2012 – slightly adapted)

Chapter 11

Business and equity v luations

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

identify and explain the different definitions of valu ;

clearly differentiate between financial reporting principl s and business valuation principles;

display a clear understanding of the various valuation approaches, methodologies, methods and models, and the linkages between them;

critically reflect on the circumstances in which different valuation approaches, methodologies, methods and models will be suitable in a valuation;

correctly incorporate the appropriate types of valuation premiums and discounts into a valuation method or model;

use a range of specialised skills to perform, and professionally present, a comprehensive business or equity valuation using the following methodologies, methods or models: Price of recent investment, earnings multiples (including the P/E multiple and MVIC/EBITDA multiple), market price multiples, the Gordon Dividend Growth Model, models based on Free Cashflow, a model based on EVA/MVA, and net assets;

critically reflect upon the assumptions and information that underlie a valuation;

critically review a valuation performed by a third party; and

identify and d scribe factors affecting the value of a business or equity shareholding, and offer a recommendation on the choice of action, based on a scenario.

This chapter further explores the stimulating topic of valuations by concentrating on business and equity valuations. Mo e specifically, the focus of this chapter is on the valuation of South African, private equity business ente p ises (i.e. unlisted entities), or a majority or minority shareholding in such a business.

It is important to realise from the outset that this chapter does not represent an exhaustive guide to business and eq ity val ations; it covers only a limited number of valuation methodologies, methods and models; but aims to include those that are most academically sound, widely used in practice today and that are increasing in p pularity.

As uch, this chapter builds on the concepts introduced in chapter 10 (*Valuations of preference shares and debt*), and conveys essential knowledge that will serve as a stepping-stone towards a student's ability to master va uations in the context of *Mergers and acquisitions* (chapter 12), and *Interest rates and interest rate risk* (chapter 16). In this process the chapter addresses a mix of fundamental, intermediate and advanced topics. For convenience, the intermediate and advanced areas are labelled as such. (Unlabelled areas therefore represent basic, fundamental knowledge areas.)

This chapter will first traverse basic valuation concepts, including: (1) different definitions of value; (2) differences between financial reporting principles and business valuation principles; (3) different valuation approaches, methodologies, methods and models, and the appropriate circumstances under which they could be

used; and also (4) different valuation premiums and discounts, and the circumstances under which they should be applied.

As a second phase, this chapter will apply the basic concepts to illustrate and explore the valuation process using several methods and models, including: (1) the P/E multiple, (2) the MVIC/EBITDA multiple, (3) the Gordon Growth Model, (4) models based on Free Cashflow, and (5) a model based on EVA/MVA.

Thirdly, this chapter will consolidate all that was learned to support critical reflection on: (1) valuations performed by others, and (2) factors affecting the value of a business or equity shareholding.

Throughout the chapter, the aim is to promote the application of sound va uation *principles,* based on proper understanding; the application of quick valuation 'recipes' or the short-term memorisation of 'shortcuts' are therefore strongly discouraged.

11.1 Some of the intricacies of value

The obvious starting point to business and equity valuations is their basic building block: value. Of course, the way in which value is created and measured has already been c ntemplated for centuries. A few more recent examples will hopefully jumpstart the learning process

in the late 1990s, only to disappear or shed most value when the 'Internet' or '.com bubble' burst after the turn of the millennium. Was this reduction in value because the Internet was not as revolutionary as people thought, or were those Internet companies themselves not really as promising as they claimed to be? and help to unpack some of the intricacies of value.

Consider the following examples.

> The value of shares in South African platinum mining companies fell in recent years. Since platinum is a rare precious metal used in several applications – including catalytic converters (an automobile component), lab equipment, electronics and jewellery – has there been a reduction in worldwide demand for these goods or has platinum been substituted by other materials? Is the fall in value of the shares in these mining companies due to the waves of debilitating industrial action that hit South Africa in recent years or the deadly Marikana mining strikes of 2012? Is this fall due to the severe slump in platinum production that followed these strikes or the cyclical nature of mining? Finally, is it due to the uncertain fiscal policies in South Africa, with the ruling party seeking greater rents (mining royalties) from the mining companies, or actually, a combination of all these factors?
>
> The value of Internet companies grew substantially.
>
> Today's major Internet companies, such as Facebook, Inc and Twitter, Inc – that recently obtained listings on US stock exchanges – have not yet delivered much in terms of earnings or cash flows, given their substantial market valuations. Will these companies live up to their lofty promises or are they, too, overvalued? Are these companies different from those that came in the 1990s or is yet another Internet bubble forming?
>
> A man owns a family-run green-grocer, which is barely profitable, and is situated on a prime piece of real estate. Why would this man refuse to sell, even if offered a large amount of money by a property developer? Is the man i ational or does he possibly value family tradition and a passion for his business more highly than money?
>
> Two appraisers will seldom obtain exactly the same value for a business enterprise. Is the one right and the other wrong? Are both wrong, or can both be right?

These questi ns obviously raise a few interesting points. Certainly an appraiser must have a good awareness of ec n mic and ther developments, and their implications on the business being valued. (It is therefore essen-tial f r an appraiser – and by implication a student studying the topic of business valuations – to read business article , and to read *widely*.) An appraiser would therefore be wise not to lose sight of the fundamental drivers of va ue, no matter the latest fads, or the complexity of a particular valuation model.

The term *value* obviously also does not have the same meaning to all persons and in all circumstances. From the questions it is also clear that value is not always measured in monetary terms. Likewise, Albert Einstein summed up his sentiments thus: 'Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted.'. This is true of course; nevertheless, one should remember that valuation for purposes of this chapter is essentially the act whereby *monetary* value is estimated.

It has further been said that valuation is highly subjective and is more of an art than a science. Assuming this is true, how then can valuation possibly be taught to managerial finance students? It can, but only if one demystifies both the concept and the uncertainties surrounding it. Here, the following words may serve as a first step on this journey:

> 'Valuation is a prophecy as to the future and must be based on the facts available at the required date of appraisal.' (Larry Kasper, 1997:5).

11.2 Reasons for undertaking business and equity valuations

Appraisers in South Africa are called upon to perform valuations for many different reasons, all of which may require different assumptions and methodologies. These reasons can include –

- an acquisition or disposal of an entire business, a minority interest or m jority interest in a business enterprise *from its present owners*, not part of a merger or acquisition by another business;
- an acquisition or disposal of an entire business, a minority interest or a majority interest in a business enterprise *from its present owners*, part of a merger or acquisiti n by another business (necessitating additional considerations, which are addressed in chapter 12 (*Mergers and acquisitions*));
- further equity investment (capital injection) in a business enterprise;
- valuation for taxation purposes (e.g. for purposes of donations tax, estate duty or capital gains tax);
- valuation for financial reporting purposes;
- an initial public offering, as part of a new company listing; and
- as security for a loan, including management buy-outs.

Since this chapter does not aim to be an exhaustive guide to valuations, or to explore valuations for all the purposes mentioned above, it does not address all valuation methodologies, methods and models. For instance, this chapter does not address the valuation of financial institutions and other specialised business entities with unique requirements.

11.3 Underlying valuation theory

This section considers the essential theory of valuations, including different definitions of value, a comparison to financial reporting principles, and different valuation approaches.

11.3.1 Different definitions of value

Why are there so many diff r nt definitions of value and what is meant by the word 'value'? Firstly, it important to realise that the r ason for the valuation could affect the definition of value (e.g. a valuation for financial reporting purpos s may require the use of certain fixed definitions of value, such as fair value and historical cost).

Secondly, one should ealise that the same business could also have different values to different parties. It is therefore vital to think about the party for whom the valuation is prepared and to then use the correct 'thinking hat' and val e definition.

There are many different definitions of value, including: historical cost, market value, fair market value, intrinsic value, market capitalisation, and liquidation value. For purposes of this chapter 'fair market value' and 'market capitalisation' are the most important.

Historical cost

Simp y tated, historical cost represents the original monetary sum paid for something. Historical cost is fixed at a certain point in the past and therefore has the limitation that it does not account for any changes in the v lue of money over time.

This concept of value has historically been applied extensively in the financial reporting field, but is increasingly being modified for certain items accounted for at fair market value. *Unadjusted* historical cost has little relevance in business and equity valuations.

Market value

Market value is often simply defined as the price the buyer is willing to pay and the seller is willing to sell for something as determined by demand and supply considerations. It represents a general definition, with other definitions (e.g. fair market value, intrinsic value and market capitalisation) being more clearly defined sub-definitions.

Fair market value

For purposes of this chapter fair market value is defined as follows:

the amount for which a business enterprise, or shareholding in such enterprise, can be exchanged;

- involving a (hypothetical) willing buyer and (hypothetical) willing seller (thus, ny possible bidder – even if they don't really exist – and not a specific buyer);

where both parties have reasonable knowledge of the relevant facts;

considering the highest and best use of the business, or its underlying assets;

with the transaction representing an arm's-length transacti n (between independent parties who are on equal footing).

Clearly the definition of 'fair market value' shows strong rese blance to that of 'fair value', as used in *International Financial Reporting Standards.* However, the guidelines on fair value measurement are increasingly tailored for purposes of financial reporting. This chapter therefore refers to 'fair market value' in order to promote the use of an appraiser's 'thinking hat' – as oppos d to a financial reporting one – and to avoid confusion.

Certain concepts are closely associated with the definition of fair market value and are further described below.

Synergy benefits (Advanced for purposes of this chapter)

Research demonstrates that mergers and acquisitions of business entities may create synergy benefits – frequently referred to as the '2 + 2 = 5 effect' (i.e. the sum is greater than the individual components) – but, notably, that this is by no means guaranteed. Synergy benefits are frequently overestimated, but *could* exist thanks to efficiencies, economies, and other benefits that are realised when bringing together two disparate business entities.

A merger between two automobile manufacturers, for example, could lead to synergy benefits, in the form of economies of scale in production, where these manufacturers could better share vehicle platforms and therefore move closer to an efficient scale in production. Nonetheless, the numerous *unsuccessful* mergers between automobile manufacturers (*e.g.* the merger between Daimler-Benz and Chrysler in 1998, which failed mainly due to corporate culture clashes) testify to the difficulty in realising synergy benefits.

When determining the fair market value of a business enterprise an appraiser must consider the aforementioned five elements and may therefore only incorporate synergy benefits – *if any* – that could exist between the business enterprise being valued and (hypothetical) buyers in general (*i.e*. not a specific acquirer). *Unique* synergy benefits that could exist *only* between the business being valued and a specific buyer (i.e. the benefits unavailable to others) must therefore be *ignored*.

For exam p rposes, unless specific information is available to determine the value of general synergies for p rposes of determining the fair market value of a business or equity interest, one should ignore synergy benefits. However, synergy benefits are more likely to feature as part of valuations for purposes f mergers and acquisitions. The intricacies of synergies are explored further in *Mergers and Acquisi-ti ns* (chapter 12).

Highe t and best use

When applying the fair market value definition, an appraiser should consider the highest and best use of the business, or its underlying assets, obtainable from:

- the value in its continued use as a going concern; or
- the value in exchange, as part of an orderly sale (not a forced liquidation).

When determining the fair market value, for example, of the family-run green grocer situated on prime real estate, mentioned in one of the introductory statements to this chapter, one must therefore consider the price that will possibly be offered by a (hypothetical) buyer.

In this case, the highest and best use is probably from the value in exchange (due to a buyer being willing to pay more for the land), not the continued use of the business as a going concern (since the green grocer business offers only meagre returns). In this example, one could say that the current owner may be unwilling to sell; the second-generation may well be willing to sell and invest the money elsewhere; and, a cynic may say that the third-generation will spend all the money and then have nothing left!

Preferred valuation inputs (Intermediate)

A valuation using the fair market value definition should, if possible, use the v lue of an *identical* asset traded in an active market with a quoted price as an input. This would only be possible in limited circumstances, such as when valuing a minority share in a listed company where an appraiser could use the unadjusted quoted price on the valuation date as such a preferred input.

Failing this, a valuation should obtain its inputs from *similar* assets with market information, requiring *modest* adjustment. A similar business entity could be listed n the JSE in South Africa, but if not availa-ble, an appraiser could search for similar entities listed internati nally, *e.g.* on the New York Stock Ex-change, NASDAQ, or the London Stock Exchange. (If valuation inputs are taken from internationally listed business entities this would complicate a valuation and necessitate further adjustments, such as an ad-justment for country risk factors.)

However, most business enterprises – even those op rating in the same principal business arena – will often display significant differences in areas such as siz , growth prospects, returns on invested capital, financing structures, and auxiliary business operations. In addition, few listed entities would have a single or 'pure play' business focus. These factors imply that the ideals of finding an identical or similar comparator entity are difficult to achieve in practice.

In practice most business valuations will therefore have to make *significant* adjustments to observable market data or use *unobservable* inputs. This is one of the reasons for the popularity of valuation models based on Free Cash Flow, as described later in this chapter.

Intrinsic value

Intrinsic value is often described as the most basic value of a business. It is principally based on the net present value of expected future cashflows and should be viewed independently of any merger or acquisition transaction (Eccles, Lanes and Wilson, 1999). Intrinsic value should therefore ignore the effect of any possible synergy benefits.

Market capitalisation

Full market capitalisation is an indication of the fair market value of all equity and is essentially derived by using the following formula:

Full market apitalisation	**=**	**Price per share (quoted on a Securities Exchange) × the number of group shares in issue**
	~	**Fair market value of equity**

However, f ll market capitalisation calculated in this way will not always be an accurate representation of the fair market val e of equity. In some cases adjustments will have to be made for some or all of the following matters.

C ntr l premium (Intermediate)

There is a contested argument that full market capitalisation possibly does not represent the fair market value of all equity (implying a controlling shareholding) as it could apply the price at which a non-controlling share is traded, to all issued shares. It is therefore recommended that each listed company's market capitalisation be viewed on a case-by-case basis, and that a control premium (discussed later in this chapter) be added only if appropriate. If warranted, the following formula should then be applied:

Fair market value of equity	**=**	**Full market capitalisation + control premium**

Convertible securities (Intermediate)

Convertible securities, such as convertible preference shares and convertible debt, *described in Valuations of preference shares and debt* (chapter 10), should be treated as part of the value of equity where these are likely to be converted to equity. If warranted, the following formula should then be applied:

Fair market value of equity = Full market capitalisation + value of preference shares and debt likely to be converted to equity

Share options (Advanced)

The fair market value of equity should include the value of all equity c aims on the business entity. Where there are share options outstanding , the following formula should be app ied:

Fair market value of equity = Full market capitalisation + the v lue of sh re options

Treasury shares (Advanced)

The total number of shares in issue is complicated in the case of share buybacks – so-called *treasury shares* – where the group repurchases some of its own shares (thr ugh a subsidiary) and keeps them for resale or reissue, instead of cancelling them. In such a case the number of shares per the calculation of the usual full market capitalisation should be adjusted, as f ll ws.

Fair market value of equity = Price per share (quoted on a Securities Exchange) × (the number of company shares in issue – the number of treasury shares)

Liquidation value

A liquidation value is the amount that could be realis d if a group of assets of a company are sold separately. Here the sum of the likely proceeds from all assets is reduced by the liabilities outstanding, and the difference represents the liquidation value of the company.

Note that liquidation can be either *voluntary* or *forced*. In the case of voluntary liquidation the liquidation value could be close to a fair market value for some businesses, such as property-holding companies.

Conversely, in the case of a forced liquidation, where a seller is compelled to sell the assets as part of a distressed sale, a willing buyer and willing seller are not involved. Therefore, in such circumstances, a liquidation value cannot be described as a fair market value. Fittingly, the term 'fire sale' is commonly used to refer to the sale of assets at a very low price when the seller is facing bankruptcy or where the seller is desperate to dispose of certain assets quickly to get cash.

11.3.2 Principles of financial reporting vs business valuation principles

To better understand business valuations it is important to contrast its principles against those applied in financial reporting. The following table underscores the principle differences.

Financial reporting principl s	Business valuation principles
Measure value using mixed definitions, including historical ost, arrying (or book) value, fair value and de ivatives the eof;	Measure market value, normally defined as fair market value;
Records items meeting prescribed recognition criteria (as a result, several items are *not* recognised – most notably – internally developed intangible assets);	Value incorporates all components of the business;
Valuati n, if required, normally occurs after the fact (*ex p st)*;	Valuation usually occurs in advance, before a transaction takes place (*ex ante);*
Focus on the parts (using a bottom-up approach) whereby the values of the individual assets and liabilities are determined.	Focus on the whole (using a top-down approach) whereby the value of the overall firm or equity interest is appraised directly.

A helpful tool to move from a financial reporting mind- set to that of an appraiser, is to reorganise a traditional s atement of financial position (compiled for purposes of financial reporting) and to then compile an appraiser's balance sheet. Note that an IFRS-based statement of financial position would *not* equal an appraiser's version, as numerous items would be excluded, and the items included would be recognised using a muddled mix of valuation definitions (e.g. historical cost and fair value).

Illustrative example: Statement of financial position – moving from financial reporting to business valuations (Fundamental, except where otherwise indicated)

Assume that a business entity has a carrying value (the original cost minus accumulated depreciation) of total assets equal to R1 050 000, but that it has an overall firm value of R2 000 000, measured at fair market value. The following condensed statement has been prepared in accordance with IFRS. It includes notes and represents the position as at the most recent financial year-end.

Statement of financial position

	R'000		R'000
ASSETS		**EQUITY**	
Non-current assets		Share capit l	10
Non-current tangible assets	550	Retained e rnings	540
Intangible assets and goodwill (some)	100		
Investments (non-operating assets)	200	**LIABILITIES**	
Current assets		N n-current liabilities	400
Cash (assume the entire amount represents excess cash in this example)	50	Current liabilities (50+50)	100
Other current assets	150		
TOTAL ASSETS	**1 050**	**TOTAL EQUITY AND LIABILITIES**	**1 050**

Required:

Trace the illustrative values included in the traditional statement of financial position through to the next version shown in the various steps below. Take cognisance of changes in the illustrative values, additional items included in each step, and the various explanatory notes.

Explain the principle differences between a traditional statement of financial position (as provided) and an appraiser's version in your own words.

Step 1: Reorganise the traditional statement of financial position (illustrative values only)

(Carrying values)	R'000	(Carrying values)	R'000
NET OPERATING ASSETS		**EQUITY**	
Non-current tangible assets	550	Share capital	10
Intangible assets and goodwill (some)	100	Retained earnings (balancing figure)	540
Other current assets	150	**DEBT CAPITAL**	
Non-debt current liabilities	(50)*	Non-current liabilities	400
NON-OPERATING ASSETS		Short term portion of debt (100-50*)	50
Investments	200		
Cash (excess cash)	50		
EMPLOYMENT OF CAPITAL	**1000**	**CAPITAL EMPLOYED**	**1000**

Note: Only *excess* cash represents a non-operating asset.

Step 2: Compile an appraiser's balance sheet (illustrative values)

Replace the values in the reorganised, traditional statement of financial position with fair market values and include unrecognised items.

(Fair market values)	R'000	(Fair market values)	R'000
NET OPERATING ASSETS		**MARKET VALUE OF EQUITY**	1 400
Non-current tangible	570		
assets Intangible assets	1 000	**DEBT CAPITAL**	
(all) Other current assets	150	Non-current debt	445
Non-debt current liabilities	(50)	Short term portion of debt	55
Other liabilities linked to operations (Intermediate – e.g. a contingent legal cost liability, previously unrecorded)	(20)		
VALUE OF OPERATIONS	1 650		
NON-OPERATING ASSETS			
Investments	300		
Excess cash	50	**OFF-BALANCE SHEET DEBT** (Advanced)	100
VALUE OF OPERATIONS AND NON-OPERATING ASSETS	**2 000**	**OVERALL FIRM VALUE**	**2 000**

Note: Accounting reserves are excluded here as these represent only ccounting entries

Note: Additional items are included here

Note: Certain fair market values will differ little from the corresponding carrying values

Not : This is an advanced area and should be ignored for purposes of basic courses. Off-balance sheet debt could include operating leases and debt linked to possible non-consolidated entities

Step 3: Compile an appraiser's balance sheet: Different slices of the same 'cake' (1)

(Fair market values)	R'000	(Fair market values)	R'000
NET OPERATING ASSETS		**MARKET VALUE OF EQUITY**	1 400
Non-current tangible assets	570		
Intangible assets (all)	1 000	DEBT CAPITAL	
Other current assets	150	Non-current debt	445
Non-debt current liabilities	(50)	Short term portion of debt	55
Other liabilities linked to operations (Intermediate)	(20)	**OFF-BALANCE SHEET DEBT** (Advanced)	100
		Less: NON-OPERATING ASSETS	
		Investments	(300)
		Excess cash	(50)
VALUE OF OPERATIONS	**1 650**	**MVIC (market value of invested capital)**	**1 650**

Note: MVIC equals the value of operations (viewed from the basis of the left column).
Alte natively, MVIC equals the market value of equity *plus* the value of debt *less* the value of non-ope ating assets (viewed from the basis of the right column). One could also state that MVIC equals the val e of equity *plus* the value of *net* debt (debt after theoretically selling non-operating assets and sing the proceeds to settle debt).

Step 4: Compile an appraiser's balance sheet: Different slices of the same 'cake' (2)

(Fair market values)	R'000	(Fair market values)	R'000
NET OPERATING ASSETS		**MARKET VALUE OF EQUITY**	1 400
Non-current tangible assets	570		
Intangible assets (all)	1 000		
Other current assets	150		
Non-debt current liabilities	(50)		
Other liabilities linked to operations (Intermediate)	(20)		
VALUE OF OPERATIONS	1 650		
NON-OPERATING ASSETS			
Investments	300		
Excess cash	50		
Less: DEBT CAPITAL			
Non-current debt	(445)		
Short term portion of debt	(55)		
Less: OFF-BALANCE SHEET DEBT (Advanced)	(100)		
VALUE OF OPERATIONS AND NON-OPERATING ASSETS LESS DEBT	**1 400**	**MARKET VALUE OF EQUITY**	**1 400**

11.3.3 Valuation approaches, methodologies, methods and models

Before any valuation calculations can be performed it is important to understand what is meant by the encompassing terms of valuation approaches, methodologies, methods and models. It is further important to clearly differentiate between these concepts.

Valuation approaches

Basic valuation approaches can be grouped into several categories, but for purposes of further discussion here the following categories are used: the *replacement cost approach*, the *market comparable approach* and the *income approach*. An appraiser will have to take the circumstances of each case into account and then apply the necessary judgement to determine which valuation approach to apply. When determining the value of, or shareholding in, a private equity enterprise in South Africa, an appraiser will often make use of both the income approach and the market comparable approach in the valuation – the one will represent the main valuation approach, while the other will serve as a reasonability test.

Note: A private equity busin ss or enterprise refers to an enterprise that is not listed on a securities exchange, and should be cl arly differentiated from a private equity fund or house – a dedicated pool of funds – targeting investm nt in th se private equity businesses, in all stages of development.

The three approa hes are described as follows:

The replacement cost approach

Here the q estion 'What will it cost today to acquire a similar asset?' is asked. For example, a three-year-old man fact ring machine could be valued by obtaining the replacement cost of the same machine when new and depreciating it to some degree to reflect its current state. This approach is less relevant in a business valuation, or in determining the value of a shareholding in such a business.

The market comparable approach

Here the question 'What is an identical or similar asset actually selling for in the market?' is asked. Within this approach, there are many valuation methods that compare the entity to a comparable entity in the market, making use of an earnings multiple. As mentioned previously, the main problem here is the lack of directly comparable entities, with the result that a significant amount of adjustment is necessary – thereby compromising the purity of the approach.

The income approach

In this case, the question 'What is a buyer willing to pay for an asset in today's monetary terms, with a given income (or cashflow) stream in the future, adjusted for perceived risks?' is asked. Part of this

approach is to use a discounted-cash-flow method. This approach also makes use of inputs based on information available in the market, including information from directly comparable entities. As in the case of the market comparable approach, a lack of directly comparable entities will reduce the reliability of the approach (albeit to a lesser extent).

Valuation methodologies

Simply put, valuation methodology describes the system of methods that could be applied in performing a valuation. Several methodologies exist, some of which could be clearly linked to a specific valuation approach, others less so.

Some of the principle valuation methodologies include –

price of recent investment (linked to the market comparable appro ch);

- *industry valuation benchmarks* (linked to the market comparable ppro ch);

multiples (linked to the market comparable approach);

discounted cashflows from the investment (linked to the income approach);

discounted cashflows of the underlying business enterprise (linked to the income approach); and

net assets (which may be linked to different valuation approaches).

In selecting the most appropriate valuation methodology for a specific assignment, the appraiser should apply his/her judgement. **However, the principal valuation ethodology is often supplemented by another methodology, used as a reasonability test.**

Valuation methods and models

By unpacking the valuation methodologies, one could identify the underlying methods and models. Some of the principle valuation methods and models include –

earnings multiples (linked to the multiples methodology);

market price multiples (linked to the multiples methodology);

the Gordon Dividend Growth Model (linked to a discounted-cash-flow-from-the-investment methodology);

models based on Free Cashflow (linked to a discounted cash-flow methodology – either cashflows available to the investment or the underlying business enterprise); and

models based on EVA®/MVA (linked to a discounted cash-flow methodology – from the underlying business enterprise).

11.4 Factors affecting the value of a business or equity interest

The value of a business enterprise or equity interest is dependent on a number of factors. It is not possible to list and describe all the factors to be considered in all circumstances, as they will differ on a case-by-case basis. However, in this section a f w g neral factors affecting value are discussed, including –

the relationship between value, risk and return;

the business model applied;

whether the b siness is a going concern;

growth and ret rn of the business;

the business vehicle;

investment in equity or net assets of a business;

the level of control;

shares publicly traded on a Securities Exchange; and

hidden factors (often examined as part of due diligence investigations).

11.4.1 The relationship between value, risk and return

The intricate link between an investment's value, the risk attached to it, and the required rate of return on this investment, is demonstrated in chapter 10 (*Valuations of preference shares and debt*). The link between two of

the variables, risk and return, could easily be explained by the behaviour of a rational investor: investing in a risk -free investment demands a minimum required rate of return equal to a risk-free rate, to compensate for the time value of money. However, investing in a more risky investment demands a required rate of return in excess of a risk-free rate, to not only compensate for the time value of money, but also the probability of not actually receiving future benefits related to the investment.

Continuing with this line of thought, the link between value and risk could similarly be explained by the behaviour of a rational investor: in deciding on a price to pay for two investments, each identical except for the fact that one is more risky than the other, this investor would surely pay less for the investment carrying the higher risk.

These linkages are easy to draw when valuing, for instance, preference shares or debt, with predictable cashflows. When valuing a business or an equity interest, however, the vari bles re more difficult to define. For instance, what would the expected future benefits be? Here different investors m y define it differently – perhaps as the uncertain amount of future ordinary dividends that may, or may not, be declared; perhaps as the uncertain earnings that may be attributable to the shareholding; or perhaps, as the uncertain cashflow that may be free for distribution, after other required payments and investments ha e been made?

Following the contemplation of the expected future benefits, as part f the valuation of a business or an equity interest, one should consider what the required rate of return sh uld be. Again, it is easy to determine the required rate of return on an investment in a debt security, for instance, by linking the return to the yield to maturity of a similar security that is quoted on a securities exchange. Since a very similar business or equity interest, quoted on a stock exchange, is unlikely to exist, how then does an investor determine a required rate of return?

These dilemmas led to the development of ever more intricate valuation methods and models – some of which are explored later in this chapter. But no matter how complex the valuation method or model, it would be wise for an appraiser – and, by implication, a student – to not forget that there should always be a link between value, risk and return.

11.4.2 The business model

The business model followed can influence the value of an entity in several ways. When following an income approach to valuation by employing a discounted-cash-flow method, for example, the specific business model followed and its effect on future cashflows is often considered. This method assists in obtaining an entity's intrinsic value.

Intrinsic value often equals an entity's fair market value, but in some cases they could differ. For instance, market participants interested in the business entity could be of the opinion that the current business model is inferior, or that current management is inefficient, and that they could improve on these matters. In such a case, the fair market value might exceed the entity's intrinsic value.

Furthermore, the value of modern business entities stems increasingly from the use of intangible assets, rather than tangible ones. The industrial revolution led to large-scale mechanisation, offering great benefits over the earlier labour-intensive proc ss s. As a result, the main source of value to entities in earlier days lay in the tangible factories and ma hinery, and the processes whereby they were used.

In contrast, the mode n e onomy is increasingly knowledge-based; businesses are ever more subject to severe change and entities a e exposed to competition from all over the world. The use of information and communication technology (ICT) also increasingly influences modern business models and the value of these entities.

11.4.3 The going concern

M st valuati n methodologies value the business enterprise in its continued use as a going concern and therefore do not merely focus on the value of the net assets. The going concern of the enterprise is therefore an important consideration and is influenced by a number of factors, including:

State of the assets

One must form an opinion of the current state of the assets. Are they in a good physical state; have they been replaced regularly and maintained? What is the average age of the assets compared to the norm for the industry?

Demand for the products and services of the company

It is possible that historical profits were strong; however, the value of a company is based on future profits (or cash flows), not past profits. One must therefore assess whether the type of business a company is involved in is still viable. Is there a continuing demand for the products and services of the company, or are they becoming redundant? Is technology making the offerings obsolete? Is the business changing with the times? (Consider the case of Eastman Kodak Company, the well-known manufacturer of photographic film, which failed due to not having implemented sufficient measures to adapt to changing technologies.)

Competition

Business is very competitive; therefore one must assess one's competition. How many competitors is the company faced with; do they supply similar services or products in the s me m rket and are they a threat to the business?

For instance, the emergence of cheap imports such as clothing, shoes and other consumer products from China makes the viability of companies in South Africa that manufacture similar products challenging.

Suppliers

How reliant is the company on local or foreign supplies? What is the viability of those suppliers?

Debt capacity

How indebted is the company? Does the debt to equity (D:E) ratio show that the company has a high level of debt? Consider the times interest earned ratio – is the company able to repay interest and capital commitments easily? What is the expectation for int r st rates? Are they rising or dropping?

Most companies operate in a debt environment; therefore one must establish whether the company is carrying too much debt. The most essential question to be asked in the final analysis is, given the industry, the company-specific factors and future expectations, is the company's capital structure at its target level?

Business environment

The local, national and world business environment as it affects the company must be assessed. Political considerations are also important, as they will have either a favourable or a negative impact on the business being valued. Empowerment or affirmative aspects of business can also add value, or reduce the value of a company or its ability to operate as a viable going concern.

SWOT

All of the above aspects that affect the going concern aspects of a company can be summarised in a SWOT-analysis: the appraiser needs to consider the internal **strengths** and **weaknesses** of a company and also evaluate the external **opportunities** and **threats** before carrying out a valuation that assumes a viable going concern.

11.4.4 Growth and the return that is derived from the assets

It is often a gued that g owth adds value. This is true; however, growth will only add value if an entity is also generating a sufficient eturn on invested capital. The minimum required return of an entity is its Weighted Average Cost of Capital (WACC).

11.4.5 The business vehicle

Business vehicles normally influence the value of ownership through different levels of taxation, the types of inve tors allowed, and restrictions placed on the sale and transfer of ownership, or its effect on personal liability. (A closely related concept is owner level discounts, including a marketability discount and BEE lock-in di count.)

Currently the choice of business vehicle in South Africa includes: a company, an existing close corporation, a business trust, a partnership, a sole proprietor, or a member firm of a Swiss Verein. More information on the specific types is presented below (adapted and updated from a 2011 online publication by law firm DLA Clive Dekker Hofmeyer).

Company

Larger profit-seeking businesses often operate as a company, unless specific benefits of a different vehicle are sought. For this reason, the main focus in this chapter is on businesses operating as companies.

A company can consist of one of the following types –

public company (identified by the word 'Limited' or its abbreviation, 'Ltd.' in the company name);

private company (identified the expression 'Proprietary Limited' or its abbreviation, '(Pty) Ltd.');

personal liability company (identified by the word 'Incorporated' or its abbreviation 'Inc.');

a non-profit company (identified by the expression 'NPC'); or

a state-owned company (identified by the expression 'SOC Ltd.').

Public companies represent the flagship business vehicle available to the larger business as they offer many benefits, normally including the following –

the company is a separate legal entity;

there is segregation between management and shareholders;

it allows for an unlimited number of shareholders;

there is no limitation on transferability of shares;

capital can be raised from the public; and

public companies alone may be listed on the JSE.

As is usually the case, with increased benefits, there are normally increased responsibilities and associated costs (although this is connected to a company's 'public interest score' as described in the Companies Act 71 of 2008). A private company is usually subject to more restrictions, including the transferability of its shares and the raising of capital from the public. A personal liability company is often reserved for professional and other organisations seeking personal liability.

Except for companies that qualify as *small business corporations* or *micro-businesses* in terms of tax legislation, companies currently have the same income tax rate.

Close corporation

A close corporation is identified by the expression 'Close Corporation' or its abbreviation, 'CC' in its name. A close corporation is to some degree comparable to a private company, but is normally only suited to a smaller business as it involves even more restrictions, such as –

a limited number of members (maximum of ten);

greater fiduciary r sponsibilities of members; and

limitations on the type of members (limited to natural persons). This limitation makes close corporations unsuitable for orporate investors.

In terms of cu ent legislation, existing close corporations are allowed to continue, but no new registrations are allowed.

Except for close corporations qualifying as *small business corporations* or *micro-businesses* in terms of tax legislation, close corporations currently have the same income tax rate as companies.

Business trust

A business trust makes it possible for the trustees to conduct business for the benefit of nominated trustees. A tru t offers limited liability to both trustees and beneficiaries. Although not a specific requirement, a trust is u ua y formed by way of a trust deed. A trust has separate tax rates, requirements and benefits.

Partnership

A p rtnership usually involves two to twenty partners. A partnership does not have to be registered and there are no specific formalities that have to be complied with to form a partnership. Although not a specific requirement, an agreement is often entered into to regulate the partnership. Partnerships are flexible and often serve as the vehicle for joint ventures. Except for limited partnerships, partners are jointly and severally liable for the debts and obligations of the partnership.

Sole proprietorship

A sole proprietorship exists where an individual conducts business in his personal capacity. A sole proprietor is taxed as a natural person. Due to its nature, it is obviously not available to corporate investors.

Member firm of a Swiss Verein (Intermediate)

A Swiss Verein is a special form of overarching business organisation, in which member firms have no liability for the actions of other member firms. As control is decentralised to the member firm, the firm is usually only subject to the laws and regulations of the specific country in which it operates. Swiss Vereins are often used by multinational professional firms, for example Deloitte Touche Tomatsu, to imit their global accountability. (Remember the recent public debacles, such as the *Arthur Andersen/Enron*-case, which placed shared liabilities of professional firms under renewed scrutiny.)

11.4.6 Investment in equity or net assets of a business (Intermediate)

When investing in a business, an investor may choose to –

- invest in the equity of the company (i.e. buy the shares); r to

  purchase the net assets (together constituting a business) of the company.

The inherent differences between these two options may have an i pact on the distribution of value between the buyer, seller and taxation authorities. The differences between the two options include –

- the level of investment (when investing in equity it is asi r to obtain an investment in the business below a 100% interest);

  continuity of existing business contracts and agreements (more certain when investing in the equity);

  the buyer may be able to select only the exact assets required (when acquiring the assets);

  the buyer may inadvertently acquire a hidden liability (predominantly when acquiring the equity); and

  different tax treatments.

The tax implications of either option will depend on the specific circumstances of each case. The discussion below demonstrates that taxation often has a major impact on the buyer and seller. Taxation should therefore receive careful consideration by the parties involved, and assistance by a tax specialist and reference to a dedicated source may be required.

The brief outline is based on generalised circumstances and information available at the time of publication of this edition. It assumes a normal sale of a private equity South African business in an arm's-length transaction and does not address exceptional circumstances, including: shares representing trade-stock, employee share incentive schemes, or corporate restructuring events.

The following taxation tr atm nts usually apply in the case of investment in/sale of *net assets* (constituting a business):

For the buyer –

there may be a step-up in the tax values of the assets (from the existing tax values to the newly-allocated purchase p ice), allowing higher wear-and-tear allowances to be claimed by a new company holding the business;

any assessed tax loss cannot be transferred to a buyer; and

in terms of value-added tax (VAT), the sale of net assets may still meet the requirements of the sale of a g ing-c ncern business at a zero rate (in which case the seller does not raise output tax and the buyer d es n t claim input tax) thereby offering the buyer upfront cash-flow relief.

For the eller –

there may be a recoupment on the sale of the assets (for the company);

there may be capital gains tax (CGT) implications (also for the company); and

possible dividends tax, where the remaining proceeds are paid in cash to the shareholder.

By contrast, the following taxation treatments usually apply in the case of investment in/sale of *equity*, where the company holds only the business in question:

For the buyer –

wear-and-tear allowances on assets will continue as in the past, where assets still have sufficient remaining tax value;

latent CGT of the company at the transaction date will be acquired;

latent dividends tax may be acquired (indirectly, by the new shareholders);

any assessed tax loss may, however, be transferred to the buyer; and

in terms of VAT, the sale of the equity may also meet the requirements of the sale of a going concern business at a zero rate, allowing the same cash-flow benefits to the buyer s mentioned earlier.

For the seller –

there may be CGT on the sale of the equity; and

there may be securities transfer tax, if this also represents the market value (payable by the shareholder).

Given these implications, it is often more beneficial in terms of taxation for a buyer to acquire the net assets (constituting a business), but for a seller to sell the shares.

11.4.7 Level of control (Intermediate)

The level of control has a direct influence on value on two fronts: value of the entire business enterprise, through control of entity level factors, and the value of ownership, through control of owner level factors.

Entity level factors that fall under the powers of control may include –

the ability to make policy and strategy decisions;

control over the selection of customers and suppliers;

influence over remuneration policies; and

the ability to revise the memorandum of incorporation and rules.

Furthermore, control extends to owner level factors, such as –

control over the dividend policy; and

the ability to revise the Memorandum of Incorporation (MOI) and rules (the latter might affect the entity and/or the owners).

An important related matter is owner level premiums and discounts that are linked to the level of control. These include the control pr mium and minority discount. Both may be applied in some cases and depend on the method of valuation. The marketability discount is also indirectly related to the level of control as it is usually easier to sell, for example, a controlling interest in a private-equity business than a minority share. These adjustments are dis ussed further under the heading: 'Valuation premiums and discounts'.

A dominant, but not exclusive, indicator of control is the level of ownership. In South Africa, legislation and other regulations often influence key shareholding levels, which, in turn, affect the level of control. For example, the Companies Act 71 of 2008 dictates typical key shareholding levels for a company, based on the level of votes req ired to pass certain decisions. Based on this Act, as of this writing, the typical key shareholding levels for a company and corresponding reasons are:

Typical key shareholding level	**Reason – should shareholders hold and exercise votes equivalent to their shareholding:**
0,01% – 25%	Lowest level of control for shareholder.
25,01% – 50%	Shareholder does not control the company, but has enough votes to stop a special resolution.
50,01% – 74,99%	Shareholder controls the entity and has enough votes to pass ordinary resolutions.
75% – 100%	Shareholder has the highest level of control of the company as has enough votes to pass a special resolution.

Note that, as of this writing, the Companies Act 71 of 2008 allows for changes to the typical key shareholding levels and other protection measures for shareholders, which include changes to the MOI (see section 65 of the Act), whereby –

the minimum 50,01% votes to pass an ordinary resolution may be increased; and

the minimum 75% votes to pass a special resolution may be increased or decreased; but

a 10% margin between the minimum voting levels required to pass an ordinary and special resolution must remain.

It is important to realise that the spread of the shareholding for a specific case is a more relevant indicator of control, and that the shareholding percentages above are not required in a instances. It is therefore more important to analyse the exact shareholder composition for each case nd to identify a shareholder's ability to pass an ordinary or a special resolution.

The Companies Act 71 of 2008 further prescribes 'affected transactions', including certain mergers and acquisitions, where certain ownership percentages could have an impact on the alue of shares through prescribed mandatory offers, compulsory acquisitions and other actions.

Other matters affecting control include contractual agreements and the acquisition of a minority interest with a swing vote potential (Pratt, 2001), for example a company could have three shareholders who hold, respectively, 40%, another 40% and 20% of the shareholding. (There are no other contractual arrangements affecting control in this case.) If one of the holders of a 40% shareholding were to acquire the 20% shareholding, this minority holding could represent a swing vote (it would increase this shareholding to 60%) and could therefore dictate either a lower minority discount on the 20% share (compared to a controlling share), or a control premium on the 20% share (compared to a minority share without swing vote potential).

11.4.8 Shares publicly traded on a securities exchange

Publicly trading securities, for example on the JSE, may enhance the value of public companies by offering several benefits, including –

access to large amounts of new capital to facilitate growth, such as equity finance (e.g. ordinary classified shares), or debt finance (e.g. through bonds that may also be quoted on an exchange, such as the Bond Exchange of South Africa, a division of the JSE); and
facilitating the easy transfer of ownership of previously issued securities (referred to as the secondary market), which also enhances their marketability.

Market data and compulsory disclosures by quoted companies provide an additional benefit of access to information, which may be of value to many role -players, including investors, analysts and the financial media. Note that marketability also affects the value of ownership in a private equity business. As shareholding in a private equity business is less marketable, one often applies a marketability discount to the value of these shares (discussed below) when utilising public data available for a quoted company to value ownership in a private equity busin ss.

Publicly trading se urities also have disadvantages, including –

high cost (in luding the cost to prepare compulsory disclosures and to meet additional legal requirements);

increased level of scrutiny; and

increased press re to meet projections.

For this reas n, not all large companies decide to publicly trade their securities; some companies even decide to delist in s me cases, for example through a leveraged buyout.

11.4.9 Hidden factors

'Buyer: beware the hidden flaws.' Even if there is an increased focus on consumer protection and corporate governance today, these cautionary words are unfortunately still relevant. Knowingly or unknowingly, sellers re f r more likely to emphasise the positives of a transaction than the negatives.

Hidden factors may therefore directly affect the value of a business, for example, the value of its assets may be overstated, or the business may have a hidden liability that may also inadvertently be assumed by a buyer as part of the transaction. For these reasons, a buyer has to apply a certain standard of care before investing in a

business, especially when investing in the equity of a business. The application of this standard of care by the buyer is often facilitated by so-called due diligence investigations.

Due diligence investigations

Due diligence investigations represent a specialist area and may cover many areas, including financial matters, legal matters, environmental matters, ICT system matters, or even compatibility matters which involve investigating the strategic match of parties to an intended merger or acquisition. The areas of emphasis in due diligence investigations are often linked to the specific business, for example a waste-disposal company may have higher risks related to environmental matters than ICT system matters.

11.5 Other valuation matters

11.5.1 Valuation premiums and discounts

Valuation premiums and discounts are much debated, firstly because they exist as a result of using imperfect data in a valuation, and secondly, because they often have a significant effect on the end value. Imperfect data is often used due to a lack of alternatives because appraisers ften need to 'measure value in one type of market based on the actions of buyers and sellers in a different type of market' (Pratt, 2001: xxi). (The chosen valuation methodology will therefore also impact on the pre ium or discount, as illustrated in later examples.)

By contrast, empirical data exists to support, at least, the concept of certain premiums and discounts (e.g. Business Valuation Resources, 2009).

Several different premiums and discounts have been d scrib d. These fall into two main categories –

entity level premiums and discounts (e.g. key person risk or concentrated customer base), which are usually dealt with as part of the usual processes of the chosen methodology of valuing a business enterprise; and

owner level premiums and discounts (e.g. control premiums, minority discounts and marketability discounts), which, if appropriate, are preferably applied to the market value of equity separately at the end of the 'usual' valuation steps (e.g. after discounting entity cashflows or after multiplying earnings with an adjusted earnings multiple).

The overall recommendation in this chapter is that the relevance of valuation premiums or discounts be assessed for each business on a case- by-case basis. This section briefly describes the more prominent owner level premiums and discounts, including the ones that are most prominent in a South African context.

Owner level premiums and discounts *(Intermediate)*

Minority discount

A minority discount is the p rc ntage deducted from the *pro rata* value of a 100 % controlling interest in a ct business enterpris , to r fl the absence of the powers of control applicable to a minority interest (Pratt, 2001).

Cont ol p emium

The control premium is the inverse of the minority discount. A control premium thus reflects the percentage added to the *pro rata* value of a non-controlling interest to reflect the powers of control (Pratt, 2001).

Marketability discount

A marketability discount, also known as an illiquidity discount, is the percentage deducted from the value of a shareholding to reflect the shares' lack of liquidity (or the difficulty to convert them into cash). It is not to be confu ed with the minority discount, but the level of shareholding could influence the marketability discount, as a 100% hareholding in a private equity business is generally easier to sell than a 20% shareholding, for examp e.

Other factors affecting the marketability discount include:

the cost of achieving an initial public offering (IPO) in South Africa;

the cost of preparing a sales transaction; and

the possibility of receiving deferred transaction proceeds (PwC, 2010).

Black Economic Empowerment (BEE) lock-in discount

Broad-Based Black Economic Empowerment (B-BBEE) remains a central component in transformation in South Africa. In an endeavour to ensure longer-term commitment and benefits, BEE structures typically contain clauses restricting the transferability of these shares for a certain period (commonly referred to as a lock-in period).

BEE lock- in discounts remain a contentious issue and are not to be confused with the usual marketability discount. However, the majority of South African valuation practitioners have indicated that they applied a BEE lock-in discount to value an existing BEE shareholding, where such a condition existed (PwC, 2010).

In an appendix to this chapter there is a summary of average owner level premiums and discounts applied in practice.

Example: Owner level premiums and discounts *(Intermediate)*

Assume that there are two identical companies, except for the fact that one is listed on a Securities Exchange, while the other represents a private equity business.

Assume further that shares in the listed company trades for R100 per share and that market conditions make this price reflective of a controlling interest value.

Required:

Determine the fair market value per share belonging to:

a non-controlling share in the private equity company; and

a non-controlling share in the private equity company belonging to a Broad-Based Black Economic Empowerment (B-BBEE) shareholder with a lock-in period.

Solution: Value per share

		R
	Price of a single share in the listed company (reflective of a controlling interest) **Less**: Minority discount, for lack of control (e.g. 16% × R100)	100 (16)
	Value of a single share in the private equity company (adjusted for lack of control, but not for lack of marketability)	84
	Less: Marketability discount (e.g. 14% × R84)	(12)
(a)	Value of a single share in the private equity company (belonging to a non-controlling shareholder)	72
	Less: BEE lock-in discount (e.g. 7% × R72)	(5)
(b)	Value of a single share in the private equity company (belonging to a BEE non-controlling shareholder, with a lock-in discount)	67

Note: Figures may not orre tly total due to rounding.

Note: ***For examination purposes the exact discount percentage used in the example is not particularly important; more important is the principle of when to apply a premium or discount.***

Remember that a minority discount is the inverse of a control premium. If one were to value the price of a single controlling share in the listed company (if the R100 price was not provided), but had been supplied with the price of a single share in the private equity company equal to R84 (as shown ab ve), the calculation would be as follows: R84 × (1 + 19%) = R100, or R84 + R16 control premium = R100. Therefore both the minority discount and control premium result in a difference of R16, but the percentages differ due to the different bases to which they are applied (a 16% minority discount is applied to R100, but a 19% control premium is applied to R84).

11.5.2 Generally accepted valuation standards

A valuation practitioner is expected to comply with certain professional valuation standards. These standards include standards of planning, supervision, professional care, independence, use of reliable and relevant

information, the following of appropriate procedures, using appropriate methodologies, keeping adequate records, and standards of reporting.

In this regard, the International Valuation Standards Council is a well-established international standard setter for valuation. Through its International Valuation Standards Board, the International Valuation Standards Council develops and maintains generally accepted valuation standards, which has been published since 1985.

11.5.3 Valuation report

A valuation report is usually a substantial document and forms an integral component of generally accepted valuation standards. Typical elements are highlighted here to serve main y as a point of reference, but the exact content will differ depending on the facts and circumstances of every case. A complete valuation report is seldom required for examination purposes; students should therefore p y p rticul r attention to the exact wording of the required section and the number of marks allowed.

A useful sample valuation report is provided by Reilly and Schweihs (1999) and contains most of the following elements:

1 an introduction;

2 the terms of reference, including a description of the assign ent and the sources of information;

a summary description of the business enterprise;

a description of the definition of value used;

a brief description of the economic indicators of the countri s in which the business enterprise operates;

a history and description of the business enterprise, including industry factors;

a financial statement analysis, including ratio analysis, for a few years;

a discussion of the valuation methodology, method and model used;

a description of the key input variables to the valuation model, including the discount rate (where appropriate);

a discussion of the key discounts and premiums applied;

a reasonability test;

a valuation conclusion; and

appendices to the valuation report, which may include amongst others:

– a statement of limiting conditions, for example that the appraiser relied on inputs provided by management, or an indication of where a limited due diligence investigation was performed;

– an appraisal c rtification, for example an indication of the exact assets that were physically inspected, a certification that the appraiser does not hold a personal interest in the assets or business, and a certifi ation that the fees are not contingent on the outcome of the valuation; and

– a des ription of the qualifications of the principal analyst and appraiser.

Disc ssion of certain valuation methodologies, methods and models

Before valuation methodologies, methods and models can be discussed it is important to first differentiate between the c ncepts of overall firm value, MVIC (Market Value of Invested Capital), and the value of equity; and sec ndly, to understand whether a specific method or model is designed to directly determine overall firm value, MVIC and the value of equity.

Overa firm value represents the value of an entire business enterprise, whereas MVIC represents the value of operations (this will equal overall firm value if there are no non-operating assets) . The value of equity is that which remains of the overall firm value after the values of senior-ranking forms of capital have been deducted (such as preference shares and debt).

When determining the value of equity by using a valuation method or model designed to directly determine the MVIC (e.g. a method based on a MVIC/EBITDA multiple or a Free Cashflow model) an appraiser will have to *add* the value of non-operating assets and *deduct* the value of other senior-ranking forms of capital in order to

determine the value of equity. In contrast, certain valuation methods or models determine the value of equity directly (e.g. the price of a recent equity investment or a method based on a P/E multiple).

A selection of methodologies, as well as some of the methods and models relating to them, is discussed below.

11.6.1 Price of recent investment

A valuation method based on the price of recent investment applies the following basic formulae:

$$\text{Value of an 100\% equity shareholding} = \text{Price of recent investment (excluding transaction costs)} \times \frac{100\%}{\%\text{ shareholding obtained in recent investment}}$$

$$\text{Post-money valuation} = \text{new investment} \times \frac{\text{Total post investment shares outstanding}}{\text{Shares issued for new investment}}$$

$$\text{Post-money valuation} = \text{Pre-money valuation} + \text{new investment}$$

The price paid for a recent investment in a business enterprise c uld pr vide a good starting point for valuing a follow-on (subsequent) investment in the same enterprise. For valuation purposes, the price of recent investment should *exclude* transaction costs as this is not considered a characteristic of an asset (Equity and Venture Capital Valuation Board (IPEV), 2012).

Usually a young company receives several rounds of financing. Here a 'pre-money valuation' refers to the valuation of the business enterprise *before* a new round of inv stment/financing. It follows that a 'post-value valuation' refers to the value *after* the new round of inv stm nt/financing.

The price paid for a recent investment in a business enterprise could further also provide a good starting point for valuing an investment in a *similar* enterprise – although here information could be hard to come by. Moreover, the price of recent exits from an investment (e.g., an investment made and then sold by a private equity fund or venture capital house) could also give an indication of the later value of a similar enterprise that is in an earlier stage of its development. In this case, however, significant adjustments would be required, thereby reducing its reliability.

In all cases the background of the transaction, level of the investment, and changes in risk and prospects should be considered to ensure comparability. In addition, the transaction date of this investment should be fairly close to the date of the current valuation, otherwise the passage of time would reduce the suitability of this methodology.

Application of this methodology

This methodology is often applied to value a business enterprise with the following characteristics –

- a business in the arly stag s of its life (especially early stage technology businesses and those involved in scientific innovation); and

  where a re ent investment was made (at a certain price); and

  where the e is little or no historical earnings and cash-flow information; and/or

  where it is difficult to project earnings or cashflows for the entity.

Other considerations

An appraiser sh uld consider other factors, including typical milestones, benchmarks and key market drivers for such a business enterprise, where these factors could influence the value of the business compared to the recent transacti n. These factors could include measures such as revenue growth, patent approvals, customer urveys and assessment of market share (IPEV, 2010).

Examp e *(Fundamental)*

An existing company has received a capital injection as recently as six months ago (a so-called Round B investment), whereby an existing shareholder invested R10m in return for an additional 8% equity stake in the business. At the time this was considered a fair price, representative of an arm's length transaction. (This shareholder remains a minority shareholder). The total number of equity shares in issue after the round B investment was 100 shares.

The company now requires R5m expansion capital (Round C investment). The company's risk profile and market prospects remained similar over the past six months. Transaction costs linked to the issue of new shares will equal roughly 0,5% of the investment.

Required:

Ignoring any possible control premium for purposes of this example:

Determine the present market value of an 100% equity shareholding in the company based on the price of recent investment (before Round C investment).

Explain whether the price of recent investment would be a reasonab e basis for determining a market price in part (a).

Determine a current pre-money valuation (before Round C investment).

Determine a post-money valuation following Round C investment.

Calculate a fair number of shares to be issued to the Round C investor.

Part (a)

Recent investment	R10m	
In return for an equity stake of	8%	
Market value of 100% equity (R10m × (100%/8%)	**R125m**	(Here implying a minority perspective)

Part (b)

The price of recent investment would be a reasonable indicator of the current market value of all equity in this case because:

originally, it was priced at arm's length;

the company's risk profile and market prospects remained fairly similar in this case; and

time value of money would not have a significant impact on this (rand denominated) value as six months is a relatively short period.

Had the period been more than six months or did the other circumstances not apply, this valuation method would become less reliable due to the impact of time value of money, a higher probability of changes in circumstances, and an unreasonable starting point.

Part (c)

Pre-money valuation (before Round C investment) equals the same value as in part (a)	**R125m**	(Here implying a minority perspective)

Note: transaction costs are included in this and later calculations.

Part (d)

Post-money valuation = Pre-money valuation + new investment

Pre-money val ation	R125m	
New investment (Ro nd C investment)	R5m	
P st-m ney valuation after Round C investment	**R130m**	(Here also implying a minority perspective)

Part (e)

$$\textbf{Post-money valuation} = \textbf{new investment} \times \frac{\textbf{Total post investment shares outstanding}}{\textbf{Shares issued for new investment}}$$

Let X be the new number of shares to be issued, then:

R130m = R5m × (100shares + **X**) / **X**
R130m / R5m = (100 + **X**) / **X**
26 = (100 + **X**) / **X**
26X = 100 + **X**
26X-1**X** = 100
25**X** = 100
X = 4 shares

Thus, four new shares will have to be issued to the Round C investor.

11.6.2 Earnings multiples

This method forms part of the valuation methodology based n multiples and the market comparable approach. In an appendix to this chapter, valuation outlines that can be used by a student when applying this method in an examination are supplied.

Listed companies trade in an active market and therefore have a published market price for their shares. One can then calculate earnings multiples as a function of these arket prices. These earnings multiples, in turn, can then serve as a reference that could be adjusted to value a similar entity, without a known market price.

A valuation method based on earnings multiples appli s the following basic formula:

Value = maintainable earnings for a single year × adjusted earnings multiple

Application of a method based on earnings multiples

Earnings multiples can be applied to value a private equity business enterprise, a majority shareholding in such an entity, or a minority shareholding.

Some business appraisers argue that this method should not be used to value a minority shareholding in a business. However, in principle it should be possible to value a majority or minority shareholding using this method – provided appropriate adjustment is made for owner level differences (between the owners of shareholding being appraised and the owners of the comparator entity). (Refer to the section entitled 'Valuation premiums and discounts'.)

Such an application is supported by the valuation methodology survey conducted by PwC (2010). This survey indicates that earnings multiples are used by valuation practitioners in South Africa to value both majority and minority equity shareholdings in a business, but that appropriate owner level premiums and discounts are then incorporated.

More reliable results will be obtained from this method where the following conditions are met –

the business enterprise is a going concern;

the business ente prise is already established;

there is an earnings history;

contin ing earnings are expected to be maintainable;

the maintainable earnings are expected to be positive (i.e. not a loss);

a similar c mparator listed entity is available;

non-operating assets of the entity are valued separately; and

when used to value a multi-business entity, each business is treated separately.

Selection of a comparator entity

In order to value a private equity business entity using this method, a comparator listed company should be identified with similar risk attributes, as well as similar prospects for return on invested capital and growth in earnings.

This is more likely to be the case where both businesses have similar business activities, are serving similar markets, operate in the same areas and are of the same size.

When using this method, a comparator entity's earnings multiple is taken as a reference, to which certain adjustments are applied, before multiplying it with the maintainable earnings of an entity to eventually obtain a value. The purpose of the initial aim – to find a *similar* listed company – is to reduce the number of adjustments to be made to the comparator earnings multiple. (These adjustments are not only difficult to make, they are often subjective, sensitive, and normally have a big effect on value.)

When valuing a South African business enterprise, a listed South African entity with similar business activities might be difficult to find. As a result, foreign listed companies are sometimes used as the comparator entity. Notice that in the latter case, adjustments could still be required for the other differences, including country risk.

Available comparator earnings multiples

Several comparator earnings multiples exist that could be applied, including –

Price/Earnings (P/E) multiples;

Market Value of Invested Capital/Earnings Before Interest, Tax, Depreciation and Amortisation (MVIC/EBITDA) multiples;

Market Value of Invested Capital/Earnings Before Interest and Tax (MVIC/EBIT) multiples; and

Market Value of Invested Capital/Earnings Before Interest, Tax and Amortisation (MVIC/EBITA) multiples.

Of these, the first two comparator multiples are more commonly used and are discussed further below. Since many of the principles apply equally to all earnings multipl s, the bulk of the discussion is placed with the P/E multiple method. It is therefore not repeated unnecessarily when discussing the MVIC/EBITDA multiple method.

In practice, MVIC is sometimes referred to as Enterprise Value (EV) – a term that has been used in prior editions of this text. However, EV is frequently calculated using different formulas, which may cause confusion. The term MVIC is therefore preferred and is used in this chapter.

Note that earnings multiples could be described in different ways, depending on the use of different denominators (the figure below the line), as follows:

A 'historical' or 'trailing' multiple, where its denominator is based on historical earnings for one financial year (this is the default) *(Fundamental)*;

A 'current' multiple, where the denominator is based on current, annualised earnings of a financial year not ended yet *(Intermediate)*; or

A 'forward' multiple, where the denominator is based on projected earnings, *e.g.* from analysts' consensus forecast *(Int rm diat)*.

Example: Trailing, current and forward multiples

The current market pri e of a listed company is 1 010 cents per share. The company's latest annual financial statements for the year ended 20X2 reported earnings of 120 cents per share.

Interim financial statements for the first six months of the current financial year ending 20X3 reported earnings of 65 cents per share, whereas the up-to-date management accounts of the company for the second six months of 20X3, which is just about to end, has indicated earnings of 66 cents per share.

In line with these results, it was not necessary for the company to publically issue any profit warning. Generally, the c mpany's earnings do not vary significantly from month to month.

Recent analysts' consensus forecast for the company indicated expected earnings of 140 cents per share for the future year ending 20X4.

Assume that the formula for the P/E multiple is:

$$\text{P/E} = \frac{\text{Current market price per share}}{\text{Earnings per share}^{1}}$$

[1] Either for the most recent (single) historical year, for the current year (annualised), or a (single) forecast year

Required:

Determine the company's *trailing* P/E multiple at the end of the current financial year ending 20X3. *(Fundamental)*

Determine the company's *current* P/E multiple at the end of the current financial year ending 20X3, assuming insider information. *(Intermediate)*

Determine the company's *current* P/E multiple at the end of the current financial year ending 20X3, making use of only publically-available information. *(Intermediate)*

Determine the company's *forward* P/E multiple at the end of the current financial year ending 20X3. *(Intermediate)*

Solution:

Trailing P/E multiple *(Fundamental)*

Trailing P/E multiple = Current market price per share / earnings per share for the historical year 20X2
= 1 010 c / 120 c
= 8,4

This implies that the current market price would be recovered in 8,4 years by earnings of 120 cents per annum.

Current P/E multiple, with insider information *(Int rm diate)*

Current P/E multiple = Current market price per share / earnings per share for the current year 20X3 with insider information (annualised)
= 1 010 c / (65 c + 66 c)
= 1 010 c / 131 c
= 7,7

This implies that the current market price would be recovered in 7,7 years by earnings of 131 cents per annum. Notice that the earnings per share of 131 cents above are already reflective of a period of 12 months and therefore does not have to be annualised.

Current P/E multiple, without insider information *(Intermediate)*

Current P/E multiple = Current market price per share / earnings per share for the current year 20X3 calculated based on publically available information (annualised)
= 1 010 c / (65 c × 12/6)
= 1 010 c / 130 c
= 7,8

This implies that the urrent market price would be recovered in 7,8 years by earnings of 130 cents per annum. Noti e that the earnings per share per the interim results of 20X3 are for six months and therefore have to be annualised. In this case it is merely multiplied by 2 (or multiplied by 12 divided by 6), since no profit warning was issued and since results generally do not vary significantly from month to month.

Forward P/E m ltiple *(Intermediate)*

F rward P/E multiple = Current market price per share / forecast earnings per share for the future year 20X4
1 010 c / 140 c
7,2

This implies that the current market price would be recovered in 7,2 years by earnings of 140 cents per nnum.

Maintainable earnings

When using earnings multiples to value a business enterprise or equity shareholding, a comparator listed entity's earnings multiple is taken as a reference, to which certain adjustments are applied, before multiplying it with the maintainable earnings of the subject entity.

Example

In this process the maintainable earnings figure of the business entity being valued should also be comparable to the adjusted earnings multiple used in the valuation. When applying an adjusted *trailing* P/E multiple, for instance, one normally uses the *historical*, maintainable headline earnings for one year. Furthermore, when applying a *forward* MVIC/EBITDA multiple, for example, one should use the *forecast*, maintainable EBITDA of the entity for one year.

Ensuring reliability and relevance

In determining maintainable earnings it is important that the appraiser ensures that the maintainable earnings figure is as reliable and relevant as possible. Historical audited inf rmati n should of course be reliable in a historical context, but might be less indicative of the future, which is better captured in a forecast earnings figure. The appraiser therefore has to apply some judge ent to deter ine the appropriate trade-off between the reliability and relevance of the earnings figure.

Ensuring sustainability

Moreover, a maintainable earnings figure will have to be sustained in the future. Adjustments will therefore have to be made for certain items, which may include: Exc ptional events, adjustment of expenditure to realistic levels (such as management fees), non -recurring items, discontinued business operations, adjustment of income and expenditure that does not relate to the main business operations (and which is valued separately), and adjustment to current tax rates (where this may have changed).

Determining a trend

Even after all these adjustments are made to an earnings figure (either historic, current or forecast), it is still not always clear whether this figure is likely to be maintainable in future. For this reason, a number of year's earnings figures are adjusted for the items indicated above; these are then compared side-by-side in order to identify a trend.

Although not always a best valuation practice, appraisers frequently estimate maintainable earnings based on trends, as follows –

- in the case of a consistent upward trend over the years analysed – use the latest earnings figure as the maintainable earnings;
- in the case of a consist nt downward trend over the years analysed – use the latest earnings figure as the maintainable arnings, but in this case, it should be questioned whether the entity should in fact be valued using a method based on an earnings multiple as the going concern assumption may not hold;
- in the case of no lear trend over the years analysed – use a weighted average of the earnings figures as the maintainable earnings.

The o tline provided as an annexure later in this chapter provides further guidance in this regard.

Example: Maintainable earnings *(Fundamental)*

Three separate c mpanies reported the following historical earnings figures:

	20X0	**20X1**	**20X2**
	R'000	**R'000**	**R'000**
Company A: Earnings	1 000	1 100	1 200
Company B: Earnings	1 000	900	800
Company C: Earnings	1 000	900	1 100

All earnings figures are free from the effects of exceptional events, non-recurring items, and discontinued business. All expenditure included in the reported earnings is at realistic levels (e.g. market- related management fees were charged). Furthermore, all income and expenditure relates only to the main business operations.

Required:

Provide an estimate of the likely maintainable earnings for Company A, B and C if no further information is available.

Solution:

Company	Trend in earnings	Likely maintainable earnings	Maintainable earnings estimate R'000	Calculation
A:	Upwards	That of the latest year	1 200,0	–
B:	Downwards	That of the latest year	800,0	–
C:	No trend	Weighted average	1 016,7	$\frac{(1 \times 1\,000) + (2 \times 900) + (3 \times 1\,100)}{(1 + 2 + 3)}$
				$= \frac{6\,100}{6}$

Valuation method based on a P/E multiple

The P/E multiple has historically been applied extensively, but it is sensitive to differences between the entities, including differences in financial gearing, the age of the underlying assets (affecting the depreciation charge), and effective tax rates.

A P/E multiple for the comparator listed entity is often supplied by the financial press. Although not always specified as such, it usually represents a *trailing* P/E multiple, or where interim results were published, a *current* (annualised) P/E multiple. As highlighted, it could also be based on a forecast year in which case it is called a *forward* P/E multiple.

Using these inputs, it is calculated as follows:

$$P/E = \frac{\text{Closing market price per share}}{\text{Diluted headline earnings per share (for one year)}}$$ **or**

$$P/E = \frac{\text{Current full market capitalisation}}{\text{Total dilut d h adline earnings (for one year)}}$$ **or**

$$P/E = \frac{1}{\text{Earnings yield percentage}}$$

The earnings yield pe centage (EY%) is closely related to the P/E multiple. It is usually calculated as follows:

$$EY\% = \frac{\text{Dil ted headline earnings per share (for one year)}}{\text{Closing market price per share}} \times 100$$ **or**

$$EY\% = \frac{\text{Total diluted headline earnings (for one year)}}{\text{Current full market capitalisation}} \times 100$$ **or**

$$EY\% = \frac{1}{P/E} \times 100$$

In order to avoid confusion it is **recommended that students focus on the P/E multiple, not the EY%,** and if provided with a comparator EY% in a test or examination, to convert it into a P/E multiple using the relevant formula above.

An outline is provided as an annexure to this chapter to guide a student in applying this method in an examination context. Other relevant matters are discussed in this section, including examples illustrating the concepts.

Headline earnings *(Intermediate)*

As indicated, the P/E multiple of a comparator listed entity in South Africa is usually calculated using *headline earnings*. If this P/E multiple is to serve as the starting point in valuing a private equity business entity, then it is important to understand how it is calculated. A detailed exploration of the calculation of headline earnings falls beyond the scope of this text, but further details can be found in Circular 2/2013, published by SAICA (2013).

The JSE specifies the calculation of headline earnings as part of its listings requirements, in order to provide an earnings figure to the users of financial statements *that better reflects the operating/trading earnings of the entity, after interest and tax*.

'The operating/trading items are essentially those that reflect performance in the current period (sales, salaries, etc.) and that can be extrapolated . . . into the future' (SAICA, 2013:5) . In the calculation of headline earnings, re-measurements of a capital nature (such as gains on the dispos l of pl nt and equipment or impairment of these types of assets) are thus ignored, but re-measurements rel ting to the operations of the entity (such as impairment of the carrying value of inventories) are incorporated (SAICA, 2013).

Typical adjustments made to the comparator P/E multiple

Since a comparator entity is unlikely to be identical in all respects to the entity being valued, certain adjustments will have to be made.

Remember: one always aims to compare like to like (this applies to all atters relating to this valuation meth-od, including the way in which the comparator P/E multiple is calculated, timing, quality of earnings, riskiness, and growth expectations. To reiterate: Accurately adjusting for differences is not only very difficult, but often highly subjective; the greater the number and lev l of th se adjustments, the more *unreliable* this valuation method will become.

Nonetheless, typical adjustments made to the comparator P/E multiple include:

Adjustment for differences in business and finance risk, due to:

(Occasional adjustments)

- the level of borrowing (only if not accounted for in maintainable earnings);
- level of excess cash and non-operating assets (only if not valued separately and/ or not adjusted for at the comparator P/E multiple);
- relative age of non-current assets and need for reinvestment in assets (only if not adjusted for in maintainable earnings);

(Regular adjustments)

- difference in the level of competition;
- the relative size of the entities;
- access to finance;
- the reliance on a small number of key employees;
- the diversity of the product ranges; and
- differen e in the quality of earnings.

Adjustment for differences in the expectations of growth in maintainable earnings.

Example: P/E m ltiples (1) *(Fundamental to Intermediate)*

Assume there are two hypothetical South African business enterprises: Company Subject ('S') and Company C mparat r ('C').

Further assume that these two companies operate in the same industry and that they are *identical* in all re-pect , *except* as indicated in the **mutually exclusive** scenarios (1 to 4) below:

There are no differences between Company S and C.

The market views Company S as being slightly more risky than Company C (on an entity level).

The market expects slightly higher growth in the earnings of Company S over the next few years, when compared to Company C.

Company C is listed on the JSE, whereas Company S is not listed on a stock exchange.

Further assume the following additional information applies:

At present, Company C has a published trailing P/E multiple of 10.

At present, Company C has a full market capitalisation of R500 million (due to large block of shares recently traded, this is reflective of the value of a 100% equity shareholding).

Company S has earned maintainable headline earnings during the most recent financial year equal to R50 million.

Required:

Indicate which companies normally have *published* P/E multiples. *(Fundamenta)*

Indicate for **each** of the mutually exclusive scenarios (1 to 4), with re sons, whether the current fair market value of equity in Company S is expected to be the same, higher or lower than that of Company C. *(Fundamental)*

For <u>each</u> scenario (1 to 4), determine the value of an 100% equity share in Company S by applying a valuation method based on a P/E multiple and by using illustrative figures. Indicate and discuss all adjustments made (show positive and negative adjustments). *(Fundamental, but Scenario 4 is at an Intermediate level)*

Solution:

Part (a)

Only companies listed on a stock exchange would normally have *published* P/E multiples. In such a case, recent trades in the shares, made on the stock exchange, will indicate a market price for a share. This, in turn, will allow a P/E multiple to be calculated as follows:

- P/E = $\frac{\text{Closing market price per share}}{\text{Diluted headline earnings per share (for one year)}}$ (Trading information) (E.g. from the most recent audited financial statements) or
- P/E = $\frac{\text{Current full market capitalisation}}{\text{Total diluted headline earnings (for one year)}}$ (Market price per share × all issued shares) (E.g. from the most recent audited financial statements)

Part (b)

Scenario	Expectation of the fair market value of equity	Reason
1	The same	The companies are identical in all respects.
2	Company S < Company C	Since Company S is viewed as lightly more risky than C, a rational investor will be inclined to pay *less* for a shareholding in Company S, compared to a shareholding in Company C. (There is a greater chance of *not* receiving the same future benefits, such as dividends, from a shareholding in Company S.)
3	Company S > Company C	A rational investor will be inclined to pay *more* for a shareholding in Company S, compared to a shareholding in Company C. (There is a greater chance of receiving *more* future benefits from a shareholding in Company S, such as dividends, which may be declared due to higher levels of future earnings.)
4	Company S < Company C	On an entity level the companies are identical, which should not result in a difference in market value. However, on a shareholder level, shares in Company S would be more difficult to sell than those in Company C, due to the lack of a stock exchange listing. This '*marketability discount*' results from several factors, including the higher costs to sell (e.g. marketing costs) and the likelihood of a longer wait for the compensation ('time is money' and there may be deferred proceeds, etc.).

Part (c)

Scenario 1: No difference in the two companies

Step 1: Determine the maintainable headline earnings of the subject entity	**R' million**
Maintainable headline earnings of Company S	50

No adjustments are necessary here as already a *maintainable* figure

This figure is a historical figure for the most recent financial year and is thus *compatible* with the way the comparator P/E multiple of Company C was calculated (a trailing multiple, also expressed in terms of the most recent – historical – headline earnings)

Step 2: Adjust the comparator P/E multiple for differences in risk and growth f ctors on an entity level	**P/E**
Comparator P/E multiple of Company C	10
Adjustment for differences in business and finance risk, and growth expectations	
l No differences	None
Adjusted P/E multiple applicable to S	10

Step 3: Determine the value of an 100% equity shareholding in the subject entity	**R' million**
Maintainable earnings of Company S × adjusted P/E multiple = R50 illion × 10	500
Adjust for owner (shareholder) level differences	None
Fair market value of an 100% equity shareholding in Company S	**500**

(This value is *the same* as the value of an 100% shareholding in Company C, as expected (per part b))

Scenario 2: S more risky than C		**P/E**
Step 1: Determine the maintainable headline earnings of the subject entity		**R' million**
Maintainable headline earnings of Company S (same as for Scenario 1)		50
Step 2: Adjust the comparator P/E multiple for differences in risk and growth factors on an entity level		**P/E**
Comparator P/E multiple of Company C		10
Adjustment for differences in business and finance risk, and growth expectations		
l Company S is more risky	This is a negative factor for Company S, thus:	(–)
Adjusted P/E multiple applicable to S	Less than 10, say: 9	9

Step 3: Determine the value of an 100% equity shareholding in the subject entity	**R' million**
Maintainable earnings of Company S × adjusted P/E multiple = R50 million × 9	450
Adjust for owner (shareholder) level differences	None
Fair market value of an 100% equity shareholding in Company S	**450**

(This value is *less* than the value of an 100% shareholding in Company C, as expected (per part b))

Scenario 3: S has higher growth in earnings than C		**P/E**
Step 1: Determine the maintainable headline earnings of the subject entity		**R' million**
Maintainable headline earnings of Company S (same as for Scenario 1)		50
Step 2: Adjust the comparator P/E multiple for differences in risk and growth factors on an entity evel		**P/E**
Comparator P/E multiple of Company C		10
Adjustment for differences in business and finance risk, and growth expectations		
Higher growth in earnings expected for Company S		
This is a positive factor for Company S, thus:		(+)
Adjusted P/E multiple applicable to S	More than 10, say: 11	11

Step 3: Determine the value of an 100% equity shareholding in the subject entity	**R' million**
Maintainable earnings of Company S × adjusted P/E multiple = R50 million × 11	550
Adjust for owner (shareholder) level differences	None
Fair market value an 100% equity shareholding in Company S	550

(This value is *more* than value of an 100% shareholding in Company C, as expected (per part b))

Scenario 4: C is listed and S is not	**P/E**
Step 1: Determine the maintainable headline earnings of the subject entity	**R' million**
Maintainable headline earnings of Company S (same as for Scenario 1)	50
Step 2: Adjust the comparator P/E multiple for differences in risk and growth factors on an entity level	**P/E**
Comparator P/E multiple of Company C	10
Adjustment for differences in business and finance risk, and gr wth expectati ns	
l No differences on an entity level	None
Adjusted P/E multiple applicable to S	10
Step 3: Determine the value of an 100% equity shar holding in the subject entity	**R' million**
Maintainable earnings of Company S × adjusted P/E multiple = R50 million × 10	500
Adjust for owner (shareholder) level differences	
Marketability *discount*, say 5% (5% × R500 million)	(25)
Fair market value an 100% equity shareholding in Company S	**475**

(This value is *less* than value of an 100% shareholding in Company C, as expected (per part b))

Note: For this example it is critically important to be able to correctly adjust for differences between the subject entity and the comparator entity – that is, to correctly make either a positive or negative adjustment. At this stage, the size of each adjustment is less important.

Example: P/E multiples (2)

An appraiser of the value of the shares in a private equity company has already determined the following:

The trailing earnings yield percentage of a similar listed company equalled 8,333% on the valuation date (based on available information for the specific listed company, this should be reflective of a controlling shareholding).

The comparator P/E multiple should be reduced by 20% to account for differences in entity level risk and growth prospe ts between the entities.

The private equity company should be able to maintain the historical earnings of R100 000 in the future.

Shareholder level differences between the entities could be resolved by applying a discount of 5% to the val e of the shareholding in the private equity business to account for the necessary differences in marketability of the shares.

Required:

A i t the appraiser by calculating the market value of all equity shares in the private equity business by applying a method based on a trailing P/E multiple. *(Fundamental)*

Determine the fair market value of all equity shares by incorporating the effect of shareholder level differences. *(Intermediate)*

Solution:

Part (a)

First translate the earnings yield percentage to a P/E multiple

(This is recommended practice when dealing with this type of valuation methods.)

Maintainable historical earnings of the subject entity	=	R100 000
Comparator trailing P/E multiple	=	1 / earnings-yield percentage
	=	1 / 8,333%
		Multiple
	=	12,0
Adjusted for entity level differences (20% × 12)		(2,4)
Adjusted P/E multiple		9,6
Value of all equity in the subject entity based on the adjusted P/E multiple	=	R100 000 × 9,6
Market value of equity (before adjusting for shareholder level differences)	=	R960 000

Part (b)

Continued from part a)

Market value of equity (before adjusting for shareholder level differences)	=	R960 000
Adjust for shareholder level differences (5% × R960 000)		(R48 000)
Market value of all equity shares in the subject ntity		R912 000

Note that some textbooks co-mingle the adjustments for entity level and shareholder level risks, by incorporating the effect of both when adjusting the comparable P/E multiple. (If performed correctly, this should result in the same answer. However, it is better to keep these adjustments separate – as treated above – as this should allow for more accurate adjustments in most cases.)

Example: P/E multiples (3) – determining maintainable earnings *(Fundamental)*

The following information on financial performance and some additional information relates to a private company. Financial information was compiled based on IFRS for SMEs, unless otherwise indicated.

An extract from the:

Statement of Profit/Loss and Other Comprehensive Income for the year ended 28 February

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
Earnings before xc ptional items (1)	1 636	1 694	2 770	2 847
Exceptional it ms (2)				750
Earnings before interest and tax	1 636	1 694	2 770	3 597
Interest expense (3)	(20)	(20)	(30)	(30)
Earnings befo e tax	1 616	1 674	2 740	3 567
Income tax expense (4)	(662)	(670)	(959)	(926)
Earnings for the year from continuing operations	954	1 004	1 781	2 641
Pr fit n / (loss on closure of) discontinued operations	115	110	15	(90)
Earnings f r the year	1 069	1 114	1 796	2 551

Note: **Figures may not total correctly due to rounding.**

Additional information:

1 Earnings before exceptional items were calculated after taking the following into account:

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
Investment income other than interest: Dividends received on listed investments				10
Director's remuneration (5)	(900)	(900)	(900)	(900)
Operating lease (6) – actual amounts paid	(240)	(240)	(240)	(240)
Impairments				
Trade receivables	0	0	0	(5)
Plant and equipment	(20)	0	0	0

Exceptional items

The exceptional item relates to profit on the disposal of land.

Interest expense

Amounts shown represent actual interest amounts paid. Interest is payable on an intercompany loan, which bears preferable interest rates.

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
A market-related interest expense on the loan would have been:	30	30	40	40

4 Income tax

	20Y9 %	20X0 %	20X1 %	20X2 %
Actual income tax rates for the year	40	40	35	28

Capital gains tax inclusion rate for the year 20X2 is equal to 66,67%.

5 Directors' remuneration

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
Fair directors' remuneration would be:	1 000	1 080	1 166	1 260

6 Operating lease

Premises are leased from a related company.

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
Fair operating lease amounts on these premises on a straight line basis would have b n:	360	360	360	360

Required:

Determine the company's maintainable earnings at the end of the 20X2 financial year, to be used in determining the fair ma ket value of equity using a method based on a trailing P/E multiple.

Solution:

Determine the adjusted, headline earnings figures for each year provided:

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000
Earnings before exceptional items	1 636	1 694	2 770	2 847
Adjust for:				
Investment income – exclude as not of an operating/trading nature and investment is to be valued separately using another method				(10)
Fair directors' remuneration: additional amounts above R900' pa	(100)	(180)	(266)	(360)
Fair operating lease amount: additional amounts above R240' pa	(120)	(120)	(120)	(120)
Impairments: Trade receivables – do not add back as of an operating/trading nature				–
Impairments: Plant and equipment – add back as not of an operating/trading nature	20			
Adjusted earnings before exceptional item	1 436	1 394	2 384	2 357
Exceptional items – exclude as not of an operating/trading nature				–
Interest expense – adjust to market-related figures	(30)	(30)	(40)	(40)
Adjusted earnings before tax	1 406	1 364	2 344	2 317
Income tax expense at 28% (i)	(394)	(382)	(656)	(649)
Profit/loss on discontinued operations – exclude (ii)	–	–	–	–
Adjusted earnings for the year	1 012	982	1 688	1 668
Movement		– 3,0%	+ 71,9%	– 1,2%

Determine maintainable earnings:

Analysing the adjusted earnings for the past four years display no clear trend. Further investigation is required to ascertain whether the major increase that occurred in the 20X1 year is sustainable.

If it is *clearly sustainable*, then calculate the weighted average adjusted earnings as follows:

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000	Result
Adjusted earnings for the relevant years			1 688	1 668	
Weight			1	2	3
Weighted			× 1/3	× 2/3	
			563	1 112	1 675

Thus, if the increase in arnings for 20X1 is likely to be sustainable, then the maintainable earnings at the end of the 20X2 finan ial year equals R1 675 000.

If it is *not clear whether this increase will be sustainable*, then calculate the weighted average adjusted earnings as follows *(Inte mediate)*:

	20Y9 R'000	20X0 R'000	20X1 R'000	20X2 R'000	Result
Adjusted earnings for the relevant years	1 012	982	1 688	1 668	
Weight	1	2	3	4	10
Weighted	× 1/10	× 2/10	× 3/10	× 4/10	
	101	196	506	667	1 470

Thus, if the increase in earnings for 20X1 is not clearly sustainable, then the maintainable earnings at the end of the 20X2 financial year equals R1 470 000.

Note: Since the maintainable earnings figure will be used as a variable in determining the fair market value of equity, and since its calculation* excluded *income from non-operating assets, for example, one should make a mental note that these items should be valued separately. Note: Figures may not total correctly due to rounding.

Notes on adjustments made:

The income tax expense is restated at the current rate. Non-taxable/non-deductible items have already been adjusted for (assuming impairment on trade receivable qualify as a tax deduction).

The profit/loss on discontinued operations is excluded as this will not be sustained into the future, and is therefore not maintainable.

Example: P/E multiples (4) – determining the fair market value of a shareholding *(Intermediate)*

Shield Industrial (Pty) Ltd manufactures garden furniture and swimming pool safety fences. An extract from the management accounts (prepared on a historical cost convention) is shown be ow:

Summarised Statement of Financial Position as at 31 December 20X2

	R
Share capital	200 000
Reserves	400 000
Debt	1 200 000
Total capital and debt	R1 800 000

Summarised Statement of Profit/Loss for the year ended 31 Dece ber 20X2

	R
Net operating income	600 000
Less: Interest on borrowings	(120 000)
Net profit before tax	480 000
Less: Taxation	(134 400)
Net profit after taxation	R345 600

Information relevant to a similar listed entity in the industry:

1 Trailing P/E multiple of a similar listed company in this sector 9

(Based on available information this is not reflective of a controlling shareholding)

2 D:E ratio based on market values
(This ratio is close to the optimal for this industry.) 1:1

3 Cost of debt (before tax) 10%

Information relevant to Shield Industrial:

Interest on borrowings would have totalled approximately R100 000 before tax for the year ending 31 December 20X2, if the company had a D:E ratio, based on market values, similar to that of the listed entity.

Differences in entity level business risks and growth prospects between Shield Industrial and the similar listed company should equate to a reduction of 25% in the comparable P/E multiple.

Differences in sha eholder level risks to the similar listed company should result in a control premium to the value of 20%.

Differences in shareholder level risks to the similar listed company should result in a marketability discount to the val e of 5% of the equity value adjusted for entity and other shareholder differences.

Required:

Determine the fair market value of an 100% equity shareholding in Shield Industrial (Pty) Ltd.

Solution:

Adjustment to earnings for difference in D:E ratio:	**R**
Net operating income	600 000
Interest expense with a D:E ratio of 1:1 (based on market values)	(100 000)
Net profit before tax	500 000
Less: Taxation (rate = 28% [134 400 / 480 000])	(140 000)
Adjusted historical earnings	360 000

	Multiple
Comparator trailing P/E multiple	9,00
Adjusted for differences in entity level business risk (25% × 9)	(2,25)
Subtotal	6,75
Adjusted for differences in entity level finance risk (not performed as the maintainable earnings were adjusted) Adjusted trailing P/E multiple	– 6,75

	R
Value of all equity based on adjusted P/E multiple (6,75 × R360 000)	2 430 000
Adjustment for immediate equity injection required to repay debt (in order to obtain a D:E ratio of 1:1)	(200 000)

Interest expense is too high by R20 000 (R120 000 – R100 000).
The value of the equivalent 'excess' debt could be stimat d as follows:
Interest expense after tax / cost of debt (after tax)
R20 000 × (100% – 28%) / [10% × (100% – 28%)]
R14 400 / 7,2%
R200 000
Thus D:E equals (1X + 200 000):1X, but should equal 1X:1X, that is the company requires an equity *injection* equal to R200 000 to bring the ratio to (1X + 200 000): (1X + 200 000), and would then use the R200 000 equity to pay off excess debt, which gives: (1X + 200 000 – 200 000):(1X + 200 000 – 200 000), or just 1X:1X

	R
Value of all equity assuming no shareholder level differences	2 230 000
Control premium (20% × R2 230 000)	446 000
Subtotal	2 676 000
Marketability discount (5% × R2 676 000)	(133 800)
Fair market value of equity	2 542 200

Conclusion

The fair ma ket value of a 100% shareholding in Shield Industrial (Pty) Ltd equals R2 542 200 at the valuation date, and was dete mined using a valuation method based on a P/E multiple.

Val ation method based on an MVIC/EBITDA multiple

In recent years, many appraisers started to favour a valuation method based on an MVIC/EBITDA multiple over other multiples. This is because a valuation method based on an MVIC/EBITDA multiple has certain benefits over ther multiples, but this will only be the case if used in the right circumstances, and with the necessary skill and understanding.

Benefits and drawbacks

As valuation method, the MVIC/EBITDA multiple has the benefit of being less sensitive to differences be-tween the target entity and comparator entity, in terms of:

the level of financial gearing, and

effective tax rates and depreciation policies (which often vary in time and especially between different countries)

The MVIC/EBITDA multiple has the drawback of being sensitive to differences between entities in terms of required fixed asset investment (capital intensity).

To reiterate: one always aims to compare like to like (this applies to all matters relating to this valuation method, including the way in which the comparator MVIC/EBITDA multiple is calculated, timing, quality of the earnings (EBITDA), riskiness, and growth expectations. Here, too, it is very difficult to accurately adjust for differences. As a consequence, the greater the number and level of these adjustments, the more unreliable this valuation method, too, will become.

Note: EBITDA is frequently described as a readily available proxy for operating cash flow. However, it is *not* necessarily equal to operating cash flow as it is still an accounting figure.

Calculation

An MVIC/EBITDA multiple is usually calculated for the comparator entity as follows:

$$\text{MVIC/EBITDA} = \frac{\text{Market Value of Invested Capital}}{\text{Operating Earnings Before Interest, Tax, Depreciation and Amortisation for one year}}$$

$$\text{MVIC/EBITDA} = \frac{\text{MVIC}}{\text{Operating EBITDA for one year}}$$

Where:

MVIC = **Market value of equity *plus* mark t value of debt *less* value of non-operating assets (refer to section 11.3.2)**

Operating EBITDA = **Operating revenue *less* all operating expenses *plus* depreciation and amortisation expense, or**

Profit for the year *plus* taxation expense *plus* finance cost *plus* depreciation and amortisation expense *less* finance income (the latter normally represents a non-operating income and is therefore excluded)

A valuation outline is provided in an appendix to this chapter to guide students in applying this method in an examination context. In this section, a few other relevant matters are discussed, including examples illustrating the concepts.

Example: MVIC/EBITDA multiples

An appraiser of the value of the shares in a private equity company has already determined the following:

The *trailing* MVIC/EBIT A multiple of a similar listed company currently equals 7 based on operating EBITDA earned for the financial year just ended.

The *forward* MVIC/EBITDA multiple of a similar listed company currently equals 6, based on its forecast operating EBITDA for the n xt 12 months.

Based on available information, the market value of equity of the comparator entity, included in its MVIC, is reflective of a ont olling shareholding.

The private equity company and the listed entity are very similar, but differences include –

- the listed company has higher financial gearing;
- the listed company is significantly larger; and
- the private equity company relies more on a group of key employees.

The private equity company earned operating EBITDA over the most recent 12 months equal to R2,8 million (this is considered to be maintainable).

The private equity company is forecast to earn operating EBITDA over the next 12 months equal to R3,2 million (this is considered to be maintainable).

Debt capital in the private equity company has an estimated value of R2 million.

The private equity company's non-operating assets have a current value of R200 000.

Required:

Estimate the current market value of equity in the private equity business enterprise, without adjusting for shareholder level differences, using a valuation method based on a *trailing* MVIC/EBITDA multiple. (Fundamental.)

Estimate the current fair market value of equity in the private equity business enterprise using a valua-tion method based on a *forward* MVIC/EBITDA multiple. (Intermediate.)

Solution:

Note: One should compare like to like – in this case, historical earnings; and a trailing multip e

Part (a)

Maintainable *historical* operating EBITDA of the private equity business enterprise		R2 800 000
Comparator *trailing* MVIC/EBITDA multiple		7
Adjusted for:		
– Relative size		Reduce
– Dependence on a group of key employees		Reduce
(Note that one should *not* adjust for differences in financial gearing as the numerator and denominator of this multiple are not affected by financial gearing.)		
Adjusted trailing MVIC/EBITDA multiple (acceptable range ± 4 to 5)	Say:	4

Note: One should compare like to like – in this case, historical earnings; and a trailing multiple

	R
MVIC of the company (4 × R2 800 000) before adjusting for shar holder level differences	11 200 000
Value of non-operating assets	200 000
Overall firm value	11 400 000
Market value of debt	(2 000 000)
Value of equity (before adjusting for shareholder level differences)	9 400 000

Conclusion

The market value of equity in the entity equals R9,4 million (excluding adjustment for shareholder level differences), and was determined using a valuation method based on a MVIC/EBITDA multiple.

Note: ***At this stage it is important to realise that a valuation method based on an MVIC/EBITDA multiple, as the name implies, provides the MVIC (Market Value of Invested Capital), whereas a valuation method based on a P/E multiple provides the value of equity. Thus, when applying a method based on an MVIC/EBIT A multiple, one therefore has to make further adjustments to the MVIC in order to obtain the value of equity (as shown in the example).***

Part (b)

Note: One should compare like to like – in this case, forecast earnings; a forward multiple; and a controlling basis

Maintainable *fo ecast* operating EBITDA of the private equity business enterprise		R3 200 000
Comparator *forward* MVIC/EBITDA multiple		6
Adj sted for:		
– Relative size		Reduce
– Dependence on a group of key employees		Reduce
(N te that ne should *not* adjust for differences in financial gearing as the numerator and denominator of this multiple are not affected by financial gearing.)		
Adju ted forward MVIC/EBITDA multiple (acceptable range ± 3,3 to 4,3)	Say:	3,5

Note: One should compare like to like – in this case, forecast earnings; a forward multiple; and a controlling basis

Note: This value should be very close to the comparable MVIC determined in part a)

Note: One should compare like to like – in this case, forecast earnings; a forward multiple; and a controlling basis

	R
MVIC of the company (3,5 × R3 200 000) before adjusting for shareholder level differences	11 200 000
Value of non-operating assets	200 000
Overall firm value	11 400 000
Market value of debt	(2 000 000)
Value of equity before adjusting for shareholder level differences	9 400 000
Adjusted for shareholder level differences	
– Control premium (not applicable as comparator multiple already reflective of controlling interest)	Nil
– Marketability discount (acceptable range 3%-15% of R9 200 000; here e.g. 5% × 9 400 000)	(470 000)
Fair market value of equity	8 930 000

Note: Again, one should compare like to like – this adjustment is necessary because a shareh lder in the private business will find it more difficult to sell their shareholding that a shareholder in the listed comparator entity

Conclusion

The fair market value of equity in the entity equals R8 930 000, and was determined using a valuation method based on a MVIC/EBITDA multiple.

Note: **As the question does not contain specifics, the value and adjustments made are indicative only. In this case, the direction of adjustments (positive or negative) is therefore more important than the exact figures or percentages.**

11.6.3 Market price multiples

This method, forming part of the valuation methodology based on multiples and the market comparable approach, often serves mainly as a reasonability check to a valuation performed using another methodology. These multiples can be useful in some industries.

The following market price multiples are described further: Price/Sales multiple, MVIC/Sales multiple and the Price/Book multiple.

11.6.3.1 Price/sales (p/s) multiple

This multiple is usually calculat d as follows:

$$P/S = \frac{\text{Curr nt full mark t capitalisation}}{\text{Annual revenue}} \textbf{ or}$$

$$P/S = \frac{\text{Cu ent market value of 100\% equity}}{\text{Annual revenue}}$$

A P/S m ltiple can serve as a reasonability test, but is more useful where there is an observable trend between its variables for entities within a specific industry. As such, the IPEV Board (2010) recommends its use in the foll wing sect rs: financial services, information technology and long-term contract services.

Where an entity has incurred losses that are considered to be of a temporary nature, this ratio can be used in tead of an earnings multiple. The usefulness of this multiple is reduced when comparing entities with differ-ent capital tructures because its numerator incorporates only one form of capital: equity.

11.6.3.2 MVIC/Sales (MVIC/S) multiple

This multiple is usually calculated as follows:

$$\text{MVIC/S} = \frac{\text{Market Value of Invested Capital}}{\text{Annual revenue}} \quad \textbf{or}$$

$$\text{MVIC/S} = \frac{\text{Market Value of Invested Capital}}{\text{Annual revenue}}$$

An MVIC/S multiple is similar to the P/S multiple, but uses a different numerator (the term of a fraction above the line). It is often used in similar circumstances, but has the benefit of ower sensitivity to differences in capital structures between the compared entities.

Price/Book (P/B) multiple

The Price/Book multiple, also known as the Price-to-Book ratio and Market-to-Book ratio, is usually calculated as follows:

$$\text{P/B} = \frac{\text{Current full market capitalisation}}{\text{Carrying value (book value) of shareholders' equity}} \quad \textbf{r}$$

$$\text{P/B} = \frac{\text{Current market value of 100\% equity}}{\text{Carrying value (book value) of shareholders' equity}}$$

This multiple will display large differences among industri s, but could also differ among companies within an industry where some have grown organically and oth rs through mergers and acquisitions. Current IFRS requirements usually result in a lower carrying value for companies growing organically, as intangible assets are normally not capitalised in this case, whereas business combinations result in the capitalisation of certain qualifying tangible and intangible assets at fair market value. Capital-intensive industries will typically display lower P/B multiples compared to companies in the service industry.

11.6.4 The Gordon Dividend Growth odel

This model forms part of the valuation methodology based on discounted cashflows from the investment, and the income approach.

Where a shareholder is entitled to future dividends only, the correct valuation method would be to discount the future expected dividend payments at the appropriate shareholders' required return. Which shareholders would be entitled only to future dividends? These shareholders would normally represent minority shareholders, unable to control the business enterprise. The type of entity and its dividend policy will also have an impact here.

The model formulat d by Gordon captures, in a single formula, the present value of a stream of future cashflows from the investm nt (in this case dividends), which are growing at a constant rate.

The Gordon Dividend Growth Model formula is:

$$\mathbf{P_0} = \frac{\mathbf{D_1}}{\mathbf{-\ g}}$$

Where:

P_0 = the present value of the future dividends

D_1 = the expected dividend at the end of Year 1, sometimes expressed as $D_0(1 + g)$

r = the required rate of return, in the case equal to the cost of equity (k_e)

g = the expected, constant, sustainable dividend growth rate.

Application of this model

The Gordon Dividend Growth Model can be applied to value a minority share in a private equity business enterprise. More reliable results will be obtained from this model where the following conditions are met –

the business enterprise is a going concern;

the source of value to the shareholder is essentially only the future stream of dividends;

D_1 represents a sustainable dividend (thus considers the growth in earnings and the required investment to support the dividend growth rate); the dividends are expected to grow by a constant rate that is likely to be sustainable into the future (for this reason this method is sometimes described as the Gordon *Constant* Growth Model); and

the expected dividend growth rate (g) is lower than the discount rate (k_e). (This model cannot be used where this is not the case.)

Determining the discount rate (k_e)

When determining the value of a shareholding using this model in an examination, the calculation of the cost of equity (k_e) will probably represent a large proportion of the available marks. The cost of equity is essentially derived from public security-exchange market data (Pratt, 2001).

The two main approaches to determine the cost of equity are –

deductive methods, which use market data (such as dividends paid) to determine an implied cost of equity; and

risk-return methods, which use a base rate and add a premium to this rate for specific risks.

The deductive method should sound familiar and, indeed, the Gordon Growth Model forms part of this method. (If one transposes the variables of the Gordon Growth Model, one obtains $k_e = D_1 / P_0 + g$.) Obviously, one cannot apply the data of the entity being valued in this deductive odel, because the intention is to use it to determine P_0; P_0 is therefore not a known variable. One can, of course, apply this model to a similar listed entity to obtain the cost of equity (k_e).

The Capital Asset Pricing Model (CAPM), as discuss d in chapt r 5 (*Portfolio management and the Capital Asset Pricing Model*), forms part of the risk- return method and is the predominant model applied by valuation practi-tioners in South Africa in recent years (PwC, 2010).

In spite of its popularity, the CAPM is not an ideal model. It has been criticised for a few limitations, including its inability to explain the observed phenomenon whereby smaller business entities often obtain higher returns, known as the 'small firm effect' (PwC, 2010:25). To address this matter, most valuation practitioners in South Africa add an additional 'small stock premium' to the cost of equity (k_e) of a smaller entity, when calculated using the CAPM (PwC, 2010). Note that the use of such a premium is in fact contested and not universally accepted (PwC, 2010).

Furthermore, when applying the CAPM to determine the cost of equity (k_e) of a private equity business enterprise, there should be interdependence between the applied risk-free rate, market risk premium and underlying index used in estimating the Beta (β) coefficient.

The Fama-French Three-Factor Model (first described by Fama and French, 1992) is a different model that takes cognisance of such excess returns and is gaining popularity in determining the cost of equity (k_e).

Example: The Gordon Divid nd Growth Model: Constant Growth (1) (*Fundamental*)

A minority shareholder holds 1 000 shares in a private company, which consistently pays annual dividends growing by 5% per annum. The recently paid annual dividend equalled 50 cents. The minority shareholder expects a rate of etu n of 18%.

Required:

Calculate the market value of the minority shareholding, using:

The G rd n Dividend Growth Model.

A spreadsheet to discount the future dividends for 100 years.

Solution:

Valuation using the Gordon Dividend Growth Model

$$P_0 = \frac{D_1}{k_e - g}$$

$$P0 = \frac{1\,000 \times R0{,}50 \times 1{,}05}{18\% - 5\%}$$

R525
13%
R4038,46

Valuation using a spreadsheet

There is insufficient space to display the entire spreadsheet calculation (columns F:CW are not show), but an extract appears below:

	A	B	C	D	E	CX	CY
1			**Future year:**	**1**	**2**	**3**	**4**
2	Total future dividends			525,00	5551,25	62619,65	65750,63
3							
4	Discount rate	18%					
5							
6	Net present value	R 4 038,43					

A selection of the formulas applied, using for example Microsoft Excel[1], is shown below ('drag' the formu-las from cell E2 to cell CY2 to simplify the process).

Microsoft and Excel are registered trademarks of the Microsoft Corporation, registered in the US and other countries.

	A	B	C	D	E	CX	CY
1			**Future year:**	**1**	**2**	**99**	**100**
2	Total future dividends			=1000*0,5*1,05	=D2*1,05	=CW2*1,05	=CW2*1,05
3							
4	Discount rate	0,18					
5							
6	Net present value	=NPV(B4, 2:CY2)					

Note: The discount rate excludes growth as this is incorporated in the forecast dividend of every year (in row 2)

The results make it vid nt that both options provide similar results, as long as a sufficient number of years are includ d in the spreadsheet calculation.

Example: The Gordon Dividend Growth Model: Non-constant growth (2) (*Fundamental*)

The following info mation relates to a private South African company:

The company j st paid a dividend of R1 000 000 to an ordinary shareholder who holds 10% of equity.

The expected ann al growth in ordinary dividends (in years from the present date) is –

Year 1: 20%
Year 2: 15%
Year 3: 10%
Year 4 and thereafter: 6%.

3 The required rate of return of the minority ordinary shareholder is 20%.

Required:

Calculate the market value of the 10% ordinary shareholding in the South African private company, based on available information.

Solution:

	Year 0	Year 1	Year 2	Year 3	Year 4
		R	R	R	R
Expected dividend to the minority shareholder					
Year 1: R1 000 000 × 1,2		1 200 000			
Year 2: R1 200 000 × 1,15			1 380 000		
Year 3: R1 380 000 × 1,10				1 518 000	
Year 4: R1 518 000 × 1,06					1 609 080
Gordon Dividend Growth Model (**Note**):					
$P_0 = D_1 / (K_e - g)$,but adjust for appropriate year:					
$P_3 = D_{(3+1)} / (K_e - g)$, thus:					
P_3 = (R1 609 080) / (20% – 6%)					
P_3 = (R11 493 429)				11 493 429	
		1 200 000	1 380 000	13 011 429	
Fair rate of return	20%	0,8333	0,6944	0,5787	Note: this figure is not included in the total
	R				
Net present value	9 487 946	999 960	958 272	7 529 714	

Note: *Figures may not total correctly due to rounding.*

Conclusion

Thus, the market value of the 10% ordinary shareholding in the South African private company, equals R9 487 946. (Owner level differences are not accounted for here, as the discount rate equals exactly the return required by the minority shareholder in this case.)

Note: ***The Gordon Dividend Growth Model supplies the value of a growing perpetuity at the* beginning *of a period, where the payment is receivable at the end of the first year following this date. Since the value calculated using this model encapsulates the value of all future dividends incorporated in the model, the value of the dividend receivable in Year 4 is not included for further discounting. (Including it would oth rwise r sult in double-counting.)***

11.6.5 Models based on Free Cashflow

Models based on F ee Cashflow forms part of the income approach, and are valuation methodologies based on discounted cashflows emanating from *either* the underlying business enterprise *or* from the investment.

If Free Cashflow is taken as the cashflow available to the business enterprise then this model would form part of the disco nted-cash-flows-from-the-underlying-business-enterprise-methodology. However, if Free Cashflow is taken as the cashflow available to holders of equity then this model would form part of the discounted-cash-fl ws-fr m-the-investment-methodology.

Model based on Free Cashflow available to the business enterprise

Of the two available models based on Free Cashflow, this model is the more popular. It is therefore explored in greater detail below. A valuation outline in an appendix to this chapter offers additional guidance on the use of this model.

( ) ***Application of a model based on Free Cashflow available to the business enterprise***

A model based on Free Cashflow available to the business enterprise, can be used to value a private equity business enterprise, a majority shareholding, or a minority shareholding in such an entity.

A similar argument as was made with the earnings multiple method is put forth here: in principle it is possible to value a majority or minority shareholding using a model based on Free Cashflow available to the business enterprise – provided owner level differences are adjusted for appropriately.

Likewise, South African valuation practitioners indicated that an income approach (incorporating this model by implication) is used to value both majority and minority shareholdings, and that appropriate adjustment is then made for owner level differences (PwC, 2010).

More reliable results will be obtained from this model where the following conditions are met –

the business enterprise is a going concern;

the expected Free Cashflow of the entity can be reliably forecast for a projection period;

the entity maintains, and will continue to maintain, a stable c pit l structure based on a target level, allowing the use of a single discount rate – the Weighted Aver ge Cost of C pital (WACC) (McKinsey, 2010);

non-operating assets of the entity are valued separately; and

when used to value a multi-business entity, each business is treated separately.

Steps in applying a model based on Free Cashflow available to the business enterprise

The following steps are usually applied in this model:

Calculate the WACC of the business enterprise based on co parable market data at the valuation date and adjust for enterprise-specific factors.

2 Project the expected future Free Cashflows from th business enterprise for an explicit period, during which Free Cashflows are likely to be unstable. The explicitly forecasted period should include years with negative Free Cashflows and years of 'super growth'. (In deciding on the number of years to include, in an examination, students must be guided by the question; in real world practice it is usually less than ten years.)

Calculate the enterprise's continuing value, or alternatively, if the entity is not expected to survive for longer than the specific projection period, calculate the appropriate terminal value (usually by estimating the value to be realised at that point in time from closing the business).

Calculation of the Weighted Average Cost of Capital (WACC)

The calculation of the WACC is described in chapter 4 (*Capital structure and the cost of capital*). Only a few important concepts are revisited here. Essentially, WACC represents a business enterprise's combined opportunity cost linked to all the forms capital invested. WACC should further be reflective of the risk involved in *using* the funds, even though it is calculated from the perspective of the *source* of funds.

To determine the WACC, one has to calculate three main components, namely the –

cost of equity;

after-tax cost of debt; and

appropriate weight of the capital structure (normally based on a target structure or fair market values of the invested capital).

For a private equity business enterprise, these components are normally based, to some extent, on information relevant to a peer group of listed entities. Adjustments should therefore be made for enterprise-specific factors, including differences in target financial gearing.

Determining the Free Cashflow available to the business enterprise

When applying a model based on Free Cashflow available to the business enterprise, the free cashflow repre ents operational cashflow that is 'free' for distribution to *all* providers of capital that is it is independent of the way the business is financed.

As a result, Free Cashflow available to the business enterprise must *exclude*–

non-operational cash inflow (e.g. interest income, dividends received and rental income to a manufacturing firm), as non-operating assets should be valued separately; and

finance related cash outflows (e.g. interest expenditure on loan capital and dividend payments).

Free Cashflow available to the business enterprise must further *include* –

the effects of capital expenditure and working capital investment that are necessary to sustain the future projected Free Cashflows; and

the taxation effect of the cashflows included.

Example: Free Cashflow available to the business enterprise (Fundamental)

The following information has been forecast in respect of a company for the year ending 28 February 20X4:

	R
Earnings before tax	10 000 000
Depreciation	2 000 000
Interest expense	1 000 000
Cash required to be ploughed back as new investment and for increased working capital	3 300 000
Income tax rate	28%

Allowances for income tax purposes are expected to equal the acc unting depreciation.

Required:

Determine the Free Cashflow available to the business enterprise for the year ended 28 February 20X4.

Solution: Calculation of Free Cashflow available to the business enterprise:

	R
Earnings before tax	10 000 000
Add back: Depreciation (non-cashflow included in earnings above)	2 000 000
Add back: Interest expense (included in earnings above)	1 000 000
Adjusted earnings before interest, tax, depreciation and amortisation (EBITDA)	13 000 000
Recalculated tax	(3 080 000)
Tax on EBITDA at 28%	(3 640 000)
Tax allowances' effect (R2 000 000 × 28%)	560 000
Gross cashflow	9 920 000
Gross investment	(3 300 000)
Free Cashflow available to the business enterprise	6 620 000

Thus, the Free Cashflow available to the business enterprise for the year ended 28 February 20X4, equals R6 620 000.

(e) ***Model based on Fr Cashflow available to the business enterprise: preparing the explicit forecast***

Projected Free Cashflows are usually based on formal management projections, but these should be checked for reasonability. Often the enterprise's historical information is analysed using trend analysis, regression analysis and other techniques, to establish trends and relationships that could be applied to check (or di ectly p oject) future Free Cashflows. External data should be used, where possible, to verify or support the projections (e.g. industry reports and economic reports).

The following important matters should be remembered when preparing the forecast:

The pr jected figures and the discount rate should be comparable. As the WACC represents a nominal percentage in its standard form (i.e. it includes the effect of inflation), the forecast Free Cashflows sh uld also incorporate the effect of inflation. This approach is usually followed, as the various elements included in the Free Cashflow are generally subject to different rates of inflation and also subject to different rates of inflation over the different years.

However, a limiting assumption could be made that a single specific rate of inflation could be applied to ll projected Free Cashflows, in which case one could exclude the effect of inflation from the Free Cashflows and exclude the effect of inflation from the WACC, by applying the following formula:

$$(1+r) = \frac{(1+R)}{(1+h)}$$

Where:

R = the nominal rate
r = the real rate
h = the inflation rate.

The projected figures and the discount rate should not duplicate the effect of risk. As described, this model essentially discounts the expected Free Cashflows available to the enterprise, using the WACC (a risk-adjusted rate). Where expected Free Cashflows are subject to a large degree of uncertainty, this risk should be incorporated *either* at the cash-flow level (not preferred), *or* at the discount-rate level by increasing the WACC by a specific risk premium (preferred), but not at both levels.

Note that the application of probability weightings to expected scenarios (best case, worst case, etc) for future Free Cashflows is merely a more sophisticated way of obt ining expected Free Cashflows. It therefore does not imply that the risk of a large degree of uncert inty h s been adjusted for here. In order to properly adjust cashflows for such a risk, certain-equi alent cashflows will have to be determined, which are then to be discounted at an appropriate rate that does not duplicate the effect of this risk, for example, a risk-free rate (depending on the techniques applied). (The latter is not explored further in this textbook).

As mentioned earlier, Free Cashflow should include the effects of capital expenditure and invest-ments in working capital. This implies inclusion of the cashflows invested in (or recovered from) these elements, not the balances of these elements. (This is a co on error made by students in examinations.)

(f) ***Model based on Free Cashflow available to the busin ss nterprise: determining continuing value***

The continuing value (CV) of a business enterprise can be determined in a number of ways, including:

I The Gordon Growth Model

This model is similar to the Gordon Dividend Growth Model (described earlier) and is used most often by South African appraisers (PwC, 2010). It is calculated based on the following formula:

$$CV_t = \frac{FCF_{t+1}}{WACC - g}$$

Where:

CV_t = the continuing value at the end of the final year of the explicit forecast
FCF_{t+1} = the estimated Free Cashflow one year after the final year of the explicit forecast
WACC = Weighted Average Cost of Capital
g = the expected constant growth rate in Free Cashflows.

Guidelines wh n using this model to determine the continuing value:

Growth rate (g): McKinsey & Company (2005) suggests that the growth rate be set equal to the expe ted long-term rate of consumption growth for the industry (a real rate), plus expected inflation. If not available, the expected nominal growth in gross domestic product (GDP) of South Africa, where this is the main country of operation, could be used. Only in exceptional cases, where there is a sus-tainable sou ce of further competitive advantage (such as a strong brand), can a higher rate be used. (Remember to exclude inflation from the growth rates when using a WACC that has been restated as a real rate.)

The net investment made in capital expenditure and working capital, as part of the calculation of FCF_{t+1}, must be sufficient to support the growth rate (g).

Exit multiples

In this instance, one can apply an earnings multiple or market price multiple (as described earlier) as an exit multiple at the end of the explicitly forecast period. Note that it is difficult to accurately predict an exit multiple as one cannot directly apply multiples existing on the valuation date because these will include some of the effects already captured in the explicitly forecast Free Cashflows.

The McKinsey Convergence Value-Driver Formula (Advanced)

This is calculated based on the following formula:

$$CV_t = \frac{NOPLAT_{t+1}}{WACC}$$

Where:

CV_t	=	the continuing value at the end of the final year of the explicit forecast
$NOPLAT_{t+1}$	=	the estimated Net Operating Profit Less Adjusted Taxes (NOPLAT) – thus after deducting depreciation, but before gross investment in working capital and non-current operational assets – one year after the final year of the explicit forecast
WACC	=	Weighted Average Cost of Capital.

(McKinsey, 2005:228)

This formula assumes that the entity operates in a competiti e industry and that the competition will erode any excess returns after the explicitly forecast peri d, so that the company will only earn a return equal to WACC on new invested capital. Note that this f rmula appears deceptively simple, but it does not ignore growth (in NOPLAT); instead the effect of growth is cancelled out by the required investment rate (to be deducted from NOPLAT to obtain Free Cashflow, but not shown in this simplified formula).

Model based on Free Cashflow available to the business enterprise: things to remember

When applying any valuation method, but this mod l in particular, an appraiser should keep the following points in mind:

The model should be 'stress tested' by applying sensitivity analyses of certain key variables. (This is relatively easy to do when using a spreadsheet.)

Valuation is an iterative process: a change to one input often triggers a re-evaluation of other inputs and a recalculation of the result. (This also favours the use of a spreadsheet.)

When using a spreadsheet in a valuation, specific attention should be paid to formulas and cell referencing, as any error can have significant repercussions.

Where an entity consists of more than one business, each should be valued separately, taking cognisance of the specific risks and circumstances of each; from this cumulative value one must deduct a negative value for the corporate head office function, calculated as the present value of its cash outflows and then add the value of non-operating assets and excess cash to obtain the overall firm value.

The final valuation amount should be checked for reasonability, by using other valuation methodologies, for example an earnings multiple method.

Advantages and disadvantages

This model fo uses on the value of the operations of a business entity and is especially useful in valuing an entity onsisting of more than one business (McKinsey, 2005).

Howeve , this model does not clearly display in which years value is added, for example a year with a negative p ojected Free Cashflow can indicate either poor performance or investment for future years.

Example: Model based on Free Cashflow available to the business enterprise (1)

The f ll wing inf rmation has been determined for a private equity business enterprise:

The f recast Free Cashflow available to the business enterprise has been calculated as:

for the year ending 28 February 20X4: R2 200 000;

for the year ending 28 February 20X5: (R200 000);

for the year ending 29 February 20X6: R1 500 000;

for the year ending 28 February 20X7 and onwards it is expected to grow at a constant 4% per annum from each previous year.

The WACC equals 22% (calculated based on market information of a listed peer group).

The fair market value of debt on 28 February 20X3 equals R2 500 000.

The cash balance in excess of operational requirements on 28 February 20X3 equals R450 000.

Required:

Determine the market value of an 100% ordinary shareholding at 28 February 20X3, without adjusting for shareholder level differences. *(Fundamental)*

Determine the fair market value of a 25% ordinary shareholding at 28 February 20X3. *(Intermediate)*

Solution:

Part (a)

Determine the present value of Free Cashflows for the explicit forecast and the continuing value

	20X4 R'm	20X5 R'm	20X6 R'm	20X7 R'm
	-------- (Explicit f recast) ---------			CV base
Free Cashflow	2,20	(0,20)	1,50	1,56
				1,50 × 1,04
Continuing value: P_{20X6} = FCF_{20X7} / (WACC – g) = 1,56 / (22% – 4%)			8 ,67	
Free Cashflow with continuing value	2,20	(0,20)	10,17	

Note: this figure is not included in the total below

Net present value discounted at WACC (22%) = 7,27 million (in examination, show discount factors with their calculations, or calculator steps, e.g.: CF_1 2,20; CF_2 –0,20; CF_3 10,17; I / YR 22%; P / YR 1; NPV)

Determine the fair market value of a 25% equity shareholding

	20X3 R'm
Value of operations / MVIC	7,27
Value of non-operating asset: Excess cash	0,45
Overall firm value (assuming no shareholder level differences to peer group)	7,72
Value of debt	(2,50)
Value of 100% equity (assuming no shareholder differences to peer group)	5,22

Note: **Figures may not total correctly due to rounding.**

Valuation con lusion:

A 100% equity sha eholding in the private business enterprise (excluding adjustment for shareholder level differences) has a ma ket value of R0,98 million at 28 February 20X3, determined by using a model based on the Free Cashflow Model available to the business enterprise.

Part (b)

Continued fr m Part (a)

Value f 100% equity (assuming no shareholder differences to peer group) – from part a)		5,22
Adju tment for shareholder level differences		
– Minority discount	(say 15%)	(0,78)
– Marketability discount	(say 10%)	(0,52)
Value of 100% equity (adjusted for shareholder level differences)		3,92
Value of a 25% equity shareholding (multiplied by the percentage shareholding	(25%)	0,98

Note: **Figures may not total correctly due to rounding.**

Valuation conclusion:

A 25% equity shareholding in the private business enterprise has a fair market value of R0,98 million at 28 February 20X3, determined by using a model based on the Free Cashflow Model available to the business enterprise.

Example: Model based on Free Cashflow available to the business enterprise (2)

Company Z (Pty) Ltd is an unlisted South African company, which relies not only on tangible assets, but also unrecognised, internally-generated intangible assets to generate income.

Forecast financial statements of Company Z are available. These are presented in a condensed format, but otherwise applied IFRS for SMEs applicable on the valuation date (recognition criteria are indicated in brackets where appropriate).

Forecast Statement of Financial Position at

	20X3 R'm	20X4 R'm	20X5 R'm
ASSETS			
Non-current assets			
Property, plant and equipment (at cost less accumulated depreciation)	80	100	110
Other investments (at cost)	20	20	20
Current assets			
Inventory	40	50	65
Trade and other receivables	30	45	60
Cash and cash equivalents	7	17	15
TOTAL ASSETS	177	232	270
EQUITY			
Total shareholders' equity	109	145	185
LIABILITIES			
Non-current liabilities			
Borrowings (at amortised cost)	58	67	65
Current liabilities			
Trade and other payables	6	14	13
Borrowings (current portion)	1	2	2
Current income tax liabilities	3	4	5
TOTAL EQUITY and LIABILITIES	177	232	270

Forecast Stat m nts of Profit/Loss and Other Comprehensive Income for the year ending

	20X3 R'm	20X4 R'm	20X5 R'm
Gross p ofit	188	247	289
Depreciation	(8)	(12)	(14)
Other administration and operating expenses	(60)	(70)	(80)
Operating profit	120	165	195
Dividends received	2	2	3
Pr fit bef re interest	122	167	198
Finance cost	(6)	(6)	(7)
Profit before tax	116	161	191
Taxation	(32)	(45)	(53)
Profit for the year	84	116	138
Dividends paid	(50)	(80)	(98)
Increase in reserves	34	36	40

Other information pertaining to Company Z:

Gross cashflow before investments in 20X6 is expected to be 6% higher than in 20X5 and should grow at the same annual rate in later periods.

Gross investment in working capital, and property, plant and equipment should be 40% of gross cashflow before investment in the year 20X6, to ensure that future growth can be sustained.

The carrying amount of borrowings approximates its fair market value.

Depreciation amounts approximate income tax allowances.

The company's D:E ratio is managed to a target level and any variance in this ratio is considered temporary and purely due to practical considerations.

6 The other investment represents a small shareholding of 2 000 000 sh res in listed company. These shares had a closing price equal to 1 200 cents at the end of 20X2.

7 Relevant rates:

- WACC – calculated based on market information of a listed peer gr up 18%
- Income tax rate 28%

8 Carrying values at the end of 20X2:

Property, plant and equipment	R50 m
Borrowings (non-current portion)	R58 m
Borrowings (current portion)	R1m
Inventory	R35m
Trade receivables	R25m
Cash	R5m
Trade payables	R4m
Current income tax liability	R1m

Required:

Calculate the fair market value of a 75% equity shareholding in Company Z at the end of 20X2, using a model based on Free Cashflow available to the business enterprise.

Solution:

Determine the present value of Free Cashflows for the explicit forecast and the continuing value

	20X3 R'm	20X4 R'm	20X5 R'm	20X6 R'm
	-------- (Explicit forecast) ---------			CV base
Operating profit	120	165	195	
Dividends received (excluded as valued separately)	–	–	–	
Add back: Non-cash item (depreciation) (**Note 1**)	8	12	14	
Adjusted EBITDA	128	177	209	
Recalculated income tax:	(33,6)	(46,2)	(54 ,6)	
Tax on adjusted EBITDA at 28%	(35,8)	(49,6)	(58 ,5)	
Tax effect of allowances (equal to depreciation) at 28% (**Note 1**)	2,2	3,4	3,9	
Gross cashflow	94,4	130,8	154,4	163 ,7
				154,4 × 1,06
Gross investment:				(65 ,5)
				163,7 × 40%
Change in working capital requirements				
Change in non-excess cash current assets (**Note 2**)	(10)	(25)	(30)	
Opening (20X3: Inventory R35m + Receivables R25m)	60	70	95	
Closing (20X3:40 + 30; 20X4:50 + 45; 20X5:65 + 60)	70	95	125	
Change in non-debt current liabilities (**Note 3**)	4	9	0	
Opening (20X3: Payables R4m + Tax liability R1m)	5	9	18	
Closing (20X3:6 + 3; 20X4:14 + 4; 20X5:13 + 5)	9	18	18	
Capital investment (**Note 4**)	(38)	(32)	(24)	
Free Cashflow	50,4	82,8	100,4	98,2
Continuing value: P_{20X5} = FCF_{20X6} / (WACC – g) = 98,2 / (18% – 6%)			818 ,3	
Free Cashflow with continuing value	50,4	82,8	918,7	

Note: this figure is not included in the total

Net present value discounted at WACC (18%) = R661,3 m (in examination, show discount factors with their calculations, or calculator steps, e.g.: CF_1 50,4; CF_2 82,8; CF_3 918,7; I / YR 18%; P / YR 1; NPV)

Note: Figur s may not total correctly due to rounding.

Note 1: Depre iation

In the example above, depreciation is added back as it represents non-cashflow; the income tax allowances a e then used separately to determine its effect on the tax cashflow. For examination purposes, students are recommended to always show their calculations in this fashion, with appropriate descriptions. In this case, the tax allowances and depreciation are the same amount. This allows a simpler treatment, whereby the tax is calculated directly from operating profit (which includes the effect of depreciati n). (Note that the simpler treatment is possible only where depreciation is equal to the in-c me tax allowances.) Following such a simplified treatment in an examination is, however, unadvised but, if f ll wed, a short explanation is warranted to clearly indicate to the examiner that knowledge was indeed applied correctly.

Note 2: Non-excess cash

All cash is viewed as excess cash due to the high working capital ratio.

Note 3 : Non-debt current liabilities

There is an argument that the income tax liability might include a portion relating to items excluded from the Free Cashflow (e.g. other investments and finance cost), which, in theory, should be removed here.

This example applied a common simplified approach of including the entire movement as the effect should be minor.

Note 4: Capital investment

	20X3 R'm	20X4 R'm	20X5 R'm
Carrying value beginning	50	80	100
Carrying value end	80	100	110
Movement in carrying value	30	20	10
Depreciation included here	8	12	14
Total cash movement	38	32	24

Determine the fair market value of a 75% equity shareholding

		20X2 R'm
Value of operations		661,3
Value of non-operating asset: Excess cash end of 20X2		5
Value of other non-operating assets: Investment	(2m shares × R12)	24
Overall firm value (assuming no shareholder level differences to peer group)		690,3
Value of debt (carrying amount approximates fair arket value) (R58m + R1m)		(59,0)
Value of 100% equity (assuming no shareholder differences to peer group)		631,3
Minority discount (not applicable in this case as a majority shareholding is being valued)		–
Marketability discount	(say 5%)	(31,6)
Value of 100% equity (adjusted for shareholder level differences)		599,7
Multiplied by percentage shareholding	(75%)	449,8

Note: Figures may not total correctly due to rounding.

Reasonability test:

No reasonability test will be performed here as there is not enough information to apply another valuation methodology. Net assets could be calculated, but will add little value here as market values are not available for property, plant and equipment, and other intangible assets.

Valuation conclusion:

A 75% equity shareholding in Company Z has a fair market value of R449,8 million at the end of 20X2, determined by using a model based on Free Cashflow available to the business enterprise.

Model based on Free Cashflow available to equity holders

Of the two available mod ls bas d on Free Cashflow, the model based on Free Cashflow available to equity holders is less popular. It is th refore not explored in much detail within this text. In theory, a similar value should be obtained when using either model.

In many rega ds it is similar to the model that uses Free Cashflow available to the business enterprise, but with differences in a few key areas. Differences include the way in which Free Cashflow is calculated and the discount rate sed.

Free Cashflow available to the equity holders

Simply put, when an equity approach is selected, Free Cashflow is the cashflow that is 'free' for distribu-ti n to equity holders, that is usually *after* interest expenditure.

Di count rate

In this case the required return of the holders of ordinary equity is the cost of equity (k_e), not the WACC.

11.6.6 Model based on EVA®/MVA (Advanced)

EVA®(Economic Value Added) is registered trademark of the firm, Stern, Steward & Co. (registered in the US and in other countries). MVA (Market Value Added) has been described by the same firm and is a measure that is closely linked to EVA.

Thanks in part to successful implementation at high-profile companies and effective self-promotion, EVA has become a popular tool in measuring performance. In recent years, valuation models based on EVA and MVA have also increased in popularity.

EVA®

EVA is described in the context of performance measurement, in chapter 8 (*Analysis of financial statements*). EVA can be defined as follows:

EVA = NOPLAT – (Invested capital × WACC)

Where:

NOPLAT = (Adjusted) net operating profit after adjusted t x
Invested capital = (Adjusted) carrying value of net operating assets: oper ting (PPE) assets plus non-excess cash current assets less non-debt current liabilities
WACC = Weighted Average Cost of Capital

The full EVA product prescribes several adjustments to correct f r acc unting distortions and conservatisms; the more critical being:

- Investment in goodwill, research and development and arketing are to be capitalised as part of assets (to be less conservative).

  Depreciation/amortisation should be adjusted to reflect the usage of the assets.

  Removal of general provisions, such as provisions for bad debts and for warranties (these allow for accounting manipulation).

MVA

MVA could be defined as –

MVA = Present value of expected EVA for future years, discounted at the firm's WACC

Since MVA represents, in essence, the market value *added* over and above a business enterprise's existing (adjusted) carrying value of invested capital, it follows that –

- Market value of a business enterprise = MVA + current (adjusted) carrying value of invested capital; **or**
- Market value of a business enterprise = Present value of expected EVA for projected future years, discounted at the firm's WACC + current carrying value of invested capital

11.6.6.3 Steps in applying a valuation model based on EVA/MVA

A valuation model based on EVA/MVA usually applies the following steps:

Calculate the WACC of the business enterprise based on comparable market data at the valuation date and adjust for enterprise-specific factors.

Determine the adjusted invested capital balance at the valuation date and for explicitly forecast years.

Calculate adjusted NOPLAT for the explicitly forecast years and for years after this until a steady-state position is obtained.

Determine the EVA for each of these years.

Determine the MVA by discounting each of the EVA amounts, using the WACC.

Add to the MVA the adjusted invested capital balance on the valuation date.

Add the value of non-operating assets in order to obtain the overall firm value (this does not yet account for hareholder level differences to peer group).

Example: Valuing a business using a model based on EVA/MVA *(Advanced)*

The following condensed historical and forecast financial statements are available for Evagreen (Pty) Ltd, an unlisted South African company:

Statement of Financial Position at

	Historical	Forecast		
	20X3 R'm	20X4 R'm	20X5 R'm	20X6 R'm
ASSETS Non-current assets				
Property, plant and equipment (PPE)	80,00	85,00	90,90	96,70
Opening carrying amount	80,00	80,00	85,00	90,90
Net capital expenditure	16,00	23,00	26,00	28,00
Depreciation for the year	(16,00)	(18,00)	(20,10)	(22,20)
Closing carrying amount	80,00	85,00	90,90	96,70
Current assets				
Trade and other receivables	6,67	7,50	11,67	8,92
Cash and cash equivalents	20,00	22,61	24,35	25,57
TOTAL ASSETS	106,67	115,11	126,92	131,19
EQUITY				
Total shareholders' equity	96,33	104,36	114,08	119,73
LIABILITIES				
Non-current liabilities				
Long-term debt	7,00	7,00	7,00	7,00
Current liabilities				
Trade and other payables	3,34	3,75	5,84	4,46
TOTAL EQUITY and LIABILITIES	106,67	115,11	126,92	131,19

Statements of Profit/Loss and Other Comprehensive Income for the year ended/ending

	Historical	Forecast		
	20X3 R'm	20X4 R'm	20X5 R'm	20X6 R'm
Gross profit	40,00	45,00	70,00	53,50
Depreciation	(16,00)	(18,00)	(20,10)	(22,20)
Other administration and operating expenses	(4,00)	(4,20)	(4,41)	(4,63)
Operating profit	20,00	22,80	45,49	26,67
Net finance costs	(0,50)	(0,50)	(0,50)	(0,50)
Profit before tax	19,50	22,30	44,99	26,17
Taxation	(5,46)	(6,24)	(12,60)	(7,33)
Net p ofit	14,04	16,06	32,39	18,84

Other information relevant to the company: **1** Relevant rates:

WACC – calculated based on market information f a listed peer group	20%
Income tax rate	28%

The market value of debt on the last day of the 20X3 year equalled its carrying value.

Depreciation amounts are reflective of the true usage of the assets.

Net operating profit after adjusted tax (NOPLAT) is expected to grow by 5,373% per annum for the year 20X7 and the following years.

Free cashflow for the 20X7 year is expected to equal 73,14% of NOPLAT in order to account for the appropriate gross investment.

Required:

Calculate the fair market value of a 51% equity shareholding in Evagreen (Pty) Ltd at the end of the financial year ended in 20X3, based on available information and using a model based on Free Cashflows available to the business enterprise.

Calculate the fair market value of a 51% equity shareholding in Evagreen (Pty) Ltd at the end of the financial year ended in 20X3, based on available information and using a model based on EVA/MVA.

Compare the answers obtained using the two different models and highlight the benefit (if any) of the model based on EVA/MVA.

Solution:

Valuation based on Free Cashflow (FCF) available to the business enterprise:

	20X3	20X4 R'm	20X5 R'm	20X6 R'm	20X7 R'm
				= 19,2 × 1,05373%	
NOPLAT		16,42	32,75	19,20	20,23
Add back: Depreciation (non-cashflow)		18,00	20,10	22,20	
Gross cashflow		34,42	52,85	41,40	
Gross investment		(23,42)	(28,08)	(26,63)	
Investment in working capital					
Change in non-cash current assets		(0,83)	(4,17)	2,75	
Change in non-debt current liabilities		0,41	2,09	(1,38)	
Net capital expenditure		(23,00)	(26,00)	(28,00)	
FCF		11,00	24,77	14,77	14,80
				= 20,23 × 0,7314	

	20X3	20X4 R'm	20X5 R'm	20X6 R'm	20X7 R'm
Calculate the continuing value (CV)					
CV_{20X6} = FCF_{20X7} / (WACC – g)					
= 14,8 / (0,20 – 0,05373)				101,16	
		11,00	24,77	115,93	
	20%	0,8333	0,6944	0,5787	
	R'm				
Value of operations (MVIC [market value of invested capital])	93,46	9,17	17,20	67,09	
Add non-ope ating assets: Excess cash	20,00				
Overall firm val e (assuming no shareholder level differences to peer group)	113,46				
Val e of debt	(7,00)				
Value f 100% equity (assuming no shareholder differences to peer group)	106,46				
Minority discount (not applicable in this case as a majority shareholding is being valued)	(0,00)				
Marketability discount (say 5%)	(5,32)				
Value of 100% equity (adjusted for shareholder level differences)	101,13				
Fair market value of a 51% equity shareholding (subtotal multiplied by 51%)	51,58				

Note: Figures may not total correctly due to rounding.

Conclusion:

Thus, the value of a 51% shareholding in Evagreen (Pty) Ltd is equal to R51,58 million, using a model based on Free Cashflow available to the business enterprise.

Valuation using a model based on EVA/MVA:

1 ***Determine the adjusted invested capital balance at the valuation date and for explicitly forecast years***

INVESTED CAPITAL (ADJUSTED)	**20X3 R'm**	**20X4 R'm**	**20X5 R'm**	**20X6 R'm**
PPE	80,00	85,00	90,90	96,70
Trade and other receivables	6,67	7,50	11,67	8,92
Excess cash (see **note**)	–	–	–	–
Current liabilities	(3,34)	(3,75)	(5,84)	(4,46)
At year-end	83,33	88,75	96,73	101,16

Note: The cash and cash equivalents are *excluded* from the calculati n f adjusted invested capital where this represents *excess* cash and is thus not an operating asset n which a return equal to WACC is to be earned. In line with other operating assets – generally their ass ciated benefits are excluded (in this case interest income excluded in net finance cost) and the asset valued separately using another methodology.

The argument could be made that excess cash should be distributed back to the shareholders, since the business may not earn an appropriate return on these funds. (However, counter arguments exist for keeping some excess cash, including its lowering eff ct on risk, and its availability to replace debt, should new debt not be available in these troubled times).

Calculate adjusted NOPLAT for the explicitly forecast years and for years after this until a steady-state position is obtained

	20X3 R'm	**20X4 R'm**	**20X5 R'm**	**20X6 R'm**	**20X7 R'm (Steady-state)**
Gross profit	40,00	45,00	70,00	53,50	
Depreciation	(16,00)	(18,00)	(20,10)	(22,20)	
Other administration and operating ex-penses	(4,00)	(4,20)	(4,41)	(4,63)	
Operating profit	20,00	22,80	45,49	26,67	
Adjusted tax at 28%	(5,60)	(6,38)	(12,74)	(7,47)	
Operating profit	20,00	22,80	45,49	26,67	
Add back: Depreciation	16,00	18,00	20,10	22,20	
Deduct: Tax allowance (in this case equal to d pr ciation)	(16,00)	(18,00)	(20,10)	(22,20)	
Adjusted taxable income link d to operations	20,00	22,80	45,49	26,67	
Net ope ating p ofit after adjusted tax (NOPLAT)	14,40	16,42	32,75	19,20	20,23
Determine ret rn on invested capital (ROIC)					19,2 × 1,05373
ROIC = NOPLAT/Invested capital (beginning of year)		19,7%	36,9%	19,8%	20,0%

Note: In this case this is equal to WACC

3 ***Valuation based on EVA/MVA***

	20X3	20X4	20X5	20X6	20X7
		R'm	R'm	R'm	R'm
NOPLAT		16,42	32,75	19,20	20,23
Required return (WACC × Adjusted Invested Capital)		(16,67)	(17,75)	(19,35)	(20,23)
WACC		20%	20%	20%	20%
Adjusted invested capital at beginning of the year		83,33	88,75	96,73	101,16
EVA for the year		(0,25)	15,00	(0,15)	(0,00)

Note: No EVA is created for this year and onwards as ROIC = WACC

	20%	0,8333	0,6944	0,5787	0,4823
	R'm				
MVA	10,13	(0,20)	10,42	(0,08)	(0,00)
Opening adjusted carrying value of IC	83,33				
Add non-operating assets: Excess cash	20,00				
Overall firm value (assuming no shareholder level differences to peer group)	113,46				
Value of debt	(7,00)				
Value of 100% equity (assuming no shareholder differences to peer group)	106,46				
Minority discount (not applicable in this case as a majority shareholding is being valued)	0,00				
Marketability discount (say 5%)	(5,32)				
Value of 100% equity (adjusted for shareholder level differences)	101,13				
Fair market value of a 51% equity shareholding (subtotal multiplied by 51%)	51,58				

Note: The overall firm value is the same value as that obtained using the model based on Free Cashflow

Note: The fair market value of a 51% equity share is the same as that obtained using the model based on Free Cashflow

Note: Figures may not total correctly due to rounding.

Thus, the value of a 51% shareholding in Evagreen (Pty) Ltd is equal to R51,58 million, using a model based on EVA/MVA.

Comparison

Identical answers are obtained using these two different models.

Conclusion:

The benefit of the model based on EVA/MVA is that it clearly highlights the exact year(s) in which value is added, whe eas the model based on Free Cashflow does not. For example, value in excess of carrying value is created *only* in year 20X5 (see positive EVA for this year only).

11.6.7 Net assets

This valuati n methodology determines the value of a business entity as a function of its net assets, by calculat-ing the value f its assets less the value of its liabilities.

A net a ets methodology is sometimes linked to a liquidation value, which as described earlier, could repre-ent fair market value for some businesses in the case of voluntary liquidation, but not in the case of forced iquidation.

To offer any meaningful results, regardless of the definition of value, the value of assets and liabilities cannot be expressed in terms of unadjusted historical cost.

Application of this methodology

This methodology may be used to determine the *fair market value* of a business enterprise only in the following circumstances or for the following purposes –

where the value of a business is principally represented by the underlying fair market value of its assets, rather than its earnings or future operating cashflows, such as a property-holding company or an investment fund-of-funds (examples by IPEV Board, 2010); or

where the business enterprise does not generate a sufficient return on its assets, where a higher value can be obtained by closing the business and selling the assets; or

as a reasonability check to the main valuation performed using another va uation methodology.

Which assets and liabilities?

When determining the value of net assets, one has to ask the question: which assets and liabilities should be included? All liabilities, generally, have to be included in the initial aluation. However, the assets to be included will depend on the prospects of the business entity, and whether liquidation is considered or may be enforced.

In order to determine which assets to include, one may ask the questi n: is there a market for the asset? For instance, there is usually a market for most fixed assets (such as property, plant and equipment) and current assets (such as accounts receivable and inventory). However, if these assets are highly specialised, the market may be small, which may reduce their value in some cases.

Moreover, the market for intangible assets (such as brands, trademarks and customer relationships) often depends on the future prospects of the entity. Wh re one xp cts a greater value from closing a business and selling the assets, rather than continuing to use all the ass ts in a business, or in the case of liquidation, the intangible assets are likely to have little or no value.

A few examples

Methodologies for the calculation of the fair market value of debt are discussed earlier in this book. The methodologies described in this chapter may be used to value individual assets; however, the variables to be included usually differ from those used to value a business or equity share. Some examples follow.

Property

The fair market value of property is usually determined by a registered property appraiser. SAICA has compiled a guide on the measurement of assets for the purposes of financial reporting on a business combination (2006), but its principles are equally relevant here.

In this guide, SAICA suggests that the fair market value of property (consisting of land or built-on property) is preferably determined using a market approach, by determining prices paid for similar properties that have been sold in recent transactions, with adjustments for differences in qualities. In cases where built-on prop-erty differs significantly from those included in recent transactions (such as in the layout, age and condition of the building), the built-on property value is then normally determined using an income approach, on the basis of the discount d pr s nt value of the rental that could be derived from it (SAICA, 2006).

Plant and equipment

The fair ma ket value of non-specialised plant and equipment is usually determined based on a market approach, with eference to recent selling prices of similar assets. Where such market transactions are not available, or where the plant and equipment are specialised, a replacement cost approach is often used, by obtaining the new replacement cost for the asset from a supplier and then deducting deprecia-tion to reflect its current state, or by indexing its historical purchase price (SAICA, 2006).

Brands

The fair market value of brands can be valued using a relief-from-royalty-method as described by SAICA (2006). Here one must ask what the equivalent royalty would be if the entity did not own the brand, but made use of a similar brand belonging to a third party. The present value of the royalty *saved* is then equal to the fair market value of the brand.

Contingent liabilities

The fair market value of a contingent liability is 'measured at the amount that an unrelated third party would demand for assuming the contingent liability' (SAICA, 2006:14). When considering what an unrelated third party would demand, one often has to consider different scenarios and then weigh the outcome of each based on an estimate (SAICA, 2006).

Appendix 1

Valuation outlines (*Intermediate*)

These outlines are intended to provide guidance to students when applying these methods of valuation in an examination context.

Students are reminded that examination questions on valuations vary considerably. Inevitably, these templates *cannot* therefore be viewed as all-inclusive or valid in all circumstances. Particular attention should thus be paid to the exact wording of the 'required' section and the number of marks a ocated, and answers should be carefully planned before being executed.

OUTLINE: METHOD BASED ON A P/E MULTIPLE

Assume one uses a comparator P/E multiple of reference listed company (A) to determine the fair market value of a private equity business enterprise (B). Entity A is to be as similar as possible to entity B, so that fewer adjustments are required.

Steps

Determine whether some of the initial steps of valuation are required and address these (refer to elements 1–8 as discussed earlier in this chapter, in the section entitled: 'Valuation report' (section 11.5.3)).

Determine the maintainable annual earnings of entity B:

2.1 When applying *historical* multiples and *historical* arnings:

Adjustments to all years for the purposes of trend analysis

	<- Previous financial years ended (FYE)		
Years to analyse	**FYE**	**FYE**	**FYE**
(let the question be the guide):	**Most recent – 2**	**Most recent – 1**	**Most recent**
E.g. starting with: Earnings before interest, tax, depreciation and amortisation (EBITDA)			
Adjust for			
– Non-operating income			
– Non-maintainable items			
Adjusted EBITDA			
Do not include income from other investments here (e.g. rentals, dividends or interest) where these are valued separately			
Deduct recalculated interest expense (so that gearing ratio is comparable to that of entity A), but adjust for *.			
Deduct restated depreciation/amortisation expense (required to ensure the asset base can support maintainable earnings)			
Adjusted ea nings before tax			
Recalculated tax expense			
Adj sted earnings			

Analyse the trend in historical earnings:

– If inclining or declining trend: use most recent adjusted figure

– If no clear trend: use a weighted average of adjusted earnings

– Analyse growth percentages in adjusted figures (for use below when adjusting the P/E multiple)

(Assume the maintainable historical earnings equal R1 million)

2.3 When applying *forward* multiples and *projected* earnings:

Years to analyse (let the question be the guide):	**FYE Most recent – 2**	**FYE Most recent – 1**	**Most recent FYE**	**Current year (annualised) (possibly)**	**12 months forward the valuation date**
	<-Historical / Current			Forecast ->	
Adjusted earnings (calculate as above)					

Evaluate reasonability of forecast earnings:

– Analyse trend in earnings over time
– Consider other evidence (industry forecasts, market research, competitor ana ysis, etc)
– Analyse growth percentages in adjusted figures (for use below when djusting the P/E multiple)
– Use forecast earnings only if they appear reasonable

(Assume the maintainable forecast earnings equal R1,060 million)

3 Adjust the comparator P/E multiple for differences in risk and growth factors.	**Historical/ current P/E**	**Forward P/E**
	(Example)	(Example)
Comparator P/E multiple of A (based on market capitalisation representing a controlling basis, based on headline earnings)	**10,00**	**9,30**
– Sometimes the comparator multiple is adjusted by re oving excess cash and investments**		
Adjusted for *entity level differences* between the comparator entity and the entity being valued:		
[Always consider the way the above P/E multiple was calculat d before making adjustments here]		
Adjustment for business and finance risk: (–) B has higher risk; (+) B has lower risk		
– The level of borrowing (only if not accounted for in maintainable earnings)		
– Level of excess cash and non-operating assets (only if not valued separately and/or not adjusted for above)**		
– Relative age of non-current assets and need for reinvestment in assets (only if not adjusted for in maintainable earnings)		
– Difference in the level of competition		
– Country risk		
– The relative size of the entities		
– Access to finance		
– The reliance on a small number of key employees		
– The diversity of the product ranges		
– Difference in the quality of earnings		
– Specific differences mentioned in the question		
Maintainable arnings long-t rm **growth expectations**:		
(–) B has low r growth xp ctations; (+) B has higher growth expectations		
Assume adjustments equalled:	(5,50)	(5,05)
Adjusted P/E multiple applicable to B	**4,50**	**4,25**

4 Determine value of a 100% equity shareholding in entity B (first assuming no owner level differences to comparator).

	Either method
	R
Maintainable earnings × adjusted P/E multiple = (R1m × 4,5) or (R1,060m × 4,25) Note: Figures may not total correctly due to rounding.	4 500 000
Adjustment for required (injection)/reduction in debt to equal gearing-ratio in B* (assume injection of R300 000 required in this case)	(300 000)
E.g. if entity A has too much debt on valuation date, the recalculated interest expense at maintainable earnings based on the gearing ratio of entity B would result in ess interest and higher earnings. The resulting value above will thus be inflated. Here one must reduce the value again by the required equity capital injection to obtain this level of ge ring.	
Value of excess cash and other investments** (if valued separately, assume v lue is R800 000 in this case)	800 000
Value of a 100% equity shareholding in entity B (assuming no shareholder le el differences to comparator)	5 000 000

5 Further steps depending on required:

[Always remember here to compare like to like: compare the shareholder of the comparator entity (incorporated in the comparator P/E multiple) to the shareholder in the entity being valued.]

– e.g. determine overall firm value of entity B	**R**
Value of a 100% equity shareholding in entity B (assuming no shareholder level differences to comparator) from above	5 000 000
***Shareholder level* premiums and discounts (compar d to shar holders in entity A):**	
– Control premium (possible, but not in this case as comparator P/E is already representative of a controlling share)	Nil
Subtotal	5 000 000
– Marketability discount (applicable as this share in entity B is less marketable) (e.g. 5% × 5 000 000)	(250 000)
Value of a 100% equity shareholding in entity B (adjusted for shareholder level differences in this case)	4 750 000
Value of actual debt on the valuation date (valued separately, assume value is R2 000 000 in this case)	2 000 000
Fair market value: Overall firm value of entity B	6 750 000

– e.g. determine the fair market value of a 74% shareholding in entity B	
Value of a 100% equity shareholding in entity B (assuming no shareholder level differences to comparator)	5 000 000
***Shareholder l vel* pr miums and discounts (compared to shareholders in entity A):**	
– Control pr mium (possible, but not in this case as comparator P/E is already representative of a ontrolling share)	Nil
Subtotal	5 000 000
– Ma ketability discount (applicable as this share in entity B is less marketable) (e.g. 8% × 5 000 000)	(400 000)
Val e of a 100% equity shareholding in entity B (adjusted for shareholder level differences in this case)	4 600 000
Multiplied by percentage shareholding	74%
Fair market value of a 74% equity shareholding in entity B (adjusted for shareholder level differences)	3 404 000

– e.g. determine the fair market value of a 20% shareholding in entity B		R
Value of a 100% equity shareholding in entity B (assuming no shareholder level differences to comparator)		5 000 000
***Shareholder level* premiums and discounts (compared to shareholders in entity A):**		
– Minority discount (necessary as comparator P/E is representative of a controlling share)	(e.g. 16% × 5 000 000)	(800 000)
Subtotal		4 200 000
– Marketability discount (applicable as this share in entity B is less marketable)	(e.g. 20% × 4 200 000)	(840 000)
Value of a 100% equity shareholding in entity B (adjusted for shareholder level differences in this case)		3 360 000
Multiplied by percentage shareholding		20%
Fair market value of a 20% equity shareholding in entity B (adjusted for shareholder level differences)		672 000

6 Reasonability test
Based on a different valuation methodology, if possible.
7 Valuation conclusion

OUTLINE: METHOD BASED ON AN MVIC/EBITDA MULTIPLE

Assume one uses a comparator MVIC/EBITDA multiple of r f r nce list d company (entity A) to determine the fair market value of a private equity business enterprise (entity B). Entity A is to be as similar as possible to entity B, so that fewer adjustments are required.

Steps

Determine if some of the initial steps of valuation are required and address these (refer to elements 1–8 as discussed earlier in this chapter, in the section entitled: 'Valuation report' (section 11.5.3)).
Determine maintainable annual EBITDA of B:
When applying *historical* multiples and *historical* EBITDA:
Adjustments to all years for the purposes of trend-analysis <- Previous financial years ended (FYE)

Years to analyse (let the question be the guide):	**FYE Most recent – 2**	**FYE Most recent – 1**	**FYE Most recent**
E.g. starting with: Earnings before interest, tax, depr ciation and amortisation (EBITDA)			
Adjust for			
– Non-maintainable items			
Adjusted EBITDA			

Ensure that non-operating income is excluded

Note: finance cost excluded

Analyse the trend in historical earnings:
– If inclining, or declining trend: use most recent adjusted figure
– If no clear trend: use a weighted average of adjusted earnings
– Analyse growth percentages in adjusted figures (for use below when adjusting the MVIC/EBITDA multiple)
(Assume the maintainable historical EBIDTA equals R2 million.)

When applying current multiples and current EBITDA (annualised):

Adjustments to all years for the purposes of trend-analysis

	<- Previous years			Current financial year
Years to analyse (let the question be the guide):	**FYE Most recent – 2**	**FYE Most recent – 1**	**Most recent FYE**	**Current year (annualised)**

Analyse the trend in historical earnings:
– As above

2.3 *When applying forward multiples and projected EBITDA:*

	<-Historical / Current				Forecast ->
	FYE Most recent – 2	**FYE M st recent – 1**	**Most recent FYE**	**Current year (annualised) (possibly)**	**12 months forward the valuation date**
Years to analyse (let the question be the guide):					
Adjusted earnings (calculate as above)					

Evaluate reasonability of forecasted earnings:
– Analyse trends in EBITDA over time
– Consider other evidence (industry forecasts, market research, competitor analysis, etc)
– Analyse growth percentages in adjusted figures (for use below when adjusting the MVIC/EBITDA multiple)
– Use forecasted EBITDA only if it appears reasonable
(Assume the maintainable forecast EBITDA equals R2,12 million)

3 Adjust the comparator MVIC/EBITDA multiple for differences in risk and growth factors	**Historical/ current MVIC/EBITDA**	**Forward MVIC/EBITDA**
	(Example)	(Example)
Comparator MVIC/EBITDA multiple of entity A (based on market capitalisation representing a controlling basis)	**5,00**	**4,65**
– (Note: The comparator's multiple would exclude excess cash and investments from MVIC)		
Adjusted for *entity level differences* between the comparator entity and the entity being valued:		
[Always consider the way the above multiple was calculated before making adjustments h r]		
Adjustment for busin ss and finance risk: (–) B has higher risk; (+) B has lower risk		
– Relative age of non- urrent assets and need for reinvestment in assets		
– Differen e in the level of competition		
– Count y isk		
– The elative size of the entities		
– Access to finance		
– The reliance on a small number of key employees		
– The diversity of the product ranges		
– Differences in the quality of EBITDA		
– Specific differences mentioned in the question		
[Note that one does not adjust for differences in borrowing, or non-operating assets here]		
Maintainable EBITDA long-term ***growth expectations***:		
(–) B has lower growth expectations; (+) B has higher growth expectations		
Assume adjustments equalled:	(1,75)	(1,58)
Adjusted MVIC/EBITDA multiple applicable to entity B	**3,25**	**3,07**

Determine the overall firm value of entity B (assuming no owner level differences to comparator)
Either method

	R
Determine the MVIC	
Maintainable EBITDA × adjusted MVIC/EBITDA multiple = (R2m × 3,25) or (R2,12m × 3,07)	6 500 000
(Note: Figures may not total due to rounding.)	
Value of excess cash and other investments (assume this was valued separately at this value)	800 000
Overall firm value of entity B (unadjusted - assuming no shareholder level differences to comparator)	7 300 000

5 Further steps depending on required:
[Always remember here to compare like to like: compare the shareholder of the comp r tor entity (incorporated in the comparator P/E multiple) to the shareholder in the entity being v lued.]

– e.g. determine overall firm value of entity B	**R**
Overall fir m value of entity B (assuming no shareholder level differences to comparator)	7 300 000
Value of debt (valued separately, assume value is R2 000 000 in this case)#	(2 000 000)
Value of 100% equity (assuming no shareholder level differences)	5 300 000
***Shareholder level* premiums and discounts (compared to shareh lders in entity A):**	
– Control premium (possible, but not in this case as co parator ultiple is already based on the value of a controlling share)	Nil
Subtotal	5 300 000
– Marketability discount (applicable as this share in B is l ss marketable) (e.g. 6% × 5 300 000)	(318 000)
Value of a 100 % equity shareholding in B (adjusted for shareholder level differences in this case)	4 982 000
Value of actual debt on the valuation date (as above, add back again)#	2 000 000
Fair market value: Overall firm value of entity B	6 982 000

[Note that shareholder level differences are preferably adjusted directly to the value of equity, but if it is not possible to determine the value of debt (e.g. R2 000 000 in this case), then the premium and discounts could be adjusted directly to overall firm value, although not ideal.]

– e.g. determine the fair market value of a 40% shareholding in B	**R**
Overall firm value of entity B (assuming no shareholder level differences to comparator)	7 300 000
Value of debt (valued separately, assume value is R2 000 000 in this case)	(2 000 000)
Value of 100% equity (assuming no shareholder level differences)	5 300 000
***Shareholder level* premiums and discounts (compared to shareholders in entity A):**	
– Minority discount (necessary as comparator multiple is representative of a controlling share) (e.g. 14% × 5 300000)	(742 000)
Subtotal	4 558 000
– Marketability discount (applicable as this share in entity B is less marketable) (e.g. 15% × 4 558000)	(683 700)
Value of a 100 % equity shareholding in entity B (adjusted for shareholder level differences in this case)	3 874 300
Multiplied by percentage shareholding	40%
Fair market value of a 40% equity shareholding in entity B (adjusted for shareholder level differences)	1 549 720

6 Reas nability test
Ba ed on a different valuation methodology, if possible.

7 Va uation conclusion

OUTLINE: MODEL BASED ON FREE CASHFLOW AVAILABLE TO THE BUSINESS ENTERPRISE

(Using a simplified tax treatment – Refer to Question 11-5 for an illustration of both a long and a short method)

Steps:

Determine whether some of the initial steps of valuation are required and address these (refer to elements 1–8 as discussed earlier in this chapter, in the section entitled: 'Valuation report' (section 11.5.3))

Calculate the Weighted Average Cost of Capital (WACC). Refer to chapter 4 (*Capital structure and the cost of capital*).

Determine the present value of Free Cashflows (FCF):

	Valuation date	**Explicit forecast for non-steady state** *(for number of years to include et the question be the guide)*			**Continuing value base (steady state)**
Year:	0	1	2	3	4
Revenue		XXXXX	XXXXX	XXXXX	
Cost of sales		(XXXX)	(XXXX)	(XXXX)	
Gross profit		XXXX	XXXX	XXXX	
Do not include non-operating income here (associated assets are valued separately)		–	–	–	
Selling, general and administration		(XXX)	(XXX)	(XXX)	
Operating EBIT		XXX	XXX	XXX	
Exclude depreciation and non-cash items		add/deduct	add/deduct	add/deduct	
Adjusted EBITDA		XXX	XXX	XXX	
Recalculated tax		add/d duct	add/deduct	add/deduct	
Operating EBITDA × cash tax rate Tax allowances effect × cash tax rate		add/deduct XX	add/deduct XX	add/deduct XX	
Assessed losses × cash tax rate (if applicable)		XX	XX	XX	
Gross cashflow		XX	XX	XX	Growth from previous year
Gross investment:					
Change in working capital requirements		add/deduct	add/deduct	add/deduct	normally deduct
Change in *non-excess cash current asset* balance: increase: deduct / decrease: add		add/deduct	add/deduct	add/deduct	normally deduct
Change in *non-debt current liabilities*: increase: add / decrease: deduct		add/deduct	add/deduct	add/deduct	normally add
Capital investment					
Change in *non-current assets* balance: increase: deduct / decreas : add (include change in additional ass ts to increase capacity)		add/deduct	add/deduct	add/deduct	normally deduct
FCF		X	X	X	X
Continuing value (CV3) = FCF4/(WACC – g)			Note: placement	XXX	
FCF with CV		X	X	XXX	
Disc unt using WACC (show calculator steps)					
Value of operations (MVIC)	**XXX**				
Add va ue of non-operating assets:					
Excess cash at valuation date	X				
Other non-operating assets (valued separately)	X				
Overall firm value (unadjusted)	**8 000 000** (example)				

Note: FCF of continuing value base not included with totals

Further steps depending on required:

– e.g. determine overall firm value of the entity	**R**
Overall firm value (assuming no shareholder level differences to peer group used to calculate WACC)	8 000 000
Value of debt (valued separately, assume value is R2 500 000 in this case)##	(2 500 000)
Value of 100% equity (assuming no shareholder level differences)	5 500 000
Shareholder level premiums and discounts:	
– Control premium (no, as FCF normally determined from the perspective of a controlling party)	–
– Marketability discount (applicable as this share is less marketable) (e.g. 6% × 5 500 000)	(330 000)
Value of a 100% equity shareholding (adjusted for shareholder level differences in this case)	5 170 000
Value of actual debt on the valuation date (as above, add back again)##	2 500 000
Overall firm value of enterprise B	7 670 000

[Note that shareholder level differences are preferably adjusted directly to the value of equity, but if it is not possible to determine the value of debt (e.g. R2 500 000 in this case), then the premium and discounts could be adjusted directly to overall firm value, although not ideal.]

– e.g. determine the fair market value of a 30% shareholding in the entity	**R**
Overall firm value (assuming no shareholder lev l diff r nc s to peer group used to calculate WACC)	8 000 000
Value of debt (valued separately, assume value is 2 500 000 in this case)	(2 500 000)
Value of 100% equity (assuming no shareholder level differences)	5 500 000
Shareholder level premiums and discounts:	
– Minority discount (necessary as FCF normally determined from the perspective of a controlling party) (e.g. 18% × 5 500 000)	(990 000)
Subtotal	4 510 000
– Marketability discount (applicable as this share is less marketable) (e.g. 16% × 4 510 000)	(721 600)
Value of a 100% equity shareholding (adjusted for shareholder level differences in this case)	3 788 400
Multiplied by percentage shareholding	30%
Fair market value of a 30% equity shareholding (adjusted for shareholder level differences)	1 136 520

Reasonability test

Based on a differ nt valuation methodology, if possible.

Valuation con lusion

Appendix 2

Summary of the average owner level premiums and discounts applied by most South African appraisers in 2012 (Intermediate)

The tables contained in this appendix have been recalculated and compiled based on the information in PwC's Valuation Methodology Survey (2012), and is presented here with permission. These tables summarise the *average* adjustments for owner level premiums and discounts, made by *most* survey respondents in 2012 when using a specific valuation approaches. It is therefore a useful indication of actual South African valuation practice.

Note that these average percentages fail to highlight the large vari tion in responses. This summary also cannot do justice to the full report; interested parties should refer to the det iled report. Further note that these averages are grouped into key shareholding interest levels, affecting control of companies. However, the Companies Act 71 of 2008 (which became effective in 2011) offers possibilities to *change* key shareholding interest levels affecting the level of control. In addition, where control is affected by other factors (*e.g.* an agreement), shareholder interest levels are less relevant in this c ntext.

A special note to students: due to the nature of this course it is n t necessary to memorise these percentages. Trends and observations as described below are, however, i portant.

Average adjustments to the market value of equity for owner level differences when using an *income approach*

	Shareholding interest					
	1–24%		**25–49%**		**50–74%**	**75–100%**
Percentage of value per share	%	%	%	%	%	%
MVE with no shareholder level differences to comparator quoted entity used in the calculation of the discount rate	**100**		**100**		**100**	**100**
Minority discount	– 18		– 14		0	0
MVE adjusted for the above	82	**100**	86	**100**	100	100
Marketability discount	– 15	– 18	– 13	– 15	– 10	– 8
MVE adjusted for the above	**67**	**82**	**73**	**85**	**90**	**92**

Note: Figures may not total correctly due to rounding.

Average adjustments to the market value of equity for owner level differences when using a methodology based on multiples – part of the *market comparable approach*

	Shareholding interest					
	1–24%		**25–49%**		**50–74%**	**75–100%**
Percentage of value per share	%	%	%	%	%	%
MVE assuming no shareholder level differences to comparator quoted entity	**100**		**100**		**100**	**100**
Control premi m	0		0		19	22
MVE adjusted for the above	100		100		119	**100**	122	**100**
Marketability discount	– 15		– 13		– 10	– 8	– 8	– 7
MVE adjusted for the above	**85**		**87**		**109**	**92**	**114**	**93**

Notes

Figures may not total correctly due to rounding.

Percentages have been rounded to the nearest percentage point.

Observations

A minority discount is normally applied only when using the income approach. For the income approach this makes sense as it usually involves a discounted cashflow method where the forecast cashflows are frequently determined on an enterprise level – implying control.

A minority discount decreases in steps as the shareholding increases, up to below a 50% interest, which makes sense as the lack of control progressively decreases up to this point. (With the absence of other influences, control effectively starts with a shareholder owning 50% plus one share).

A control premium is normally applied only when using a market mu tip e approach. This makes sense only where the comparator multiple (e.g. P/E multiple) belongs to an entity of which the quoted market share price is reflective of a non-controlling share. Since this practice is not universally accepted, the recommendation is to evaluate the comparator entity on a case-by-c se b sis. B sed on the survey, the control premium increases in steps as the interest is increased from 50%, since these incremental levels each represent a key level allowing increasing authority in decision-making.

A marketability discount decreases as the shareholding increases, which makes sense as it should be relatively easier to sell a larger shareholding than a lesser ne.

Practice questions

Question 11–1 *(Intermediate)* *22 marks 33 minutes*

The following extract from the management accounts of a family-run retailer is available. The information was compiled on a historical-cost convention and all figures have been indexed and adjusted to reflect the value of money at the end of the financial year ended 20X1.

Statement of Profit/Loss (In constant 20X1 money)

	Historical year 20X1	Historical year 20X2	Historical year 20X3 (most recent)	Forecast
Turnover	2 000 000	1 800 000	2 100 000	2 520 000
Cost of sales	1 110 000	1 160 000	1 180 000	1 350 000
Gross profit	890 000	640 000	920 000	1 170 000
Sale of assets	–	120 000	–	–
Depreciation	(50 000)	(50 000)	(50 000)	(50 000)
Interest	(200 000)	(200 000)	(200 000)	(200 000)
Other expenses	(270 000)	(300 000)	(280 000)	(280 000)
Investment income	80 000	120 000	120 000	120 000
Foreign exchange loss	(150 000)	–	–	–
Earnings before tax	300 000	330 000	510 000	760 000

The following information is also available (figures in 20X1 monetary terms):

The drop in sales for year 20X2 was due to strike action.

The foreign exchange loss occurred as no forward cover was taken on exports. It is now company policy to take o t forward cover.

In the year 20X2 the company incurred legal costs of R50 000 (included under other expenses) as a result of c ntesting an unfair dismissal case.

Mr I Jones holds 70% of the shares in the company. He manages the company and receives an annual salary of R80 000. If the company employed a suitably qualified manager, the annual cost would be R200 000.

The property, plant and equipment of the company are old and need to be replaced to sustain the business. Asset replacement would result in increased depreciation of R100 000 per annum if operations are to be sustained at historical levels, but would have to increase by R125 000 to facilitate the forecast figures.

The forecast above was prepared by Mr Jones, based on indications of a strong demand for the company's products. Specific industry information is not available, but the current order book has grown compared to a year ago. Discussions with Mr Jones indicate that the company has obtained new contracts, thereby

slightly increasing its market share, but the overall market seems to have grown in line with the economy. Mr Jones views the increased sales as sustainable.

The effective tax rate on income before tax of the company is 28%.

Inflation equalled roughly 5% per annum over the past number of years.

Required:

Determine the maintainable earnings to be used for the purposes of determining the fair market value of equity shares, using a P/E multiple method. Mention and discuss the matters of contention and perform additional calculations to support your final answer. **(*22 marks*)**

Solution:

Maintainable earnings

In this example there are some obvious factors that need to be addressed, such as:

Sale of assets

Foreign exchange loss

Managerial salary.

Then there are those factors that are not as obvious, such as:

Legal costs – must one adjust for the R50 000?

Depreciation – does one update and, if one does, to what l v l?

Drop in Year 2 sales – what does one do?

Are financial adjustments made to all three years, or do some adjustments relate to Year 3 or the forecast only?

Contentious issues include:

Does one determine historical maintainable earnings (to be used with an adjusted trailing P/E multiple) or forecast maintainable earnings (to be used with an adjusted forward P/E multiple)?

Does one adjust for the effect of inflation and, if so, where is the adjustment made?

Are the increased sales, as included in the forecast, maintainable? (Here one must analyse the new contracts, as well as the prospects for the industry and economy in general.)

Is the forecast cost reasonable compared to sales, given the fixed and variable nature of the company's cost?

Analysis of the comparator listed entity, to determine other possible adjustments to be made, including adjustments for diff r nc s in gearing.

If investment in ome is removed from the maintainable earnings calculation, one has to value the investment separately.

Calculation of adjusted earnings (in constant 20X1 money):

		Historical Year 20X1 R	Historical Year 20X2 R	Historical Year 20X3 R	Forecast
Gross profit		890 000	640 000	920 000	1 170 000
Other expenses		(270 000)	(300 000)	(280 000)	(280 000)
Adjusted for:					
– Legal cost	**(Note 1)**	–	50 000	–	–
– Market-related salary	**(Note 2)**	(120 000)	(120 000)	(120 000)	(120 000)
Sale of assets	**(Note 3)**	–	0	–	–
Depreciation (updated)	**(Note 4)**	(150 000)	(150 000)	(150 000)	(175 000)
Interest		(200 000)	(200 000)	(200 000)	(200 000)
Investment income	(**Note 5**)	–	–	–	–
Foreign exchange loss	(**Note 6**)	0	–	–	–
Adjusted earnings before tax		150 000	(80 000)	170 000	395 000
Taxation (28%)		(42 000)	22 400	(47 600)	(110 600)
Adjusted earnings		108 000	57 600	122 400	284 400
Or alternatively:					
Earnings before tax		300 000	330 000	510 000	760 000
Adjustments					
Sale of assets	**(Note 3)**	–	(120 000)	–	–
Investment income	(**Note 5**)	(80 000)	(120 000)	(120 000)	(120 000)
Foreign exchange loss	(**Note 6**)	150 000			
Legal costs	**(Note 1)**		50 000		
Increased salary	**(Note 2)**	(120 000)	(120 000)	(120 000)	(120 000)
Depreciation	**(Note 4)**	(100 000)	(100 000)	(100 000)	(125 000)
Restated earnings		150 000	(80 000)	170 000	395 000
Taxation (28%)		(42 000)	22 400	(47 600)	(110 600)
Adjusted earnings (in 20X1 money)		108 000	57 600	122 400	284 400
Growth			(46,7%)	112,5%	132,4%
Adjusted earnings increased by inflation		108 000	60 480	134 946	329 229
		× 1,00	× $1,05^1$	× $1,05^2$	× $1,05^3$
Growth			(44,0%)	123,1%	144,0%

Notes

1 Assuming that the l gal costs were once-off costs, add them back.

2 A normal arm's-length salary is R200 000 per annum. An adjustment of R120 000 is therefore re-qui ed.

Sale of assets here does not represent income from operating/trading performance – therefore ignore it.

The depreciation adjustment is required, as the current state of the assets cannot maintain profitability.

Investment income must be excluded here as it is not part of the normal business operations. This does not mean that one should ignore it altogether. In this instance, calculate the market value of the investments held, and add it to the value of the earnings valuation. Note that one does not treat long-term debt (and the related interest expense) similarly as a P/E multiple is based on (net) earnings, which includes the interest expense. Note that the capital structure (i.e. the debt to equity (D:E) ratio) of the entity should be similar to that of the comparable entity, otherwise this should be adjusted for as well.

Where an entity engages in transactions in foreign currency as part of operations, the effects of foreign exchange movements are normally included in maintainable earnings. In this case, however, it is clear that it was an exceptional expense as the company now hedges this risk.

Discussion of maintainable earnings

Additional procedures will have to be performed to confirm the reasonability of the forecast earnings, especially considering the large increase on the historical results. These procedures should include:

Analysing the new sales contracts, and investigating the prospects for the industry and economy in general, to confirm if the increased level of sales is maintainable.

Analysing the forecast cost (in 20X1 money), including its fixed and variable components (using a high-low method or regression analysis) to confirm the reasonability of the forecast cost. Here an appraiser should also be mindful of semi-variable costs and stepped-fixed costs. (The execution of such a step in an examination will depend on the exact instructions and the number of marks.)

	High-low
Change in turnover (R2 100 000 [highest from 20X3] – R1 800 000 [lowest from 20X2])	R300 000
Change in adjusted earnings (R122 400 [20X3] – R57 600 [20X2])	R64 800
Variable earnings per R1 turnover (R64 800 / R300 000)	0,2160
Total variable earnings highest point (R2 100 000 × 0,2160)	R453 600
Fixed cost therefore (R453 600 – R122 400)	(R331 200)
Projected sales	R2 520 000
Therefore – projected adjusted earnings in 20X1 money (R2 520 000 × 0,2160 – R331 200)	R213 120
Therefore – projected adjusted earnings (also adjusted for inflation: × $1,05^3$)	R246 713

Linear regression will result in a similar picture (Intercept = – 338 914; Slope = 0,2211; Correlation coefficient = 0,9928. When applied to projected sal s of R2 520 000 it gives projected adjusted earnings of R218 366). Students should refer to the owner's manual of their financial calculators for the steps.

These results would not be distorted by the effect of inflation as all figures reflect 20X1 money (if figures were not already indexed and adjusted, this step will have to be performed in addition). These results are limited, however, due to the low number of historical years included in the analysis. Nonetheless, the results do suggest that the projected adjusted earnings are optimistic. Further consideration should be given to the scale of operations. Where this will increase, an additional fixed-cost component might also be warranted.

Additional procedures will have to be performed to confirm the reasonability of the historical earnings, especially considering the strike action in year 20X2, as follows:

Analyse the industry and company to determine the incidence of strikes, the strength of labour unions, typical recent wage rate increases and the ability of the company to afford them.

Analyse the new equipment to be obtained by the company and confirm whether it will reduce the reliance on labour.

Students faced with such a situation in an examination could take different views, but must motivate their choice, for example bas d on ***one*** of the following arguments:

- The forecast arnings of **R329 229** (R284 400 before adjustment for inflation) seems to be optimistic, based on analysis of the fixed and variable components of the cost structure (more procedures should ideally be pe fo med to analyse this). A figure of roughly **R246 713** might be more realistic as forecast maintainable ea nings. This earnings figure is to be used with an adjusted *forward* P/E multiple, and the investment is to be valued separately and added to the value obtained.

  The forecast earnings of **R329 229** (R284 400 before adjustment for inflation) seems to be maintainable, based on the information supplied (including information from Mr Jones), even though more procedures sh uld ideally be performed to confirm this. This earnings figure is to be used with an adjusted *forward* P/E multiple, and the investment is to be valued separately and added to the value obtained.

  Due to the lack of sufficient information, more reliance should be placed on the adjusted historical earnings. In this case, one should ideally perform further procedures to analyse the likelihood of strikes in future (as described above), but strike action seems to be common in many industries today and could therefore occur again in future. Consequently, a weighted average of the adjusted historical earnings (also adjusted for inflation) is calculated to obtain the maintainable earnings: (R108 000 × 1 / 6) + (R60 480 × 2 / 6) + (R134 946 × 3 / 6) = **R105 633**. This earnings figure is to be used with an adjusted *trailing* P/E multiple, and the investment is to be valued separately and added to the value obtained.

In summary, the most important aspect to remember is that students should apply their knowledge to the scenario.

Question 11–2 (*Advanced*) ***42 marks 63 minutes***

PreFab (Pty) Ltd ('PreFab') manufactures, sells and rents out prefabricated units, and is the leading manufacturer of these products in South Africa. Units are manufactured at its factory situated in Centurion, Gauteng. PreFab's individual units vary from 12 m^2 to 612 m^2, and because of the modular format of units, can be sized according to customer requirements.

PreFab supplies significant volumes to various South African government departments, which accounted for 22% of the company's revenue in the 2007 financial year. The government uses PreFab's units for new schools and in low-cost housing developments. Various government departments have also embarked on an extensive infrastructural development programme and PreFab is confident that it wi benefit from increasing expendi-ture by them.

The rest of PreFab's customer base is diversified and no single customer ccounts for more than 10% of the company's total revenue. Some of these customers, for example South Afric n nd African mining groups involved in exploration projects and new mining projects, use prefabricated units to provide temporary accommodation for staff. Others use the units for office accommodation on a temporary or permanent basis. The construction industry is undergoing a major growth phase and many f the major construction groups use PreFab's units as temporary offices and residential accommodati n n c nstruction sites.

PreFab also rents out units to customers, and the demand for rental units is increasing. The minimum rental period is three months, and monthly rentals of units are deter ined as the historical cost of the unit divided by 24. In order to keep up with customer demand for rental units, PreFab has utilised most of its historical cash flows and raised term loans from banks to fund the acquisition of units by the Rental division. The Rental division was started in January 2006.

Steven Hamilton founded PreFab in 1996 and is still the Chi f Executive Officer (CEO) of the company. Mr Hamilton's family trust, The Hamilton Family Trust, owned 100% of the shares in issue until July 2007. The Hamilton Family Trust advanced a R35 million loan to PreFab in 2000 which loan bears interest at 13% per annum, payable annually in arrears, and has no fixed date of repayment.

Effective from 1 July 2007, BBZ Holdings, a broad-based black economic empowerment (B-BBEE) investment group, acquired a 30% interest in the company and advanced an interest-bearing shareholder's loan of R15 million to PreFab on the same date. The terms and conditions of the loan are the same as those applicable to The Hamilton Family Trust loan.

The PreFab shareholders' agreement contains a clause that provides that if any shareholder disposes of its equity to a third party, the purchase consideration would first be allocated to shareholder loan accounts and thereafter to the shares.

Xtatic Ltd ('Xtatic'), a company listed on the JSE Limited, has recently approached the shareholders of PreFab with an offer for the acquisition of a 100% shareholding in the company. Xtatic is in the process of formulating an offer price for PreFab shares and has indicated that a key condition of the acquisition would be that Steven Hamilton remains CEO of PreFab for three years after the acquisition. Xtatic has indicated that it will pay cash for the shareholding in Pr Fab. Xtatic is a major manufacturer and supplier of mining and construction capital equipment, and is aggr ssiv ly growing through acquisitions.

Abridged historical and forecast income statements of PreFab

Prefab (Pty) Ltd
Income Statements for the Years Ended/Ending 31 December

	Notes	Actual		Forecast
		2006 Rmillion	2007 Rmillion	2008 Rmillion
Revenue		94,1	147,0	197,4
Manufacturing division		84,1	122,0	152,4
Rental division	1	10,0	25,0	45,0
Cost of sales		(56,9)	(86,8)	(113,4)
Manufacturing division		(53,4)	(78,0)	(97,6)
Rental division	2	(3,5)	(8,8)	(15,8)
Gross profit		37,2	60,2	84,0
Operating costs		(20,9)	(24,7)	(27,7)
BEE transaction costs	3	–	(12,4)	–
Unusual entertainment costs	4	–	(2,4)	–
Contract penalties	5	–	(1,8)	–
Depreciation		(1,8)	(2,2)	(2,3)
Profit before interest and tax		14,5	16,7	54,0
Finance charges		(0,5)	(2,1)	(3,8)
Interest on shareholders' loans		(4,6)	(5,5)	(7,0)
Interest income		0,3	1,0	1,9
Profit before tax		9,7	10,1	45,1
Tax	6	(2,8)	(6,5)	(13,1)
Profit after tax		6,9	3,6	32,0

Notes

The periods of rental agreements vary from 3 to 12 months with the option to renew. PreFab has a long waiting list for rental units and accordingly plans to acquire further units to rent over the next three years.

Cost of sales for the Rental division comprises mainly depreciation, maintenance and servicing costs of units. Rental assets are depreciated on a straight-line basis over ten years. Depreciation amounted to R2 million in the 2006 financial year. The Rental division purchases prefabricated units from the Manufacturing division at the same prices at which units are sold to external customers, which in total amounted to R30 million in 2007 (2006: R20 million). It is forecasting acquisitions of R40 million in the 2008 financial year. The Manufacturing division revenue shown in the income statements includes sales at market value to the Rental division.

The auditors of PreFab recommended that a once-off cost associated with the B-BBEE deal in July 2007 be recognised in the ompany's annual financial statements. The auditors are of the opinion that the differ-ence between the fair market value of shares acquired by BBZ Holdings and the actual cost of their share subscription (which was a nominal amount) should be accounted for based on their interpretation of IFRS 2, *Share-based payment*, and AC 503, *Accounting for black economic empowerment (BEE)*. The following journal entry, which can be assumed to be correct, was processed at year-end:

	Rmillion	Rmillion
BEE transacti n costs	12,4	
Share premium		12,4

PreFab invited various client representatives to accompany them to the Rugby World Cup held in France in October 2007. The company deemed this to be a non-recurring expenditure and therefore disclosed it separate y in the income statement.

PreFab incurred a penalty due to the late supply of prefabricated units to Galaxy Mining. Such a penalty has never previously been incurred, because PreFab generally refuses to include a late supply clause in supply contracts. The late supply occurred as a result of disruptions caused by a ten-day strike by PreFab manufacturing employees over proposed wage increases. The strike took the executive directors of PreFab by surprise, as no such incident had occurred in the preceding three years.

The company's effective normal tax rate has historically been 29%. In the 2007 financial year, the effective tax rate increased due to the non-deductibility of the B-BBEE transaction costs.

PreFab's budgeting for and forecast of earnings have generally been highly accurate. Steven Hamilton is confident that forecast profit after tax of R32 million will be achieved in the year ending 31 December 2008, particularly given that the 12-month forward order book at the end of February 2008 exceeded R100 million.

Abridged historical and forecast cashflow statements

Prefab (Pty) Ltd
Cashflow Statements for the Year Ended/Ending 31 December

	Actual	Forec st		
	2007	2008	2009	2010
	Rmillion	Rmillion	Rmillion	Rmillion
Profit before interest and tax	16,7	54,0	78,7	105,1
Depreciation				
Property, plant and equipment	2,2	2,3	2,2	2,2
Rental fleet	5,0	9,0	14,0	19,0
B-BBEE transaction costs	12,4	–	–	–
Net interest	(6,6)	(8,9)	(8,7)	(6,6)
Tax	(5,6)	(11,5)	(18,5)	(26,5)
Working capital				
Inventories	(4,7)	(4,3)	(4,3)	(5,1)
Accounts receivable	(6,7)	(6,1)	(7,6)	(8,4)
Trade and other payables	4,4	2,9	2,9	3,5
Capital expenditure				
Property, plant and equipment	(2,5)	(2,0)	(2,1)	(2,2)
Rental units	(30,0)	(40,0)	(50,0)	(50,0)
	(15,4)	(4,6)	6,6	31,0
Interest-bearing debt (net movement)	16,6	4,9	(10,1)	(3,6)
Shareholders' loans	15,0	–	–	–
Net cash movement for the year	16,2	0,3	(3,5)	27,4

The above cash-flow forecasts have been reviewed and approved by the Board of Directors of PreFab.

Additional information

1 The total interest-bearing liabilities and cash balances were as follows at 31 December 2007:

	Rmillion
Long-term inter st-b aring borrowings	20,4
Shareholders' loans	50,0
Short-term borrowings	4,0
Cash and cash equivalents	20,4

The following information is available regarding companies listed on the JSE Limited which operate in the same ind stry as PreFab –

their average increase in headline earnings per share in the 2007 calendar year was 25% and they are expecting similar increases in 2008;

their average price earnings multiple, based on 2007 reported profits, is currently 12,0;

their average total revenue in the 2007 calendar year was R175 million; and

they all have BEE shareholders.

Required:

Assuming that the accountant was tasked to perform an earnings-based valuation of Prefab (Pty) Ltd based on the profits achieved in the 2007 financial year –

state, with reasons, what adjustments, if any, he would make to the reported profit after tax for the effects of the transfer pricing arrangement between the Manufacturing and Rental divisions; **(*8 marks*)**

state, with reasons, what other adjustments he would make to the reported 2007 profit after tax in order to derive a sustainable earnings figure for the purposes of your valuation; and **(*8 marks*)**

indicate, with reasons, what price earnings multiple he would use to va ue PreFab (Pty) Ltd. **(*6 marks*)**

Perform a Free Cashflow valuation of PreFab (Pty) Ltd in order to v lue 100% of the shares in issue of the company and the shareholder loan accounts. For the purposes of the v lu tion –

assume that PreFab (Pty) Ltd's weighted average cost of capital (WACC) is 17,5%;

base the valuation on information from 1 January 2008; and

assume that the company's annual growth in Free Cashfl ws will be 2% from the 2011 financial year onwards.

State any additional assumptions that have been ade. **(*10 marks*)**

(c) Identify and describe five key business risks faced by PreFab (Pty) Ltd. **(*10 marks*)**

(Source: SAICA, 2008 Qualifying Examination Part 1; Pap r 2; Qu stion 2 – an extract, slightly adapted)

Solution:

(i) Adjustments for transfer pricing arrangement

For the purposes of determining sustainable earnings, recognising sales from Manufacturing to Rental division after internal mark-up is incorrect. The gross profit has not yet been earned from an external party. Instead, internal sales should be recognised at cost and reflected as an asset for rental to customers.

To derive sustainable earnings, the gross profit in respect of the interdivisional sales or the transfer transaction must be reversed.

The reversal would be effected as follows:	**2007**
– Inter-divisional revenue	– 30,0
– Cost of sales [78 / 122 × 30]	19,2
	– 10,8

The d pr ciation acknowledged on the unit transferred with the internal sale must also be decr as d. The r ntal asset value is inflated with the profit of the interdivisional sale: the asset should be stated at cost price, and therefore the depreciation on the 'profit part' must be re-versed.

Alte native to the discussion above, a calculation of the depreciation to be adjusted could have been presented, as follows:

Adj stment to depreciation:		**2007**
Act al cost of units		
2006: (53,4 / 84,1) × 20,0	12,70	
2007: (78 / 122) × 30,0	19,18	
	31,88	
Correct depreciation (31,9 × 10%)		– 3,18
Prefab's depreciation policy is to amortise for a full year irrespective of the acquisition date: Compare R5 depreciation on R50 purchases		
Depreciation as per income statement		5,00
		1,82

No tax adjustment is required as the profit on the interdivisional sale is a notional profit.

Effective tax of 29% may need to be taken into account if the profit was included in the audited income statement. Tax would have to be adjusted by (– 10,80 + 1,82 = – 8,98 × 29%) if the profit was included in taxable income.

An assumption may be made that the internal transfer is in one direction only, that is the manufacturing division sells to the rental division, but the rental division does not rent any units to the manufacturing division, and therefore no adjustment to the rental income of the rental division is required.

Other adjustments required to profit after tax

The future sustainable earnings must be calculated, as follows:

Add back the B-BBEE transaction costs.

(The B-BBEE transaction has no impact on actual profits/non-recurring item)

Add back the unusual entertainment expenditure.

(Based on management representations, these c sts are non-recurring. However, all the entertainment may not be unusual: some entertainment expenditure may well be expected in the future – it would make sense to nor alise this expense).

Add back interest on the shareholders' loans.

(The capital structure of the business should not affect the overall firm value or the shareholders' loan agreement stipulates that loans and shares are treated indivisibly).

Add back penalty payments *or* do not add back penalty payments.

(Add back penalty payments: non -recurring, unusual expense; or do not add back penalty payments: although unusual, the payments are a cost of doing business and cannot be regarded as exceptional).

Adjust the tax charge for the effect of the above adjustments, excluding the B-BBEE costs which are noted as being non-deductible.

(iii) Appropriate P/E multiple

Average of similar listed companies	12,0
Adjustments to the P/E multiple to account for entity level differences (*must be described*):	
Discount for size: R147m (before adjustment for transfer price profit) turnover, compared to average of R175m.	– 1,0
Premium for high r PAT growth of PreFab, say 20%	2,4
[Average listed company growth: 25% in 2007 (and 2008); Calculation of PreFab growth rate (various options available)]	
Significant business risk: reliance on government for 22% of turnover	– 1,0
Strong government contracts which may give a competitive edge	1,0
Possible key-man risk: reliance on Steve Hamilton	– 1,0
Capital structure in comparison to similar listed companies? Similar listed companies may use external debt with fixed repayments.	1,0
[Additional comment: this is adjusted here as there is not enough information on the debt to equity (D:E) ratio of the comparator entities to allow for adjustment in PreFab's maintainable earnings, or to determine a required capital injection.]	

Other valid comments:

– PreFab is South Africa's leading manufacturer	1,0
– May lose B-BBEE status on take-over of company	– 2,0
– More diverse client base/business profile compared to industry	1,0

Additional comment: an allowed, but non-suggested treatment is to include an adjustment for shareholder level differences here (but only if motivated and stated that later adjustments to the calculated overall firm value should, in this case, not include a marketability discount or control premium.) Adjustment for ***shareholder level differ-ences*** *(included in the suggested solution of SAICA):*	
l Discount for unlisted status: lack of tradability/marketability of shares	– 3,0
l Control premium (say 20%)	2,4
Conclusion: Appropriate P/E multiple for PreFab	7–14

(b)

	2008 R'm	2009 R'm	2010 R'm
Net cash movement	0,3	– 3,5	27,4
Adjustments for:			
l Interest	8,9	8,7	6,6
l Tax effect of interest added back	– 2,6	– 2,5	– 1,9
l Movement in interest bearing debt	– 4,9	10,1	3,6
Free Cashflow	1,7	12,8	35,7

Or alternatively:			
Earnings before interest and tax	54,0	78,7	105,1
Add back: Depreciation – PPE	2,3	2,2	2,2
Add back: Depreciation – rental	9,0	14,0	19,01
Interest – no adjustment (EBIT used)	–	–	–
Tax – per cashflow statement	– 11,5	– 18,5	– 26,5
Tax – interest adjustment	– 2,6	– 2,5	– 1,9
Working capital (sum of movements)	– 7,5	– 9,0	– 10,0
Capital expenditure (sum of movements)	– 42,0	– 52,1	– 52,2
Interest bearing debt – should not be included	–	–	–
Free Cashflow	1,7	12,8	35,7

	R'm	2008 R'm	2009 R'm	2010 R'm
Discounted cashflows 2008-2010 at 17,5%	32,7	1,45	9,27	22,01
Terminal value				
Formula to estimate terminal value				
(R35,7 × 1,02) / (17,5% – 2%)	234,9			
Discounted using 17,5% as at end 2010	144,8			

FCF valuation summary	R'm
Discounted cashflows 2008-2010	32,7
Terminal value	144,8
Cash resources 12/2007 (excess cash)	20,4
The cash balance could also have been reduced if the assumption had been made that a portion of the amount is required for operations and this has been motivated.	
Additional comment: if a portion of the cash balance is directly associated with operations, this represents non-excess cash and, in such a case, the movement in this portion of the cash balance should be included in the projected cashflows.	
Overall firm value (unadjusted)	197,9
Interest bearing debt 12/2007	– 24,4
The short-term debt may have been excluded (if it was assumed to be p rt of operations), but such an exclusion must be motivated.	
Value of 100% equity shareholding (assuming no shareholder le el differences)	173,5
Additional comment: if we assume that the 17,5% WACC was calculated based on inputs from comparable listed companies, we suggest the f ll wing further shareholder level adjustment:	
Marketability discount (say 5%)	– 8,7
Value of 100% equity shareholding (adjusted)	164,8

(c) (*1 mark for identifying key risk and 1 mark for xplaining risk*)

Over reliance on government for revenue – PreFab derives 22% of its revenue from government departments. These may be separate departments but failure by PreFab to perform on a particular contract may jeopardise overall business with government.

Over reliance on government – government is known to be a slow payer. Payment delays may have a negative impact on PreFab's cash-flow position.

Liquidity risk – historical cashflows have been used to finance the rental division, or impact on the company's cashflows of shareholders requiring immediate repayment of the shareholder loans, or potential funding problems of the business given the high revenue growth, or liquidity problems as a result of rising interest rates.

Foreign exchange risk resulting from the invoicing of foreign customers in their own currencies.

Risk of losing BEE status when 100% of shares are taken over by Xtatic Ltd (depending on Xtatic shareholding): may hamper growth and lead to the loss of future government contracts.

Risk of continued demand for rental units subsiding if and when construction and government spending boom abat s – Pr Fab will be left with units that cannot be rented out.

Risk that future growth may not be sustainable due to energy crisis (ESKOM load-shedding) – energy crisis ould affe t PreFab in the production of its units, and also affects PreFab's clients, that is mines, which have been hard-hit by rolling blackouts.

Cont act penalties – as it was an issue in 2007, it may now become a regular occurrence where PreFab is exposed to penalties for late or non-delivery of units.

Risk of f rther labour unrest and strikes – could be very disruptive to manufacturing operations.

Key-man risk – Steven Hamilton started business and is CEO. Steven leaving the employ of PreFab due to illness, retirement or any other reason may negatively impact the company.

Reputation risk – resulting from the company's inability to meet the ever-growing forward order book in future.

Operational risk – resulting from dysfunctional decisions/lower employee morale should disputes arise between the manufacturing and rental divisions regarding the pricing of sales to the rental division.

Risk of new competition entering the market due to high demand and profitability – PreFab may struggle to remain market leader and maintain high growth.

The company may struggle with its infrastructure/capacity constraints – due to extremely fast growth.

Any other valid comment.

(Source: SAICA, with minor adjustments and additional commentary)

Question 11–3 (*Intermediate*) *24 marks 36 minutes*

Amounts in the question exclude VAT, except where indicated.

ElectriBolt Ltd ('ElectriBolt') is an independent electricity supplier with various power generation operations throughout South Africa. ElectriBolt is listed on the main board of the JSE. The comp ny's most recent financial reporting date was 31 December 2009.

Background

On 1 January 1999, ElectriBolt entered into a unique hydro-electricity supply licence agreement with the South African government ('the government'). The licence agreement entitled ElectriBolt to install three turbines at the Augrabies Waterfall, which is situated in the Augrabies National Park, and generate and supply electricity for a period of 15 years. The licence agreement provides that –

- ElectriBolt is required to pay the government a fixed instal ent of R800 000 annually in arrear for the right to use the site to generate electricity; and
- the agreement is not renewable at the end of the 15-y ar t rm.

ElectriBolt decided to grant the right of use of the abovementioned supply licence, from the inception date of the agreement with the government (1 January 1999), to PowerSmart Ltd ('PowerSmart'), a large electricity supplier, for a period of 15 years. All licensing rights granted to ElectriBolt by the government were transferred to PowerSmart in exchange for a fixed annual instalment of R1 million, payable in arrear to ElectriBolt. By law, the final operator of an electricity supply business is solely responsible and liable for any related environmental site rehabilitation. PowerSmart may not transfer or sell the supply licence to any other party. A cancellation penalty of R900 000 is payable by PowerSmart to ElectriBolt should PowerSmart at any stage unilaterally decide on the early cancellation of the agreement.

On 1 January 1999, ElectriBolt did not recognise any assets or liabilities in respect of the hydro- electricity supply licence with the government and the right of use of the licence granted to PowerSmart. The R800 000 per annum for the supply licence is expensed on an annual basis and the R1 million per annum receipt from PowerSmart is recognised as revenue on an annual basis. This accounting policy is acceptable in terms of International Financial Reporting Standards.

Feasibility study on Pow rSmart's Augrabies operations

ElectriBolt recently stablish d that PowerSmart is underperforming at the Augrabies site and believes that significantly more ele tri ity an be generated during the last four years of the supply licence. The major reason for PowerSmart's disappointing performance is the regular labour disputes experienced at the Augrabies operation. Elect iBolt conducted a feasibility study in December 2009 to evaluate the possible acquisition of PowerSmart's Aug abies operations.

Following this feasibility study, ElectriBolt proposed acquiring the PowerSmart Augrabies division as a going concern, incl ding all assets and liabilities of this division except for cash and cash equivalents and taxation liabilities. The licensing agreement between ElectriBolt and PowerSmart would be terminated as part of the acquisiti n.

The Chief Financial Officer (CFO) of ElectriBolt prepared the following cashflow projections, following a detailed review of historic financial information of the Augrabies division of PowerSmart and its budgets for the next four years, for the purposes of valuing the Augrabies division:

Year ending 31 December	**Notes**	**2010**	**2011**	**2012**	**2013**
		R	**R**	**R**	**R**
Turnover	1	18 000 000	18 000 000	18 000 000	18 000 000
Operating costs	1	(4 500 000)	(4 500 000)	(4 500 000)	(4 500 000)
Opportunity cost	2	(1 000 000)	(1 000 000)	(1 000 000)	(1 000 000)
Supply license agreement instalments		(800 000)	(800 000)	(800 000)	(800 000)
Operating cost savings	3	300 000	300 000	300 000	300 000
Cost of helicopter lease	4	(480 000)	(480 000)	(480 000)	(480 000)
Depreciation: Turbines		(700 000)	(700 000)	(700 000)	(700 000)
Interest on long-term loan	5	(897 536)	(712 469)	(503 344)	(267 032)
Environmental site rehabilitation costs	6	–	–	–	(2 500 000)
Pending legal claim	7	–	–	–	–
Taxation	8	(2 778 290)	(2 830 109)	(2 888 664)	(2 254 831)
Net cashflows		7 144 174	7 277 422	7 427 992	5 798 137

Related calculations	**Notes**	
Weighted average cost of capital (WACC)	9	23,00%
Net present value of the future cashflows of the Augrabies division of PowerSmart	9	R17 143 393

Notes to the cashflow projections

Projected turnover includes a conservative estimate of the additional electricity that ElectriBolt could generate and supply, assuming it acquired control of the operations. Operating costs exclude annual supply licence payments due by PowerSmart to ElectriBolt.

Opportunity cost represents annual instalments in terms of the supply licence agreement, to which ElectriBolt will no longer be entitled.

PowerSmart incurred research and development costs during the period 2007 to 2009 aimed at improving operating efficiency. As a result thereof, PowerSmart expects a possible annual operating cost saving of R300 000 from 2010 to 2013. The CFO of PowerSmart is of the opinion that the cost-saving is only 45% probable, resulting in the development costs not meeting the recognition criteria in terms of IAS 38, *Intangible assets*, for recognition as an intangible asset. It follows that development costs were immediately expensed when incurred.

PowerSmart leases an executive helicopter from Fly-with-Me Airways (Pty) Ltd at a fixed instalment of R360 000, payable annually in arrears. The lease agreement was correctly classified as an operating lease in terms of IAS 17, *Leases*. The lease agreement commenced on 1 January 2008 and ends on 31 December 2012. On 31 December 2009, it was reliably established that similar executive helicopters can be leased at a market-related fixed instalment of R480 000, payable annually in arrears.

5 PowerSmart obtained a long-term loan of R15 million on 1 January 1999 to finance this particular operation. The long-term loan is repayable in 15 equal annual instalments, which commenced on 31 December 1999. The loan bears interest at a fixed rate of 13% per annum. The loan agreement provides that the loan cannot be repaid earlier than the agreed repayment profile. On 31 December 2009, long-term loans with a similar risk profile and remaining maturity were available at a fixed rate of 12% per annum.

This amount has been reliably estimated by an independent environmental rehabilitation expert.

Labour unrest increased after the recent dismissal of a number of PowerSmart's employees as a result of increased operational inefficiency. The trade union to which these employees belong has instituted a legal claim against PowerSmart on behalf of the employees on the grounds of unfair dismissal. The legal advisers of PowerSmart are of the opinion that –

the dismissed employees have a valid claim against PowerSmart for unfair dismissal;

the trade union will not be able to prove the claim for unfair dismissal in court, due to a lack of evidence; and

it is possible, but not probable, that the court will require PowerSmart to make a financial settlement to the dismissed employees.

The CFO did not include any amount relating to the legal claim in the forecast cashflows. Should such a claim be successful, any amount paid by PowerSmart will not be deductible for tax purposes. The fair market value of the legal claim at 31 December 2009, as reliably determined by an experienced actuary, is R450 000.

All items in the cash-flow budget have been assumed to be taxable or deductible for income tax purposes, except as per point **7** above.

The nominal WACC of ElectriBolt is 23% and the forecast cashflows have been discounted using this rate.

Financing alternatives

On 31 December 2009, the Augrabies division of PowerSmart was acquired by ElectriBolt as a going concern, including all assets and liabilities of the division except for cash and cash equi alents and taxation liabilities. The purchase consideration of R16 million was paid by ElectriBolt on 31 December 2009. It was correctly established that the transaction between ElectriBolt and PowerSmart c nstitutes a 'business combination' as defined in IFRS 3, *Business Combinations*.

ElectriBolt is considering various financing alternatives for the business combination transaction –

payment out of existing cash reserves of R16 million; or

obtaining a R16 million medium-term loan from ElectriBolt's bankers. The loan is to bear interest at 1% above the prevailing prime overdraft rate. This is th company's incremental cost of borrowing. The loan is to be repaid in one bullet payment at the end of four y ars. Interest is to be calculated and compound-ed annually in arrears, and capitalised into the outstanding loan balance. Transaction costs of 1% of the principal amount will be payable at the inception of the medium-term loan. The interest to be incurred on such a long-term loan is deductible for taxation purposes in terms of section 24J of the Income Tax Act; or

the issue of compulsory convertible preference shares with a par value of R16 million. Preference shareholders will be entitled to an annual dividend calculated as 80% of the prevailing prime overdraft rate multiplied by the par value of shares held. ElectriBolt is required to pay preference dividends annually in arrears and has no discretion with regard to declaring these dividends. Each preference share will automatically convert into one ordinary share after four years. Analysts predict that the value of the converted shares at the end of Year 4 will amount to R17 800 000.

Draft statement of financial position of the Augrabies division of PowerSmart as at 31 December 2009

The information below represents an extract from the **draft** statement of financial position of the Augrabies division of PowerSmart as at 31 December 2009, which contained *inter alia* the following:

	Notes	R
ASSETS		
Non-current assets		
Property, plant and equipment	1	9 750 000
Current assets		
Invento ies	2	750 000
Trade receivables	3	300 000
Cash and cash equivalents		250 000
LIABILITIES		
N n-current liabilities		
L ng-term borrowings	4	5 480 535
Deferred tax	5	592 200
Long-term provisions	6	–
Current liabilities		
Trade payables	7	435 000
Current portion of long-term borrowings	4	1 423 590
South African Revenue Service (SARS)		115 000

Notes

Items of property, plant and equipment are subsequently measured according to the cost model in terms of IAS 16, *Property, plant and equipment*. The market value of the property, plant and equipment as at 31 December 2009 was R14 million.

The fair market value of inventories was reliably determined at R800 000 as at 31 December 2009.

The balance of net trade receivables comprised the following as at 31 December 2009:

	R
Gross trade receivables	480 00
Less: Allowance for doubtful debts*	(180 000)
	300 000

* The SARS grants a tax deduction of 25% of the allowance for doubtful debts for t x tion purposes.

The fair market value of trade receivables as at 31 December 2009 was reliably determined at R400 000.

Long-term borrowings are subsequently measured acc rding to the amortised cost model in terms of IAS 39, *Financial Instruments: Recognition and Measurement*. L ng-term borrowings consisted of the following as at 31 December 2009:

	R
Long-term loan	6 904 125
Less: Current portion of long-term borrowings	(1 423 590)
	5 480 535

The deferred tax balance as at 31 December 2009 was calculated as follows:

Asset/liability	Carrying amount	Tax base	Temporary difference
	R	R	R
Property, plant and equipment	9 750 000	7 500 000	2 250 000
Inventories	750 000	750 000	–
Trade receivables	300 000	435 000	(135 000)
Long-term loan	6 904 125	6 904 125	–
Trade payables	435 000	435 000	–
Taxable temporary differences			2 115 000
Deferred tax calculated at 28%			592 200

No provision has been made in the statement of financial position of PowerSmart in respect of the environmental site rehabilitation. 70% of the damage caused to the environment occurred when the turbines were installed, while the r maining 30% of the damage to the environment is caused evenly over the duration of the contract. No environmental rehabilitation activities had been undertaken by 31 December 2009, and the CFO therefore holds the opinion that no provision should be recognised in the statement of finan ial position until the electricity supply operation ceases. The SARS will allow the amount in u ed in respect of environmental rehabilitation costs as a deduction for taxation purposes when it is actually paid.

The fair market value of trade payables as at 31 December 2009 was reliably determined at R500 000.

The s pply licence, the use of which was granted by ElectriBolt, had a fair market value of R4 500 000 at 31 December 2009 based on the terms of the licensing agreement between ElectriBolt and PowerSmart. If a similar right with payments at market rates were granted at 31 December 2009, it would have a fair market value of R5 million.

Additional information

Where appropriate and unless stated otherwise, the SARS accepts the acquisition date fair market values of ssets and liabilities for taxation purposes.

The current prime overdraft rate is 10% per annum, nominal and pre-tax.

Required:

Identify, with reasons, any errors in and omissions from the cash-flow forecasts and discounted future cashflows of the Augrabies division of PowerSmart Ltd as prepared by the CFO of ElectriBolt Ltd. **(*16 marks*)**

Identify and describe any advantages and disadvantages of ElectriBolt Ltd settling the purchase consideration due to PowerSmart Ltd using its own cash resources. **(*6 marks*)**

Presentation marks: Arrangement and layout, clarity of explanation, logical argument and language usage. **(*2 marks*)**

(Source: SAICA, 2010 Qualifying Examination Part 1; Paper 2; Question 3 – an extract, s ight y adapted)

Solution:

(a)

Errors/omissions	**Reasons**
No indication of perspective of valuation: fair market value, or intrinsic value?	PowerSmart may not transfer supply licence that is no ther potential bidders. Power-S art's alternative to selling to ElectriBolt is intrinsic value (current management with future expectations as originally anticipated), that is quantifying intrinsic value.
Projected turnover includes additional electricity generated and supplied (thus incorporating efficiencies/synergy contributed by ElectriBolt).	Sp cific synergies should be quantified s parately, but excluded from the intrinsic valuation. (Synergies preferably not paid for as fully contributed by ElectriBolt.) [*Additional comment: this is included here for the sake of completeness, but synergies are addressed as part of mergers and acquisitions* (chapter 12)]
Forecast revenues and operating costs do not change over forecast period. **Or** A nominal WACC has been used to discount future real cashflows.	Revenues and/or costs are likely to change annually due to inflation/tariff increas-es/rain-fall expectations etc. **Or** Cashflows have not been adjusted for inflation and are real cashflows. A real WACC should be used to determine the net present value.
Including R1m and R800 000 outflow relating to supply licenc ; d scription of 'opportunity cost'.	Business of PowerSmart is being valued hence, only costs and revenue relevant to this business should be included in Free Cashflow (only R1m outflow)
Operating costs savings included.	Probability of achieving cost savings – 45%, insufficient to justify including in Free Cash-flow **Or** (45% × 300 000 = 135 000) But rather include this potential in a sensitivity analysis.
Helicopter lease payments included at market va ue. *Question unclear as to what will happen to the lease on acquisition/will probably be transferred.*	PowerSmart has negotiated a contract, therefore use actual contractual cashflows until expiry of contract (end of 2012). There-after, use estimated costs for 2013 at fair market values.
Depreciation included in forecasts, is not a cash-flow item.	Wear-and-tear should be included.

Errors/omissions	**Reasons**
Interest on long-term loan included.	Interest should be excluded as these cash-flows should exclude all finance costs, as it should be distributable to all capital providers/interest is incorporated in WACC. Market value of long-term debt should be deducted from discounted cashflows to derive equity value.
Taxation projections will be incorrect due to changes in cashflows indicated here.	Estimated tax to be paid should be based on amended forecasts taking into account adjustments.
No inclusion of terminal values for assets and liabilities.	Cashflows for s le of ssets and payment of liabilities should be included in cashflow.
Changes in working capital ignored.	Forecasts should include estimated changes in invent ries, accounts receivable and trade payables as these are cashflows. Recoup ent of working capital should be included.
ElectriBolt's WACC used to discount cashflows.	PowerS art's WACC should be estimated. **Or** El ctribolt's WACC should be adjusted for higher risk associated with Augrabies operation/smaller size. **Or** WACC appear to be too high, not explained why.
Potential costs associated with labour action ignored.	To be conservative, estimated costs of settling dispute should be included as a cash outflow. Use actuarial calculated value (R450 000).
Other valid points (must be core).	

Advantages

Interest returns on cash are currently low, therefore utilising cash for acquisitions should yield a higher return on equity than having cash on deposit.

The Pow rSmart division should generate positive cashflow, therefore using cash to settle purchase consideration should not have an adverse impact on overall cash resources/cash required for day-to-day requirements.

Less time and effort is devoted to reviewing loan agreements/drafting preference share agreements and obtaining necessary approvals from shareholders/JSE Limited.

Cash p rchase will avoid dilution in control from convertible preference shares.

Disadvantages

Using cash will void the opportunity to move closer to target WACC (where it minimises finance cost). Or a reasonable degree of overall leverage lowers WACC and enhances shareholder value (using cash will negate this).

Preserving cash allows more flexibility to pursue growth/acquisitions.

In the current liquidity crisis/recessionary environment, the company should be retaining cash for liquidity strength in a period where it is costly and difficult to obtain finance.

(Source: SAICA, with minor editorial adjustments and additional commentary)

Question 11–4 (*Fundamental to Intermediate*) *45 marks 68 minutes*

The Directors of Blue Bowl Ltd are considering the acquisition of the entire share capital of Wagtail (Pty) Ltd, a private limited company which manufactures a range of engineering machinery. Both companies are all-equity firms. The Directors of Blue Bowl believe that, if Wagtail is taken over, the business risk of Blue Bowl will not be affected. Wagtail's year-end date is 30 June and its statement of financial position as on 30 June 20X8, prepared on a historical cost convention, is expected to be as follows:

	R	R
Issued ordinary shares of R1 each		105 000
Retained income		762 000
		867 000
Represented by:		
Non-current assets (carrying value)		
Plant and machinery	252 000	
Motor vehicles	186 000	438 000
Current assets		
Inventory – finished goods	261 000	
Inventory – work-in-progress	315 000	
Debtors	462 000	1 038 000
Current liabilities		
Creditors	401 000	
Bank overdraft	208 000	(609 000)
		867 000

Wagtail's summarised financial record for the three years to 30 June 20X8 is as follows:

Year ended 30 June	20X6 R'000	20X7 R'000	20X8 (estimated) R'000
Sales	5 117	4 774	6 357
Cost of sales	4 000	3 600	5 000
Gross profit	1 117	1 174	1 357
Expenses	810	822	1 022
Net operating income	307	352	335
Taxation	142	180	140
Net income	165	172	195
Dividends	40	44	49
Effect on retailed income	125	128	146

The following additional information is available:

1 There has been no change in the issued share capital of Wagtail during the past three years.

2 The estimated values of Wagtail's non-current assets, finished goods and work-in-progress as at 30 J ne 20X8 are:

	Replacement cost R	Realisable value R
Plant and machinery	542 000	189 000
Motor vehicles	205 000	180 000
Finished goods	256 000	250 000
Work-in-progress	342 000	392 000

Blue Bowl will be able to achieve distribution cost savings for Blue Bowl of R22 000 per annum in 20X8's monetary terms, which is unlikely to be achievable by other market participants.

Directors' emoluments currently paid to Wagtail management are considered to be below market-related salaries, and will have to be increased by R15 000 per annum in 20X8's monetary terms.

Wagtail retains roughly 20% of net income (in addition to the depreciation charge) to maintain and replace its assets at current operating efficiencies.

During the year ended 30 June 20X7, the company received a claim amounting to R42 000 for allegedly faulty work carried out by the company. The claim was disputed and no provision was made for any possible loss at the year-end. Settlement was subsequently reached, and during December 20X7 the company paid an amount of R26 000 to the customer. This expense was charged to operating income. Measures were immediately put in place to avoid similar incidences in future.

The current P/E multiple of Blue Bowl is 12. Quoted companies with business activities and profitability similar to those of Wagtail have P/E multiples of approximately 10, although these companies tend to be much larger than Wagtail.

Assume the company tax rate is 50%.

Assume the company's cost of equity (k_e) equals 15% and that the 20X8 dividend will be paid shortly after year-end.

Required:

Estimate the value of the total equity of Wagtail (Pty) Ltd as on 30 June 20X8 by determining or using:

Historical net asset value *(Fundamental)*

Replacement cost *(Fundamental)*

Net realisable value *(Fundamental)*

The Gordon Dividend Growth Model *(Fundam ntal)*

(v) Fair market value based on the forward P/E multiple method *(Intermediate)* **(*22 marks*)**

Explain the role and limitations of each of the above five valuation bases in the process by which a price might be agreed for the purchase by Blue Bowl of the total equity capital of Wagtail. *(Fundamental)*

(*15 marks*)

State and justify briefly the approximate range within which the purchase price is likely to be agreed. *(Fundamental)*

(*8 marks*)

Solution:

(i) Historical net asset value = R867 000

Replacement cost value

= 867 000 + (542 000 – 252 000) + (205 000 – 186 000)
+ (256 000 – 261 000) + (342 000 – 315 000) = R1 198 000

Net realisable value

= 867 000 + (189 000 – 252 000) + (180 000 – 186 000)
+ (250 000 – 261 000) + (392 000 – 315 000) = R864 000

Gordon's Dividend Growth Model

Analysing dividend growth for three years

20X6	**20X7**	**20X8**
40	44	49
	10%	11%

Assume a growth of (say) 10,5%

$$\text{Then MV cum div} = \frac{\text{Dividend in 1 year (20X9)}}{0{,}15 - g} + \text{current dividend (20X8)}$$

$$= \frac{49\,000\,(1{,}105)}{0{,}15 - 0{,}105} + 49\,000 = \text{R1 252 222}$$

(v) P/E multiple model

An average forward P/E multiple for similar quoted companies is	10
Adjustments for entity level differences:	
The company is small when compared with similar listed companies. This increases risk	(1)
Adjusted forward P/E multiple	9

Determine maintainable forecast earnings

	20X6 R	20X7 R	20X8 R
Net income	165 000	172 000	195 000
Adjustments excluding synergy benefits	(13 606)	(14 286)	0
Director's emoluments – adjust to market related	(13 606)	(14 286)	(15 00)
(assume a 5% annual rate of inflation)	R14286 / 1,05	R15000 / 1,05	
Add back: Claim			26 000
Impairment – finished goods (**Note 1**)	?	?	(11 000)
			R250k – R261k
Taxation on adjustments (50%)	6 803	7 143	0
Adjusted earnings	158 197	164 857	195 000
Less income required to maintain earnings (20%) (**Note 2**)	(31 639)	(32 971)	(39 000)
Adjusted net income after tax	126 558	131 886	156 000

Notes:

The impairment on inventory items is included here as it has an effect on the operating/trading performance of Wagtail, but any possible impairment on plant and machinery and motor vehicles is ignored, as these represent non-current (capital) assets. Here one must consider the guidance on calculating headline earnings as P/E multiples of the listed entities are normally calculated using this basis.

This additional reduction to the net income after tax, in a sense, represents an adjustment to depreciation, which is understated. (No additional tax effect was assumed, but this is debatable.)

Matters of concern include the impairment on finished goods. Is this reflective of problems in the sale of engineering equipment, or changes in technology? Assuming that this was a once-off event, the forecast net income after tax appears to be maintainable given historical growth. Maintainable for cast earnings are therefore equal to R156 000.

[Additional not : if the number of marks allowed for this, one could have analysed the fixed and variable omponents in calculating earnings, and other factors, to ensure the reasonability of the fore ast.]

Value excluding synergies not available to market participants:

	R
Maintainable earnings × adjusted forward P/E multiple R156 000 × 9 *[Additional note: no adjustment is made for the bank overdraft as interest expense is already captured in adjusted earnings.]*	1 404 000
Value of a 100% equity shareholding in Wagtail (assuming no shareholder level differences to comparator)	1 404 000
Shareholder level premiums and discounts	
Control premium (possible, but insufficient detail provided on the quoted companies; assume therefore that the comparator multiple already reflects a controlling basis)	0
Subtotal	1 404 000
Marketability discount (e.g. 8% × 1 404 000)	(112 320)
Adjusted value of a 100% equity shareholding	1 291 680

The fair market value of total equity of Wagtail is equal to R1 291 680 using a method based on a forward P/E multiple.

[Additional note: The fair market value normally excludes the value of synergies unavailable to market participants. If synergies were available to other market participants, then that portion could create a market of its own and that portion would then be included in the fair market value. Synergies are discussed here for the sake of completeness, but are addressed as part of mergers and acquisitions (chapter 12).]

(i) Historical net asset value

Unless both parties are financially naive, the balance sheet value wi not p ay a part in the negotiation process. Historical costs are not relevant to a decision on the future v lue of the company.

Replacement cost

This gives the cost of setting up a similar business. The cost is lower than the dividend or P/E valuation and suggests that there is some goodwill. Although it may seem attractive to start up an identical company, Blue Bowl will have to consider that it will be g ing into competition with Wagtail and that it may take a long period of time to build up a pr fitable c mpany.

Net realisable value

This shows the cash price which the shareholders in Wagtail could get by liquidating the business. It is therefore the minimum price they would accept. The valuation indicates that a price well above the realisable value would be accepted by the shar holders of Wagtail.

Methods **(i)** to **(iii)** suffer from the limitation of not looking at the going concern value of the business as a whole, or its fair market value. Methods **(iv)** and **(v)** do consider this value. However, the realisable value is of use in assessing the risk attached to the business as a going concern, as it gives the base value if things go wrong and the business has to be abandoned.

Gordon Dividend Growth Model

The dividend model is useful when valuing a minority shareholding where the shareholders do not have a say in the running of the company. The valuation in the question is clearly a majority valuation; therefore the method based on the P/E multiple is more useful. One of the main limitations of the Dividend Growth Model is the estimate of the future growth of *g*.

Forward P/E multiple method

This method attempts to establish the value that a market participant (willing buyer) would put on a company like Wagtail. It does provide an external yardstick, but is a very crude measure. As already stated, the P/E multiple which applies to larger quoted companies must be lowered to allow for the size of Wagtail, and further adjustments are required for the non-marketability of its shares. Another limitation of P/E multiples is that it is very dependent on the expected future growth of the firm. It is ther fore not asy to find a P/E multiple of a 'similar firm'. However, in practice, the P/E multi-ple method may well feature in the negotiations over price, simply because it is an easy to under-stand yardsti k.

The range within which the purchase price is likely to be agreed will be the minimum price the shareholders of Wagtail will accept and the maximum price the Directors of Blue Bowl will pay.

The minim m price that the Wagtail shareholders are likely to accept depends on the alternatives open to them. Are there other interested buyers? Do they want to continue with the business? The shares are less marketable; therefore they must consider the break-up value of the business of R864 000 if they wish to liquidate the holding. However, if they are happy to continue running the business, the going concern value must be considered, including the R1 252 222 obtained when using the Gordon Dividend Growth Model, and the fair market value of R1 291 680 determined using the P/E multiple method.

From the point of view of Blue Bowl, the upper range of a price would be between R1 198 000 (the replacement cost), R1 291 680 (the fair market value based on a P/E multiple method), with the absolute maximum price incorporating the full value of synergies, the sum total equal to R1 382 760 (R1 291 680 + R91 080 (calculation 1)).

Blue Bowl should, however, be wary of paying in excess of the R1 291 680 (fair market value) as the synergies are unlikely to be realised by other market participants and therefore probably represent unique benefits brought on board by Blue Bowl.

The approximate range within which the purchase price is likely to be agreed is between R1 198 000 and R1 382 760.

Calculation 1 – Full value of synergies is calculated as follows:

		R
Distribution cost savings		22 000
Taxation on adjustment (50%)		(11 000)
Net saving (that will form part of Blue Bowl's earnings)		11 000
Effect on earnings × adjusted forward P/E multiple R11 000 × 9 (Additional full value of synergy before premiums and discounts)		99 000
Shareholder level premiums and discounts		
Control premium		0
Marketability discount	(e.g. 8% × 99 000)	(7 920)
Full value of synergy after adjustments		91 080

[Additional note: synergies are discussed here for the sake of co pleteness, but are addressed principally as part of mergers and acquisitions (chapter 12).]

Question 11–5 *(Fundamental to Intermediate)* *20 marks 30 minutes*

USE Ltd is a South African manufacturing company that has been in existence for more than a decade. Its most recent and forecast financial results for the company are summarised below:

Summarised Statements of Financial Position of USE Ltd

As at 30 June

	Historical 20X4 R'000	Forecast 20X5 R'000	Forecast 20X6 R'000	Forecast 20X7 R'000
ASSETS				
Non-current assets	29 329	20 000	19 500	38 000
Current assets	14 365	13 900	12 500	14 850
• Inventories	5 312	4 500	5 000	6 000
• Trade and other r c ivabl s	6 131	5 900	7 100	8 500
• Cash and cash equival nts	2 922	3 500	400	350
Total assets	43 694	33 900	32 000	52 850
EQUITY AND LIABILITIES				
Total equity and non-cu ent liabilities	33 522	25 116	20 120	41 050
Current liabilities	10 172	8 784	11 880	11 800
• Trade and other payables	6 745	6 000	4 900	5 800
• Pr visi ns f r other liabilities	750	950	740	780
• Current inc me tax liability	650	514	440	520
• Borrowings	2 027	1 320	5 800	4 700
Total equity and liabilities	43 694	33 900	32 000	52 850

Summarised Statements of Comprehensive Income of USE Ltd

For the years ended/ending 30 June

	Historical 20X4 R'000	Forecast 20X5 R'000	Forecast 20X6 R'000	Forecast 20X7 R'000
Revenue	104 280	109 000	112 000	140 000
Cost of sales	(82 900)	(86 500)	(88 600)	(114 000)
Gross profit	21 380	22 500	23 400	26 000
Operating costs	(12 055)	(14 200)	(12 400)	(13 300)
Depreciation	(4 690)	(5 300)	(4 040)	(5 500)
Operating profit	4 635	3 000	6 960	7 200
Net finance cost	(748)	(256)	(812)	(1 750)
Profit before income taxation	3 887	2 744	6 148	5 450
Taxation	(1 049)	(768)	(1 721)	(1 526)
Profit for the year	2 838	1976	4 427	3 924

Additional information relating to USE Ltd

l The forecast operating costs for 20X5 includes a loss of R2,5 illion relating to the discontinuance of a subassembly line which the company intends outsourcing. The carrying value of non-current assets to be disposed of as part of this process amounts to R5,0 million – roughly the same amount that USE (Pty) Ltd expects to realise.

USE (Pty) Ltd plans to extend its main manufacturing plant in 20X7 and this will represent major capital expenditure for the company. The company is likely to require a capital injection in a few years' time to help finance this expansion, with the present shareholders and the company's bankers indicating that this should be possible, in principle.

The gross cash flows of 20X7 are expected to show a sustainable growth in 20X8 and beyond equal to 2% above the South African forecast Producer Price Index (PPI). This will only be achieved if 38% of gross cash flows be reinvested in working capital and non-current assets. PPI is expected to stabilize at 5% per annum from 20X8.

Company income tax is currently 28%.

USE Ltd has 12 000 ordinary shares in issue.

A small shareholding was recently traded between non-connected, existing shareholders at 242 000 cps (an over-the-counter trade).

Future income tax allowances are expected to approximate the depreciation expenses.

The cash balance at 30 June 20x4 represents excess cash.

At 30 June 20x4 the arrying value of non-current borrowings was R9 842 000.

USE Ltd's p esent apital structure is close to a target capital structure for a company of its nature and size.

The company's current weighted average cost of capital equals 17%.

Required:

	Marks Sub-total	Total
(a) Ca culate the fair market value of a 51% shareholding in USE Ltd as at 30 June 20X4, based on available information and using a model based on Free Cash Flow available to the business enterprise. Show all supporting calculations.	19	
Communication skills – layout and structure	1	20

Solution:

Part (a)

Determine the present value of Free Cashflows (FCF) – short method (Fundamental):

	20X5	20X6	20X7	20X8	
	----------Explicit forecast ----------			CV base	
	R'000	R'000	R'000	R'000	
Operating profit	3 000	6 960	7 200		
Add back: Depreciation	5 300	4 040	5 500		
Subtotal	8 300	11 000	12 700		
Recalculated tax (simplified treatment)	(840)	(1 949)	(2 016)		
Subtotal × 28%	(2 324)	(3 080)	(3 556)		Interest must be excl in subtotal
Tax allowances: depreciation × 28%	1 484	1 131	1 540		
Gross cash flow	7 460	9 051	10 684	11 432	
Growth = (1,02 × 1,05) – 1 (Intermediate) or ~ (2% + 5%)				10684 × (1,00+0,07)	
Change in working capital requirements	896	(1 432)	(2 014)		
Change in non-cash current asset balance	1 043	(1 700)	(2 400)		
Opening balance	11 443	10 400	12 100		
Closing balance	10 400	12 100	14 500		
Change in non-debt current liabilities	(681)	(1 384)	1 020		
Opening balance	8 145	7 464	6 080		
Closing balance	7 464	6 080	7 100		
Capital investment	4 029	(3 540)	(24 000)		
Opening balance	29 329	20 000	19 500		
Depreciation	(5 300)	(4 040)	(5 500)		
Closing balance	(20 000)	(19 500)	(38 000)		
Gross investment required				(4 344)	
				(11432 x38%	
Free Cash Flow (FCF)	11 851	2 427	(14 696)	7 088	
Continuing value (CV)			71 596		Incl in 2016
$CV_{20X7} = FCF_{20X8}$ / (WACC-g)			7 088		
			(0,17 – 0,071)		
	17%				
= (1,02 × 1,05) – 1 (Intermediate) r ~ (2% + 5%)	8,1%				
FCF with CV		11 851	2 427	56 900	If no value incl in year 2017
Di count factor	17%	0,85470	0,73051	0,62437	
	R'000				
V lue of operations	**47 429**	10 129	1 773	35 527	Factors or calc steps shown for *17%* rate

Note: Simplified tax treatment results in slightly different values compared to long method

Note: Figures may not total correctly due to rounding

Determine the present value of Free Cashflows (FCF) – long method (alternative, Intermediate):

	20X5	20X6	20X7	20X8	
	----------Explicit forecast		----------	CV base	
	R'000	R'000	R'000	R'000	
Gross profit	22 500	23 400	26 000		
Operating cost	(14 200)	(12 400)	(13 300)		
Depreciation (non-cash items must not be included)	–	–	–		
Add back: Change in provisions (incl in operating costs)	200	(210)	40		
Opening balance	750	950	740		
Closing balance	950	740	780		
Adjusted EBITDA	8 500	10 790	12 740		
Recalculated tax	(976)	(2 022)	(1 936)		
Current income tax liability - opening bal	(650)	(514)	(440)		
Tax per statement of comprehensive income	(768)	(1 721)	(1 526)		
Tax linked to interest (at 28%)	(72)	(227)	(490)		
Current income tax liability – closing bal	514	440	520		
Gross cash flow	7 524	8 768	10 804	11 560	
Growth = (1,02 × 1,05) -1 (Intermediate) or ~ (2% + 5%)				10804 × (1,00+0,07)	
Change in working capital requirements					
Change in inventory balance	812	(500)	(1 000)		
Opening balance	5 312	4 500	5 000		
Closing balance	4 500	5 000	6 000		
Change in trade and other receivables	231	(1 200)	(1 400)		
Opening balance	6 131	5 900	7 100		
Closing balance	5 900	7 100	8 500		
Change in trade and other payables	(745)	(1 100)	900		
Opening balance	6 745	6 000	4 900		
Closing balance	6 000	4 900	5 800		
Capital investment	(971)	(3 540)	(24 000)		
Opening balan e	29 329	20 000	19 500		
Depreciation	(5 300)	(4 040)	(5 500)		
Disposal	(5 000)	–	–		
Closing balance	(20 000)	(19 500)	(38 000)		
Infl w fr m disp sal	5 000				Only if excl at capex
Gr ss investment required				(4 393)	
				(11560) × 38%	

Note: this tax treatment actually provides the superior result

		20X5	20X6	20X7	20X8	
		----------Explicit forecast ----------			CV base	
		R'000	R'000	R'000	R'000	
Free Cash Flow (FCF)		11 851	2 428	(14 696)	7 167	
Continuing value (CV)				72 394		Incl in 2016
$CV_{20X7}=FCF_{20X8}$ / (WACC-g)				7 167		
	17%			(0,17-0,071)		
= (1,02 × 1,05) -1 (Intermediate) or ~ (2% + 5%)	7,1%					
FCF with CV		11 851	2 428	57 698		If no value incl in year 2017
Discount factor	17%	0,85470	0,73051	0,62437		
	R'000					
Value of operations	**47 928**	10 129	1 774	36 025		Factors or calc steps shown for *17%* rate

Note: due to the different tax treatment the final value also differs somewhat to the answer per the short ethod

Note: Figures may not total correctly due to rounding

	R'000	
Value of operations	47 429	(Implying a control perspective)
Excess cash at valuation date	2 922	
Overall firm value	50 351	
Value of debt (R2 027k+R9 842k)	(11 869)	
Value of 100% equity (assuming no s/h diff)	38 482	
Marketability discount (say 10%)	(3 848)	(Intermediate) Any % *deducted*
Value of 100% equity (adj for s/h diff)	**34 634**	
Shareholding	**51%**	
Fair market value of 51% shareholding based on FCF model	**17 663**	
Reasonability test		
Based on price of recent trades		
Recent over-the-count r trade	242 000	cps
Total number of shar s	12,000	
	R'000	
Value of 100% equity	29 040	(Implying a minority perspective)
Shareholding	51%	
Value of 51% eq ity (assuming minority perspective)	14 810	
Control premium (say 20%)	2 962	(Intermediate) Any % *added*
Fair market value of 51% shareholding based n recent trades	**17 772**	

Note: Figures may not total correctly due to rounding

The reasonability test offers a value 1% higher, and provides a level of comfort as to the value obtained using the FCF model.

Conclusion

The fair market value of a 51% shareholding in USE Ltd as at 30 June 20X4, based on available information and using a model based on Free Cash Flow available to the business enterprise, is equal to **R17 663 000**.

Chapter 12

Mergers and acquisitions

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –
differentiate between the various forms of m rg rs and acquisitions;
understand the reasons for mergers and acquisitions;
understand why mergers and acquisitions sometimes fail;
discuss the various regulatory mechanisms for mergers and acquisitions;
discuss the behavioural implications of mergers and acquisitions;
understand the valuation considerations around mergers and acquisitions;
understand the financial effects of mergers and acquisitions;
discuss the advantages and disadvantages of the various forms of funding mergers and acquisitions; and
discuss the advantages and disadvantages of a management buy-out.

Most, if not all companies cannot grow indefinitely relying on organic growth alone. Sooner or later other options for growth must be considered as slowing market demand or increased competition impacts on sales. After all there is a limit to which growing the customer base or taking market share away from existing competition can be achiev d. Th se oth r options are the focus of this chapter.

12.1 Strategic ontext

If companies cannot g ow sufficiently by organic means, then they will pursue growth strategies by either merging with other companies or taking them over. This is often seen to be a very exciting and interesting part of a financial manager's role, especially when it comes to evaluating the financial benefits and costs in undertaking s ch an event.

12.1.1 F rms of mergers and acquisitions

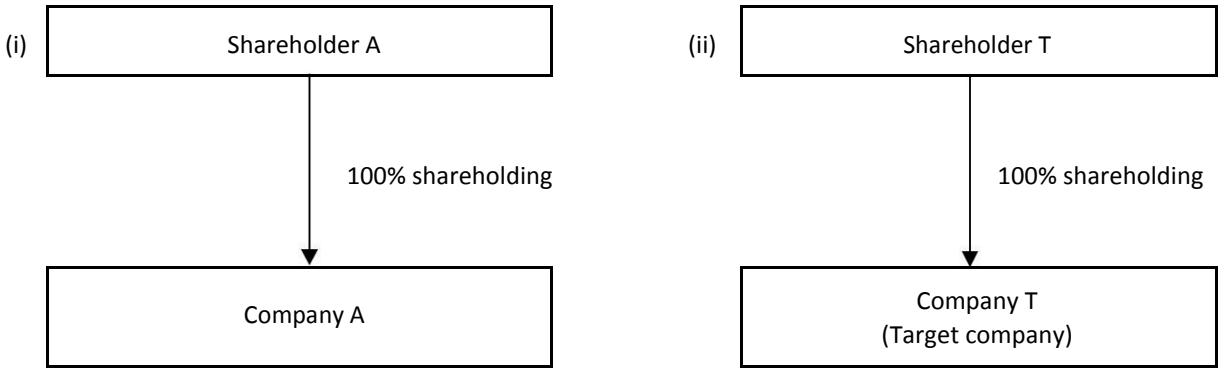
Takeover

A takeover refers to the purchase of a controlling interest in one company by another. The acquiring company ret ins its name and its identity, but brings the separate identity of the purchased company to an end. A t keover often results in the rationalisation of the target company's governance structures (board and senior management team). Some senior managers of the target company often resign or are dismissed in such an event.

Example

Company A buys out 100% of the shares of the targeted company from shareholder T.

Before takeover:



After takeover:

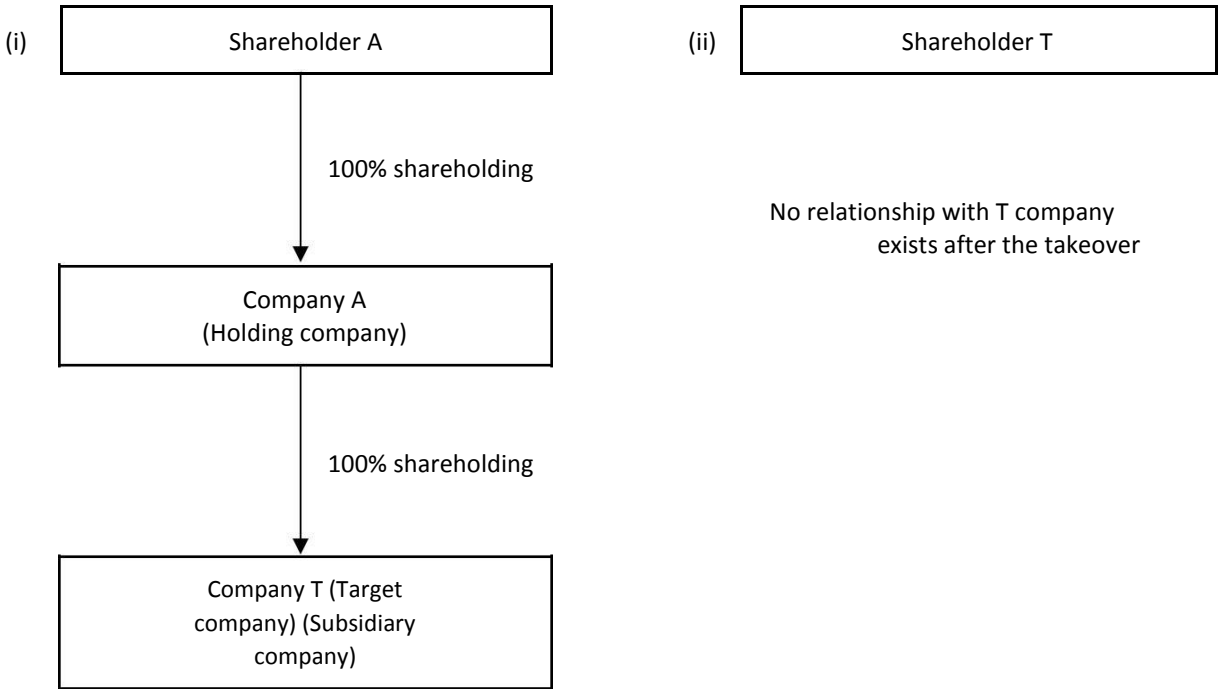


Figure 12.1: Form of a tak ov r

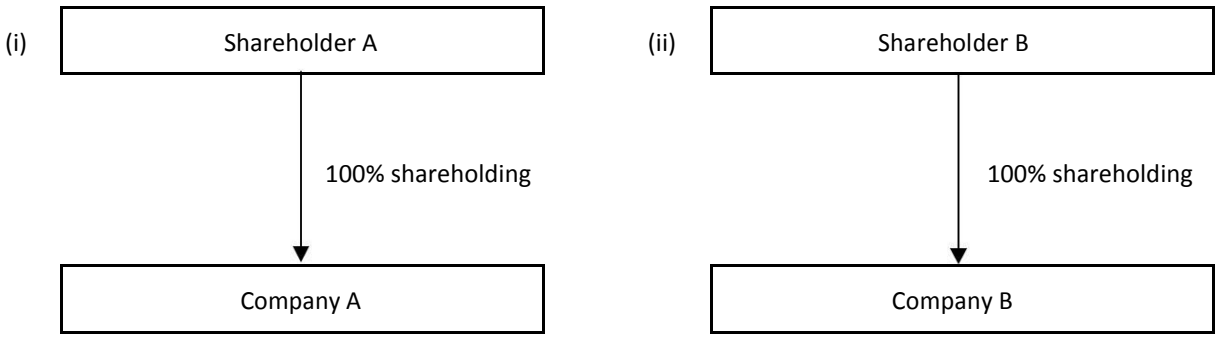
Me ger

A merger is very similar to a takeover, except that an entirely new company is formed. The shareholders of both companies s rrender their shareholding in the companies to be merged and a new company is formed, giving the shareholders an interest in the combined entity. This means that no resources leave the companies at the time f the merger. As is the case with a takeover, a merger is often accompanied by the realignment of the b ard, the senior management team and in the majority of cases, the corporate strategy of the merged entity.

Examp e

Company A with Mr A as 100% shareholder and Company B with Mr B as 100% shareholder decided to amal-g m te their respective business concerns into one. A new company, C, will be incorporated for this purpose.

Before amalgamation



After amalgamation

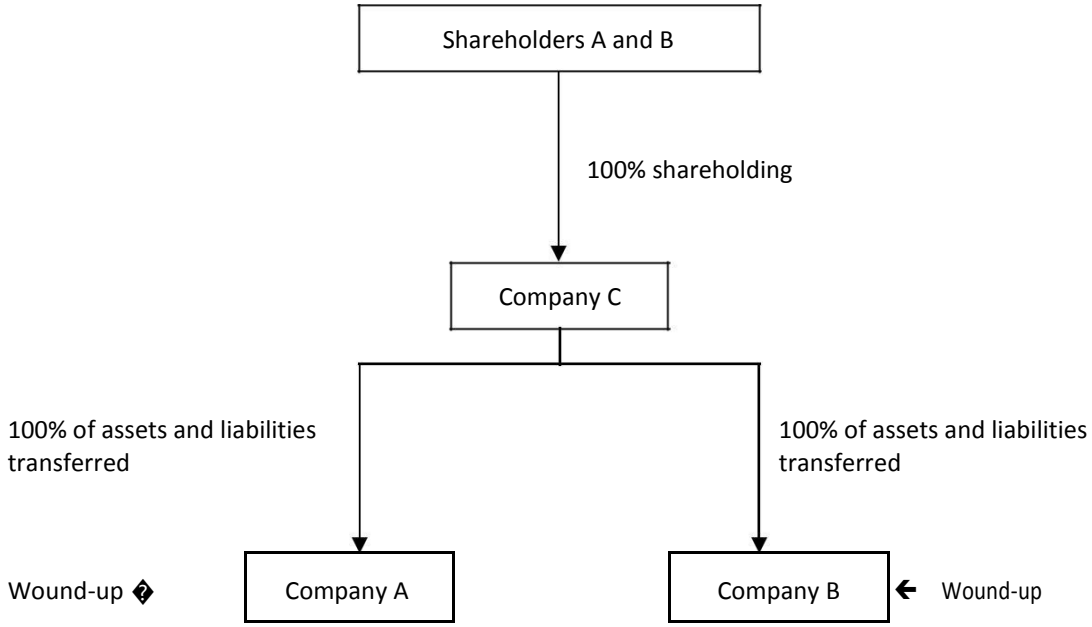


Figure 12.2: Form of a takeover

12.1.2 Reasons for takeovers and mergers

Acquisitions

Acquisitions can be classifi d into three types:

(a) *The horizontal a quisition*

This occurs whe e a company (the acquirer) acquires a competitor (target) in the same industry. An example is the acquisition of Massmart by Wal-Mart. This often results in an enlarged organisation and industry concentration. The latter is often frowned upon by the Competition Commission as it is contrary to consumer interests. The acq isition can be hostile, in which case the acquiring company is referred to as the predator. The target company often "fends" off the attack by various defensive tactics. One of these might include portraying, in the pen press, the acquirer as a "socially irresponsible "company.

(b) *The vertical acquisition*

Occurs where a *company on a given chain of supply* acquires another company *up or down the same chain*, for examp e ESKOM (a key consumer of coal) taking over a coal mine upstream, in order to ensure its supplies of the commodity. This is known as *backward integration*. *Forward integration* is the expansion of activities downstream. An example would be a clothing manufacturer acquiring a clothing retail chain.

(c) *Conglomerate acquisition*

This situation occurs where two companies trade in unrelated markets and merge, or one takes over the other. A company would merge or take over another where it believes that –

the two companies are worth more together than apart; or

the company it wishes to acquire can be purchased at a price below its true value.

The financial management theory is that a merger or takeover is justified where the present value (PV) of future cash flows of the combined companies is greater than the present value of each separate company.

$PV_{AB} = PV_A + PV_B +$ Net Synergy gains

Where:

PV_{AB} = Present Value of future cash flows for the combined comp ny fter the merger

PV_A = Present Value of future cash flows of company A before the merger

PV_B = Present Value of future cash flows of company B before the merger

Relevant economic arguments

Economies of scale

Bigger facilities and equipment result in a decrease in unit cost (often through fixed costs); alternatively, duplicated facilities are rationalised, for example two accounting departments are amalgamated thereby resulting in cost savings. Economies of scale are a function of increased production output in industries where operating leverage is high (steelworks, airlin s and rail companies are a case in point).

Synergy

This takes place where the combination of resources increases output, and is known as the 2 + 2 = 5 effect, where the end result is greater than the sum of the parts. The synergies are operational (e.g. acquisition of new technologies, rare skills, etc) and financial (cost savings, tax savings, etc). Combined resources increase the business base and thus the potential for growth, profit and free cash flows.

Marketing gains

The combination of companies often results in improved marketing techniques through stronger and expansive distribution networks, a balanced product - portfolio mix and greater advertising muscle.

Leadership

The acquisition may improve the overall management team, refocusing the strategy thus ensuring continued growth, especially where one of the companies has aggressive and competent managers. This concept is often referred to as 'differential efficiency'.

Entry into new mark ts

Acquisitions can provide quick entry into new markets and industries. If a company finds itself in a declining industry or market, it will acquire new technologies to improve growth prospects. For example, a company may be producing custom-made products for its current market. It may wish to move into a new ma ket that equires mass-produced items. To do this, it will need to acquire the technological skills of mass-p oduction. This skill may be obtained through a merger.

Financial reasons

If a company is competing in a risky industry with a high level of earnings to assets, it may wish to reduce its risk pr file by acquiring a company with substantial assets and a less risky earnings profile. A company may also wish to improve its liquidity or leveraged position by acquiring a more financially stable company. For example, a company with high gearing may wish to take over a company with little or no gearing o the latter will improve its ability to raise additional finance at more competitive rates.

Strategic benefits

Strategic benefits comprise an opportunity to take advantage of the competitive environment. For example, backward integration towards the source of supply may put a company in an advantageous position relative to its competitors. Another strategic benefit occurs where a company increases its market share as a result of a takeover, and so is able to reduce competition.

Investment opportunities

Cash rich companies may acquire another company as a way of utilising their excess cash resources. There has been an increase of this practice in the last decade. Recent examples include the acquisition of Skype by Microsoft as well as the acquisition of Instagram by Facebook.

Asset stripping

A predator acquires a company whose assets as per the statement of financial position are undervalued relative to their true market values. The assets are then sold for a profit.

Share price

Companies involved in long-term investment programs may find themse ves in a situation where, because they initially published low earnings and dividend yields, their market r ting is low. For the interim period they might become the target of a takeover or merger bid by a knowledge ble bidder.

Technology

Owing to the fact that it is sometimes expensive and time-c nsuming to develop and implement new technology, it is understandable that companies that are leaders in their industry may become targets for takeovers or mergers. Google has achieved substantial gr wth ver time through acquisitions. In April 2003 it acquired Neotonic Software, an acquisition which laid the foundation for the creation of Gmail as we know it today.

12.1.3 Why mergers sometimes fail

Many acquisition problems arise simply because the buy r ov r-estimates the value of particular assets, for example inventory may be unsaleable or some receivables uncollectable. Other difficulties arise when the buyer overlooks hidden liabilities such as an inadequately funded pension plan or an outstanding obligation on a contract.

The most serious problems are often the administrative ones. Differences in administrative procedures, accounting methods, productive processes and standards are all common sources of difficulty. Problems may also stem from the fact that the entrepreneurial qualities needed to build a small company are not necessarily identical to the qualities needed to direct a major concern. Other common post-merger problems arise in the wider area of personnel management. News of a pending merger may create considerable unease among employees, as well as problems resulting from differences in remunerations levels, pay scales and fringe benefits.

In summary, the key reasons why mergers and acquisitions fail are the following:

Lack of managerial fit: Lack of fit manifests itself in terms of conflicting management styles or corporate cultures. In some cases, it could be the product portfolios that could be incompatible.

Lack of industrial or comm rcial fit: In vertical or horizontal takeovers the target company may not have the product rang , mark t position or technological niche that was predicted by the initial appraisal.

Lack of goal ongruen e: Disputes about how to proceed with the acquired company in critical functional areas may ompromise an otherwise good investment.

Bargain pu chases: Turnaround costs may add substantially to the price paid for the company as the acq irer battles to rectify anomalies in key functional areas (product design, head count, IT, etc.).

Paying too m ch: A premium is paid that does not match the future value creation to the shareholders.

Failure to integrate the entities successfully: Proper fit does not guarantee success. Management could still fail to translate visible synergies into shareholder value.

Inability to manage change: The board must drive change management by being prepared to depart from established routines and practices in favour of those routines and practices that will substantially add to shareholder value. Companies often have different “firm specific cultures” and a failure to manage the differences often contributes to a failed merger.

12.1.4 Legal implications

Mergers are regulated by the following bodies:

The Competition Commission of South Africa (established by the Competition Act 89 of 1998). The Commission approves mergers and acquisitions after considering a number of issues all aimed at preventing what the act calls 'Abuse of dominance'. It also requires that employees and unions be consulted and be part and parcel of the negotiations. Visit http://www.compcom.co.za for more details.

The Companies Act 71 of 2008 came into effect on 1 May 2011 and replaces the former Companies Act 61 of 1973 (as amended by the Corporate Laws Amendment Act 26 of 2006) and also amends the Close Corporation Act 69 of 1984. The Act contains sections that deal with issues relevant to mergers and acquisitions such as provisions governing offers of shares to the public, the introduction of a shareholder appraisal rights regime for dissenting minority shareholders, the limit tion of the role of the court in schemes and the introduction of a new regulator for mergers and cquisitions (M&A) to replace the Securities Regulation Panel (SRP) with the Takeover Regulations Panel (TRP).

The Securities Regulation Panel (SRP) regulates certain acquisitions and takeovers of public companies in which the shareholders' interests exceed R20 000 000. The new C mpanies Act seeks to replace the SRP with the TRP.

The Johannesburg Stock Exchange (JSE) lays down rules regarding disclosures and procedures to be followed in relation to transactions affecting listed co panies. These include cautionary announcements which must be made to shareholders in certain circu stances, and suspensions of listing when certain types of takeover bids are in progress.

The Securities Services Act 36 of 2004, which, amongst oth r things, regulates insider trading and market manipulation, practices.

The Exchange Control Department of the South African Reserve Bank (SARB) gives consideration to M&A transactions that have implications for Exchange Control Regulations. The primary objective of the SARB is to encourage capital inflows into the capital account of the balance of payments account but also balance the latter against inflows that may result in increased volatility of South Africa's currency, the rand.

12.1.5 Behavioural implications

Mergers and acquisitions often give rise to significant changes in many areas of governance and operations within the affected entities. Such changes often threaten existing interests of key stakeholders. Key stakeholders with vested interests include the following:

The target and acquiring company's shareholders

Shareholders may be concerned about their wealth; therefore the key indicators they monitor to determine whether they will decrease, be maintained or increase are –

- the share pric ;
- earnings per share;
- the Pri e Earnings (P/E) ratio; and

the dividend per share.; and

- the dividend yield.

If projections indicate that there is bound to be a decrease in the above key indicators, the shareholders may v te against an acquisition or merger. Their cooperation hinges on these key parameters experiencing gr wth in future.

The target and acquiring company's management

Executives are agents (agency theory in corporate governance) for shareholders and are concerned about the following –

- the share price, mostly for their share options and stock market rankings;

whether the earnings per share will be maintained or increased;

- whether the P/E ratio will be maintained or increased; and
- how their management positions will be affected by the new governance structure.

Senior managers resist mergers or takeovers if they perceive that the above issues will be adversely affected.

Employees of both companies

Employees are concerned about the following –

- whether conditions of service will be maintained or changed;
- whether jobs can be guaranteed; and
- whether the new management will be receptive to their needs.

Employees (through unions) resist mergers or takeovers if they perceive that the above issues will be adversely affected.

The state

The state acts through various organs (for example, the Department of Trade and Industry (DTI), the Competition Commission and the Reserve Bank). Its concerns are primarily with the preservation of the 'public interest', which often includes the following issues –

- whether jobs can be guaranteed; and
- whether competition is being encouraged.
- whether the entity would promote the state's e power ent policies for designated groups.

Any merger or acquisition should therefore try to balance these often conflicting interests. Any agreement reached should be a win-win situation, but in some cases stakeholders make sacrifices to ensure that progress is made, or benefits such as technology transf r are seen to materialise in the long-term.

12.2 Valuation considerations

The principles introduced in chapter 11 (*Business and equity valuations*) on how to value a company using various valuation methods are equally applicable to this chapter.

12.2.1 Difference between 'normal' valuations and 'merger/takeover' valuations

Valuations, as introduced in the Chapter 11, require a shareholding to be valued from the perspective of a shareholder or group of shareholders with identical share value requirements. The valuation examines the shares being valued on the basis of an arm's length transaction and arrives at a single valuation instead of multiple valuations.

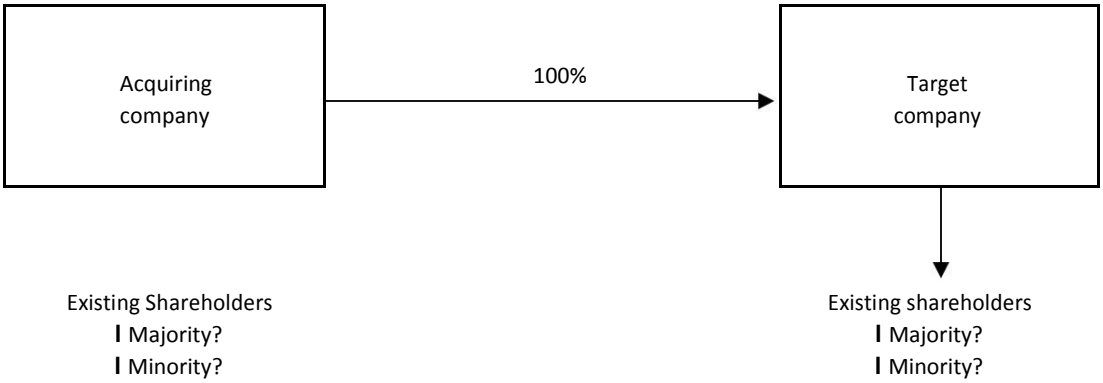


Figure 12.3: Merger/takeover valuation

Figure 12.3 indicates that there are two parties to a takeover bid, namely the acquiring company and the current hareholders of the target company. The perceived value of the target company can be totally different when seen from the perspective of the acquiring company as opposed to the existing target company shareholders.

When valuing a takeover, one should first establish whether the shares are being valued from the perspective of –

the existing shareholders;

the acquiring shareholders; or

both.

12.2.2 Minimum share value

If the valuation is being carried out for the benefit of the existing shareholders in the target company, one must consider the minimum value for which the shareholders are prepared to sell their shares. The valuation is an arm's length valuation where the value does not take into account any potenti l synergies that may arise. This is a conservative approach since synergic benefits are uncertain.

The approach is to determine –

the percentage shareholding held by the individual shareh lder; and

the method of valuation.

Where the shareholder or shareholders of the target co pany are inority shareholders, the appropriate method would be to value the 'going concern' shareholding on a dividends basis, where the cost of equity (k_e) for a similar quoted company is used as the required return and adjusted for business and financial risk perti-nent to the target company. If the shareholding being considered is a majority, then it would be appropriate to do earnings or free cash flow valuation.

Although one is considering the value of 100% of the shares, one must nevertheless consider who the shareholders are and how many shares each of them own. The appropriate method is often a minority valuation, as no shareholder may be able to influence the distribution of the earnings. In such a case, the valuation is done by using the Gordon Dividend Growth Model but no allowance may be made for benefits that will be derived by the acquiring company (synergies). If the target company is not considered to be a viable going concern, it would be appropriate to do an asset or liquidation valuation depending on the information provided in the scenario.

Note: ***A takeover question will state that 'certain synergy benefits will accrue as a result of the takeover'. Such benefits will affect future cash flows of the combined entity. These benefits must not be included in a minimum share valuation exercise.***

12.2.3 Maximum share valuation

From the point of view of the acquiring company, one must determine the maximum price that the shareholders of the acquiring company are willing to pay for the target company. One must take into account the synergy benefits that will be d riv d as a result of the acquisition. These are normally synergies that are directly attributable (specific) to the acquir r and target company.

Synergy benefits refers to the combination of complementary resources and implies that using the resources of the two firms together will in rease the value of the firm going forward.

12.2.4 Fair share valuation

The fair val e of a financial asset or firm is its value in the open market. The "open market" principle implies competiti n am ng bidders for the financial assets or firm. The estimated synergy benefits available are those that are kn wn by all bidders (assuming an efficient market). In carrying out a fair valuation it is these synergies that are included rather than the attributable (specific) synergies. The concept of fair valuation relies heavy on the concept of "market efficiency". The latter implies bidders have the same information set as far as it relates to the target company. If information flows are distorted then individual bidders would come up with differing va ues for synergy benefits and hence differing valuations for the target firm.

12.2.4 Various forms of synergy benefits (financial and operational)

Financial synergies

Revenue enhancement

Marketable gains – It is claimed that mergers can produce greater operating revenues from improved marketing, such as better advertising efforts, the strengthening of the distribution network and a more balanced product- portfolio mix.

Strategic benefits – This is the opportunity to take advantage of the competitive environment.

Market or monopoly power due to reduction in competition. Monopo ises arise due to such factors as legislation (ESKOM), first mover advantage in technology (Microsoft/Windows) and scale economies (Intel and Samsung in the manufacture electronic chipsets).

Cost reduction

Efficiencies may result due to economies of scale, the sharing of complementary resources, the elimination of duplicate functions and availability of cheaper sources f funding.

Tax gains

Possible tax gains can come from –

- the use of tax losses from net operating losses;
- the use of unused debt capacity; and/or
- the use of surplus funds.

Operational synergies

The operational synergies are often related to the functional areas of the organisation and may include the following –

acquisitions intended for geographical expansion (Wal-Mart's acquisition of Massmart);

acquisitions intended for complementary resources (Microsoft's acquisition of Skype); and

acquisitions intended for production processes and patents (Google's acquisition of Motorola).

12.2.5 Dividend versus earnings and cash valuation

From the perspective of the acquiring company, which is taking over a majority stake in the target company, one could argue in favour of earnings (Price to Earning or Earnings Yield) or free cashflow valuation (Free cash flow due to operations or free cash flow due to equity). There is one problem, however. Who are the shareholders of the acquiring company? If the shareholders consist of a majority shareholder and a number of small minority sharehold rs, it is appropriate to do a majority valuation (earnings or cash). However, where the shareholders of the a quiring company are all small minority shareholders, it would be appropriate to do a minority valuation (Gordon Dividend Growth model).

The method of pu chase price settlement constitutes another point that must be taken into account when trying to decide whether the acquiring company shareholders are minorities or a majority. It often happens that some kind of a share-swap of target company shares for acquiring company shares takes place, in which case the shareholders of the acquiring company will include new minority shareholders. The purpose of this chapter is to c ntextualise the theoretical aspects of mergers and acquisitions, hence a brief appraisal of valuati n aspects as they relate to this area. For a detailed discussion on valuation methodologies students are referred to chapter 11.

12.3 Financial effects of acquisition

Why would a company want to take over another company? Surely it is going to buy more problems than the keover is worth, when negative factors such as management hostility and employee animosity from merging different company cultures may be encountered.

Companies are always very keen to take over other companies because –

compared to organic growth it is an easy way to expand;

it eliminates competition;

the acquiring company can purchase assets for a bargain price; and

it can buy into new ideas.

The main reason however, is that the company believes that by simply taking over another company, it will create value on a P/E ratio basis. One must however, ask how this will be achieved?

Example: Effect of takeover

Let's assume that Company A has a market value of R100 million and e rnings of R10 million. The P/E ratio is therefore 100m / 10m = 10x.

Company B, a similar company in the same industry, has a market alue of R50 million and earnings of R10 million. The P/E ratio is therefore 5x.

Required:

Determine what the effect will be of Company A taking over Co pany B for R50 million.

Solution:

There are several factors that one needs to consid r, but the most important factor is that Company A, the acquiring company, has a P/E ratio of 10. Assuming that after the takeover, the P/E ratio of Company A remains at 10 and the earnings of Company B remain at 10 million:

	m
Effective value of Company B = 10 × 10m =	100
Less: Acquisition price	(50)
Premium on takeover	50

Assuming that a P/E ratio of 10 is valid, the market value of the enlarged company has increased by R50 million, even before any synergistic benefits, which will further increase the premium on takeover, have been considered. In practice, negative investor sentiments may drastically reduce the post- acquisition P/E hence reducing the value of B and the resultant takeover premium. If investors are bullish about the perfor-mance of the combined entity going forward, the P/E may rise.

12.3.1 Earnings growth

Stock markets in g n ral attach considerable importance to earnings per share when arriving at a company's stock-market rating. Companies will normally increase the earnings per share by normal manufacturing, trading and selling cycles, but another method of increasing earnings per share is simply by acquiring companies.

For example, whe e two more-or-less identical companies exist and one has a higher market capitalisation by virtue of its pe ceived g owth potential, it is able to purchase the other company on advantageous terms.

Example: Acq iring company – higher P/E ratio

Two c mpanies (A and B) each have issued share capital of 2 million shares. The financial position of the two companies is sh wn below:

	Company A	Company B
Earnings per share	R20	R20
Market price per share	R320	R180
P/E ratio	16	9

	Company A	Company B
Number of shares	2 million	2 million
Total earnings	R40 million	R40 million
Value (P/E × Total earnings)	R640 million	R360 million

Company A has a higher P/E ratio than B because the market believes that A has greater growth prospects. Company A will take over Company B at its current value of R360 million by issuing Company A shares to Company B shareholders.

The combined companies will derive no additional value from the takeover.

Required:

Calculate the price per share for Company A after the takeover.

Solution:

Company A purchases Company B. The market value of Company B is R360 million, nd Company A will have to offer 1,125 million of its shares (R360m ÷ R320) to the shareholders of Comp ny B.

The position of Company A after the purchase is:

Total earnings	R80 million	[40m + 40m]
Number of shares	3,125 million	[2m + 1,125m]
Earnings per share	R25,60	

The earnings per share has increased, purely because of the purchase of Company B.

Since the price of a share is related to the earnings p r shar , if the P/E ratio and the earnings are known, then price equals P/E ratio multiplied by earnings (Price = P/E × Earnings).

If the market believes that the management of the purchasing company will use its abilities to achieve a similar growth rate on the assets of the purchased company as it has on its own assets, then the market would keep the same P/E ratio (assuming that the risk of the purchasing company remains the same).

The position of Company A after the merger is:

Earnings per share	R25,60	
P/E ratio	16	
Market price per share	409,60	(16 × 25,60)
Number of shares	3,125 million	
Total earnings	R80 million	
Value	R1,28 billion	(80m × 16)

The shareholders of Company A have gained, because the market price is up from R320 to R409,60. The wealth of the shareholders of Company B has increased by R100,8 million.

Before merger	2m shares × R180	R360 million
After merger	1,125m shares × R409,60	R460,8 million

This is because they now hold shares in a company with higher growth prospects.

12.3.2 The smart argument

One can argue that the market value of the combined firm is R1 billion (R640m + R360m), which is the sum of the values of the separate companies before the merger. The market is smart, and realises that the value of the combined company is the sum of the values of the separate companies. The price per share is thus R320 (R1 bi ion ÷ 3,125 million shares).

Because the share price of Company A after the takeover is the same as before the takeover, the P/E ratio must f ll to 12,5 (320 / R25,60). The earnings will however, rise from R20,00 per share to R25,60 per share. The e rnings growth creates the illusion that the shareholders of Companies A and B have received something for nothing. Although this illusion may work for a while, in the long run the value per share will decline.

However, if Company A can bring the growth of Company B up to its level by increasing the growth of earnings attributable to Company B, then the market value of the combined company should increase.

In practice, the stock market tends to attach a higher P/E ratio to the company after the acquisition than would be expected from the above logical analysis. This is because investors tend to have optimistic expectations after a merger, as they hope economies of scale, improved management, forecast synergistic benefits and the like will lead to improved performance.

Example: Acquiring Company – lower P/E

Biglad agrees to take over the shares of Tiddler in a share exchange arrangement. The financial position of the two companies is as follows:

	Biglad	**Tiddler**
Earnings per share	R40	R20
Market price per share	R600	R400
P/E ratio	15	20
Number of shares	8 million	5 million
Total earnings	R320 million	R100 million
Value	R4,8 billion	R2,0 billion

Biglad acquires Tiddler by offering two shares in Biglad for every three shares in Tiddler. Biglad's directors report that the earnings per share will increase as a result of the acquisition of Tiddler, because the current earnings of both companies will increase by 10% due to synergistic benefits.

Required:

Calculate the earnings per share accruing to the shar hold rs of Biglad and Tiddler assuming that –

the takeover results in total increased earnings of 10%; and

the takeover does not increase the reported earnings.

Solution:

Number of new shares

	Total
Biglad	8m
Tiddler (2 for 3) (5m / 3 × 2)	3,333m
	11,333m

(a) Previous earnings

	Rm
Biglad	320
Tiddler	100
	420
10% increase	42
New earnings	462

Earnings per sha e R462m ÷ 11,333m = R40,8

Earnings per share	**Biglad**	**Tiddler**	
Previo s	R40	R30	[R20 × 3 / 2]
New	R40,8	R40,8	

(b) Current earnings

	Rm
Biglad	320
Tiddler	100
	420

Earnings per share R420m ÷ 11,333m = R37,06

Earnings per share	**Biglad**	**Tiddler**
Previous	R40	R30
New	R37,06	R37,06

Conclusion:

Where a company acquires another company with a higher P/E ratio than itself, it is essential for continued positive effect on earnings per share, and the return on shareholder's capital that both companies promise to offer prospects of strong profit growth going forward. Of late, there has been an increase in incidences of cash – rich companies buying target companies on a cash basis. (Microsoft's purchase of Nokia's hand-set division in 2013 for USD 7,2 Billion)

12.4 Funding for mergers and acquisitions

When a company takes over another company, the payment to the shareho ders wi be in –

cash;

a share exchange; or

a combination of cash and a share exchange.

Most takeover bids incorporate some measure of share exchange between the acquiring company and the target company, notwithstanding the increase in cash only acquisiti ns highlighted earlier.

12.4.1 Impact on capital structure

How a company pays for the shares of the target company will have a significant effect on the resultant capital structure of the acquiring company. If a company d cid s to pay cash for the shares, it will have to either issue new shares or raise debt finance (unless it has a pile of xc ss cash). It also has to consider the D:E ratio of the target company and the effect that the combination of the two companies will have on the new statement of financial position of the acquiring company.

If the company decides to go the share-exchange route, it has to consider the effect of a dilution in the share-holding of existing shareholders.

12.4.2 Methods of payment: cash versus share exchange

The choice between a cash offer and a share offer depends on the perceptions of the shareholders and manag-ers of the acquiring company on the one hand, and the view taken by the shareholders of the target company on the other.

Cash offers

Effects on the shareholders of the target company

Generally, the shareholders of the target company are unlikely to prefer cash if they become liable to any taxation on profits th y make on the sale of the shares. The advantage of a cash offer, however, is the certainty of the amount r ceived. With a share offer, the amount received is uncertain, because of the possible volatility in the share price, which will affect the value of their holdings.

A cash offer will also allow the shareholders to choose their own investment portfolio in line with invest-ment oppo tunities. The critical consideration for shareholders of the target company is the potential tax liability as a result of a cash sale. Where a large tax liability exists, the shareholders will prefer a share ex-change. Where the tax liability is small, the shareholder will prefer cash.

(b) ***Effects n the shareholders of the acquiring company***

The main advantage of a cash transaction is that the acquiring company may claim tax deductions on the a ets purchased. The bidding company's share equity value will not be affected which means that its control remains intact.

A cash deal financed by a debt issue is cheaper to the acquiring company, as the interest is allowable as a tax deduction. A dilution of earnings can also be avoided as the number of shares in issue does not change. A major disadvantage of a cash transaction is the gearing position. Increased debt will alter the D:E ratio, which could change the financial risk profile of the company. Private companies would prefer to offer cash as a means of payment to prevent voting power shifting to outsiders. Private companies would also have difficulty in valuing their own shares in a share deal, due to the lack of marketability.

Share offers

Effects on the shareholders of the target company

The main advantage is that any potential capital gains tax (CGT) is deferred. The shareholders will also continue to have a financial interest in the company sold, with potential of increased earnings and market share value.

Effects on the shareholders of the acquiring company

One of the advantages of a share offer (as previously discussed) is the effect of increased earnings per share if the acquiring company has a higher P/E ratio than the target company. The uncertainty of the effect of the share price must also be taken into account as the number of issued shares increases.

A big disadvantage of a share-for-share offer is the dilution in the equity holding of the company's original shareholders. The dilution of the equity holding may cause the bidding company's share price to fall. One of the potential problems is that, after the share-for-share transaction has taken place, a large number of shares may trade on the market, forcing a drop in share price as a result of supply and demand.

The main advantage of a share transaction is that the initial cost is relatively l w from a cash flow point of view, as no money passes to the company being taken over.

A further problem of a share-for-share transaction is the level of dividends per share and dividend cover expected by shareholders of the acquiring company and those of the target company. Once the arrangements take place, there will be a single dividend policy, whereas previously there may have been two separate policies.

Example: Takeover consideration

Company A has a market value of R6 billion and an issued share capital of 60 million shares. Company B, a company in the same industry as Company A, has an issued share capital of 20 million shares and a market value of R1 billion. Company A wishes to take over Company B, and believes that the combined company value will be R8 billion. Company B has agreed to a takeover value of R1,5 billion.

Required:

Discuss the effect(s) the takeover of Company B will have on the existing shareholders of Company A, if Company B is acquired by –

an issue of new shares to existing shareholders;

an issue of shares to new shareholders;

borrowing; or

a share exchange.

Solution:

Issue new sha es to existing shareholders

Assuming a new issue will be made via a rights issue or a new share issue at the current market share value, the effect wo ld be as follows:

Market val e before acquisition	R6 billion
Number f shares	60 million
Price per share	R100 (R6 billion /60 million shares)
New issue of shares R1,5 billion / R100	= 15 million new shares
Market value of combined company	R8 billion
Total shareholding	75 million shares (60 m + 15 m)
Value per share R8 billion / 75 million	= R106,67

Increase in value to existing shareholders

75 million × 6,67 (R106,67 – R100 = R6,67) = R500,25 million [Say R500 million]
As the existing shareholders financed the new issue, they benefit from the increased value of R500 million. Their shareholding has not been diluted.

(ii) Issue of shares to new shareholders

Existing shareholders	60 million shares
New shareholders	15 mi lion shares
Gain per share	R6,67
Existing shareholders benefit by R 6,67 × 60 million	= R400 million

In this situation, there will be a dilution in value to existing shareholders, as the benefit from the acquisition is shared with new shareholders.

(iii) Borrowing

	R
New market value	8 billion
Increased debt	(1,5 billion)
Net value	6,5 billion
Number of shares	60 million
Value per share (R6,5 billion /60 million shares)	108,33
Net value attributable to existing shareholders = 8,33 × 60 million (R108,33 – R100,00 = R8,33)	500 million

The benefit to existing shareholders is the same as financing the new acquisition via a rights issue, or a new issue of shares to existing shareholders.

(iv) Share (R6 billion /60 million shares) **exchange**

Market value		R8 billion
Existing shareholders – shares		60 million
New shareholders – shares		15 million
New shareholders = R1,5 billion market value / R100 per share	=	15 million shares
Value per share R8 billion / 75 million	=	R106,67
Net benefit to xisting shar holders	=	R400 million
Net benefit to Company B shareholders = R6,67 × 15 million	=	R100 million

Company B shareholders have gained twice over. The market value of Company B was R1 billion before the takeover. The agreed sale value was R1,5 billion. The shareholders of Company B gained R500 million on acquisition date.

F rther gain on share exchange = 15 million × R6,67	=	R100 million
Total gain R500 million + R100 million	=	R600 million

The ab ve calculations show that Company A's shareholders will gain more if the acquisition is for cash and the funds are financed via a new issue of shares to existing shareholders or by debt financing. If the finance f the acquisition is made via a new issue of shares to new shareholders or by a share exchange of Company A shares for Company B shares, the current shareholders of Company A will not receive the full benefit of acquiring Company B and the value of their shares will be diluted.

12.4.3 Management buy-outs

A management buy-out (MBO) is the purchase of all or part of a business from its owners by the executive managers. The success of a company after a buy-out is very high. Research has shown that as many as 97% of MBO companies succeed.

Reasons for MBOs

A large company decides to sell or close a division or subsidiary because –

the division may have become peripheral to the company's mainstream activities and no longer fits in to the group's overall strategy;

the company may wish to sell off a loss-making subsidiary or a division that is not showing a sufficient return or generating sufficient cash;

the holding company may have recently acquired a group of companies and now wishes to sell unwanted elements; or

the holding company needs cash.

A private company decides to sell a division or subsidiary because –

shareholders believe that the business is no longer profitable for them;

shareholders may wish to retire; or

shareholders may require quick cash.

The management team would buy out the business because –

it gives them a chance to run their own business;

it leaves them free from interference from Head Office executive directors; or

it secures their position with the company which could be taken over.

Why buy-outs usually succeed

One of the major reasons why MBOs succeed is because the new owners will have an incentive to succeed – their future wealth and employment prospects depend on the company's success. The company is also more flexible, as decision-making is quicker and improvements can take place on pricing and debt collection.

The customers of the company will gain, as continuity of supply will carry on under the same management team. The employees may also benefit, as they will continue to deal with managers who are known to them. How-ever, it often happens that some redundancies take place after a buy-out, in order to cut running costs.

The purchase price

If a company is showing poor results, the price is usually based on the net book value of the assets acquired. However, if the company can be sold as a successful going concern business, the price will be based on normal valuation techniques. It is often possible to predict future cash flows with more confidence as new manage-ment will have a cl ar r id a of future prospects. In such situations a free cash flow (FCF) valuation would be considered appropriate.

Often the managers will invest their own funds (albeit a small percentage of the total capital required) into purchasing the ompany (an incentive in itself for them to ensure the business succeeds), and borrow the balance. As a esult, in a buy-out situation, the company's gearing level in the early years is often high. Debt to equity (D:E) atios of 10:1 are not uncommon. The gearing will tend to fall as future cash distributable profits are retained in the b siness and debt is repaid.

Management buy-out finance

The financing f an MBO is normally in the form of long-term loans financed by banks, pension funds, or insur-ance companies and of late, private equity.

In titutions providing the required finance often require board representation or equity. The employees in-vo ved in the MBO often have to put up substantial personal guarantees and offer their private property as coll teral to support the loan finance.

Where the purchasing parties have insufficient personal funds to purchase the required equity, they may use mezzanine finance. This type of finance normally has little or no asset backing and falls behind 'senior debt' in erms of claim on income. This type of higher risk finance will carry a higher interest rate, and some participa-tion in the equity of the company. The use of this 'quasi debt' allows the management to hold a higher equity percentage. The repayment period for this type of debt is often about ten years.

Practice questions

Question 12–1 *(Fundamental)* *30 marks 45 minutes*

Empirical research has it that, in the main, mergers and acquisitions are extremely difficult to conceive. Expected synergies may not be realised and in the majority of cases the merger is considered a failure. The reasons for failure are often many and differ from case to case.

Required:

List and briefly explain at least 6 reasons why mergers and acquisitions fail.

Solution:

Lack of managerial fit: Lack of fit manifests itself in terms of conflicting management styles or corporate cultures. In some cases, it could be the product portfolios that could be incompatible.

Lack of industrial or commercial fit: In vertical or horizontal take vers the target company may not have the product range, market position or technological niche that was predicted by the initial appraisal.

Lack of goal congruence: Disputes about how to proceed with the acquired company in critical functional areas may compromise an otherwise good investment.

Bargain purchases: Turnaround costs may add substantially to the price paid for the company as the acquirer battles to rectify anomalies in key functional ar as (product design, head count, IT, etc.).

Paying too much: A premium is paid that does not match the future value creation to the shareholders.

Failure to integrate the entities successfully: Proper fit does not guarantee success. Management could still fail to translate visible synergies into shareholder value.

Inability to manage change: The board must drive change management by being prepared to depart from established routines and practices in favour of those routines and practices that will substantially add to shareholder value. Companies often have different "firm specific cultures" and a failure to manage the differences often contributes to a failed merger.

Question 12–2 *(Fundamental)* *18 marks 27 minutes*

You are a junior consultant at an investment firm situated in Jabulani. Your senior partner has recently attended a seminar on mergers and acquisitions where a number of themes were discussed. Although she is up to date on the subject of mergers and acquisitions, she would like to "test" your understanding of the concepts of synergies and diversification. She has asked you to draft notes on the following:

What synergi s may arise in mergers and acquisitions?

What challenges you foresee in the achievement of synergies under (a) above?

Can mergers and a quisitions be undertaken to achieve corporate diversification?

Solution:

What synergies may arise in mergers and acquisitions.

Operating synergies:

l Impr ved productivity as a result of the merger or *acquisitions.* **l**

The merged entity may experience economies of scale or scope.

Increased product – market scope.

l The elimination of inefficiencies that previously existed in the target company. **l**

Better use of previously underutilised talent.

l In horizontal mergers, the elimination of competitors may contribute to economic value addition to the new firm.

Vertical mergers between customers and suppliers can create value by enhancing value within the supply chain

Note: This list is not exhaustive. What additional points can you add?

Financial synergies:

Cost savings as a result of the rationalisation of operations. This may entail the elimination of duplicate service functions in the areas of finance, procurement, human resources, etc.

Tax savings, whereby the merged entity is able to fully utilise tax allowances or tax losses.

Diversification reduces firm specific risk, making the company more attractive to investors and reducing the company's weighted average cost of capital.

Note: This list is not exhaustive. What additional points can you dd?

What challenges you foresee in the achievement of synergies under (a) abo e?

- The acquisition decision is based on incomplete or incorrect information resulting in synergies not being fully realised.
- Synergies may prove difficult to value.

Business combinations often result in a nu ber of proble s often around corporate culture and organisational politics. In resolving these issues, additional costs may be incurred which tend to "eat" into synergy gains.

Managers are not given suitable inc ntiv s to achieve maximum synergies.

Note: This list is not exhaustive. What additional points can you add?

Can mergers and acquisitions be undertaken to achieve corporate diversification?

- Borrowing capacity and access to differing forms of financing is often increased. This lowers the firm's cost of capital as cited above hence contributing to the minimisation of firm specific risk.
- The merger or acquisition often minimizes the risk of corporate failure.
- A company overly reliant on one core business area may acquire other businesses (Conglomeration) in order to reduce the risk of over reliance on a single sector (Bidvest is a case in point).
- Empirical research suggests that in some instances investors can diversify far more efficiently through their portfolios than the company. In such a situation a company may be forced to return cash to the shareholders by declaring a cash dividend.

Note: This list is not exhaustive. What additional points can you add?

Question 12–3 *(Fundamental)* *100 marks 150 minutes*

Access the internet and s arch for 10 (ten) local and 10 (ten) foreign business combinations in the form of mergers and a quisitions that took place in the last ten years. In your selection of the candidates for analysis ensure, where possible, that 70% are acquisitions and the balance are mergers. For each candidate indicate the following:

The natu e (fo ms) of the merger or acquisition.

The rationale (reasons) for the combination (pronouncements by the parties and analysts are required here).

Legal issues that arose as a result of the combination (what regulatory or state bodies were involved, who were the litigants, what was/were the basis of the litigation and what were the outcomes of such litigation?)

The ocial, cultural and political issues that arose as a result of the combination and how these were resolved (if at all).

From a review of literature and in your own opinion would you say the combination was successful?

Solution:

This mini case study has no solution. Students will be required to derive the answers based on their own research. Academics may use each mini case study to assess students' ability to access and analyse information from the internet and only present information that is tailored to the requirement.

Question 12–4 *(Fundamental)* *30 marks 45 minutes*

The following is a summary of the Statement of Financial Position of Banco Ltd at 31 December 20X1:

	Rm
ASSETS	
Non-current assets	240
Plant and machinery	240
Current assets	75
Inventories	5
Trade receivables	20
Cash equivalents	50
TOTAL ASSETS	**315**
EQUITY and LIABILITIES	
Total equity	210
Issued capital	140
Reserves	100
Retained earnings/(losses)	(30)
Non-current liabilities	35
Long-term borrowings	35
Current liabilities	70
Trade payables	60
Short-term borrowings	10
TOTAL EQUITY and LIABILITIES	**315**

Additional information:

Astra Ltd offers to take over all the assets at book value and to discharge some of Banco Ltd's liabilities.

Trade creditors will be tak n over and paid by Astra Ltd. Astra Ltd will be able to negotiate a 15% discount from creditors and imm diat ly pay them.

Banco Ltd will repay its bank overdraft of R10 million and redeem the long-term borrowing of R35 million at a premium of 6%.

The sha e capital of Banco Ltd consists of –

	Rm
Ordinary shares of R1 each	80
12% Preference shares of R1 each	30
15% Preference shares of R1 each	30
	140

The hareholders of Banco Ltd will exchange their respective shares in Banco Ltd for ordinary shares in Astra Ltd at the following ratios –

	Banco shares	for	Astra shares
Ordinary shareholders	5		1
12% Preference shareholders	5		1
15% Preference shareholders	6		2

Astra Ltd's shares are valued at R6,00 per share.

Liquidation charges payable by Banco Ltd amounts to R2, 9 million

50% of Banco Ltd's Trade receivables are considered to be irrecoverable, and its plant to be worth 5% less than the reflected book value.

Banco Ltd will transfer its cash investment of R50 million into its bank account.

Required:

Prepare the ledger accounts of Banco Ltd reflecting the finalisation of the above absorption.

Solution:

Bank

	Rm		Rm
Cash equivalents	50	Balance	10
		Liquidation charges	2,9
		Long-term b rr wing	37,1
	50		50

Trade payables

	Rm		Rm
Liquidation account	60	Balance	60

Cash equivalents

	m		Rm
Balance	50	Bank	50

Long -term borrowing

	Rm		Rm
Bank	37,1	Balance	35
		Liquidation account (premium)	2,1
	37,1		37,1

Ordinary shares

	Rm		Rm
Shares for Astra	96	Balance	80
		Profit on liquidation	16
	96		**96**

12% Preference shares

	Rm		Rm
		Balance	30
Shares for Astra	36	Profit on liquidation	6
	36		**36**

15% Preference shares

	Rm		Rm
		Balance	30
Sh res for Astra	60	Profit on liquidation	30
	60		60

Liquidation account

	Rm		Rm
Plant and machinery	240	Payables	60
Bank (liquidation charge)	2,9	Reserves	100
Inventory	5	Purchase price	192
Trade receivables	20		
Long-term borrowing – premium	2,1		
Retained loss	30		
Profit – ordinary	16		
– 12% Preference	6		
– 15% Preference	30		
	352		352

Sundry shareholders

	Rm		Rm
Liquidation account	192	Shares in Astra:	
		Ordinary holders	96
		12% Preference holders	36
		15% Preference holders	60
	192		192

Purchase price

	Rm
Ordinary shareholders	
80m × 1/5 R6,00	96
12% Preference shareholders	
30m × 1/5 R6,00	36
15% Preference shareholders	
30m × 2/6 R6,00	60
Purchase price of net assets	192
Payables (creditors)	60
Purchase price of total assets	**252**

Question 12–5 *(Fundamental)* *15 marks 23 minutes*

Refer to **Question 12–4** above.

Additional information:

Astra Ltd
Statement of Financial Position at 31 December 20X1

		Rm
ASSETS		
Non-current assets		220
Plant and machinery		220
Current assets		220
Inventory		100
Trade receivables		60
Cash equivalents		60
TOTAL ASSETS		**440**
EQUITY and LIABILITIES		
Total equity		385
Issued capital		250
Reserves		15
Retained earnings		120
Current liabilities		55
Trade payables		30
Short-term borrowings		25
TOTAL EQUITY and LIABILITIES		**440**
The issued capital consists of – Ordinary shares of R1 each		R250m

Required:

Prepare the **Statement of Financial Position** of Astra Ltd after the absorption has taken place.

Solution:

Astra Ltd
Statement of Financial Position at 30 December 20X1

		Rm
ASSETS		
Non-current ass ts		
Plant and machinery	[(240 – 5%) + 220]	448
Current assets		184
Invento ies	[5 + 100]	105
Cash equivalents	[60 – 51]	9
Trade receivables	[(20 – 50%) + 60]	70
TOTAL ASSETS		**632**
EQUITY and LIABILITIES		
T tal equity		577
I ued capital	[250 + 32]	282
Share premium	[15 + 160]	175
Retained earnings		120
Current liabilities		55
Trade payables	[(60 – 15%) – 51 + 30]	30
Short-term borrowings		25
TOTAL EQUITY and LIABILITIES		**632**

Journal Entry

		Rm	Rm
Opening entries:			
Plant and machinery [240 – 5%]	Dr	228	
Inventory	Dr	5	
Trade receivables [20 – 50%]	Dr	10	
Payables (Creditors) [60 – 15%]			51
Share capital			32
Share premium			160
Payables (Creditors)	Dr	51	
Cash			51

Calculation of share premium

Purchase price			R192m
Value of shares			R6
Number of shares		=	32m
Nominal value of shares			R1
Share premium			R5
Share premium	= R5 × 32 000		R160 million

Comments:

In this question the values of the assets purchased w re xactly the same as the purchase price. If the purchase price was higher, goodwill would have been creat d in the books of Astra Ltd. The lower the goodwill the bigger the tax benefit for the buyer as the depreciable asset values for tax purposes are higher. The converse applies to the seller since higher asset values create bigger taxable recoupments.

Question 12–6 *(Intermediate)* *30 marks 45 minutes*

Costa Ltd and Delta Ltd decided to amalgamate their companies at 31 December 20X1. The following information is presented to you:

Costa Ltd
Statement of Financial Position at 30 December 20X1

ASSETS	**Rm**
Non-current assets	314
Property	300
Plant and equipment	14
Current assets	367
Inventory	102
Trade receivabl s	125
Cash and ash equivalents	140
TOTAL ASSETS	681
EQUITY and LIABILITIES	
Total eq ity	338
Iss ed capital – R1 shares	400
Retained earnings/(losses)	(62)
N n-current liabilities	145
Long-term borrowings	125
Deferred tax	20
Current liabilities	198
Trade payables	138
Short-term borrowings – Bank	10
Provision – Bad debt	50
TOTAL EQUITY and LIABILITIES	681

Delta Ltd
Statement of Financial Position at 30 December 20X1

	Rm
ASSETS	
Non-current assets	130
Property	120
Plant and equipment	10
Current assets	175
Inventory	100
Trade receivables	50
Cash and cash equivalents	25
TOTAL ASSETS	305
EQUITY and LIABILITIES	
Total equity	170
Issued capital – R1 shares	150
Retained earnings/(losses)	20
Current liabilities	135
Trade payables	135
TOTAL EQUITY and LIABILITIES	305

Additional information:

A new company Delcosta Ltd was incorporated with an authorised ordinary share capital of 700 000 ordinary shares of R1 each for purpose of this amalgamation.

Delcosta Ltd took over all the assets and liabilities of both companies at book value except for in the case of:

Costa Ltd:

- Liquidation costs of R5 million
- Long-term borrowings
- Bank overdraft

Delta Ltd:

- Liquidation costs of R5 million
- Cash on hand

3 Purchase consid ration:

	Shares held in		Shares in Delcosta Ltd
Costa Ltd:			
Ordina y sha eholders	10	for	7
Cash R55 million			
Delta Ltd:			
Ordinary shareholders	1	for	1

Required:

Draw up the statement of financial position of Delcosta after the amalgamation has taken place.

So ution:

Costa Ltd – Calculation of purchase price

Shares to be issued: $\frac{\text{R400m}}{10}$ x7= 280m shares

Purchase price:

	Rm
Shares of R1 each	280
Cash	55
	335

Assets and liabilities taken over:

	Rm
Non-current assets	314
Current assets	227
Inventory	102
Trade receivables	125
Cash	–
Balances	140
Liquidation expenses	(5)
Borrowings	(125)
Bank	(10)
Deferred tax	(20)
Current liabilities	
Trade payables	(138)
Provision for bad debt	(50)
	333

Goodwill paid for by Delcosta Ltd:

	Rm
Purchase price	335
Value of Assets	333
Goodwill	2

Delta Ltd
Statement of Financial Position at 30 December 20X1

Purchase price

	Rm
Shares of R1 each	150
	150

Assets and liabiliti s tak n ov r

	Rm
Non-current assets	130
Current assets	150
Invento y	100
Trade receivables	50
Cash	–
Balance	25
Liquidati n expenses	(5)
Payment to shareholders	(20)
Current liabilities	
Trade payables	(135)
	145

Goodwill paid for by Delcosta Ltd

	Rm
Purchase price	150
Value of Assets	145
Goodwill	5

Delcosta Ltd
Statement of Financial Position at 30 December 20X1

	Rm
ASSETS	
Non-current assets	**451**
Property (300 + 120)	420
Plant and equipment (14 + 10)	24
Goodwill (2 + 5)	7
Current assets	**377**
Inventories (102 + 100)	202
Trade receivables (125 + 50)	175
Cash and cash equivalents	–
TOTAL ASSETS	**828**
EQUITY and LIABILITIES	
Total equity	**430**
Issued capital (280 + 150)	430
Non-current liabilities	**20**
Long-term borrowings	–
Deferred tax	20
Current liabilities	**378**
Trade payables (138 + 135)	273
Bank overdraft	55
Provision– Bad debt	50
TOTAL EQUITY and LIABILITIES	**828**

Question 12– 7 *(Int rm diate)* *35 marks 52 minutes*

A client, Tebbitt (Pty) Limit d, has been negotiating with Thatcher (Pty) Limited for the purchase of one of its manufacturing divisions. The statement of income for the year just ended and the current statement of financial position are summarised as follows:

Thatcher (Pty) Ltd
Abridged Statement of Income

		R'000	R'000
Sales	All to external customers		376
Less:	Materials and components – external	52	
	Materials and components – internal	43	
	Manufacturing labour	124	
	Depreciation on plant and equipment	15	
	Other manufacturing overheads incurred in division	64	
	Administrative overheads incurred in division	38	
	Share of Head Office costs	24	360
	Operating profit		16

Abridged Statement of Financial Position

			R'000
Plant and equipment	–	cost less depreciation	34
Inventories at cost	–	finished goods	72
	–	raw materials	26
Trade receivables			54
			186
Less: Trade payables			32
Head Office capital employed			154

The following additional information is provided:

'Materials and components – internal' represents items transferred from another division. Under Thatcher's transfer pricing policy, these items are priced at variable cost plus 30% to cover fixed overheads. Tebbitt would manufacture the items concerned itself under similar conditions to Thatcher in terms of costs.

Tebbitt would take over all the assets of the division and discharge the trade payables. However, the plant and equipment is believed to be obsolete. It would be sold f r scrap at R10 000 and replaced by equipment leased on an annual contract for an initial rental of R25 000 per annum.

Tebbitt believes that inventories of finished goods could be reduced to 50% of their present level. The reduction would be effected by a special sale immediately after the acquisition, in order to realise R40 000.

'Share of Head Office costs' represents an allocation of administrative costs on the basis of divisional sales. The acquisition would cause Tebbitt's costs of g n ral manag ment to increase by R8 000.

It is expected that all items of cost and revenue for the division and all working capital items would increase at 15% per annum, in line with the retail price index for the indefinite future. Tebbitt requires a rate of return of 21% per annum on new investments.

Assume that all receipts and payments arise at annual intervals.

Required:

Prepare a calculation that will guide Tebbitt in its decision on the maximum sum it should pay for the division of Thatcher. **(*25 marks*)**

(b) Add a brief note on other factors that might influence the decision in practice. **(*10 marks*)**

Ignore taxation.

Solution:

1 Evidently the price paid will d pend upon the present value of cash flows stemming from the purchase.

Tebbitt (Pty) Limited

		R'000
(i) Annual cash flows (at current prices)		
Net p ofit per Thatcher (Pty) Ltd's accounts		16
Add: Depreciation (**Note 2**)		15
Internal components (**Note 1**)		10
Share of Head Office costs (**Note 3**)		24
		65
Le s: Increase on general management cost	(8)	
Annual lease rental	(25)	33
Annual cash flows		32

This annual cash flow is in current purchasing power terms and is expected to rise in line with the rate of inflation, thus the figure derived must be discounted at the equivalent real rate of interest.

The equivalent real rate (r) is found from the money rate (m) (nominal rate) and the rate of inflation (i) (inflation premium) by using the formula (Exact Fisher)

$$(1 + r) = \frac{(1 + m)}{1 + I} = \frac{1{,}21}{1{,}15} = 1{,}0521739$$

Since this annual cash flow is to arise for the 'indefinite future', one should assume that it will arise to infinity (non growth perpetuity). The present value is thus:

$$PV = \frac{32}{0{,}0521739} = 613\ 333 \text{ (say R613 000)}$$

or $\frac{32(1 + g)}{k_e - g} = \frac{32(1 + 0{,}15)}{(0{,}21 - 0{,}15)} = R613\ 333$

Assumption:

Tebbitt's required return of 21% represents the shareh lders' required return. Assume therefore that it is an all-equity company. Assume further that no cash-fl w retentions are required to maintain the annual dividend payment of R32 000. There is no c mpany business growth as no cash flows are retained for growth.

Notes:

'Material and components – internal'. The fix d cost loading has been removed on the assumption that capacity is already available to cop , as follows:

		R
Internal components – per Q		43
Before fixed costs =	$43 \times \frac{100}{130}$	(33)
Costs not incurred		10

Depreciation is removed since it involves no cash flow. It is effectively replaced by the annual lease rental.

'Share of Head Office costs' must clearly be replaced by Tebbitt's assessment of the increase in its own costs arising from the acquisition.

Once-off cash flows:

In addition to the annual flows, one must consider the once-and-for-all flows envisaged as follows:

	R
Sale of plant and quipment	10
Sale of xc ss inv ntories	40
	50

Notes:

Since these cash flows arise immediately, they do not require discounting.

No account has been taken of the receipt of accounts receivables or payment of accounts payables which will be taken over. This is based on the assumption that, together with the necessary inventories, they represent a reasonable level of investment in working capital, which would otherwise be needed.

Total cash flows

The total present value of future cash flows arising from the purchase is therefore:

	R'000
PV of annual flows	613
PV of immediate cash flows	50
Total PV	663

It would thus appear that Tebbitt should not be prepared to pay more than R663 000 for this acquisition, since a negative NPV would result.

Other factors which may influence the decision include:

The method and timing of payment

The above computation assumes immediate payment for cash. If payment was spread over a period of time, the price would be higher (PV of cash payment R663 000). Similarly, if payment was in any form other than cash (e.g. share or debt issue) this may affect the decision.

The reason for the purchase

The above computations assume that acquisition of this new enterprise will in no way affect Tebbitt's existing operations. If this is not the case, account will need to be taken of the effect on those operations. For example, acquisition of this new division may provide additional outlets for Tebbitt's current production, enabling this to be increased.

In similar vein – if purchase of this division represents the removal of a significant competitor, the price may well be higher than that computed on the existing basis.

Management confidence/efficiency

The computations above assume that the division in question will continue to operate at its existing capacity and efficiency. If the management of Tebbitt believes it can improve on this state of affairs, the price might also be higher.

Competition

Allied with the points already mentioned, the price Tebbitt is prepared to pay may be influenced by who else is in the market for the purchase of this business and what the effect on Tebbitt's existing operations would be if someone else acquired the enterprise.

Reason for sale

Given that Thatcher is apparently quite prepared to sell an apparently profitable division, it may be pertinent to consider why this is so and how the sale would affect Thatcher's future operation, particularly if Thatcher is in direct competition with Tebbitt.

Diversification

Apart from the direct interaction with existing operations, Tebbitt should give consideration to the possible change in overall risk associated with its total operations before and after the acquisition. If the proposed acquisition constitutes a beneficial diversification in the sense of reducing the risk of the consequent total operations, then a higher purchase price may be justified.

Question 12–8 *(Advanced)* *40 marks 60 minutes*

The directors of Townsend (Pty) Limited are currently considering the acquisition of Babs (Pty) Limited, a family company that manufactures packaging products.

Townsend has accumulated distributable cash profits of R1,5 million which it may use to increase dividends or invest in new projects. The directors are reluctant to increase dividends as they are of the opinion that shareholders would interpret the increase in dividends as being maintainable in the future. The resultant increase would therefore lead to a substantial increase in the share price of Townsend, and the market is likely to assume that future dividends would be maintained at the current level.

Babs Limited has been targeted by Townsend (Pty) Limited as its manufacturing activities are in a different industrial sector and therefore presents an opportunity to diversify.

The following information relevant to the operation of Townsend (Pty) Limited is available:

Dividend growth rate	6%
Cum-div market value	R5,62 per share
Current proposed dividend	R1,04

The current yield on short-term government bonds is 12% and the market return of the industrial share index is 22%. It has been estimated by the financial accountant that the relative systematic risk of Babs Limited is such that its beta (β) is approximately 50% of that of Townsend (Pty) Limited.

The following information relevant to Babs Limited is available and shows the following comparative values of historical, replacement and market asset values:

	Historical asset cost R'000	Cost of starting up an equivalent company R'000	Value of assets sold piecemeal R'000
Land and buildings	252	749	575
Plant and equipment	350	540	440
Net current assets	165	165	165

The following information relevant to Babs Limited is available:

Quoted companies similar to Babs Limited have P/E ratios of 11.

If Townsend started up an equivalent company, it would save R200 000 on plant and equipment, as it currently holds similar equipment that could be used in the Babs Limited operation.

The current tax rate of Babs Limited is 40% and current earnings after tax are R210 000. Townsend (Pty) Limited would be in a position to save R30 000 on operating c sts annually.

Expected future growth of Babs Limited is 7% per annum.

80% of Babs Limited's post-tax earnings are distributed as dividends.

Required:

Calculate

The shareholders' required rate of return for Townsend (Pty) Limited.

(ii) The beta (β) values of Townsend (Pty) Limited and Babs Limited. **(*5 marks*)**

Write a report to the directors of Townsend (Pty) Limited indicating the maximum price that they should be prepared to pay for Babs Limited and the minimum price that the shareholders of Babs Limited are likely to accept. The report must explain the principles underlying the recommendation and the problems associated with CAPM based valuations. **(*23 marks*)**

Discuss how the shareholders of Townsend (Pty) Limited might view the proposed acquisition with regard to –

diversification of Townsend (Pty) Limited;

synergistic benefits; and

(iii) future dividend payments. **(*12 marks*)**

Solution:

(i) Sharehold rs' r quir d rate of return

$$\text{Market pri e} = \frac{D1}{k_e - g}$$

$$5{,}62 - 1{,}04 = \frac{1{,}04\ (1{,}06)}{k_e - 0{,}06}$$

$$k_e - 0{,}06 = \frac{1{,}1024}{4{,}58}$$

$$k_e = 0{,}24 + 0{,}06 = 0{,}30$$

Beta value of Townsend (Pty) Ltd

Using $k_e = Rf + \beta(Rm - Rf)$

$30\% = 12\% + \beta(22\% - 12\%)$

$= 1{,}8$

The β of Babs Limited is 50% that of Townsend (Pty) Limited

Beta = 0,9

Required rate of return for Babs Limited

= 12 + 0,9 (22 – 12) = 21%

Workings

Valuation of Babs Limited using a dividends growth model

Current dividends R210 000 × 80% = R168 000
Growth = 7% k_e = 21%

$$\text{Value} = \frac{168\,000\,(1{,}07)}{(0{,}21 - 0{,}07)} = \text{R1 284 000}$$

Earnings valuation

Profit after tax	R210 000
Add back: Savings	R18 000
Earnings	R228 000
P/E ratio for similar quoted companies	**11**
Adjust for	
No stringent corporate governance	–1
Credit rating may be low	–1
Unquoted share trading difficult	–1
Comparable P/E ratio	8

Note: ***Adjustments to the P/E ratio must be justifi d by factors contributing to risk and those mitigating against it.***

Value R228 000 × 8 = R1 824 000

Asset valuations

	Historic R'000	**Replacement R'000**	**Liquidation R'000**
Land and buildings	252	749	575
Plant	350	540	440
Current assets	165	165	165
	767	1 454	1 180

Report to the directors of Townsend (Pty) Limited

Subject: Valuation of Babs Limited **Prepared by: Jabu Uys**

In evaluating the maximum price to pay for Babs Limited, one must consider –

the epla ement value of assets; and

the ea nings potential of Babs Limited.

Townsend (Pty) Limited may invest in a company similar to Babs Limited by purchasing its own land and b ildings. The disadvantage of doing this is that it lacks expertise and would in future be competing with Babs Limited. The replacement value of R1 454 000 given above is assumed to be the amount required for any c mpany wishing to start up an equivalent operation. As Townsend (Pty) Limited already has certain assets available, the cost of starting up a similar business would be R1 254 000 (R1 454 000 – R200 00).

The earnings valuation of R1 824 000 is probably too high when compared to the dividend valuation or a et valuation. There is insufficient information about Babs Limited to assess a reasonable P/E ratio. Information required includes gearing, liquidity, growth prospects and production and marketing strategies s compared to similar quoted companies. Further problems are the reliability of maintainable earnings nd the anticipated savings.

The directors should also consider any assets that may be superfluous after the takeover. Certain assets may be liquidated, and the funds used to finance the takeover. A maximum price of approximately R1 500 000 is recommended.

The minimum amount that the shareholders of Babs Limited are likely to accept depends on the alternatives open to them. The shares are relatively unmarketable; therefore they must consider the liquidation value of the business, which is R1 180 000.

However, if they are happy to continue in business, the valuation of R1 284 000 is likely to be more relevant. This price is based upon future dividends discounted according to their level of systematic risk. In this situation, much will depend upon the validity of the calculated beta (β) factor of 0,9. Secondly, the CAPM is a single-period model, and caution must be exercised in applying it in a multi-period context. It must be remembered that the beta (β) factor for Babs Limited is only an estimate, and no supporting evidence is provided. As a result, the valuation should be used with caution. A minimum selling price of R1 200 000 is recommended.

Overall, in determining maximum and minimum prices for the firm, the bove figures are only as good as the techniques employed and the data provided. In reality, much will depend upon how badly Babs Limited wishes to sell, and upon how important the directors of Townsend (Pty) Limited perceive the takeover to be. In the end it comes down to negotiation between the parties.

(c) The directors of Townsend (Pty) Limited see the acquisiti n f Babs Limited as an opportunity to diversify. In itself, this justification for the takeover is unlikely to be interesting to the existing shareholders. If they hold well diversified portfolios, they can achieve the benefits f diversification just as well by investing the excess funds for themselves. Such an arrange ent would probably be less costly when the usual premiums for takeover bids are considered, and it would also offer greater flexibility to the shareholders. Although the shares of Babs Limited are unlikely to be available to them, they should easily be able to lo-cate securities with similar levels of systematic risk. In addition, if given the cash and allowed to make their own investment decisions, they could sel ct s curiti s for investment most suitable to their own risk to return preferences. However, if Townsend (Pty) Limit d's equity-holders are not well diversified, they might welcome the risk reduction effects of the takeover. This might be the case, particularly if the undiversified shareholders would be subject not only to brokerage costs on liquidating their investment in Townsend and investing it elsewhere, but also subject to tax on any past unrealised increases in the value of their holdings. In this situation, corporate diversification could be more cost effective than personal diversification.

The proposed acquisition might reduce the variance of the operating income of the combined companies and hence reduce the financing costs of the firm. This, together with the attendant reduction in expected bankruptcy costs, could be of interest to even well diversified shareholders.

Shareholders will also be attracted by any synergistic effects of the takeover. As the two firms are engaged in different activities, the chances of synergistic effects in the areas of production and marketing seem remote; however, administration and financial savings could result. For example, the R30 000 tax reduction in operating costs could mean increased returns to shareholders. The possibility of further operating economies should be investigated.

Any impact on the future dividend policy of Townsend (Pty) Limited will also be of interest to existing shareholders. As Babs Limit d's growth rate is higher than that of Townsend (Pty) Limited, the firm's ability to stick to its chos n dividend policy of 6% growth per annum might be improved.

In the final analysis, much will depend upon the terms of the takeover and the alternatives open to Townsend (Pty) Limited. If a substantial premium is paid for the shares in Babs Limited, and it outweighs any of the benefits outlined above, a transfer of value will take place between Townsend (Pty) Limited's and Babs Limited's shareholders. This is unlikely to be an attractive proposition. However, it must be considered in the light of the alternatives available. If, for example, the cash were to remain as an idle asset, the shareholders would still suffer a substantial loss. Alternatively, if the cash were paid out as a dividend, the shareh lders must consider the transaction costs of investing the surplus cash.

Que tion 12–9 *(Advanced)* *40 marks 60 minutes*

The directors of Elisa Ltd are considering the acquisition of the entire share capital of a private limited company, Aminta (Pty) Ltd, both companies being wholly financed by equity capital. Elisa Ltd prepares annual accounts to 31 December and the takeover would take place on 1 January 20Y3. A project analyst, charged with the t sk of collecting sufficient relevant information, has discovered that Tamiri Ltd is the public company most closely resembling Aminta (Pty) Ltd. It has an equity cost of capital of 19,3% and a P/E ratio of 7,9. Tamiri Ltd is

engaged in the same line of business as Aminta (Pty) Ltd, and has very similar business and financial risk characteristics. The following details relating to Elisa Ltd and Aminta (Pty) Limited has been provided by the Analyst:

Elisa Ltd has an equity cost of capital of 15,85%. The analyst estimates that, if Aminta (Pty) Limited is acquired, the cash flow of Elisa Ltd for the year to 31 December 20Y3 will be increased by an amount equal to 105% of the 20Y2 net profit of Aminta (Pty) Limited before deducting directors' emoluments. These additional cash flows will amount to 30% of the combined cash flows of the enlarged Elisa Ltd for 20Y3. The analyst does not expect any economies of scale from the takeover, and predicts that the cash flows of Elisa Ltd will increase by 5% per annum compound in 20Y4 and subsequent years, regardless of whether Aminta (Pty) Limited is acquired.

Aminta (Pty) Limited produces annual accounts to 31 December which show the following net profit figures (after deduction of directors' emoluments):

Year		R
20X7		619 000
20X8		600 000
20X9		524 000
20Y0		604 000
20Y1		628 0198
20Y2	(estimated)	790 000

The draft 20Y2 annual accounts also show that the net assets of Aminta (Pty) Limited are R3 618 000 on an historic cost basis and R6 375 000 on a replacement cost basis. The analyst estimates that the assets of Aminta (Pty) Limited would realise approximately 4 000 000 on liquidation. The two directors and only shareholders are Mr and Mrs Alessandro, whose emoluments appear to average 10% of the net profit figures, after deducting those emoluments.

Required:

Explaining the underlying principles –

calculate the maximum sum that the directors of Elisa Ltd should be willing to pay for the share capital of Aminta (Pty) Ltd; and **(*24 marks*)**

calculate the minimum sum that Mr and Mrs Alessandro would be willing to accept for their shareholding in Aminta (Pty) Ltd. **(*16 marks*)** Ignore taxation.

(ICAEW)

Solution:

Maximum sum that the directors of Elisa Ltd should be willing to pay for the share capital of Aminta (Pty) Limited

The maxim m s m which the directors of Elisa Ltd should pay for the share capital of Aminta (Pty) Limited is eq al to the increase in the wealth of Elisa Ltd's shareholders as a result of the acquisition. This increase in wealth will come from the extra cash flows which the acquisition will generate for the acquiring shareh lders, either as an income-producing going concern, or by the sale of its assets, or by some combinati n f the two.

The maximum going concern value of Aminta (Pty) Limited can be estimated as the present value of the additional cash generated by its earnings to perpetuity. The appropriate discount rate must depend on the attached to these earnings. Elisa Ltd's existing cost of capital is not relevant, unless the new company is not expected to alter the risk of Elisa Ltd (which is unlikely, given that it will constitute 30% of the new com-pany).

A more suitable discount rate can be found by examining the cost of capital of a quoted company which closely resembles Aminta (Pty) Ltd in terms of business and financial risk characteristics. Tamiri Ltd is such a company. No extra risk premium need be added to this discount rate because, although Aminta (Pty) Ltd is

a smaller private company, the combined cash flows will be those of a public company. Thus, using the financial analyst's estimates:

	R
20Y2 net profit of Aminta (Pty) Limited	790 000
Add: Directors' emoluments (10%)	79 000
	R869 000
Additional cash for Elisa Ltd in 20Y3 (105%)	R912 450

Approach A

Assuming a 5% growth rate and a 19,3% discount rate appropriate to the risk of the cash flows

$$\text{Present value of additional cash receipts} = \frac{\text{R912 450}}{0{,}193 - 0{,}05} = \text{R6 380 769}$$

Approach B

An alternative (and possibly better) approach uses the fact that the additional cash flows will amount to 30% of the combined company.

The appropriate discount rate for the cash flows of the co bined company will be the weighted average of Elisa Ltd's present cost of capital, that is 15,85% and the rate appropriate to the new cash flows, that is 19,3%. Thus, (0,7 × 15,85%) + (0,3 × 19,3%) = 16,89%.

20Y3 cash flows from Aminta (Pty) Limited = R912 450

$$\text{Thus, 20Y3 combined cash flows of firm} = \frac{100}{30} = \times \text{R912 450} = \text{R3 041 500}$$

Present value of combined firm to perpetuity, assuming 5% growth

$$= \frac{\text{R3 041 500}}{0{,}1689 - 0{,}05} = \text{R25 580 319}$$

20Y3 cash flows from Elisa Ltd above = 0,7 × R3 041 500 = R2 129 050

Present value of Elisa Ltd to perpetuity, assuming 5% growth

$$= \frac{\text{R2 129 050}}{0{,}1585 - 0{,}05} = \text{R19 622 580}$$

Increase in value of firm following the combination with Aminta (Pty) Limited

R25 580 319 – R19 622 580 = R5 957 739

The two approach s produce different answers because the calculation of the weighted average discount rate in Approach B does not involve the 5% growth rate. Both methods would produce the same solution if no growth in earnings was expected, or if discount rates were calculated in real terms.

It is the efo e difficult to say which (if either) method is superior, but it was indicated previously that Approach B is p eferred.

F rther notes to the solution:

P rtf lio effects of risk reduction by combining the two sets of cash flows have been ignored, as there is no basis on which to make estimates. It is likely, however, that the new cost of capital of the en-larged Elisa Ltd will be lower than the weighted average of 15,85% and 19,3%.

The analyst expects no economies of scale. His estimate of extra cash flows resulting from the acquisition of Aminta (Pty) Limited really amounts to an assumption that Aminta (Pty) Limited's profits before directors' emoluments are equal to distributable cash, which will grow at 5% per annum. These assumptions can be challenged, as follows –

there may be economies of scale;

profits are likely to be greater than distributable cash when there is growth;

Elisa Ltd may not be able to save all of the directors' emoluments; and

5% may not be an appropriate growth figure. Some of these reservations are expanded below (see **4**, and **(b)**).

Past growth of Aminta (Pty) Limited

If "g" is the average annual growth rate in profits for the last five years, then

$$(1 + g)^5 = \frac{790}{619} = 1,276$$

From compounding tables, g = 5% per annum.

This average growth rate hides a slump in profits between 19X7 and 19X9, but a high growth rate thereafter. If g = growth rate for the last three years, then

$$(1 + g)^3 = \frac{790}{524} = 1,508$$

From compounding tables, g approximates 15% per annum.

It may be that Aminta (Pty) Limited has recovered fr m previ usly ailing profits and will show a growth rate higher than 5% in the future.

4 Valuation by P/E ratio

The P/E ratio of the similar public company, Ta iri Ltd, is 7,9. Applying this multiple to the current ings of Aminta (Pty) Limited before directors' earn-molum nts gives

R869 000 × 7,9 = R6 865 100

However, a P/E ratio taken from one company cannot be blindly applied to another, even if it has the same business and financial risk characteristics, because the expected growth rate of Tamiri Ltd might be very different from that of Aminta (Pty) Limited.

The directors of Elisa Ltd should have more confidence in the Discounted Cash Flow (DCF) valuation than the P/E valuation.

Sales of assets

If Aminta (Pty) Limited was acquired and then sold, its assets would realise R4 000 000. It would not therefore be acquired for this purpose, but as a going concern.

Conclusion:

The maximum sum which should be paid by the directors of Elisa Ltd is approximately R6 million.

The minimum sum which Mr. and Mrs. Alessandro should be willing to accept for their shares

This depends on the alternatives to accepting an offer from Elisa Ltd. The minimum sum to be accepted from Elisa should be equal to the highest of these alternatives.

It is not clear how much of the directors' emoluments paid to Mr and Mrs Alessandro is pure emolument in retu n for wo k done, and how much is (in effect) payment for capital invested. This would have a bear-ing on what salaries would have to be paid to managers to run the business, which would enable Mr and Mrs Alessandro to retire but to remain as shareholders. Also relevant would be the salaries they could earn elsewhere if they were to sell out of Aminta (Pty) Limited.

Furtherm re, it is not known whether they need to sell out at present and, for example, retire or whether they are quite happy to remain in the business for a number of years.

Any calculations must therefore be speculative. Some possible alternatives are as follows:

Retire or find employment elsewhere, but remain shareholders, appointing directors to run the business at total annual emoluments equal to those of Mr and Mrs Alessandro.

This would produce income of R790 000 × 105% in 20Y3, growing at 5% per annum. Discounted at 19,3%, this has a present value of:

$$\frac{R790\,000 \times 1,05}{0,193 - 0,05} = R5\,800\,700$$

There are many assumptions and problems behind this calculation, including –

a growth rate of 5% to perpetuity is again assumed;

the discount rate of 19,3% applies to a quoted company. This should possibly be raised to account for the lesser marketability of shares if the company remains private; and

Mr and Mrs Alessandro are unlikely to find employment elsewhere at their present salaries if the business is specialised; however, they may not wish to continue working, and retire instead, or, they may wish to use their time to develop a new business.

The company could become a public limited company with the aim of having the shares quoted by the stock exchange or introduced into the unlisted securities market. This would give the shares a marketable value more like the R6,38 million figure discussed in **(a)**, Approach A. There would, however, be significant costs incurred in the flotation.

The sale of some of the company assets. This is the rock-bottom alternative, and would raise R4 000 000.

Question 12–10 *(Intermediate)* *35 marks 52 minutes*

Doc Ltd, a manufacturer of patent medicines and personal hygiene products, was finding it expensive to promote this range of items through established retailers. It therefore, so e ten years ago, acquired a well-known chain of retail chemists and modernised its shops. This expansion enabled Doc Ltd to enter a new segment of the market.

Several of the company's directors now believe that this policy did contribute to increased sales, but that neglect of its traditional business allowed competitors to attack its own brands. This has led to a less than expected return on its operating capital.

In order to rectify this situation, it has now been proposed that Doc Ltd should enter into negotiations with Health Ltd, a family-controlled pharmaceutical supplier which imports unbranded drugs. Its premises are equipped as a warehouse and distribution centre.

Extracts from the annual returns are summarised as follows:

Abridged Statement of Income

	Doc Ltd		Health Ltd	
	20X1/X2	**20X2/X3**	**20X1/X2**	**20X2/X3**
	R'000	**R'000**	**R'000**	**R'000**
Sales	200 854	230 985	62 400	63 835
Cost of sales	158 343	178 568	44 050	43 768
	42 511	52 417	18 350	20 067
Interest (net)	4 779	5 238	1 250	1 100
	37 732	47 179	17 100	18 967
Taxation	10 320	13 210	5 472	5 690
	27 412	33 969	11 628	13 277
Dividends	14 835	15 000	9 800	10 700
Retained	12 577	18 969	1 828	2 577

Abridged Statement of Financial Position

	Doc Ltd		Health Ltd	
	20X1/X2	**20X2/X3**	**20X1/X2**	**20X2/X3**
	R'000	**R'000**	**R'000**	**R'000**
Issued shares	100 000	100 000	100 000	100 000
Share premium	25 110	25 110	3 000	3 000
Retained profit	80 217	99 186	2 750	5 327
	205 327	224 296	105 750	108 327
Loan capital	28 000	28 000	8 500	9 000
	233 327	252 296	114 250	117 327

Over the last three months, the ordinary shares in the two companies have been traded within the following price ranges:

Doc Ltd	(25 cent par value share)	237 to 251 cents
Health Ltd	(R1,00 par value share)	180 to 195 cents

30% of Health Ltd's shares are in the hands of financial institutions; 15% are owned in small lots, and the remaining shares are in trust for various members of the founder's family. Many of the trust's beneficiaries have made it known that they would press for a reasonable bid to be accepted.

Required:

Advise Doc Ltd's directors whether a merger with Health Ltd would be to the advantage of Doc Ltd's shareholders. **(*10 marks*)**

Calculate the highest and lowest bid price for Health Ltd between which Doc Ltd can negotiate, and recommend an appropriate bid price that, in addition to being satisfactory to the trust's beneficiaries, would also be of interest to the financial institutions. **(*13 marks*)**

Discuss the reasons why a company with a high P/E ratio believes that it can increase its share value by simply acquiring a similar company with a lower P/E ratio. **(*12 marks*)**

Solution:

(a) In advising Doc Ltd's directors about the benefits of a erger with Health Ltd, a number of factors need to be considered:

The most apparent one is that of the price to be paid for Health Ltd. There have been a number of reputable empirical studies which indicate that mergers are not financially worthwhile for the acquiring company; therefore the price assumes even more importance. As Doc Ltd is intending to enter into negotiations with Health Ltd, there is a possibility that a merger that is recommended by Health Ltd's board may result, and this is likely to prove cheaper than a contested bid.

It is noticeable that Doc Ltd, both ten years ago and now, has sought the answer to its difficulties by pursuing a policy of external acquisition. Such a policy has its attractions, for example it offers the prospect of rapid growth, but it also has inherent difficulties, such as the absorption of an 'alien' organisation.

Given that some of Doc Ltd's directors have questioned the success of the previous acquisition, it may prove instructive to carry out a post-audit on that acquisition, and to try to relate that experience to the proposed acquisition of Health Ltd (this procedure may have already been carried out if Doc Ltd has an established corporate planning function).

Other benefits may arise incidental to the main purpose of the acquisition, for example Health Ltd may have under-exploit d brands or assets (such as land). Doc Ltd may be in a position, because of its greater financial resourc s, to xploit these assets.

It may be thought that, as Doc Ltd and Health Ltd distribute related products, there is an opportunity for some operating synergies. In reality, such operating synergies are difficult to realise, although financing synergy is mo e likely.

It is difficult to be prescriptive about the potential benefits which should be apparent to Doc Ltd's board; b t it m st weigh these against the potential disadvantages.

A consideration of the financial data may be useful in establishing some parameters for the bid price.

A traditi nal yardstick in such a situation is to calculate the P/E ratio, as this reveals the market's capitalisati n f the company's earnings at a specific point in time. In order to simplify the analysis, it is assumed that both Doc Ltd's and Health Ltd's earnings are of the same risk class.

		Doc Ltd	**Health Ltd**
Earnings after interest and tax: 20X2/3		R33 969	R13 277
Number of shares		400 000	100 000
Earnings per share		8,5c	13,3c
		251c	180c
		8,5	13,3
	P/E =	29,5	13,5

Thus, one parameter could be established: if Health Ltd's earnings stream were to be incorporated within Doc Ltd's and if Doc Ltd's P/E ratio were maintained, this would imply a price per Health Ltd share in the region of 13,3c × 29,5 = 292c.

In reality, an efficient market is unlikely to apply Doc Ltd's capitalisation rate to Health Ltd's earnings, simply because the legal entities have merged.

However, the disparity in rating between the two companies implied by the respective P/E ratios may have arisen because of the nature of Health Ltd's ownership. Currently, control resides with the trust, which owns 55% of the equity. The remaining 45% is not a coherent bloc. It is possible that, in the past, Health Ltd may have followed policies which suited the beneficiaries of the trust, but were not in sympathy with market sentiment. If Health Ltd became part of Doc Ltd and market oriented policies were followed, the value of each share would rise accordingly.

An 'appropriate bid price' would seem to lie between the current 180c to 195c and an upper limit of R3,72. If further information were available, then a realisation or 'break-up' value per share could be calculated, and this could provide a new floor value. This value is likely to differ from the value revealed by the current statement of financial position.

A final consideration that will influence the price Doc Ltd is willing to pay is the value of Health Ltd's potential and assets not revealed in its accounts, for example the value of Health Ltd's brands (if any), scope for expansion offered by the merger, any operational econo ies arising from the merger.

Where two comparatively identical companies exist, the P/E ratio should be identical for both companies. However, if one of the companies has a higher P/E ratio, the resultant higher stock market value could be due to its perceived higher growth potential.

The acquiring company with the higher P/E ratio (Doc Ltd in this instance) will negotiate the purchase price at the current market value of the company being acquired (Health Ltd).

Where settlement is effected by means of a share issue, the resultant total shares and total earnings will be such that the new earnings per share will be higher than the previous earnings per share. Since the price of a share is related to the earnings per share, if the P/E ratio and the earnings are known, then price equals P/E ratio multiplied by earnings.

If the market believes that the management of the purchasing company will use its abilities to achieve a similar growth rate on the assets of the purchased company as it has on its own assets, then the market would keep the same P/E ratio, which will result in a higher value per share.

One could argue that the market value of the combined firm is the sum of the values of the separate companies before the merger, and that the result of the merger will be to lower the P/E ratio of the new company in comparison to the P/E ratio of the purchasing company.

In practice, the stock market tends to attach a higher P/E ratio to the company after the acquisition than would be expected from the above logical analysis, as investors tend to have optimistic expectations after a merger (they hope conomies of scale or improved management will lead to improved performance.

Chapter 13

Financial distress

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –
calculate the realisable value of an enterprise; design a reorganisation scheme; determine the capital requirements in order to effect a turn-around; determine the capital contributions of different parti s; calculate the cost of bankruptcy; calculate the rehabilitated value of an enterprise; do the liquidation accounting entries; calculate a crossholding; understand the winding up of a company; and calculate the profit or loss on a liquidation.

The biggest risk that any company may face is that it will fail financially. If such a failure is terminal and the company cannot be rescued then ity will be declared insolvent and will face liquidation. If the financial condition is not terminal it means that it is possible to rescue the company if it receives the correct remedies from competent experts.

13.1 Companies Act 71 of 2008

The previous Compani s Act 61 of 1973 made provision for judicial management to save companies in financial distress from being wound-up. This approach had major drawbacks though, which necessitated an overhaul of the system. For instan e, ex ept where the directors may have been held personally liable as a result of breach of sections of the Companies Act (and presuming they were able to make adequate restitution in any case), employees and c edito s had no choice but to wait in line for their proportionate share of whatever could have been realised by the judicial manager, leading in turn to great dissatisfaction and often no incentive to work towards the b siness being rescued.

The new Companies Act 71 of 2008 now makes provision for two possibilities (see diagram below) when a company finds itself in a position of business failure:



Figure 13.1: Business failing financially

The following sections of the Companies Act 71 of 2008 are particularly important when considering possible business failure:

Companies Act 71 Chapter	**Topic**
Chapter 1 (section 4)	Relates to the solvency and liquidity test. This now has wider application than the previous Companies Act.
Chapter 2 (sections 44-47)	Matters such as financial assistance, loans or other financial assistance to directors and related and inter-related companies, distribution to shareholders, the offering of a capitalisation, shares and share buy-backs or buy-ins.
Chapter 5 (section 113)	Amalgamations or mergers.
Chapter 6	Business rescue and compromises with creditors.
Chapter 12	Liquidation.

In the following section we will look in more detail into the principles for business rescue as set out in Chapter 6 of the Companies Act.

13.1.1 Business Rescue

Chapter 6 of the Companies Act deals with the following matters and is divided into five parts:

Part A	Company resolutions to enter into business rescue proceedings, and effects on employees, shareholders and directors of business rescue operations.
Part B	Appointment and functions of a business rescue practitioner.
Part C	The rights of affected persons during business rescue proceedings.
Part D	The development and approval of the business rescue plan.
Part E	The compromise between the company and its creditors.

What is financial distress?

In order for a business rescue to be implemented, the particular company must be financially distressed, which means that it is reasonably unlikely to pay all of its debts as they fall due and payable or that it is likely to become insolvent within the ensuing six months.

Meaning of business rescue

A business rescue can be described as the proceedings to rehabilitate a company that is financially distressed by providing for the temporary suspension of the company's management of its own affairs, business and property. This implies a temporary moratorium on the rights of claimants and the development and implementation of a plan to rescue the company by *restructuring* its affairs in a manner that maximises the likelihood of the company continuing on a solvent basis and if not possible the liquidation of the company. The intention of

the moratorium is to give the company the best chance to implement its plan and to allow the company sufficient time to restructure its affairs and particularly its liabilities, so as to enable it to return to a sustainable solvent position and to continue as a going concern.

Once a business rescue order is obtained a temporary moratorium for application for liquidation takes

effect. The figure below sets out the role-players in the business rescue process:

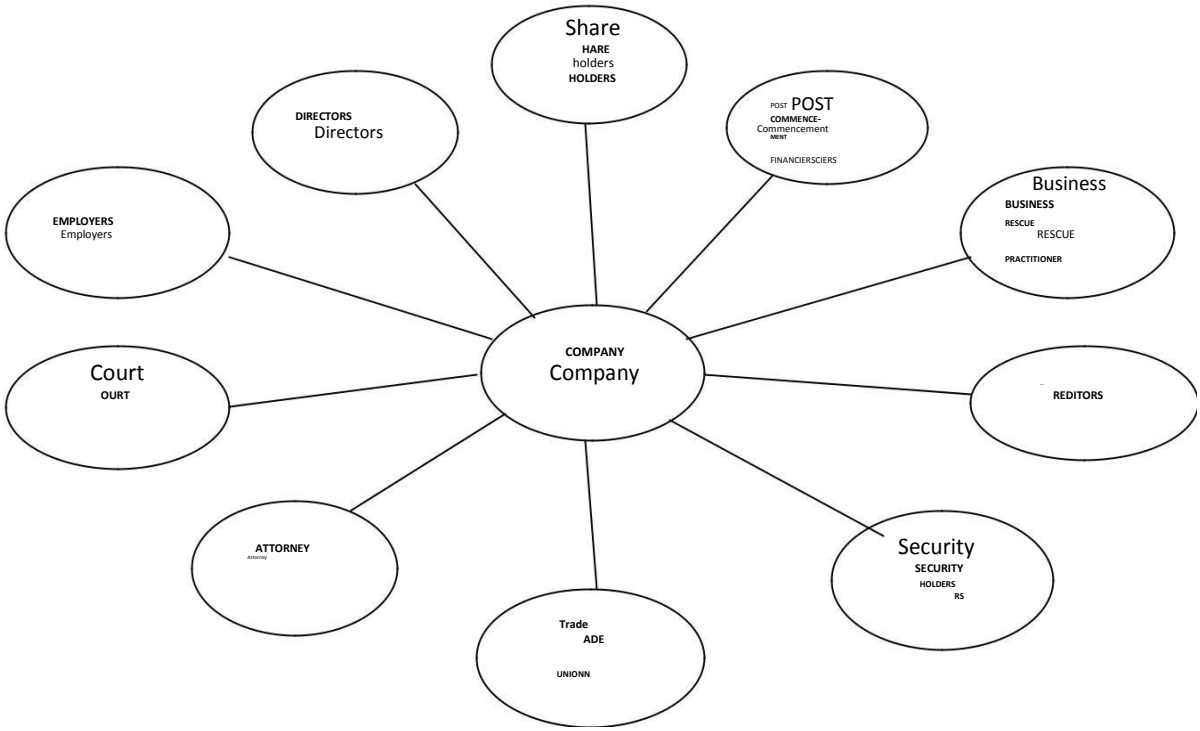


Figure 13.2: Role-players in Business Rescue

Summary of the process

The company through a board resolution or an affected person or through a court order can apply for a business rescue. A rescue practitioner is then appointed who:

takes control of the books and records of the undertaking;

receives a statement of affairs from the directors;

- arranges a first m ting of creditors;

prepares and publishes the Business Rescue Plan; and

arranges a meeting to onsider and vote on the Business Rescue Plan presented at the meeting.

The approved plan then has to be implemented.

Business Resc e Plan Layout

The business resc e plan must contain all the information reasonably required to facilitate affected persons in deciding whether or not to accept or reject the plan, and must be divided into three main parts, as follows:

Part A – Background

Part B – Proposals

Part C – Assumptions and conditions

C se Study: Actual Business Rescue of a Medicine Manufacturing Company

Background

The company was established in 1998. Its core business was to provide total healthcare support solutions (medical, surgical, dental and pharmaceutical products) to the public and private healthcare sectors in South

Africa and SADC countries. During the latter part of 2011 severe cash flow difficulties forced the company to consider the options of liquidating or restructuring its business activities. On 24 February 2012, the company filed a notice to commence a Business Rescue in terms of section 129 of the Companies Act. On 1 March 2012. **Piers Marsden** , an Executive Director at **Matuson and Associates**, was appointed as the Business Rescue Practitioner of the company. At a meeting of creditors on 12 March 2012, the practitioner presented initial findings in support of his expressed opinion, ie that there was a reasonable prospect of a Business Rescue being successful. The company had the added benefit that the shareholders also owned the building from which it was trading at that stage.

Reasons for distress:

Debt administration and trade

– Non-profitable agencies that were financially supported through the supply of inventory on credit, promotional material, helpline services, etc, but the income kept l gging behind the expenses.
– Deterioration of government debt repayments.

This resulted in up to 50% of debtors' books being in arrears for more than 120 days.

Production

Legal requirements regarding good manufacturing practice (GMP) . In order to comply with GMP the manufacturing facility had to be closed down for refurbish ent. The factory was closed during September 2011 with the expectation to be back on-line in June 2012.

Management

Top management did not anticipate the result of not impl menting adequate financial controls. Shareholders took corrective action by appointing a n w managing and financial director to manage the company going forward.

Immediate actions taken by the Business Rescue Practitioner:

Organising Preferential Capital Funds (PCF)

It was evident that without PCF, the company would not be able to continue trading and would ultimately face liquidation. The following PCF was secured:

– Bank funding: In addition to retaining the current overdraft facility, an additional funding line was arranged with the company's bankers, First National Bank.
– Supplier funding: Agreements were reached with certain suppliers to continue supplying the company with raw materials, capital equipment and services which were considered critical to ongoing trading. Payment terms were agreed depending on the type of supply and the suppliers' own circumstances. Smaller suppliers were given the benefit of being paid on delivery.
– Shareholder funding: Shareholders' loans were subordinated and partially converted to equity, there-by reinforcing the statement of financial position. Shareholders also agreed to forego rental and management f s ov r the BR period.

Organising Working Capital Funding

The Industrial Development Corporation (IDC) was approached to provide the company with working capital finance in o der to keep daily operations going. The process was as follows:

– After submission of the application a due diligence process was requested which turned out to be nq alified and the application was then presented to the credit committee of the IDC for final approval.
– The ab ve process resulted in delays in the Business Rescue time-line and the Business Rescue Practi-ti ner submitted an application for an extension for the publishing of the plan by 35 days, which was granted.
– The IDC required the latest set of audited financial statements before final approval of the application could be considered. The financial statements reflected a qualified opinion and included an emphasis of matter as a result of the existence of material uncertainty which has cast significant doubt on the company's ability to continue as a going concern.
– The Business Rescue Practitioner was now confronted with the question of how to get around this situation.

Business Rescue Plan:

The Plan

	Business Rescue	**Liquidation**
Employees	The negative impact of the plan on employees is limited to a possible retrenchment of 25 people who will receive full retrenchment packages.	In a liquidation, 146 people will lose their jobs and would receive the preferential portion of approximately R28 000, significantly less than what would be received in business rescue.
Suppliers	Suppliers would continue to service the company, and would prosper with the growth of the company.	The services of 174 suppliers will be termin ted, with ten suppliers facing possible business f ilures as a result of losing their major customer.
South African Healthcare and Opportunities	The company will quickly resume the supply of essential healthcare products to the public sector, thereby limiting the negative impact on patient care. Furthermore, should the company continue to trade, there are a nu ber of exciting opportunities in the immediate future, particularly in the manufacturing sector given its compliance with GMP.	The closure of local manufacturing facilities will l wer the barriers to entry for foreign players in the local pharmaceutical market and will give them an opportunity to further entrench themselves in the local economy. Increased pricing by foreign co petitors with high cost bases will be detrimental to the affordability of general healthcare for South Africans.
Dividend to Concurrent Creditors	Business rescue will enable creditors to realise 50% of their debt.	A liquidation of the company would result in concurrent creditors receiving virtually zero returns.

Initiation

Interested parties notified that the moratorium was activated and operational.

Concurrent creditors (also referred to as unsecured creditors, for example trade creditors)

– Calculations based on the scenario that the company would be liquidated indicated that a 50% reduc-tion in their debt would be a fair assumption.

– The creditors agreed to this write off and also the remaining balance of 50% to be repaid over a three-year period.

Secured creditors (for example, banks who have securities against the loan)

– For the period of Business Rescue, the bank agreed to retain its current overdraft exposure with no fixed repaym nt t rms.

Statement of financial position

– Restoring solven y and liquidity (see section 4 of the Companies Act).

– Conve ting sho t-term obligations to long-term debt in order to spread the repayments and improve sho t-te m cash flow.

B siness initiatives

– Foc sing the marketing drive on the more profitable and cash-flush private sector.

– Reducing the dependency on government business.

– Changing the way the company does business with government (i.e. managing the debtors' book in terms of account limits and terms of repayment).

– Diversifying into export markets.

– Improving efficiencies and reducing the cost base.

– Restructuring the workforce without unnecessarily reducing the number of workers.

– Managing working capital in terms of stock turnover, debt settlement and debt collection.

Operational initiatives

– Ensuring that the new facility is approved by the Medicines Control Council and opened for produc-tion on the planned date.

– Closing down of non-profitable agencies and restructuring relationships with profitable agencies where possible in order to ensure sustainable future profitability.

Abridged Statement of Financial Position

	Before	Dr	Cr	Dr	Cr	After
	R'm	R'm	R'm	R'm	R'm	R'm
Non-current assets	90					90
Current assets	48,8	10		5		63,8
	138,8					153,8
Equity	(8,6)		15,4		19,8	26,6
Shareholder's loans	29,8	19,8				10
Other long-term debt	57,2		10			67,2
Concurrent creditors	30,8	15,4				15,4
Other preferential creditors	29,6		5			34,6
	138,8					153,8

Adjustments

- IDC loan (R10m) and FNB (R5m) — R15 million r ceived and reflected under current assets
- Concurrent creditors' reduction — R15,4 million written off against equity
- Shareholder loan — 19,8 million converted into equity

Results

The writing off of 50% of the concurrent creditors' debt reduced current liabilities by R15,4 million, thus greatly improving the company's liquidity position and enabling the restructuring to continue. It was written off against equity, thus improving solvency.

Loan finances of R10 million from the IDC and R5 million from FNB increased current assets by R15 million, other long-term debt by 10 million and current liabilities (other preferential creditors) by R5 million.

Solvency of the group improved by R35,2 million.

13.2 Reorganisations (business rescue proceedings)

There are normally two r asons why a company will consider reorganisation.

Scenario A:

A company may find itself in a position where it has been operating at a loss over a period of time, but the operating and manage ial factors responsible for the losses no longer exist. With the factors that had a negative infl ence on its b siness out of the way, the company could be profitable in future. The problem is that by this time the financial resources of the company would have been eroded to the point where it can no longer continue to operate effectively. The company could be technically insolvent. The danger is that if concrete steps are n t taken to pay debts owed and dividends are not declared soon, the company could be forced into liquidati n.

Scenario B:

A company may be profitable and growing but may have reached the stage where it has insufficient capital avai ab e to finance capital expansion and/or working capital requirements to accommodate its growth.

In both the scenarios described above, some sort of reorganisation is needed to get the company onto a sound fin ncial footing. The focus of this section will be on scenario A as we are dealing with companies that are in financial distress.

When a reorganisation scheme is implemented, the control of the company usually remains in the hands of the present controlling members of the company. The changes effected by the scheme usually relate to existing:

shareholders;

long-term credit suppliers;

bondholders;

debenture holders;

short-term credit suppliers; and

other stakeholders, i.e. employees, etc.

13.2.1 Conditions for a reorganisation scheme

It is of the utmost importance that it be determined whether the business entity concerned is able to begin operating profitably immediately after a reorganisation scheme is undertaken. Before implementing such a scheme a pre-assessment should be done. The reorganisation scheme sh uld not merely postpone the inevitable liquidation of the company but should be the reason why the c mpany will be profitable in the future.

In essence, a reorganisation involves the scaling down of clai s against the company that is being reorganised. Prerequisites for scaling down are:

the process must be fair to all parties concerned; and

the reorganisation process must be financially f asible.

Financial decisions

If a company is failing, a decision must be made whether to liquidate it or to keep it active through a business rescue scheme (reorganisation) . This decision depends on the value of the firm if it is rehabilitated (reorganised) versus the value realised if it is liquidated.

Determination of the liquidation value

The liquidation value depends on the realisable values of the assets to be sold as well as liquidation costs such as legal costs, administrative expenses, liquidator's fees, accounting fees and business rescue practitioner's fees.

A reorganisation scheme also involves some additional expenses. Normally, there might be capital expenditure (to upgrade existing plant and machinery or technology), obsolete inventory must be disposed of and replenished where necessary, and the quality of management must be evaluated and if necessary changed if it feasible to do so.

In determining the final value of the company to be reorganised, the following elements should be considered and valued:

The value of the ompany if it was totally financed by means of own capital

Net P esent Value (NPV) of the assessed loss of the company

P esent Value (PV) benefits that are derived from outside funding

Q antified PV benefits of managerial changes

Q antified PV benefits of changes in strategies, policies and structures of the company

– PV f bankruptcy costs irrespective of the value of the company

One hould also evaluate the expected increase in income and possible dividends the reorganisation scheme would generate for the shareholders of the company if successfully implemented. If the outcome is negative the possibility of liquidating the company should be seriously considered. If positive the rescue of the company is feasib e.

C pit l requirements

Enough working capital must be accessed and generated by the scheme to put the company on a sound and liquid footing. This is necessary because historical losses would have created illiquidity in the company.

Facts to be borne in mind when considering capital requirements are:

enough cash should be generated to finance inventory and debtors at higher levels of sales;

long-term assets should **not** be financed by short-term credit;

enough cash should be provided for in order to pay dividends as soon as possible after profits are generated;

current and acid-test ratios should be at the same level as that of the industry in which the company is operating; and

assets in excess of the needs of the company should be sold in order to e iminate unused capital and capacity.

Capital contribution

Besides outside funding, other sources of capital could be the sale of redundant or surplus assets and the raising of new share capital. It is desirable that new share issues should as far as possible be limited to the existing shareholders in order to protect the control of the principal shareh lders.

It is important to note that an existing shareholder would only accept a re rganisation proposal and commit further funds to the company in distress if the NPV of future expected dividends and market value added exceeds the expected liquidation dividends and additional cash invest ent required of them.

Example: Revised capital structure or liquidation *(Int rm diate)*

Mr Alberts owns 10 000 ordinary shares of R2 each in A Ltd. He has been called upon to accept a proposal whereby his share capital will be reduced to 10 000 ordinary shares of R1 each and to take up an additional 10 000 ordinary shares of R1 each. The liquidation dividend, if the liquidation is enforced, will amount to a once off, 70c per share. If the reorganisation proposal is accepted by interested parties the effect will be as follows:

New capital structure

– 1 000 000 ordinary shares of R1 each
– 100 000 10% preference shares of R1 each

A market value per share of:

– 258c (after 10 years)
– 454c (after 20 years)

An annual dividend of 7c per share

Mr Alberts considers 15% to be a fair return on any investment he makes. He can at present invest his cash resources on a fixed deposit for 10 years at 16% per annum at PSA Bank.

Solution:

Value of the company if the ompany is reorganised:

	Cash flow R	Factor @ 15%	NPV R
Reorganisation offer accepted			
Liq idation dividend forfeited (10 000 × 70c)	(7 000)	1,000	(7 000)
Additi nal shares purchased at R1 each	(10 000)	1,000	(10 000)
Expected income (for 10 years) (20 000 × 7c) [dividends]	1 400	5,019	7 027
Shares sold (after 10 years) (20 000 × 258c)	51 600	0,247	12 745
Po itive cash inflow			2 772

Value of the company if it is liquidated:

	Cash flow R	Factor @ 15%	NPV R
Liquidation			
Liquidation dividend (10 000 × 70c)	(7 000)	1,000	(7 000)
Fixed deposit at PSA Bank [if does not take up the shares]	(10 000)	1,000	(10 000)
Expected income (for 10 years) (R17 000 × 16%)	2 720	5,019	13 652
Capital refund (after 10 years)	17 000	0,247	4 199
Positive cash inflow			851

Comparison in value:

Value if company is reorganised	R2 772
Value if company is liquidated:	R851
Difference in value (positive)	**R1 921**

Other matters to consider when making the decision:

In addition to the above financial assessment, Mr Alberts should consider the additional risks involved in a company engaged in trade activities versus a relative risk-free invest ent in PSA bank.

Statement of financial position adjustments

Statement of financial position entries where the amounts are not realistically reflected at carrying amount should be revalued. Accumulated losses should be written off against capital or reserves. This will enable the company to start declaring dividends as soon as profits are made. The same applies to intangible or fictitious assets, such as goodwill, that serve no purpose under the prevailing circumstances. This will also give recognition to the fact that capital has been lost because of the losses incurred.

The resultant financial picture of the company's statement of financial position should reflect a going concern on a sound financial footing. This will enhance ratio analysis calculations and ensure that future results are not negatively evaluated or influenced by poor historic results.

Cost of bankruptcy:

The **direct costs** of a bankruptcy consists of legal fees, accounting fees, business rescue practitioner's fees, liquidation fees and administrative expenses. There are many parties involved in the process of bankruptcy, all of whom charges fees at professional rates and this could add up to a significant amount.

The **indirect costs** could r ach v n greater proportions. Generally, these are the opportunity costs imposed on the company because financial distress changes the way a business operates. Factors contributing to these costs are:

- the company loses the right to make certain decisions without specific approval from the court or other outside inte ested parties;
- customers of the company are scared off because they do not know for how long the company will still be a reliable s pplier of goods and services;
- the uncertainty motivates competent and valued employees to leave the service of the company as soon as ther g d employment opportunities arise;
- suppliers to the company start dealing on a strict COD basis, which strains the cash flow position of the company even more;
- management becomes so involved in managing the financial distress problem that their normal duties are adversely affected; and
- the negative effects on the businesses of suppliers and customers could even force some of them into financial distress.

Studies have shown that the total direct and indirect bankruptcy costs of a company could be in the order of 20% to 25% of the net worth of a company that files for bankruptcy.

13.2.2 Structure of a reorganisation scheme

Capital lost

This amount is determined by considering and quantifying the following items:

accumulated losses;

deferred expenses;

goodwill;

any costs in connection with the implementation of the reorganisation scheme;

preliminary expenses; and

amounts by which assets are over-valued.

Sharing in lost capital

It should always be borne in mind that the alternative to a re rganisati n is to liquidate the company. The parties standing to lose if a company is liquidated should be willing to carry some of the losses in a reorganisation process if the loss distribution is fair.

Trade payables (creditors)

If they stand to lose part or all of their claims against the company if it were to become insolvent, then the creditors should also be willing to write off a similar amount in a r organisation effort.

Secured payables

The same applies to secured payables as to trade payables.

Preference shareholders

The main issue here would be whether any preference rights exist in respect of repayment of capital in the event of liquidation. If a preference right does exist, the right will be partly or totally lost. The preference shareholders should therefore be willing to write off an amount equal to the anticipated loss they would sustain under liquidation. If they have no preference rights they will have to share proportionally in the loss together with the ordinary shareholders. It might be necessary to adjust (increase) their preference dividend rate to ensure the same preference right to income which they had before the reorganisation scheme was implemented.

The preference shareholders' arrear preference dividends would, however, be lost.

Ordinary sharehold rs

In the final instance, ordinary shareholders' equity forms a cushion to absorb losses. The larger the ordinary shareholders' equity, the more creditors will be inclined to advance credit to the company.

Since the o dina y sha eholders are the ultimate risk takers they would be the biggest losers if the company were to be liquidated. They should therefore be willing to carry at least the same losses under a reorganisation effort.

Although they carry the biggest burden as far as write-offs and losses are concerned, it must be borne in mind that they will receive the biggest benefit if the company is rehabilitated. The alternative is that they will lose b th their future dividend and the capital invested in the equity.

Example: Revised statement of financial position *(Intermediate)*

The following is the statement of financial position of Msizi Ltd.

Msizi LTD
STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 20X3

	20X3 R'000
ASSETS	
Non-current assets	260
Property, plant and equipment	250
Goodwill	10
Current assets	165
Inventory	100
Trade receivables	65
	425
EQUITY AND LIABILITIES	
Total equity	260
Issued share capital	150
Retained earnings	110
Non-current liabilities	
Long-term borrowings	50
Current liabilities	115
Trade payables	100
Bank overdraft	15
	425

Additional information:

The current ratio of the company is 1,43:1, which is low in comparison to the rest of the industry it is trading in.

There is an immediate need for the purchase of inventory to the value of R100 000.

A bank is willing to advance the R100 000 if the company makes a capitalisation issue of R100 000 to its present shareholders.

Required:

Prepare the statement of financial position of Msizi Ltd after the capitalisation issue has been completed and the inventory pur hased.

Solution:

MSIZI LTD
STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 20X3

	20X3 R'000
ASSETS	
Non-current assets	260
Property, plant and equipment	250
Goodwill	10
Current assets	265
Inventory (100 + 100)	200
Trade receivables	65
	525
EQUITY AND LIABILITIES	
Total equity	260
Issued capital (150 + 100)	250
Retained earnings (110 – 100)	10
Non-current liabilities	
Long-term borrowings	50
Current liabilities	215
Trade payables	100
Bank overdraft (15 + 100)	115
	525

Comments:

The current ratio of Msizi Ltd has deteriorated from 1,43:1 to 1,23:1 because of the additional debt incurred. The reason why the bank was willing to advance funds under these circumstances is because an additional buffer capital of R100 000 was created. The creation of this buffer gives the bank greater security in that the directors can now only alienate 10 000 of the company's reserves in the form of dividends where previously they could have reduced the company's reserves by R110 000 leaving no buffer reserves. The solvency test must be applied before issuing capitalisation shares.

12.2.3 Accounting entries

The basic accounting ntri s are as follows:

All losses and fi titious assets are transferred to a reorganisation account.

Expenses and fees in onnection with the reorganisation scheme are posted directly to the reorganisation account.

The balance on the reorganisation account, if a loss, is transferred to the respective share capital ac-co nts and reserves. If for any reason a profit is made it should be transferred to a capital reserve fund.

Example: Revised statement of financial position *(Intermediate)*

The abridged statement of financial position of Amber Ltd is as follows:

	R'000
ASSETS	
Non-current assets	48 000
Current assets	40 000
Receivables	23 000
Inventory	17 000
Preliminary expenses	100
	88 100
EQUITY AND LIABILITIES	
Share capital	
Issued ordinary shares (100 million)	100 000
5% Preference shares (5 million)	5 000
Non-distributable reserves	100
Accumulated loss	(50 000)
Current liabilities	33 000
Bank overdraft	18 000
Creditors	15 000
	88 100

Additional information:

It is estimated that if at least R34 million cash could be found to restructure the company it could produce estimated profits of between R25 and R40 million per annum in future.

Preference shares have preferential rights in respect of dividends and capital. Dividends have been in arrears for three years.

Preference shareholders are willing to forfeit their preference dividends, and to convert 50% of their capital into ordinary shares of R0,50 each, and the balance into 10% preference shares of R0,50 each. They will also take up five million new preference shares at R0,50 each for cash.

Ordinary shareholders are willing to write off 51% of their shares off. They will also inject cash into the company by taking up 100 million shares at a share price of R0,51.

Reorganisation expenses will amount to R1 million.

All other values on the Statement of Financial Position are fair.

Required:

Draw up the statement of financial position after the reorganisation has taken place.

Solution:

Reorganisation account

	R'000		R'000
Accumulated loss	50 000	Ordinary share capital	51 000
Preliminary expenses	100	Capital reserve	100
Reorganisation expenses	1 000		
	51 100		51 100

Old ordinary share capital

Reorganisation account	51 000	Opening Balance	100 000
New ordinary shares	49 000		
	100 000		100 000

New ordinary share capital (R0,50)

		R'000			R'000
Balance	c/f	102 500	Bank		51 000
			Old ordinary shares		49 000
			Old preference shares		2 500
		102 500			102 500
			Balance	b/f	102 500

5% Old preference share capital (R1,00)

New ordinary shares		2 500	Opening Bal nce		5 000
New preference shares		2 500			
		5 000			5 000

10% New preference share capital (R0,50)

Balance	c/f	5 000	Old preference shares		2 500
			Bank		2 500
		5 000			5 000
			Balance	b/d	5 000

Bank

New preference shares		2 500	Balance		18 000
New ordinary shares		51 000	Expenses		1 000
			Balance		34 500
		53 500			53 500
Balance		34 500			

STATEMENT OF FINANCIAL POSITION AFTER THE REORGANISATION

	R'000
Fixed assets	48 000
Current assets	74 500
Bank	34 500
Debtors	23 000
Inventory	17 000
	122 500
Share capital	
Ordinary sha e capital	102 500
Preference share capital	5 000
Current liabilities payables	15 000
	122 500

Bu ine trategy

When a company finds itself in a situation where it is financially distressed and needs to reorganise to rescue itself from liquidation, the business strategy must be revisited. This will require considering both the short and long term business strategy. The business rescue plan discussed earlier in this chapter will link directly to the short term strategy whereas the long term strategy will focus on long term sustainability and to prevent any further financial difficulties in the future.

13.3 Liquidations

The liquidation of a company is the process of terminating the existence of that company. At the inception of the liquidation process a liquidator is appointed to oversee the liquidation process. This liquidator is also responsible for the distribution and transfer of the residual value of the company being liquidated to interested parties. This section focuses on the winding up of solvent companies specifically because of its relevance to mergers.

13.3.1 Types of liquidations

Voluntary

A voluntary liquidation of a company may be instituted by either:

the company

the creditors of the company, or

by court order.

Chapter 2 of the Companies Act, sections 79–83, deals with the voluntary winding-up of a solvent company.

Absorptions and amalgamations (mergers)

Where the winding up of a company is activated because of a merger having taken place, there are two possible methods of transferring or selling assets, i.e. eith r by cash and/or shares. The liquidator sells the assets to the acquiring company for cash and/or shares as stipulat d in the agreement of sale.

13.3.2 Rights of shareholders

The rights of each class of ordinary shareholder, preference shareholder, and trade payables must be investigated and properly dealt with in the liquidation process.

The Memorandum of Incorporation

This document provides the details of the rights of each class of shares of the company.

Common law

If the sales agreement or articles make no reference to the under-mentioned items, common law principles are applicable.

Preference shares have no preference rights as far as capital is concerned. This means that preference shareholders will *pari passu* (ie side by side) bear any loss incurred during the liquidation together with ordinary shareholders.

If preference shares had vested rights in respect of the protection of their capital, they would only become liable to cont ibute towa ds any loss after the entire ordinary share capital had been absorbed by the loss.

Loss upon liq idation

Example: Final distribution *(Intermediate)*

Li n Ltd was liquidated at 28 February 20X1. At that date, before the distribution had taken place, the trial balance was as f llows:

	Dr R	Cr R
20 000 Ordinary share capital		20 000
20 000 10% Preference share capital		20 000
Liquidation loss	30 000	
Cash on hand	10 000	
	40 000	40 000

Required:

Calculate the final distribution of cash between ordinary and preference shareholders if:

no special rights were attached to preference shares; and

preference shares had a preference right regarding the repayment of capital.

Solution:

(i)	**Ordinary shareho ders R**	**Preference shareholders R**
Balance at 28/2/20X1	20 000	20 000
Loss (50:50)	(15 000)	(15 000)
	5 000	5 000
Cash distribution	(5 000)	(5 000)
	–	–

(ii)	**Ordinary shareholders R**	**Preference shareholders R**
Balance at 28/2/20X1	20 000	20 000
Loss (100:0)	(30 000)	–
	(10 000)	20 000
Transfer of balance of loss to preference shareholders	10 000	(10 000)
	–	10 000
Cash distribution	–	(10 000)
	–	–

Profit upon liquidation

If a profit was realised upon the liquidation of a company, the profit will be to the benefit of ordinary shareholders.

Preference dividends

In the absence of a specific indication to the opposite effect, dividends payable to preference shareholders are cumulative. Arrear dividends do not constitute a claim against a company in liquidation unless such dividends have already been d clar d.

13.3.3 Accounting entries

These accounting ent ies are mainly applicable in a situation where an absorption or amalgamation has been undertaken and the liquidation of a company is imminent.

Transfer all assets and liabilities to be taken over to the liquidation account.

All reserves are transferred to the liquidation account. It is sometimes reasoned that reserves could be directly credited to ordinary shareholders as they represent the profits of ordinary shareholders that have n t been distributed to them. This reasoning is valid if the company has no preference shareholders without preference rights regarding their capital, as a resulting loss because of the reserves not being credited to the liquidation account will be to their detriment. This is so because the liquidation account does not reflect the real loss of the liquidation process.

Any pure provision, for instance a provision for bad debt, must be transferred back to its corresponding sset before the asset is transferred to the liquidation account.

Any liquidation costs paid should be directly posted from the cash book into the liquidation account.

Fictitious assets which include accumulated losses and preliminary expenses must also be transferred to the liquidation account.

The liquidation account is credited with the purchase price as reflected in the sales agreement and the purchaser is debited.

The balance in the liquidation account will reflect the profit or loss on liquidation. Transfer this profit to the sundry shareholders' accounts on the basis of the articles of the company, the sales agreement or common law principles.

The receipts from the purchase are debited against the bank or shares receivable accounts and credited to the purchaser's account.

Pay debt not taken over by the purchaser.

Distribute the balance of cash and shares received to sundry shareho ders' accounts in order to close off the books of the company.

Example: Liquidation account *(Intermediate)*

The statement of financial position of Lion Ltd at 28 February 20X1 is as follows:

	R
Assets	
Non-current assets	30 000
Net current assets	56 000
Preliminary expenses	3 000
	89 000
Equity	
Ordinary share capital (30 000 issued shares)	34 000
Preference share capital (5 000 issued shares)	5 000
Retained earnings	50 000
	89 000

Lion Ltd received an offer of R100 000 from Amber Ltd for the business of the company, which they accepted. Liquidation costs amounted to R5 000.

Required:

Draw up the liquidation account, shareholders' accounts, bank account and the purchaser's account

for a cash offer of R100 000; and

for a cash offer of R50 000 and 50 000 R1 ordinary shares in Amber Ltd for the balance.

Solution:

(i)

Liquidation account

	R		R
Liq idation costs	5 000	Retained earnings	50 000
Fixed assets	30 000	Purchaser	100 000
Net c rrent assets	56 000		
Preliminary expenses	3 000		
	94 000		150 000
Profit to ordinary shareholders	56 000		
	150 000		150 000

Ordinary shareholders

	R		R
Bank	90 000	Balance (Shares)	34 000
		Liquidation account (Profit)	56 000
	90 000		90 000

Preference shareholders

	R		R
Bank	5 000	Balance (Shares)	5 000

Bank

	R		R
Purchaser A Ltd	100 000	Liquidation costs	5 000
		Preference shareholders	5 000
		Ordinary shareholders	90 000
	100 000		100 000

Purchaser (A Ltd)

	R		R
Liquidation account	100 000	Bank	100 000

(ii)

Liquidation account

	R		R
Liquidation costs	5 000	Retained earnings	50 000
Fixed assets	30 000	Purchaser	100 000
Net current assets	56 000		
Preliminary expenses	3 000		
	94 000		150 000
Profit to ordinary shareholders	56 000		
	150 000		150 000

Ordinary shareholders

	R		R
Bank	40 000	Balance	34 000
Share a ount A Ltd	50 000	Liquidation account (Profit)	56 000
	90 000		90 000

Preference shareholders

	R		R
Bank	5 000	Balance	5 000

Bank

	R		R
A Ltd	50 000	Liquidation costs	5 000
		Preference shareholders	5 000
		Ordinary shareholders	40 000
	50 000		50 000

Share account (A Ltd)

	R		R
Purchasers (50 000 ordinary shares)	50 000	Ordinary shareholders	50 000

Purchaser

	R		R
Liquidation account	100 000	Bank	50 000
		Share account	50 000

13.3.4 Simultaneous liquidation of crossholding companies (Ad anced)

A problem may arise where companies have shares in each other (crossholding) and are liquidated at the same time (simultaneous liquidation). The reason for this is that the liquidati n values of the two companies are interdependent. The problem can be solved by drawing up two equati ns and solving them simultaneously.

Example: Liquidation dividend

The trial balances of A Ltd and B Ltd are as follows:

	A Ltd R	B Ltd R
Fixed assets	14 000	8 000
Other investments:		
– 2 000 shares in B Ltd	2 000	
– 1 000 shares in A Ltd		1 000
	16 000	9 000
Share capital		
– Shares (10 000)	10 000	
– Shares (5 000)		5 000
Retained earnings	6 000	4 000
	16 000	9 000

Both the companies are liquidated at the same date. The value of the fixed assets of both companies is considered to be fair.

Required:

Calculate the amounts payable as a liquidation dividend to the shareholders of both companies.

Solution:

(i) Value of:

$$\text{A Ltd} = \text{R14 000} + \left[\frac{2\,000}{5\,000} \times \text{B Ltd}\right]$$

$$\text{B Ltd} = \text{R8 000} + \left[\frac{1\,000}{10\,000} \times \text{A Ltd}\right]$$

$$\text{A} = \text{R14 000} + {}^{2}/_{5}\,\text{B}$$

$$\text{B} = \text{R8 000} + {}^{1}/_{10}\,\text{A}$$

$$\text{A} = \text{R14 000} + {}^{2}/_{5}\,(\text{R8 000} + {}^{1}/_{10}\,\text{A})$$

$$\text{A} = \text{R14 000} + \text{R3 200} + {}^{2}/_{50}\,\text{A}$$

$$\text{A} - {}^{2}/_{50}\,\text{A} = \text{R17 200}$$

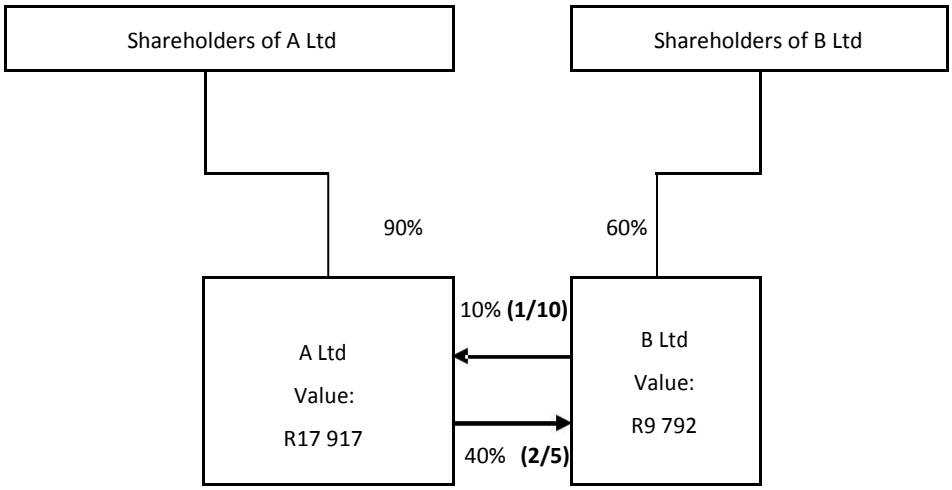
$^{48}/_{50}$ A = R17 200
A = R17 917

B = R8 000 + $^{1}/_{10}$ (R17 917)
B = R8 000 + R1 792
B = R9 792

Note to solution:

As each company has shares in the other company, the value of each company should be calculated to enable the corresponding value of the shares held in the other company to be determined respectively.

(ii) Schematically the situation is as follows:



In order to determine the final liquidation dividends to be paid out to the shareholders of A Ltd and B Ltd, the following calculation must be done.

	Shareholders A Ltd R	**Shareholders B Ltd R**
Total value (including crossholding)	17 917	9 792
B Ltd's share in A (R17 917 × 10%)	(1 792)	
A Ltd's share in B (R9 792 × 40%)		(3 917)
Value (excluding crossholding)	16 125	5 875

Practice questions

Question 13–1 *(Fundamental)* *8 marks 10 minutes*

The following is the statement of financial position of Manta Ltd, a listed company.

ABRIDGED STATEMENT OF FINANCIAL POSITION AT 28 FEBRUARY 20X1

	R'000
ASSETS	
Non-current assets	
Property and equipment	453 000
Current assets	400 000
Inventory	250 000
Trade receivables	150 000
Total assets	853 000
EQUITY AND LIABILITIES	
Total equity	510 000
Issued capital	200 000
Retained earnings	310 000
Current liabilities	343 000
Trade payables	311 000
Bank overdraft	32 000
Total equity and liabilities	853 000

Additional information:

Manta Ltd needs R150 000 for the purchase of inventories. The bank is willing to advance that amount on condition that the company makes a capitalisation issue of R200 000. It was decided to comply with the bank's request regarding the capitalisation issue.

Required:

Draw up the statement of financial position of Manta Ltd after all the transactions have taken place and discuss the effect of the above transactions.

Solution:

ABRI GED STATEMENT OF FINANCIAL POSITION AT 31 JULY 20X1

	R'000
ASSETS	
Non-current ass ts	
Property and quipm nt	453 000
Current assets	550 000
Inventory (250 000 + 150 000)	400 000
Trade e eivables	150 000
Total assets	1 003 000
EQUITY AND LIABILITIES	510 000
Total eq ity	
Issued capital (200 000 + 200 000)	400 000
Retained earnings (310 000 – 200 000)	110 000
Current liabilities	493 000
Trade payables	311 000
Bank overdraft (32 000 + 150 000)	182 000
Total equity and liabilities	1 003 000

The c pital and reserves of R510 000 have stayed the same but after the capitalisation issue only R110 000 may be declared as a dividend. Manta Ltd can now only declare R110 000 instead of the previous R310 000 of its reserves as a dividend. Alienation of any part of the R400 000 amounts to a reduction of share capital and may not take place without the consent of the client. The 'cushion' which external parties rely on has been strengthened.

Question 13–2 *(Fundamental)* *15 marks 20 minutes*

The abridged statement of financial position of Zastro Ltd at 31 December 20X1 is as follows:

ABRIDGED STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 20X1

	R
ASSETS	
Non-current assets	
Land and buildings	
Current assets	295 000
Cash and cash equivalents	10 500
Total assets	305 500
EQUITY AND LIABILITIES	
Total equity	(138 500)
Issued capital	160 000
Accumulated loss	(299 000)
Current liabilities	
Trade payables	444 000
Total equity and liabilities	305 500

The sole shareholder of the company is considering the liquidation of Zastro Ltd. The following information is provided:

The trade creditors are prepared to enter into a compromise with the company in order to prevent its liquidation.

A reasonable market value for the assets is equal to their respective book values.

Anticipated future profit amounts to R250 000 per annum which makes the company's continued existence attractive.

The company has an assessed loss of R250 000.

Current rate of taxation is 30%.

The sole shareholder has indicated that he is considering buying the land and buildings from the company's liquidator if the liquidation is to go through.

Required:

Determine whether the company should be liquidated or whether it should rather embark upon a reconstruction scheme.

Solution:

1 Determination of the ompromise with trade creditors

	R
Total value of assets	305 500
Creditors' claims	(444 000)
Possible loss creditors may suffer	(138 500)

Credit rs sh uld therefore be willing to settle for a repayment of 69c in the Rand.

$$\left[\frac{444\,000 - 138\,500}{444\,000}\right]$$

2 Co t to the sole shareholder if the company is wound up.

Purchase price of land and buildings (market value)	R295 000

3 Advance by the sole shareholder if the company is not wound up.

	R
Repayment of creditors (444 000 – 10 500 – 138 500)	295 000
Saving of taxation on future profits [(R250 000 – R138 500) × 30%]	(33 450)
Loan from sole shareholder	261 550

It will be more beneficial to enter into a compromise with the creditors and therefore not to liquidate the company.

Note: ***The assessed loss must be reduced by the amount of any compromise which is entered into with payables in terms of section 20(1)(a)(ii) of the Income Tax Act 58 of 1962.***

Question 13–3 *(Intermediate)* *40 marks* *60 minutes*

The abridged statement of financial position of Baxter Ltd, a listed company, is as follows:

	20X1 R
ASSETS	
Non-current assets	390 000 000
Property, plant and equipment	310 000 000
Goodwill	80 000 000
Current assets	281 000 000
Inventories	201 000 000
Trade receivables	70 000 000
Cash and cash equivalents	10 000 000
Total assets	671 000 000
EQUITY AND LIABILITIES	
Total equity	422 000 000
Issued capital	200 000 000
Reserves	112 000 000
Retained earnings	110 000 000
Non-current liabilities	137 000 000
Long-term borrowings	137 000 000
Current liabilities	112 000 000
Trade payabl s	100 000 000
Short-term borrowings	12 000 000
Total equity and liabilities	671 000 000

Additional info mation:

1 Property plant and equipment

	R
Land and buildings at cost	250 000 000
Plant and equipment	60 000 000
Co t	100 000 000
Accumulated depreciation	(40 000 000)
	310 000 000

2 Liquidation costs amount to R20 000 000

3 Issued capital

	R
Ordinary share capital (100 000 000 issued shares)	100 000 000
7% Preference share capital (100 000 000 issued shares)	100 000 000
	200 000 000

Required:

Prepare the liquidation account, shareholders' accounts and bank account if a cash offer amounting to R442 000 000 was accepted for the net assets of the company.

Prepare the same ledger accounts as in **(a)** with a purchase offer of R200 000 000 of which R120 000 000 is payable in cash and R80 000 000 in shares.

Solution:

(a)

Liquidation account

	R'm		R'm
Land and buildings	250	Reserves *	112
Plant and equipment	60	R tained earnings *	110
Current assets	281	Borrowings	137
Goodwill	80	Current liabilities	112
Bank – liquidation charge	20	Selling consideration	442
Ordinary shareholders' profit	222		
	913		913

Ordinary shareholders

Bank	322	Balance	100
		Liquidation account **	222
	322		322

Preference shareholders

Bank	100	Balance	100

Bank

Selling consideration	442	Liquidation charge	20
		Preference shareholders	100
		Ordinary shareholders	322
	442		442

These items are not taken over by the purchaser but are inducted in order to determine the profit or loss realised.

Since no reference was made to preference shareholders participating in profits on liquidation only the ordinary shareh lders will share in the profits.

(b)

Liquidation account

	R'M		R'M
Land and buildings	250	Reserves	112
Plant and equipment	60	Retained earnings	110
Current assets	281	Borrowings	137
Goodwill	80	Current liabilities	112
Bank – liquidation charge	20	Selling consideration	200
		Ordinary shareho ders (oss)	20
	691		691

Ordinary shareholders

Share allocation	80	Balance	100
Loss	20		
	100		100

Preference shareholders

Bank ***	100	Balance	100

Bank

Part selling price	120	Liquidation charge	20
		Preference shareholders	100
	120		120

Share allocation account

Part selling price (shares)	80	Ordinary shareholders	80

Question 13–4 *(Advanced)* *40 marks 60 minutes*

The following information relates to on Ltd:

ABRIDGED STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 20X1

	20X1 R'000
ASSETS	
Non-current assets	5 250
Prope ty, plant and equipment	5 196
Goodwill	54
C rrent assets	1 140
Inventories	545
Trade receivables	550
Prepayments	45
Total a sets	6 390

ABRIDGED STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 20X1 – *continued*

	20X1 R'000
EQUITY AND LIABILITIES	
Total equity	5 065
Issued capital	3 000
Reserves	500
Retained earnings	1 565
Non-current liabilities	700
Long-term borrowings	700
Current liabilities	625
Trade payables	271
Bank	354
Total equity and liabilities	6 390

Additional information:

1 Preference shares have preference in respect of repay ent of capital.

Preference dividends have not been paid from 1 January 20X1 up to 31 December 20X1.

Deferred shares participate in ordinary dividends aft r ordinary shares have first been paid a dividend at 10c per share. All other rights are the same as ordinary shares.

4 Long -term borrowings consist of 700 10% debentures of 1 000 each repayable on demand. A premium of 10% is payable on redemption.

5 Issued capital consists of:
2 000 000 ordinary shares issued at a cost of R1 each
500 000 deferred shares issued at a cost of R1 each
500 000 7% preference shares issued at a cost of R1 each.

Preston Ltd, a listed company, made the following offer to purchase all the assets and liabilities of Don Ltd, which was accepted:

- The total purchase price amounts to R5 500 000.
- Payment will be made in cash (40%) and shares of Preston Ltd (60%).
- Preference shares will be redeemed in cash at R1,10 per share.
- An arrear preference dividend will be declared and taken over as a liability by Preston Ltd.

Liquidation charg s amount to R25 000 and will be paid by Preston Ltd on behalf of the liquidator.

Deferred shareholders not in favour of the transaction will be paid R1,50 per share. The holders of 250 000 shares obje ted to the transaction.

Preston Ltd holds 100 000 preference shares as well as 500 000 ordinary shares in Don Ltd.

Required:

Prepare the f ll wing accounts in the books of Don Ltd in conclusion of the liquidation:

Liquidati n account.

Pre ton Ltd.

Share accounts.

Account of objectors to the transaction.

Bank.

New shares account.

Work to the nearest full percentage when calculating the respective share in profits of each type of shareholder.

Solution:

Liquidation account

		R'000		R'000
Property, plant and equipment		5 196	Preference dividends	35
Goodwill		54	Debentures	700
Inventories		545	Other payables	271
Other receivables		550	Bank	354
Prepayments		45	Reserves	500
Preston Ltd (liquidation charges)		25	Retained earnings (1 565 – 35)	1 530
Realised loss on the preference shares		50		3 390
Realised loss on deferred shares		125	Preston Ltd (selling price)	5 500
		6 590		8 890
Profit		2 300		
Ordinary shares	(67%)	1 541		
Ordinary shares	(22%)	506		
Deferred shares	(11%)	253		
	100%			
		8 890		8 890

Pr ston Ltd

	'000		R'000
Liquidation amount	5 500	Liquidation account (liquidation charges)	25
		Preference shares (100 000 × R1,10)	110
		Ordinary shares	1 006
		New shares (60%)	2615,4
		Bank (40%)	1 743,6
	5 500		5 500

New shares account (Preston)

Preston	2 615,4	Deferred shares account	371,2
		Ordinary shares account	2 244,2
	2 615,4		2 615,4

Ordinary shares

	Preston	Other		Preston	Other
Liquidation a ount			Balance	500	1 500
Preston Ltd	1 006	–	Liquidation account		
Bank	–	796,8	Preston	506	–
New share acco nt		2 244,2	Other	–	1 541
	1 006	3 041		1 006	3 041

Preference shares

Pre ton Ltd	110	Balance	500
Bank	440	Liquidation account (realised loss)	50
	550		550

Deferred shares

	Against	Other		Against	Other
Bank	375	–	Balance	250	250
Bank	–	131,8	Liquidation account		
New shares		371,2	(Realised loss)	125	–
			Liquidation account	–	253
	375	503		375	503

Bank

Preston Ltd	1 743,6	Preference shares	440
		Deferred sh res	375
		Deferred sh res *	131,8
		Ordinary shares *	796,8
	1 743,6		1 743,6

* Cash balance distribution of R928 600

$$\text{Ordinary R928 600} \times \frac{3\,041}{3\,544} = \text{R796 804}$$

$$\text{Deferred R928 600} \times \frac{503}{3\,544} = \text{R131 796}$$

Notes

The 10% premium payable at redemption of debentures is only payable at redemption and therefore not for the account of Don Ltd.

Provision for preference dividend

R500 000 × 7%		= R35 000
Retained profits	Dr 35 000	
Arrear dividends		35 000

Realised profit/loss on preference shares

500 000 shares × R0,10		= R50 000
Liquidation amount	Dr 50 000	
Preference shares		50 000

Realised profit/loss Deferred shareholders not agreeing with transaction

250 000 shar s × R0,50		= R125 000
Liquidation account	Dr 125 000	
Deferred share a ount		125 000

l Profit sha ing

			Shares
Total shareholder	–	Ordinary	2 000 000
Sharing in liq idation profits	–	Deferred	500 000
			2 500 000
Deferred shareholders against transaction			(250 000)
			2 250 000

Percentage of profit sharing

Ordinary – Other	$\left[\frac{1\,500}{2\,250}\right]$	67%
Ordinary – Preston	$\left[\frac{500}{2\,250}\right]$	22%
Deferred – Other	$\left[\frac{250}{2\,250}\right]$	11%

New shares

	R
Purchase price Liquidation	5 500 000
charges Preference shares	(25 000)
Ordinary shares – Preston	(110 000)
Share in profit – Preston	(500 000)
	(506 000)
	4 359 000
Cash 40%	1 743 600
Shares 60%	2 615 400
	4 359 000

Chapter 14

The dividend decision

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –
l explain the different methods a company may choose when paying dividends; l explain why the dividend policy is irrelevant in a perfect capital arket; calculate how a shareholder may borrow or sell shares in lieu of a dividend payment without losing investment value; discuss the dividend decision in an imperfect mark t; and explain alternative dividend payment methods.

The dividend policies of various firms have been extensively researched, and divergent theories have been proposed on the effect of specific dividend policies on the value of the firm. No definite conclusions have been formulated, and it would appear that many managers are primarily interested in giving the shareholders a fair level of dividends based on a long-term target payout rate.

Shareholders' return consists of both capital gain and dividend return. It has been argued that investors should not be concerned about the dividends received, but they should be concerned with the total return (capital gains plus dividend). Managers, in turn, are concerned with the on-going financing of the firm and are faced with the decision to:

retain whatever earnings are necessary to finance growth and pay out any residual cash dividend; or

increase dividends and then (sooner or later) issue new shares to make up the shortfall in equity capital.

As the firm is inter st d in maximising shareholder wealth, the question of whether a stable dividend policy maximise equity share value must be asked. On logical grounds, evidence indicates that a stable dividend policy leads to a higher share value. Shareholders view a fluctuating dividend policy as more risky than stable dividends which they are more likely to receive. The result is that the shareholders will require a higher rate of return from fi ms with fluctuating dividends, in contrast to those with a stable dividend policy and the same average amount of dividends that is the cost of capital of companies with a stable dividend policy is lower than those with a fl ct ating or no dividend policy.

14.1 Dividend payment methods

Dividend policies differ from company to company and often take into account the needs of the shareholders. Where company directors perceive that shareholders want dividends, they will choose to make a dividend di tribution. However, where they perceive that shareholders are indifferent between a dividend or capital appreciation, they may embark on a residual payment method.

14.1.1 Constant dividend/earnings method

This method pays shareholders a dividend which is calculated at a constant percentage of earnings.

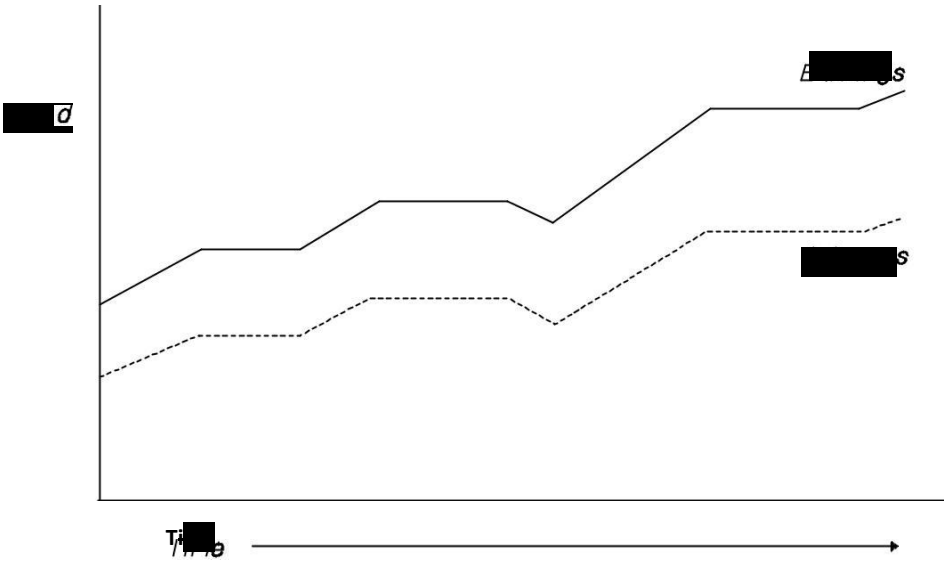


Figure 14.1: A diagrammatic representation of the constant divid nd/earnings method

Illustration:

A company has a dividend payment policy of paying out a dividend equal to 60% of earnings after tax.

	20X1	20X2	20X3	20X4
Earnings	1 000	1 150	950	1 200
Dividends 60%	600	690	570	720

This method is not too popular, as dividends fall when earnings decline. Management is always reluctant to decrease dividends as it perceives that the shareholders react negatively to declining dividend payments.

14.1.2 Stable dividend payment method

This method attempts to pay a level of dividends that is sustainable. Dividends are held at a constant level and only increased when earnings show an upward increase that is sustainable in the long-term.

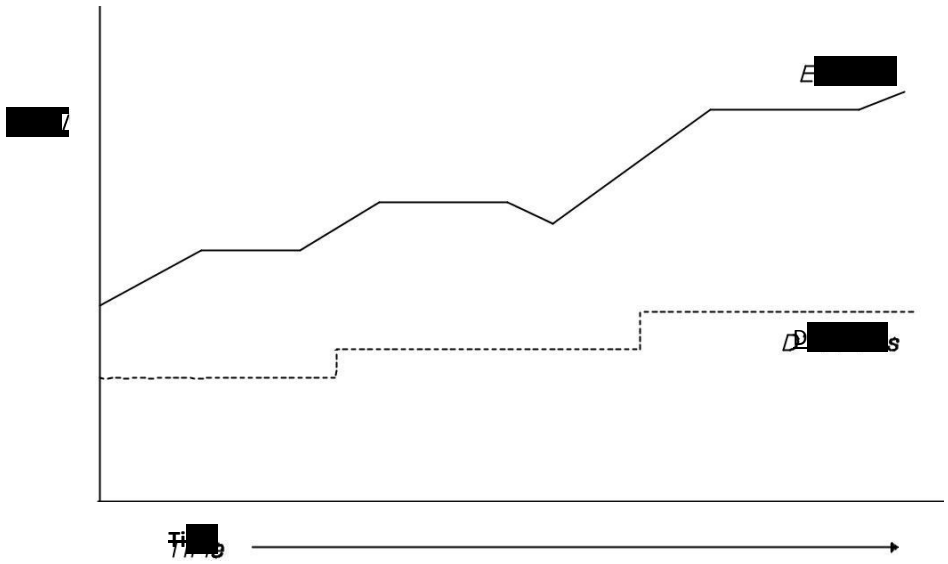


Figure 14.2: A diagrammatic representation of the stable dividend payment method

14.1.3 Bonus issues/share splits and dividend reinvestment plans

When a company makes a bonus issue in lieu of paying a dividend, it is simply increasing the number of shares in issue. The shareholder does not benefit from such a policy, as he will still retain exactly the same percentage of issued share capital. The total market value of his shareholding will, however, increase as the company re-invests surplus funds in the business.

Example: Bonus Issue

A shareholder holds 100 shares in a company that has an issued-share capital of 1 000 shares.

Required:

Determine the effect of the company making a bonus issue of one share for every ten held.

Solution:

Current position

	Company	Shareh lder
Shares	1 000	100

Shareholder holds 10% of issued share capital

New position

	Company	Shareholder
Shares	1 100	110

Shareholder still holds 10% of issued share capital

A **share split** occurs when a company issues new shares to existing shareholders in proportion to the existing shares held in a company. For example, a company may double the number of shares in issue and distribute them to existing shareholders. This strategy is often used where the value of a share has increased substantially and trading is difficult because of the high value of buying or selling a share. Where, for example, a 1:1 share split is carried out, a shareholder will hold double the number of shares at half the previous value per share. The total value of his shareholding will, however, remain the same.

Example: JSE Ltd – Share Split

Note*: *Aug 06 Shareholders should note that the Dec 04 pro forma EPS and HEPS figures were restated in line with the JSE's share split on a 10 for 1 basis on listing on 5 June 06.

Comment: Subsequ nt to the above, share splits have been scarce. This may be ascribed to listed companies with high share pric s not wishing to attract small individual shareholders eg Naspers. The opposite of a share split is a share consolidation. For example, Super Group in December 2011 consolidated 10 ordinary shares into 1.

Dividend reinvestment plans are slightly different. The method of dividend distributions gives the shareholder a choice of accepting a cash dividend or choosing a bonus issue of shares (refer to section 14.4.2, under the sub-heading 'Scrip dividend'), or by reinvesting in the company.

If all existing shareholders choose the bonus issue, their position is the same as it would be if the company had a b nus share issue. However, if some shareholders choose a bonus issue, while others opt for a cash dividend, the shareh lders choosing the bonus issue will end up with a greater proportion of the shares in issue after the re-investment plan than the shareholders who opted for the cash dividend.

Examp e: Anglo American – Reinvestment plan

A dividend reinvestment plan is available through Equiniti in the UK and Link market Services in South Africa. This plan enables shareholders to reinvest their cash dividends in the purchase of Anglo American ordinary sh res.

14.2 Dividend policy as 'irrelevant in a perfect capital market'

The controversial question of how dividend policy affects value is illustrated in the three divergent groups of opinion. One group believes that an increase in dividend payout increases company value. The more radical group believes that an increase in dividend payout reduces the value of the company.

The middle-of -the road group, founded by Miller and Modigliani, believes that the dividend decision in a perfect capital market (no taxes, transaction costs or other market imperfections) is irrelevant, as investors are indifferent to returns in the form of dividends or capital gains. The Miller and Modigliani argument is generally accepted as correct, and the emphasis has now shifted to the validity of the theory in an imperfect world of taxes and other market imperfections. The Miller and Modigliani theory states that management should use the company's earnings (which is cheaper than issuing new shares) to invest in projects with positive net present values. If all suitable projects have been taken up and retained e rnings re still available, the balance should be paid out as a dividend. Where no retained earnings are left over, no dividend is paid. The dividend decision is then a residual of the investment decision.

Example: Financing a missed dividend

The 'Rational' company has an issued share capital of 1 000 R5 shares. Its investments generate a perpetual income of R2 000 per annum after taxes, which is paid out by way of a dividend before dividend tax of 15%. The company's cost of capital is 17%.

An investment project requiring a R1 700 investment one year from today (at t_1), will become available. The investment has the same level of risk as the company's pr vious investments and will generate an after tax return of R5 000 before dividend tax after one year (at t_2). The company wishes to finance the project by using the retained earnings available at t_1 (amounting to R2 000). It will then pay out an additional dividend equal to the project return in Year t_2, and thereafter the dividend will be R2 000 per annum in perpetuity.

Required:

Determine whether the investment decision is in the shareholders' best interests.

Investor A, holds 50% of the issued share capital in the 'Rational' company, and relies on his dividend income to supplement his pension income.

Show how Investor A can replace the desired dividend and still retain the same share value by –

borrowing;

selling part of his shareholding.

Solution:

(a) Current value of mark t quity at t_0

$$V_e = \frac{R1\,700}{0{,}17} = R10\,000$$

(See sha e valuation based on zero growth – valuation section.)

Market val e of equity after investment

Revised dividend flow at t_1 0
at t_2 7 000(ADT 4 250)
at t_3 2 000

	t_0	t_1	t_2	t_3	
		(1 700)	4 250		
Current (ADT)	1 700	1 700	1 700	1 700	to infinity
New	N/A	Nil	5 950	1 700	to infinity

V_e (post investment) = present value of future cash flow at t_0

PV value at t_2 = 5 950 + $\frac{1\,700}{0{,}17}$ = 15 950

PV value at t_0 = $\frac{15\,950}{(1 + 0{,}17)^2}$ = R11 651,69

V_e (post investment) = 11 651,69

V_e (net) = 11 651,69 – 10 000 = R1 651,69

The value of the company has risen by R1 651,69 as a result of accepting the investment.

The conclusion is that new investments should be accepted when the alue of the firm post investment is greater than the value at the present time, that is when

V_e (post investment) > V_e (existing)

Alternative valuation of investment

Year 1	(1 700)	×	0,8547	=	(1 453)
Year 2	4 250	×	0,7305	=	3 105
					+ 1 652

Note: ***The present value factors have been determined back to Year 0: that is the R2 000 investment required is at the beginning of Year 1. The factor of 0,8547 is one year away from Year 0.***

(i) Borrowing to replace his dividend

Given a perfect capital market, the investor will borrow R850 at 17% at t_1 and repay the loan at t_2. At t_0, the investor's wealth in terms of share value is

R10 000 × 50% = R5 000 and will receive a dividend of R1 700 × 50%

Changes in shareholder wealth as a result of borrowing

	t_1 R	t_2 R	t_3 R
Revised dividend flow	Nil	2 975	850
Bank borrowing	850	– 995	Nil
Revised cash flow	850	1 980	850
Less:			
Existing ash flow	850	850	850
Net change	Nil	+1 130	Nil

Present value to t_0 = $\frac{1\,130}{(1 + 0{,}17)^2}$ = R825,48

C nclusion:

Shareholder wealth will increase by R825,48

Note: ***The cost of borrowing has been taken as 17%, which is equal to the cost of equity. This is correct if one takes the view that the cost of borrowing equals the opportunity cost of utilising the dividend received. In other words, when a shareholder receives a dividend, he could re-invest the funds in the company to earn a further 17%, which must be the opportunity cost of money to the shareholder.***

or:

The investor is taking on debt. The cost of equity, k_e, must therefore increase but the weighted average cost of capital (WACC) will remain at 17% (Miller and Modigliani assumption). The equivalent or opportunity cost therefore equals 17%.

Selling shares to replace a missed dividend

According to the Miller and Modigliani theory, once the 'Rational' company has announced its intentions, the 'perfect capital market' will not perceive that the company risk structure has changed as a result of a change in dividend policy and will continue to require a 17% return on investment.

The revised total market value of Investor A's shares at t_0 will therefore equal R5 825,48.

Market value at t_1 based on discounted future dividends will equal

$$\text{PV at } t_1 = \frac{\text{PV at } t_2}{(1 + 0{,}17)} + \left[\frac{1\,700}{0{,}17} \div 1{,}17\right]$$

$$= \frac{5\,950}{1{,}17} + \left[\frac{1\,700}{0{,}17} \div 1{,}17\right]$$

= 5 085,47 + 8 547,01

= 13 632,48 ÷ 1 000 shares

Value per share = R13,632

Shareholder requires R850 cash, therefore he will sell 63 shares

(63 × R13,632 = R858,82)

His shareholding, after sale of shares at t_1, is now 43,7%.

Dividend at t_2 = 5 950 × 43,7% = R2 600

Total share value at t_2 (ex-dividend) = $\frac{1\,700}{0{,}17}$ = R10 000

or R10 per share

At t_2, the shareholder will purchase 63 shares at R10 each to recover his original shareholding.

Resultant cash flows

	t_1 R	t_2 R	t_3 R
Revised dividend flow	Nil	2 600	850
Sale/pu hase of shares	+ 858,82	– 630	Nil
Revised cash flow	858,82	1 970	850
Less:			
Existing dividend flow	850,00	850	850
Additional cash	+ 8,82	+ 1 120	Nil

The equivalent present value at t_0 of resultant cash flows is

$$\frac{8{,}82}{(1{,}17)} + \frac{1\,120}{(1+0{,}17)^2} = \text{R825,72}$$

Therefore, in theory, a loss in dividend as a result of a change in the payment policy of a company should not be relevant to the shareholder as he can sell shares or borrow funds to restore lost dividends. The net result will always be that his wealth will increase and the dividend decision is irrelevant. (Note that the assumption is that shareholders do not require more than a 17% return as a result of a change in dividend policy.)

The Miller and Modigliani dividend theory follows from their capital structure theory, which states that a firm's WACC is unaffected by changes in its gearing ratio and it makes no difference whether a project is financed by debt or by equity capital.

If it is true that an investor is no worse off, regardless of whether a dividend is paid by the investor's company, one must ask what would happen if the company increased the dividend payment without changing the investment and borrowing policy.

As the company has fixed its investment policy, it will have to raise funds to finance projects, and as retained earnings are not available due to the dividend payout, it will have to raise the required funds either by borrowing or issuing new shares. Borrowing is limited by the debt to equity (D:E) ratio, so the company will eventually have no option but to issue new shares.

The company therefore prints new shares and sells them to new sh reholders who are prepared to pay what the share is worth. However, one must query how the sh res c n be worth anything if the assets, earnings, investment opportunities and market value are unchanged?

The answer is that a transfer of value takes place from the old shareholders to the new. The market value per share is therefore diluted as a result of the new issue and the old shareholders will incur a capital loss which is offset by the extra dividend they received. The two methods of 'cashing in', that is selling shares to replace dividends, or receiving a higher dividend and incurring a subsequent capital loss, have the same fundamental effect. Value is transferred from existing shareholders to new shareholders either by reducing the number of shares held or by a market dilution of share value.

In conclusion, as long as investment policy and borrowing are held constant, the firm's overall cashflows are the same, regardless of payout policy. The risks borne by all shareholders are likewise fixed by its investment and borrowing polici s, and unaffected by dividend policy.

14.3 Dividend decisions in an imperfect market

There are a number of situations that suggest that dividend decisions may be affected by a variety of factors that make dividend policy relevant.

Example: MTN – Declaration of interim ordinary dividend

Notice is hereby given that a gross interim dividend No. 3 of 321 cents per share for the six months ended 30 June 2012 has been declared payable to shareholders of MTN's shares. The dividend has been declared out of income reserves. The number of ordinary shares in issue at the date of this declaration is 1 884 968 549 (including 22 337 752 treasury shares). The dividend will be subject to a maximum local dividend tax rate of 15% which will result in a net dividend to those shareholders that bear the maximum rate of dividend withholding tax of 276,61346 cents per share after dividend withholding tax of 44,38654 cents per share and STC credits amounting to 25,08974 cents per share will be utilised.

Comment:

Dividends may be half-yearly or annually.

14.3.1 Statuto y equirements

In South Africa, the financial manager is restricted to a certain extent by the Companies Act 71 of 2008 and the Income Tax Act 58 of 1962.

The C mpanies Act states that 'no dividend shall be paid otherwise than out of profits'. Dividends may therefore only be paid out of current and previously accumulated earnings.

This restriction exists to prevent companies from paying dividends in a manner that would effectively reduce the company's paid-up share capital or share premiums (sections 46 to 48).

Prior to 1 April 2012, secondary tax on companies (STC) was levied on companies at the rate of 10% of dividends paid. The intention at that time was to encourage companies to distribute little or no dividends, and to use the funds for re-investment. With effect from 1 April 2012, STC was replaced by dividend tax (DT) at the rate of 15% payable by the recipient of the dividend. The reason for the change was to bring South Africa in line with international norms of who pays the tax and also to eliminate the perception that South Africa had a higher overall corporate tax rate. For the legislative basis for DT, refer to section 64D to 64N of the Income Tax Act.

Example: Remgro – STC Credits Take off the borders

On 31 December 2011, Remgro and its wholly-owned subsidiaries had STC credits of R8 790 million (31 March 2012: R9 544 million estimated) to be utilised by 31 March 2015.

Comment:

With effect 1 April 2012 STC was replaced by a dividend tax (DT) at a rate of 15%. DT is based on the gross outflow of dividends with no reference to the period. The beneficial owner of the dividend (share) is liable for the tax except in the case of a dividend in specie (distribution of assets) when the liability remains with the company. STC credits must be utilised by 31 March 2017.

Financial managers in an imperfect market do not have all the inform tion ssumed in theory; therefore, judgement must be exercised, especially in the area of the tax positions of both the shareholder and the company.

14.3.2 Clientèle requirements

Certain shareholders prefer high dividend-paying shares as a s urce f cash to live on. Some financial institu-tions are restricted from holding shares that lack established dividend rec rds, while Trust and Endowment Funds prefer dividend shares, which they view as disposable income, over a capital gain, which is not disposa-ble. This gives rise to the so-called 'clientèle effect', whereby certain investors based on their risk to return profile, investments needs and stage (age) in life will be drawn to particular companies.

Although the ideal dividend policy should be dictated by the owners of the company, this is unrealistic for large companies with widely-dispersed ownership. The argum nt th refore arises that a firm should have a stable dividend policy appropriate for its activities. Investors will th n choose investments that have a dividend policy that meets their particular requirement (consider the examples of Mondi, Mr Price, MTN, Remgro and Sasol below). Pensioners for example will be drawn to companies that have a stable dividend policy and a high dividend yield (consider the example of high yielding companies below). Investors, who are in pursuit of high growth shares, would be far less interested in receiving dividends and hence would prefer that the company pays no dividends (consider the example of Calgro M3 below). Then there is also the so- called 'bird-in-hand versus two-in-the-bush theory', that states that some investors would prefer to receive a known payment today (bird-in-hand), rather than wait for an uncertain capital growth in the future (two-in-bush).

Example: Mondi – Dividend policy

Mondi intends to pursue a dividend policy that reflects its strategy of disciplined and value creating investment and growth with the aim of offering shareholders long-term dividend growth. The Group will target a dividend cover range of two to three times on average over the cycle, although the payout ratio in each year will vary in accordance with the business cycle. The payment of dividends will be conditional on the Group having suffi-cient distributable reserves. Ordinary dividends paid by Mondi plc will generally be paid in Euros and ordinary dividends paid by Mondi Limited will generally be paid in Rand. The Directors intend that the final and interim dividends will gen rally be paid in May and September in the approximate proportions of two thirds (final dividend) and one-third (int rim dividend).

Example: Mr P i e G oup – Dividend policy and final cash dividend

The Group seeks to maintain a balance between –

maintaining a strong balance sheet by having adequate cash resources;

returning funds to shareholders in the form of dividends; and

funding the required level of capital expenditure to maintain and expand its operations.

The Group business model is cash generative. However, after taking into consideration the increased invest-ments detailed above, the dividend cover of 1,6 times (or alternatively the dividend payout ratio of 63,0%) has been maintained. This will be evaluated at least annually. The final gross dividend has increased by 18,4% to 314,0 cents per share and total dividends for the year by 21,1% to 482,0 cents per share, with a closer align-ment of interim and final dividends.

Comment:

Cash generating companies will tend to have a low dividend cover or alternatively a high payout ratio.

Example: MTN – Distribution to shareholders

A final gross dividend of 665 cents per share payable to 1873,3m issued shares (including 22,3m treasury shares) in respect of the financial year ended 31 December 2013 was declared on 5 March 2014, payable to shareholders registered on 20 March 2014.

Before declaring the final dividend, the board –

applied the solvency and liquidity test on the Company; and

reasonably concluded that the Company will satisfy the solvency and liquidity test immediately after payment of the final dividend.

The final dividend will be paid within 120 days of the board's performance of the solvency and liquidity test.

The company showed a table of different tax rates applicable to shareholders as a result of various double taxation agreements as well as dividend tax exemptions.

Interim dividend:

An interim gross dividend of 445 cents per share in respect f the half year period ended 30 June 2014 was declared on 7 August 2014, paid to shareholders registered on 22 August 2014.

Dividend payment policy adjustment:

Due to the Group's strong financial position, the board approv d an increase in the dividend payment policy in 2011. The dividend payment policy was increased to 70% of annual adjusted headline earnings per share (EPS). The interim dividend was based on 30% of the prior year's adjusted headline EPS.

The payments of future dividends will depends on the board's on-going assessment of the Group's earnings, financial position, cash needs, future earnings prospects and other factors.

Comment:

The dividend cover decreased from 4,2 in 2009 to 2,2 in 2010 and then to 1,7 in 2011. Treasury shares **are not entitled** to dividends.

Example: Remgro – Distribution to shareholders

Dividends to shareholders are funded from dividend income and interest received at the centre.

In terms of normal dividends to shareholders, it is the Company's objective to provide shareholders with a consistent annual dividend flow which at least, protects them against inflation, throughout the cycles. As in the past, in special circumstances, the Company will consider other distributions in the form of special dividends or the unbundling of inv stm nts to shareholders.

Note: The examples above illustrate some of the drivers of dividend policy.

Example: Sasol – Dividend history

The dividend is decla ed and paid out in Rand for the holders of ordinary shares. For investors in the depositary receipt (ADR) on the NYSE, the dividends are paid out in US dollars. Sasol declares dividends semi-annually in March and September respectively.

The salient dates for FY 2012 final dividend are:

	Declaration date	**Last date to trade**	**Ex-dividend date**	**Record date**	**Payment date**
Ordinary shares	10 Sep 2012	05 Oct 2012	08 Oct 2012	12 Oct 2012	15 Oct 2012
	Declaration date	**Date of currency conversion**	**Ex-dividend date**	**Record date**	**Payment date**
American Depository Receipts[1]	10 Sep 2012		10 Oct 2012	12 Oct 2012	26 Oct 2012

[1] All dates are approximate as the NYSE approves the record date after receipt of the dividend declaration.

Details on recent dividends paid are included below:

Dividend history	Date paid	Dividend number	SA cents	US cents
FY12 final dividend	15 October 2012 26 October 2012	66	1 180	144
FY13 interim dividend	15 April 2013 25 April 2013	67	570	67
FY13 final dividend	14 October 2013 25 October 2013	68	1 330	135
FY14 interim dividend	14 April 2014 24 April 2014	69	800	79

Comment:

On 8 October 2012 the share price fell by 778 cents per share, shad wing the share going ex-dividend of 1 180 cents per share. This is a quite normal occurrence on the ex-dividend date. The record date of 12 October is the last date to register as a shareholder in order to receive the dividend, one week after the last date to trade. A shareholder holding 100 Sasol shares will encounter the following on his investment statement:

15 October: Dividend received 1 180 cps

15 October: Dividend tax paid 177 cps

Example: High dividend yielding companies

	2012 Dividend Yield	2014 Dividend Yield
Astral	7,8%	2,4%
Kumba	7,7%	10,2%
Metmar	7,7%	0,0%
Winhold	7,6%	0,0%
Phumelela	7,4%	3,9%
Vodacom	–	5,2%
Lewis Group	–	7,4%

Comment:

The yield is driven by the dividend paid and the share price. The yield shown is now higher than what the beneficiary receives on a n t basis by 15%. The consistency in paying dividends should be considered. For the above examples, yi lds on pr f rence shares (often linked to the prime rate) and on property companies (including an interest component) are excluded. Yields have come down since 2011. A high yield may also be indicative of the share pri e not yet reacting to poor results or bad news.

Example: Calg o M3 – Dividends

No dividends have been declared for the period. The Board is of the opinion that the Group must continue to conserve cash to maintain the present growth and create shareholder value.

C mment:

The company operates in the construction and property development sectors and had projects in excess of R8 bi ion in the pipeline.

14.3.3 Dividend stability and information content

Investors favour companies with established dividend records, as it can be argued that investors receive little information about a company's earnings potential because of the creative accounting techniques used in many subsidiary-layered companies. Investors believe that the only way to separate a marginally profitable company from a profitable one is to look at the dividends. Investors would tend to refuse to believe a company's earnings announcement unless the announcement was backed by an appropriate dividend payment policy.

A stable, steadily growing dividend record over an extended period is one of the distinctive characteristics of a successful company.

The information content of dividend policies suggests that investors look to the evel and consistency of dividend payments as a guide to the company's future potential. A reduction in dividends in order to finance an investment project may be viewed as a sign of company difficulties, and m y result in the market decline of the share price.

Example: Anglo American – Skipped dividend

		Dividend hist ry (cps)	Share price in January (cps)
2008	Interim:	324,9	41 940
2009			14 241
2010	Interim:	183,1	32 850

Comment:

The company skipped their dividend payment in 2009, due to liquidity and high capital expenditure issues with a resumption only due in 2014/15. Another recent example is Palabora Mining Company, which after yielding an average 3,6% per annum over a five-year period, opted to not pay a dividend in 2012, which caused the share price to halve. This decline is partly ascribed to the (reverse) impact of clientele requirements. Share prices will take some time to recover: in the case of Anglo American who will now resume paying dividends, the price is still below the 2010 recorded price.

Miller and Modigliani regard the information content of dividends as temporary. Where the market price of a share increases as a result of high dividend payment, they believe that the increase would have happened anyway, as information about future earnings filters through the market.

Example: Pinnacle Holdings – Policy suspended

Comment:

The company susp nd d its policy of paying 20% of headline earnings as a dividend and the share price dropped by 22% to R10,51 in S ptember 2014 when this was announced.

14.4 Alte native forms of dividend payment

Dividend payments can be made in a variety of forms. The most common ones are –

special dividend;

capitalisati n issues; and

share repurchases.

14.4.1 Special dividend

In addition to normal dividend payments, a company may declare an *ad hoc* special dividend to registered sh reholders on a designated date. The company will usually have high cash reserves and may have made a decision not to buy back its own shares. By implication, such a decision will indicate that the company does not anticipate any immediate investment opportunities to present.

Example: Old Mutual – Dividends and share consolidation

'As well as the 18p per share special dividend that is to be paid following the completion of the Nordic sale, we have announced a significantly increased final dividend for the year of 3,6p per existing share, equivalent to 4,0p per new ordinary share once our shares have been consolidated. The final dividend will be paid on 7 June 2012 at the same time as the special dividend and I would draw to your attention the full timetable for the final and special dividends and the share consolidation, which is set out in the Shareholder Information section of this document. We anticipate further progression in our ordinary dividends over the coming years. In light of the complexity involved in our share consolidation, we have decided not to offer a scrip dividend alternative for this year's final dividend and the Board will decide later this year whether to offer such an alternative for the 2012 interim dividend.'

14.4.2 Capitalisation issues

Capitalisation issues or *scrip dividends* take place when the company is concerned about its liquidity or anticipates new investment project(s) which will require cash. It may then decide not to skip a dividend, but rather issue a paper dividend in the form of additional shares. Shareh lders will usually receive an option to (specifically) elect a cash payment or the share alternative. Shareholders will be enc uraged to rather select the script offered, by building a premium above the cash option into the script pti n. This premium may be up to 10% above the cash dividend. Refer Bidvest Group results for the year ended 30 June 2014: in the ratio of 1,55 shares for every 100 shares held on the record date, the equivalent of 436,0 cents per share versus a gross cash dividend of 432 cents per share.

Example: Scrip dividend

A company's share price is currently R100. The company proposes a net cash dividend of R2,50 per share held or scrip shares to all shareholders holding 100 shares or more on the basis of 2,8 shares for every R250 of cash dividends or 100 shares held. Fractions of shares to be converted to cash credits held on behalf of shareholders.

Solution:

A shareholder holding 100 shares will be entitled to a cash dividend of 100 × R2,50 = R250 and can thus purchase 2,5 new shares in the market (brokerage and taxes ignored). The alternative is two new shares with a credit for the 0,8 shares due.

A shareholder holding 1 000 shares will be entitled to a cash dividend of 1 000 × 2,50 = R2 500 or a purchase of 25 new shares. The alternative in this case will be 28 new shares being issued (2,8 shares for 100 shares held = 28 new shares).

The accounting entry for the scrip dividend will be a credit to the issued share capital and share premium account and a corresponding debit to the retained reserves in the statement of equity. For the example above, assume ordinary shar s have a nominal value of R5, then:

Retained profit	R2 800	
Nominal share apital		R 140 (28 shares × R5)
Share premium (R100 – R5)		R2 660 (28 shares × R95)

14.4.3 Share repurchases

Share rep rchases or buybacks are practised by the majority of listed companies on a continuous basis. The process is driven by a company sitting on a cash pile with –

- no immediate investment prospects;
- a perception that the market share price does not reflect the value of the company;
- as a protective measure against corporate activity; or
- management's objectives in terms of incentives or a combination of the above.

The company requires shareholders' approval for this process and must demonstrate solvency and use its own c sh for this purpose. As buybacks usually take place in the market, the share price tends to stabilise or increase. The shares bought back may be cancelled (which happens very seldom) or be held as *treasury shares*, or by a subsidiary company.

Example: MTN – Share repurchase

Integrated Report YE 31/12/13:

The group did not buy back any shares in the year, after spending approximately R3 billion in 2012 and 2011 on buybacks in the open market. Buybacks will be considered on an *opportunistic* basis.

Example: Vodacom – Share repurchase

Integrated Report YE 31/03/14:

Vodacom Group Ltd acquired 3709419 shares in the (open) market during the year at an average price of R112,48 per share. Share repurchases did not exceed 1% of VGL's issued share capital

Comment:

Companies will limit the % shareholding that may be repurchased. In Vodacom's case this is currently 5% of issued ordinary shares. The Vodacom share prices varied between R111,40 and R139,7 for this period.

Note: All the company-specific examples given in this chapter illustrate particular aspects and are based on financial information gleaned from the 2014 integrated financial reports and other public documentation of the stated companies.

Holding the shares means that they can be used again as part of a corporate transaction (e.g. doing a take-over or BEE transaction), issued in lieu of staff compensation sche es or even be sold back into the market at an opportune time. Shares bought back do not qualify for divid nds and are excluded from all earnings per share calculations. A side effect of the share buyback will thus be to increase the earnings per share, all things being equal.

For shares held and not cancelled, the accounting entry will be:

Investment at cost	Dr amount	
Bank		Cr amount

14.5 Dividend policy in practice

It would appear that financial managers favour a fair level of dividends payment policy, with a long-term target payout rate. In moving towards the long-term payout rate, dividends are increased slowly, in order to avoid wild fluctuations.

When a large dividend increase takes place, shareholders will interpret the move as an optimistic sign of future performance. There is little doubt, therefore, that sudden shifts in dividend policy will directly affect the share price.

The dividend policy in a p rf ct world has no effect on market value. However, in an imperfect world, where dividends and (often) capital gains are taxed, investors would require a higher before-tax return on high-payout shares to compensate for their tax disadvantage. High-income investors would gravitate toward the low-payout firms. It is impossible to provide a formula that can be used to establish the correct dividend payout ratio for any given situation. Financial managers will always have to exercise their judgement while taking the following factors into conside ation –

the tax position of shareholders;

the tax position of the firm;

the cash p sition of the firm and debt repayment schedule;

the rate of growth and profit level;

the tability of earnings; and

the maintenance of a target dividend policy.

Practice questions

Question 14–1 *(Fundamental)* 5 *marks 7 minutes*

Hantam Ltd, a company listed in the Hotels and Leisure sector of the JSE Securities Exchange South Africa, published their results for the year ended 30 September 2012.

Mr Mabundla, the managing director, made the following comments:

> The company grew spectacularly with EBITDA increasing by 34,2%
>
> Headline earnings per share increased by 31,0%
>
> Distributions to shareholders increased by 31,6%
>
> Good further growth is expected in the tourism industry of Southern Africa.

Hantam Ltd provides operating services to the hotel and gaming industry. The acquisitions during 2012 relate to companies organising conferences, which is regarded as the first step in becoming a fully integrated player in the hotels and leisure sector.

The distributions to shareholders comprise a final dividend of 3 cents per share and a capital repayment of 50 cents per share being the balance of the share premium and an interim dividend of 2 cents per share and capital of 20 cents per share which were paid during the year.

Supplementary Information to the Group Stat ment of Comprehensive Income

	2012	2011
Headline earnings per share (cents)	224,1	171,1
Basic earnings per share (cents)	209,7	171,1
Diluted earnings per share (cents)	204,7	166,9
Distributions to shareholders		
– Per share (cents)	75,0	57,0
Shares in issue	28 018	27 865
– Total (000)	30 526	30 353
– Held by subsidiary company (000)	(2 508)	(2 488)
Weighted average number of shares in issue		
– Basic (000)	27 892	29 682
– Diluted (000)	28 586	30 436

Required:

A financial report obs rv d: 'N w Horizons Ltd decreased their dividend to shareholders by 28%.' Evaluate this remark critically. **(5 *marks*)**

Solution: C itical evaluation of '. . . decreased their dividend to shareholders by 28%.'

Check to see that the decrease is correct. Determine what the shareholders received.

- Dividend per share decreased from 7c to 5c (28%) (1)
- Distributi n increased from 57c to 75c (32%) (1)
- Capital repayment a form of dividend, statement not true (1)

Both dividend and capital not subject to tax (if capital scheme implemented before cut-off date) (1)

Capital repayment to non-resident emigrant shareholders considered to be blocked rand. (1)

max (5)

Question 14–2 *(Intermediate)* *12 marks 16 minutes*

Hennops Ltd has made a profit after tax of R23,4 million in their current financial year, with a commensurate growth in their cash reserves of R26,1 million. They are considering a new capital project of R28 million, which the operations director has suggested be funded as follows: R14 million in cash and R14 million by way of a long-term loan with a fixed interest rate of 15% per annum.

The financial director is aware that Hennops Ltd should continue paying a dividend, as not doing so may impact negatively on their current share price of 800 cents per share, trading at twice the current net asset value. Hennops Ltd paid a dividend of 30 cents per share in respect of their previous financial year. Their 15 million shares in issue (in terms of number) have remained unchanged for the last three years.

Required:

The financial director is considering a number of dividend options for the current year:

Growing the previous dividend by 10%

Applying a dividend cover of 4

Issuing a script dividend on a 1 for 20 basis assuming all shareh lders accepts the offer

Repurchase 1 million shares at the current market price on a pro-rata basis.

Show the impact of each of the above per share and on Hennops Ltd's balance sheet. **(*12 marks*)**

Solution:

Apply the option guideline and then consider the impact, usually cash and equity.

Hennops Ltd

(a)	Dividend per share	= 30 × 1,10 = 33 cps	(1)
	Total dividend	= 15m × 0,33 = 4,95m	(1)
	Cash and retained earnings (statement of equity) will decrease		(1)
(b)	Equity per share = 23,4 ÷ 15	= 156 cps	(1)
	Dividend per share	= 156 ÷ 4 = 39 cps	(1)
	Total dividend	= 15m × 0,39 = 5,85m	(1)
	Cash and retained earnings will decrease		(1)
(c)	Share price 800 cents per share		
	On a 1 – 20 basis		
	Value per share 40 cents per share		(1)
	Total value 15m × 0,4	= R6m or	(1)
	15m ÷ 20 × R8	= R6m	
	Decrease retained earnings and increase equity		(1)
(d)	Total value 1m × 8	= 8m	(1)
	Equity per sha e will increase 23,4 ÷ 14m (assuming no growth)	= 167 cps	(1)
	Cash will decrease and equity will decrease; or		
	share held/invested will increase		(1)
		max	12

Chapter 15

The functioning of the foreign exchange markets and currency risk

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- distinguish between the three types of currency risk;
- distinguish between direct and indirect currency quotes;
- distinguish between spot and forward exchange rates;
- discuss interest rate parity and purchasing power parity principles;
- calculate the annual premium or discount at which a currency is being quoted;
- discuss the factors influencing the exchange rate mechanism;
- calculate forward rates using interest rate parity and purchasing power parity principles;
- calculate the cost of hedging and resulting 'manufactured' forward rate using a money-market hedge;
- calculate the cost of hedging using a forward exchange contract (FEC);
- set up a currency hedge using foreign exchange futures contracts and calculate the outcome thereof;
- set up a currency hedge using a foreign exchange options contract (both over-the-counter and traded currency/exchange contracts) and calculate the outcome thereof;
- distinguish b tw n long and short-term currency swaps and explain their respective functioning; and
- value forward ex hange contract for financial reporting purposes.

The objective of this chapter is to explain the relationship between currencies as they pertain to the short- and medium-term movement of money between countries in settlement of underlying transactions. The intention is to give the st dent a fundamental understanding of the principles, not an in-depth explanation of the complex principles of international finance.

As trade takes place between two countries, there is a need for a mechanism to facilitate the settlement of these transacti ns in the foreign exchange markets. For example, if a South African based company purchases a product from a German based company, the South African company will need to buy foreign currency (Euros) in order to pay the supplier in Germany. The foreign exchange rate represents the conversion relationship between currencies, and depends on demand and supply between the currencies of the two relevant countries, in this case South Africa (Rand) and Germany (Euros). The foreign exchange rate is the quotation of one currency in terms of another.

15.1 Currency risk defined

Currency risk or foreign exchange rate risk can be defined as the potential for financial losses for an enterprise due to adverse movements in the foreign exchange rate(s) when it is involved in an international transaction.

An enterprise will be exposed to such risks when it finds itself in any of the following positions:

The enterprise (being an exporter) sells goods to foreign customers or renders a service to a foreign customer, and the foreign customer is invoiced in their own currency.

An importer of foreign goods or services, which is invoiced in the currency of the seller of the particular goods or provider of the particular service.

Any enterprise owning assets that are located overseas.

Any enterprise which has borrowed funds overseas.

Any enterprise which has foreign operations which take place through an entity located overseas, in which the enterprise owns part of the equity of said entity, or through a branch of the entity located overseas.

Three categories of currency risk exist, arising from the scenari s identified above, which are discussed below.

15.1.1 Categories of currency risk

The following diagram indicates the three forms of currency risk:

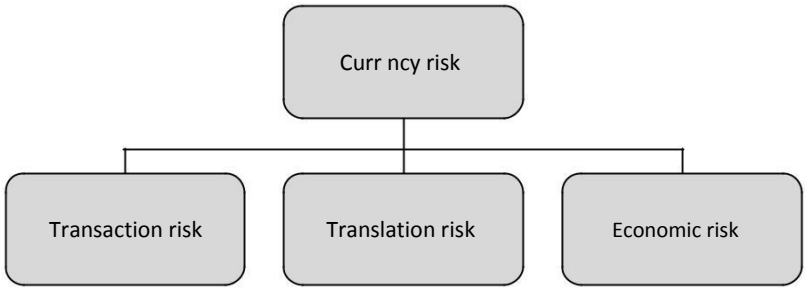


Figure 15.1: Categories of currency risk

We will now have a look at each of these forms of currency risk and its implications for the enterprise.

15.1.2 Transaction risk

Transaction risk results from adverse changes in the exchange rates between the date of entering into a transaction and the s ttl m nt date for the transaction – in other words the date on which the cashflow occurs.

An enterprise an be exposed to transaction risk from either the perspective of a supplier or a customer:

Foreign supplie s	**Foreign customers**
The enterp ise will have purchased goods or services from a foreign s pplier and been invoiced in a foreign c rrency (the currency of the supplier or the US Dollar).	Exporters are exposed to currency risk when they invoice their foreign customers, in a foreign currency (either the currency of their customer or the US Dollar).
Transacti n risk arises when the enterprise's functi nal currency *depreciates* or weakens against the currency in which they have been invoiced between entering into the transaction and making payments in respect of the amount owing to its foreign supplier.	Transaction risk arises when the enterprise's func-tional currency *appreciates* (strengthens) against the currency in which the foreign customer has been invoiced, between entering into the transaction and amounts being received from the foreign customer.
Result: Due to its functional currency losing ground (we kening) against the foreign currency in which he payment has to be made, the goods or services purchased end up costing the enterprise more.	*Result:* Due to its functional currency gaining ground (strengthening) against the foreign currency in which they will be paid, the enterprise receives *less* local currency when amounts are received from the foreign customer.

Example: Calculating foreign exchange gain/loss

ABC Manufacturers imported 10 000 components at a cost of €50 each from its German supplier. On 30 June 20X2, when the goods were loaded onto a cargo vessel in Hamburg harbour, the exchange rate between the South African Rand (ZAR) and the Euro (€) was R10,06/€1, while on 31 July 20X2, when ABC Manufacturers physically purchased Euros in the currency market in South Africa to settle the amount owing to ABC Manufacturers, the exchange rate was R10,26/€1.

Required:

How much was the foreign exchange loss which resulted for ABC Manufacturers?

Solution:

On 30 June 20X2 the cost of components was:

10 000 components × €50 each × R10,06 = R5 030 000

Given that the ZAR depreciated against the Euro, the actual payment made amounted

to: 10 000 components × €50 each × R10,26 = R5 130 000

The foreign exchange loss amounted to R100 000 (being the additional amount that had to be paid resulting from the Rand weakening from R10,06/€1 to R10,26/€1. (Assu ing that the Euro had weakened against the ZAR, for example R9,50/€1, there would have been a foreign exchange gain).

15.1.3 Translation risk

Translation risk arises for any enterprise falling into the following categories:

Any enterprise owning assets located overseas which it needs to recognise in its own statement of financial position as an asset but the value thereof needs to be reported in its own functional currency.

Any enterprise which has borrowed funds overseas would need to recognise this debt as a liability in its own statement of financial position. The fair value of the foreign borrowing however needs to be reported in its own functional currency. The same will be the case for any financial asset reported by the entity, but which is denominated in a foreign currency.

Any enterprise which has foreign operations which take place through an entity located overseas, in which the enterprise owns part of or all of the equity of said entity, or through a branch located overseas. The financial results of these foreign operations as well as the assets and liabilities of these foreign operations need to be accounted for in the financial statements of the local enterprise.

All of the cases identified above have one thing in common – they all require translating an amount of foreign currency into local currency for financial reporting purposes. IAS 21 and IFRS 9 determine the translation of financial assets and financial liabilities from one financial reporting period to the next. IAS 21 prescribes the translation of the financial r sults and assets and liabilities of foreign operations and foreign subsidiaries. The commonality is that diff r nc s arising from one financial reporting date to the next, can in certain cases impact on the earnings of the enterprise, but will not have a cashflow implication. As a result the need to hedge translation risk is in no way as important as the need to hedge transaction risk.

15.1.4 Economic risk

The third category of currency risk is economic risk. The performance of a country's currency relative to other currencies has a direct impact on how competitive an enterprise will be internationally. An enterprise will very often price the g ods or services it exports in foreign currency to stimulate the demand for its products abroad. If the enterprise's own currency strengthens, the cost of its goods becomes more expensive for its foreign cu tomers. The result of such a strengthening (appreciation) in their own functional currency relative to various foreign currencies can ultimately result in the foreign customers replacing the enterprise with a supplier in another country with a weaker currency.

The South African Rand (ZAR) (hereafter referred to as the Rand) has traded at relatively strong levels in recent ye rs making exports more expensive for foreign customers. The result of this has been calls for a weakening of he South African Rand to stimulate the export market and in so doing, creating jobs locally. Regardless of whether or not such an action might be noble and socially responsible, it is important to remember that commodities such as oil trade in US Dollars in the international markets and a weaker Rand would negatively impact on the fuel price locally.

Example: Impact on exports

One of the industries impacted on by a strong Rand, is the South African wine industry. The strong Rand has resulted in an increase in the landed cost of the wine in foreign markets. Wines sourced from countries whose currencies have not experienced the same strengthening (appreciation) as that of the Rand, are consequently at a competitive advantage in the foreign markets.

Economic risks are therefore viewed as being a strategic type of risk and can have a long-term impact on the enterprise. These risks can also impact on the value of an exporter as future cashflows are likely to reduce on the back of a stronger Rand.

15.1.5 Other risks related to foreign currency transactions

The student should also be aware of two other risks related to foreign currency tr ns ctions:

Counterparty risk: As is seen later in this chapter, many enterprises, in trying to reduce their exposure to currency risk, will enter into hedging agreements with a hedge counterparty. Should the counterparty not perform according to the hedging agreement, then the enterprise will remain exposed to currency risk. It is therefore important for an enterprise to assess, before entering into a hedging agreement, the risk of the counterparty defaulting in future.

Dealer risk: Losses can arise for an enterprise if the dealer with whom they transact, does not perform as expected. An example of dealer risk is an instance where an enterprise needs to make a foreign payment and places an order with the international banking division of its local bank. The bank does not process the order timeously as requested. The delay in proc ssing the order may result in the foreign currency purchased by the enterprise costing it more, as the local currency has depreciated in the interim.

15.2 Different currency quotes in the currency market

The buying and selling of currency takes place in the currency markets. With the exception of certain currency derivatives, the buying and selling of currency takes place through over-the-counter (OTC) transactions.

This section takes a closer look at the different kinds of currency quotes.

15.2.1 Spot rates

A spot rate in respect of currency is the rate which applies to immediate delivery of the specified amount of currency. In essence it applies only on that given day at that given time. The currency markets make a distinction between *spot* buying and selling rates. The buying rate (also referred to as the bid price) is the rate at which a bank will *buy* currency at, from a client. On the other hand the selling rate (also referred to as the ask price) of the bank is the rate at which the bank will *sell* currency to its clients at.

Applying this practically:

Example: Selling rate

South African Ai ways purchases four new Airbus engines from Airbus manufacturers in Europe. Airbus invoices South African Ai ways in Euros. As the functional currency of South African Airways is the Rand, the airline will need to p rchase E ros from its local bank to pay Airbus. South African Airways will be selling the Rand equivalent to the bank in exchange for Euros.

At what rate will the transaction take place?

It is imp rtant to remember that when determining whether the buying or selling rate will apply, one needs to focus on what the bank will be doing. In this case the bank will be *selling* foreign currency (this is the service which the bank is offering South African Airways) and as such the transaction will take place at the *selling rate* (the ask price).

Ex mple: Buying rate

Paarl Wine Cellars has just received a Euro-denominated payment from its customers located in Europe. Paarl Wine Cellars will need to convert this Euro amount into Rand.

At what rate will the transaction take place?

In this case the bank will be *buying* foreign currency and as such the transaction will take place at the *buying rate* (bid price).

The second distinction made in the currency markets in respect of currency quotes, is between *direct* and *indirect quotes*. These can be described as follows:

In a *direct* quote, a number of units of the local currency are quoted relative to one unit of a foreign currency. For example: ZAR13,0243/GBP1 would be a direct quote as the Rand is being quoted relative to one unit of British Sterling/Pound. In this quote, the Rand (ZAR) is the 'term' or 'reference' currency and the Pound (GBP) is the 'base' currency.

The base currency is always fixed (hence it is always quoted as one unit of the specific currency). It is the term or reference currency which moves relative to the base currency. As result, the movement (gain or loss) resulting from a movement in the currency will always be in the term/reference currency. In the currency quote above, any movement or change would be a Rand mo ement.

Note: The amount of foreign currency will always be multiplied by a direct quote to convert the foreign currency to the equivalent local amount.

In an *indirect* quote, a number of units of a foreign currency are quoted relative to one unit of the local currency. For example: CHF0,1178/ZAR1 would be an indirect quote as the Swiss Franc (CHF) is being quoted relative to one unit of the local currency, na ely the Rand (ZAR).

In this currency quote above the term or reference currency would be the Swiss Franc while the Rand would be the base currency.

Note: The amount of foreign currency will always be divided by an indirect quote to convert the foreign currency to the equivalent local amount.

Standard Bank

FOREX CLOSING INDICATION RATES FOR 26 September 2012 as at 16:00

Rates for amounts up to R 200 000

Closing rate history for date : 2012-09-26 16:00:40.0 Load

		Bank Buying			Bank Selling	
Country	**Cur**	**T/T**	**Cheques**	**Foreign Notes**	**Cheques and T/T**	**Foreign Notes**
QUOTATIONS ON BASIS RAND PER UNIT FOREIGN CURRENCY						
BRITISH STERLING	GBP	13,0243	12,9940	12,9018	13,5409	13,6359
EURO	EUR	10,3547	10,3259	10,2302	10,8013	10,8313
UNITED STATES DOL	USD	8,0634	8,0271	8,0559	8,3809	8,3809
QUOTATIONS ON BASIS FOREIGN CURRENCY PER R1						
ARAB EMIRATES DIR	AED	0,4779		0,4617	0,4125	04367
ANGOLAN KWANZA	AOA				10,4652	
AUSTRALIAN DOLLAR	AUD	0,1216	0,1232	0,1226	0,1128	0,1118
BOTSWANA PULA	BWP	0,9831	0,9895	0,9831	0,8723	0,8723
CANADIAN DOLLAR	CAD	0,1265	0,1270	0,1295	0,1119	0,1119
SWISS FRANC	CHF	0,1178	0,1181	0,1288	0,1103	0,1063
CHINESE YUAN	CNY	0,8190		0,7813	0,7094	0,7370

Figure 15.2: Extract from the currency quotes published by Standard Bank

The table above indicates the rate which will apply to transactions up to an equivalent of R200 000. The rates applicable will differ depending on the form in which the foreign currency is, which could be: physical cash in the form of notes (foreign currency services do not entail buying and selling of foreign coins), foreign cheque or a foreign transfer (T/T = telegraphic transfer).

How will this table be applied, assuming a foreign payment and a foreign receipt respectively?

Example: Foreign exchange transactions

Stellenbosch Wineries has two foreign exchange transactions that need to be converted:

Transaction one: They need to settle an amount of €18 500 owing to the German Manufacturer of a machine, which they purchased from the German M nuf cturer. Stellenbosch Wineries would like to transfer the money electronically to the German Manufacturer's bank account held in Frankfurt, Germany with a local Germ n b nk.

Transaction two: A payment of CHF2 680 was received by means of a foreign cheque from a Swiss customer (debtor) of Stellenbosch Wineries.

Required:

Assuming Stellenbosch Wineries wish to make the pay ent in ter s of transaction one on 26 September 20X2 and to convert the amount from the Swiss debtor (transaction two) on the same date, what will the Rand amount of each transaction be?

Solution:

Transaction one:

As a foreign *payment* needs to be made, the service offered by the bank is the *selling of foreign currency* to Stellenbosch Wineries. Therefore the bank's *selling rate* (ask price) will be used. As the payment will be made by means of an electronic transfer, the following rate will apply: R10,8013/€1. Will the Euro amount be multiplied or divided by this rate in order to convert the Euro amount to Rand?

As the foreign exchange quote between the Rand and the Euro is a *direct quote* in the currency market in South Africa (i.e, quoted as the number of and per Euro 1), we will *multiply* by the rate as follows:

EUR18 500 × ZAR10,8013 = 199 824,05

Transaction two:

As a foreign receipt needs to be converted into Rand, the bank will in this case be *buying* the foreign amount from Stellenbosch Wineries, and therefore the bank's *buying rate* (bid price) will be used. Which rate will apply? As the Swiss Franc amount is in the form of a foreign cheque, the rate applicable will be: CHF0,1181/ZAR1.

In this case, the foreign ex hange quote is between the Swiss Franc (CHF) and the Rand which is an *indirect quote* (the rate is quoted as the number of Swiss Franc per Rand 1). Due to this being an indirect quote, we will *divide* the Swiss F anc amount by the exchange rate as follows:

$$\frac{\text{CHF2 680}}{\text{CHF0,1181}} = \text{ZAR22 692,63}$$

You will also need to be able to interpret the following notations, which we illustrate using information contained in the table earlier:

ZAR/EUR1: ZAR10,2302 – ZAR10,8313

The above also indicates the buying and selling rates between the Rand and the Euro. Which amount reflects which rate? As the Rand is being quoted relative to one unit of the Euro, the quote is a *direct quote*. Applying the following principle to a direct quote, one can identify the buying and selling rate: in respect of a direct quote, the bank always *buys low and sells high*. This means then that the ZAR10,2302/EUR1 is the *buying rate* and the ZAR10,8313/EUR1 is the *selling rate*.

What about in the following case? The quote is CHF/ZAR1: CHF0,1288 – CHF0,1063.

The quote above is referred to as an *indirect quote* as the Swiss Franc is being quoted relative to one unit of the Rand, the latter being the local currency. In respect of an indirect quote, the bank always *sells low and buys high*. This means that the CHF0,1288/ZAR1 would be the buying rate and the CHF0,1063/ZAR1 would be the selling rate.

The bid-ask spread or margin

Referring to the table provided earlier (Figure 15.2), it can be seen that the bank's ZAR/EUR1 buying rate (for T/T transactions) and the bank's ZAR/EUR1 selling rate (cheques and T/T transactions) is ZAR10,3547/EUR1 and ZAR10,8013/EUR1 respectively. Why do the two rates differ?

The difference between the buying and selling rates is due to the existence of the *bid-ask spread* or the profit margin which the foreign currency dealer makes through trading in a particul r currency. The size of the spread will depend on a number of factors, including–

the volume of transactions in the local currency market in that particular currency; and

the volatility of the currencies represented in the particular exchange rate.

Where the currencies are very volatile the spread tends to increase. The v lume of transactions in the currency market tends to have the opposite effect. The larger the volume f transactions in a particular currency, the lower the spread tends to be.

Other important rates: mid-rates and cross-rates

Before having a look at forward rates quoted in the curr ncy markets, two other terms need to be identified and explained:

Mid-rates	Cross-rates
The *mid-rate* is the average rate between the buying and selling rates of a particular currency quote – alternatively stated it is the mid-point between the two quotes and is calculated as follows: $\frac{\text{buying rate} + \text{selling rate}}{2}$ = mid-rate You need to be aware of the above calculation however you will not be expected to apply this rate regularly. The mid-rate of the Rand/Euro currency quotes explained above would be:	As all global currencies will at a minimum be quoted relative to the US Dollar, one can determine a currency quote between any two currencies using the cross-rate mechanism. For example: Assuming the ZAR/USD1 buying rate is ZAR8,0559 while the buying rate for the GBP/USD1 is GBP0,66623, calculate the buying rate in terms of ZAR/GBP1: As ZAR8,0559 = USD1 = GBP0,66623 then ZAR8,0559 = GBP0,66623 resulting in:
$\frac{\text{ZAR10,2302} \quad \text{ZAR10,8313}}{2}$ = ZAR10,5308/EUR1	$\frac{\text{ZAR8,0559}}{\text{0,66623}}$ = GBP1 or ZAR12,0918/GBP1 In this example both quotes needed to be in terms of USD1 to use the cross-rate mechanism.

Figure 15.3: Mid-rates and cross-rates

15.2.2 F rward rates

If a sp t rate is the rate applicable today for immediate delivery of currency, what does a forward rate refer to? A forward rate is in essence a rate determined and quoted 'today' for settlement on a future date. The various ways of predicting forward rates are discussed later in this chapter under the so-called 'parity theories'.

A forward rate will be quoted at either a discount or premium to the spot rate. If quoted at a discount, the currency (base currency) in which the exchange rate is quoted, is expected to depreciate (lose value) in future. Should a currency (base currency) be quoted at a premium, then it indicates that the base currency is expected o appreciate (increase in value) in future. The example below illustrates:

Example: Premium or discount?

The following information is available in terms of the Rand/US Dollar exchange rate on 25 September 20X2:

	ZAR/USD1
Spot rate	8,3809
Forward rate (90 days)	8,5060

The 90-day forward rate is the forward rate for 24 December 20X2.

Required:

Identify whether the US Dollar (USD) is being quoted forward at a premium or discount relative to the South African Rand (ZAR).

Solution:

The base currency is the US Dollar in this case. It is evident that the 90-day forward rate for the ZAR/USD1 is more than the spot rate on 25 September 20X2. This indicates that the Rand is expected to weaken and in turn the US Dollar is expected to strengthen, in the forward market. The US D llar is therefore being quoted at a premium to the South African Rand in the forward market.

What does this imply about the South African Rand? The above quote is a US Dollar quote given that the US Dollar is the base currency. The South African Rand is expected to depreciate in future and hence the forward market will be quoting ZAR at a discount to the US Dollar.

It is important that one be able to calculate the annual discount or premium that a currency is being quoted at. The discount or premium will be calculated by determining the difference between the spot and forward rates for a particular currency quote, converting it to a percentage and ultimately annualising it. This will indicate theannual weakening expected in the currency being quoted at a discount or the expected annual strengthening in the currency being quoted at a premium.

The annualised premium that the US Dollar is being quoted at in the preceding example will be calculated as follows (this is a *direct quote* in South Africa):

Formula to annualise a premium/(discount):

$$\frac{\text{Forward rate} - \text{Spot rate}}{\text{Spot rate}} \times \frac{360}{n} \times 100 = \ldots\%$$

Note that the annualisation of the premium above is based on days. The annualisation can however also be based on months. Based on days, the answer is:

$$\frac{\text{ZAR8,5060} - \text{ZAR8,3809}}{\text{ZAR8,3809}} \times \frac{360}{90} \times 100 = 5{,}97\%$$

The US Dollar is quoted at an annual premium of 5,97% to the South African Rand (ZAR).*This means that the spot rate at whi h the US Dollar is being quoted at relative to the South African Rand is expected to appreciate by 5,97% over the ou se of the year*. It is important to note that the premium is positive.

The annualised discount that the South African Rand is being quoted at in the preceding example will be calculated sing the following formula (as the currency quote is in US Dollar terms, the formula needs to change in order to express the premium or discount in ZAR terms):

$$\frac{\text{Sp t rate} - \text{Forward rate}}{\text{F rward rate}} \times \frac{360}{n} \times 100 = \ldots\%$$

$$\frac{\text{ZAR8,3809} - \text{ZAR8,5060}}{\text{ZAR8,5060}} \times \frac{360}{90} \times 100 = (5{,}88\%)$$

As expected, the South African Rand is being quoted at a discount. The answer using the formula is a negative number hence it is shown in brackets.

How is the forward rate calculated?

One way of calculating a forward rate would be to use a spot rate and to adjust the spot rate for the forecasted discount or premium applying to the currency quote. As a forward rate applies to a specific date in future, the discount or premium needs to apply to the specific time interval between spot ('today') and the date to which the forward rate will apply.

The following example illustrates the concept of using a discount or premium (as applicable) supplied by a foreign exchange dealer such as the foreign exchange division of a commercial bank, and adjusting the spot rate accordingly.

Example: Calculating the forward rate using spot rate and adjusting it for a discount or premium

The following information is provided in respect of the ZAR/USD1 quoted in the South African currency market on 25 September 20X2:

	ZAR/USD1
Spot rate (bank's selling rate)	8,3809

The foreign exchange division of a local bank informs you that the annual premium at which the US Dollar is being quoted forward relative to the South African Rand is 5,98%.

Required:

Calculate the forward rates (ZAR/USD1) for the following dates:

25 September 20X3; and

24 December 20X2.

Solution:

As 25 September 20X3 is one year on from the date of the spot rate which will be used as the basis for the calculation of the forward rate, no *time adjustment* needs to be made to the premium. The forward rate will therefore be:

Spot rate + premium or – discount

R8,3809 + (5,98% of R8,3809) = 8,8821 (rounded to *four decimals*)

The spot rate is quoted in US Dollars and the premium is also in US Dollar terms. The spot rate is adjusted by *adding on* the effect of the forecasted premium.

In calculating the premium adjustment careful consideration must be given to the days:

The number of days between the spot date (25 September 20X2) and the forward date (24 December 20X2) is 90 days. The annual premium will need to be adjusted accordingly.

$$R8{,}3809 + \left(R8{,}3809 \times 5{,}98\% \times \frac{90}{360}\right) = R8{,}5062 \text{ (rounded to } \textit{four decimals}\text{)}$$

(Note that this fo ward rate differs slightly from the one given in the previous examples. The forward rates a e both for the same date. The reason is due to rounding differences.)

Alternatively the bank could quote the premium as a point (decimal) difference in a particular currency. In the previo s example, the bank could have quoted that US Dollar at a premium of ZAR0,1253/USD1 for 24 December 20X2. What would the forward rate be in that case? Following a similar process: R8,3809 + R0,1253 = R8,5062.

The student will also need to be able to deal with the following situation.

Examp e: Forward selling rate

The following spot exchange rate has been given by the bank (ZAR/USD1): ZAR8,0559 – ZAR8,3809 with the US Doll r being quoted forward at a premium of ZAR0,0500 – ZAR0,1253 for 24 December 20X2.

Required:

What is the forward selling rate for 24 December 20X2 that the bank is quoting?

Solution:

Firstly, *which rate represents the bank's spot selling rate*? Remember, the quote above is a *direct quote* with the bank always selling high. Therefore ZAR8,3809 would be the bank's selling rate.

Secondly, *which premium will apply*? In the notation ZAR0,0500 – ZAR0,1253, the first value quoted would be the premium for the buying rate of the bank with the ZAR0,1253 being the premium relating to the selling rate (note that the order that the premium is quoted in the same order in which the buying and selling rates are quoted). Therefore the forward rate will be:

ZAR8,3809 + ZAR0,1253 = ZAR8,5062

If a currency is quoted forward at a discount, then the discount would be *deducted* from the relevant spot rate to calculate the forward rate.

15.3 Theories for determining forward exchange rates

There are two theories that the student is required to address, namely the interest rate parity theory and the purchasing power parity theory. These will be dealt with in turn.

15.3.1 Interest rate parity theory

This theory states that the difference between the spot and forward rates for a currency quote can be attributed to the difference between the expected int r st rat s (known as the interest differential) of the two countries whose currencies are present in a particular xchange rate, during a particular period of time. Countries with higher interest rates normally have higher inflation rates and weaker currencies (relatively speaking), whilst countries with lower inflation rates normally also have lower interest rates prevailing and stronger currencies (relatively speaking).

If interest rate parity exists then a very important principle needs to be noted – all else being equal, you are not likely to gain by borrowing in one country (normally the country with a lower interest rate) and investing in another country (normally the country with higher deposit rates) as what is gained through the interest rate mechanism will in all likelihood be lost through currency differences. The country with the higher deposit rates will have a weaker currency, which will be expected to depreciate in future. The gain from borrowing at a lower interest and investing at a higher interest rate will in all likelihood be eliminated through a foreign exchange loss on the investment in future.

In terms of interest rate parity theory, the following formula exists:

$$\text{Forward rate} = \text{Spot rate} \times \frac{1 + \text{interest rate in reference currency country}}{1 + \text{interest rate in base currency country}}$$

Please note that int r st rate parity is normally used to determine forward rates over the short- term. To determine medium- to long r t rm rates, the purchasing power parity theory (which is discussed in the next section), is used.

The example below takes a simplified view of this theory. (Note: Later in the chapter, money-market hedges, which are based on the interest rate parity theory are discussed. At that point this theory will be revisited.)

Example: Forward rate using interest parity principles

Assume the following spot rate applies in the South African currency market on 25 September 20X2:

	ZAR/USD1
Sp t rate	8,3809

The following details are known regarding interest rates in South Africa and the United States of

America: South African interest rates = 8% per annum

United States interest rates = 2% per annum.

Required:

Using interest rate parity principles, determine a forward rate 90 days hence (i.e. for 24 December 20X2).

Solution:

Firstly, ***'disentangle' the spot rate given***: ZAR8,3809/USD1 (Note that the Rand (ZAR) is the term/reference currency and the Dollar (USD) is the base currency.)

Now apply the formula:

$$\text{Forward rate (ZAR/USD1)} = R8{,}3809 \times \frac{1 + (0{,}08 \times \frac{90}{360})}{1 + (0{,}02 \times \frac{90}{360})} = \text{ZAR}8{,}5060$$

The question that begs asking is whether one would ever gain through borrowing in one country and investing in another? Does as an *arbitrage* opportunity (the chance to make a risk-free profit through exploiting price differences between two or more markets) exist? Let us have a look at the following scenario:

Assume that the US Dollar is being quoted forward at a premium of 5% relati e to the South African Rand while the interest differential between South Africa and the United States of America is 5% (i.e. South African interest rates exceed those of the United States of America by 5%). Assume further that an investor intends borrowing USD from a bank in the United States of America, exchanging the USD into Rand and investing the Rand in a South African bank. In so doing, the investor would gain 5% per annum through investing in South Africa at a higher interest rate than is being borrowed at in the United States. However, as the US Dollar is expected to strengthen by 5% per annum against the Rand, the interest rate gain is eliminated through the Rand (in which the interest will be earned) depreciating against the US Dollar. The investor is no better or worse off!

How would the investor's attitude change if the int r st rate differential was 6% while the premium that the US Dollar is being quoted at forward relative to the Rand is 5%? Now it would make sense for an investor to:

On day 1:

Borrow money in the United States of America (at the lower interest rate).

Convert the US Dollar amount into South African Rand.

Invest the Rand amount (at the higher interest rate) in South Africa.

Reduce the risk of losing value at the end of the transaction by hedging their position – through buying forward cover and fixing the rate at which they will sell Rand and buy US Dollars at on the future date.

If we are considering this transaction over the course of a year then:

1 Year from now:

The South African investment pays the investor one year's return.

The principal sum and interest thereon are converted into US Dollars (in terms of the forward cover bought it will be at a more favourable rate than the market rates at that stage).

The US Dollar amount on conversion should exceed (>) the US Dollar borrowing at that point (principal sum plus one year's interest at US interest rates thereon).

Assuming then that all possible investors had access to this information, then clearly every investor would try to take advantage of this arbitrage opportunity and borrow funds in the United States of America, invest them in South Africa and repatriate the proceeds back to the United States of America at a later date. Sounds too good to be tr e, b t assuming that there is an efficient market the promised gains will not materialise. Why?

The arbitrage opportunity is a temporary one – the following actions will be taken in the United States of America and S uth Africa respectively:

With the inflow of funds into South Africa, the spot ZAR/USD1 exchange rate on day 1 should see the Rand trengthening and the US Dollar weakening as the USD are sold (causing an excess of USD on the market) and converted to Rand (causing a shortage of ZAR on the market).

In the forward market, the US Dollar will *appreciate* given the demand which investors have to preserve the value of their investments and to limit the effect of US Dollar appreciation in future. In short, the investor does not want the USD to appreciate, as when the time comes to convert the Rand back to USD they will have to use more Rand to acquire USD. As investors buy US Dollars forward to hedge themselves, the US Dollar strengthens in the forward market. This is exactly what we had expected; the USD was being quoted forward at a premium. The USD premium will now increase given the demand for the USD in the forward market.

The USA authorities, given the outflow of funds from the USA, will increase interest rates to stem the borrowing of funds in the USA with the subsequent movement offshore.

In South Africa, the authorities (South African Reserve Bank) will react by reducing interest rates given the inflow of funds from abroad.

The result of the last two bullets is that the interest rate differential will shrink, and together with the increase in the forward USD premium, will restore interest parity to the market.

15.3.2 Purchasing power parity theory

This theory states that the difference between a spot and forward rate in the currency markets of the two countries can be explained by the inflation rate differential. In other words, price level changes in the two countries are represented in the exchange rate. Whereas interest rate p rity theory attempts to explain the impact of interest rate changes on exchange rates in the short-term, purchasing power parity theory applies to longer term changes in exchange rates.

The formula for the purchasing power parity theory is very similar to the interest rate parity theory formula:

$$\text{Forward rate} = \text{Spot rate} \times \frac{1 + \text{inflation rate in reference currency c untry}}{1 + \text{inflation rate in base currency country}}$$

Example: Forward rate using purchasing parity principles

Assume the following spot rate applies in the South African curr ncy market on 25 September 20X2:

	ZAR/USD1
Spot rate	8,3809

The following details are known regarding inflation rates in South Africa and the USA respectively:

South African inflation rate = 6% per annum.

United States inflation rate = 1,5% per annum.

Required:

Using the purchasing power parity theory, determine a forward rate for 24 December 20X4 (i.e. two years hence).

Solution:

Firstly, ***'disentangle' the spot rate given*****:** ZAR8,3809/USD1 (the ZAR is the term/reference currency and the USD is the base curr ncy).

Now the formula can be applied:

$$\text{Forwa d ate (ZAR/USD1)} = \text{R8,3809} \times \frac{(1{,}06)^2}{(1{,}015)} = \text{ZAR9,1405}$$

It is important to note from the example above a forward rate for a future date in two years' time, has to be calculated. As a consequence, the inflation rates have been squared in the formula. The reason for this is that inflation has a compounding effect. So for a forward rate two years from now, the inflationary impact will need to be squared and not doubled.

The purchasing power parity theory is closely linked to the *law of one price*. The law of one price allows one to calculate the price of a single commodity in one country by using the price of the commodity in another country and adjusting it for the relevant exchange rate. For instance: if a Big -Mac burger costs R28 in South Africa, and the ZAR/USD1 exchange rate is ZAR8,2500 today, then what would the US Dollar price of a Big-Mac burger in New York be?

$$\text{Solution: } \frac{\text{R28}}{\text{R8,2500}} = \text{USD3,39}$$

If one now was to say that a Big-Mac costs R28 in Johannesburg (South Africa) and USD4 in New York (USA), what could one now deduce about the implicit ZAR/USD1 exchange rate between the two countries?

The aforementioned results in a theoretical exchange rate (ZAR/USD1) of: $\frac{\text{ZAR28}}{\text{USD4}}$ = ZAR7,0000/USD1

This would indicate that the South African Rand currently is undervalued if the exchange rate in the currency market is ZAR8,2500/USD1 as opposed to a theoretical exchange rate of ZAR7,0000/USD1.

15.3.3 International Fisher Effect

Essentially, the International Fisher Effect integrates the interest rate parity theory and purchasing power parity theory into a single model. According to the International Fisher Effect, the difference between spot and forward rates can be attributed to the expected changes in nominal interest r tes. This model states that the spot rate is expected to change in future (going forward) to the same extent but in the opposite direction to the expected change in nominal interest rates. *The real rates of return earned in the two respective countries equalise, as changes in inflation rates normally result in changes in the nominal interest rates which in turn results in the spot exchange rate changing.* Two very important aspects that this model stresses, which you should be aware of are:

- A country with relatively high interest rates will nor ally experience relatively high levels of inflation and will have a weaker currency.
- A country with relatively low interest rates will nor ally experience relatively low levels of inflation and will have a stronger currency.

The International Fisher Effect can be expressed as follows:

$$\frac{1 + \text{interest rate in reference currency country}}{1 + \text{interest rate in base currency country}} = \frac{1 + \text{inflation rate in reference currency country}}{1 + \text{inflation rate in base currency country}}$$

15.3.4 Expectations theory

This theory also attempts to explain the difference between spot and forward exchange rates. It proposes that it is the expectations relating to exchange rates, interest rates and other factors impacting on the exchange rates, which explain the change in the spot rate in future.

If we expect the local currency to weaken, we would typically want to pay our foreign creditors earlier, given the expectation of a weakening local currency. In buying foreign currency and in the process selling off local currency, the local currency weakens. This depreciation is as expected. In effect the way in which participants in the market react to expectations in the market, results in the expectation becoming a reality.

15.4 Factors influ ncing exchange rates

Before we have a look at mitigating or reducing currency risk through different types of currency hedges, we need to reflect on the fa tors which impact on exchange rates and through the changes in these rates how they ultimately d ive cu ency risk. These factors include amongst others the following:

Imports: The economic principle of supply of, and demand for, a particular currency. If South African Airways for instance purchases (imports) a new fleet of aircraft from Airbus Manufacturers in Europe and with the acquisition taking place in Euros, then on the settlement date, given the high value of the transacti n, the Rand is likely to weaken and the Euro to strengthen, given the demand for Euros and ver supply of Rand in the currency market, on settlement of the transaction.

Exports: Similarly, when South African exporters, who invoice their foreign customers in foreign currency, receive payment from these foreign debtors of theirs, they will need to convert the foreign currency into Rand. On the day on which they sell this foreign currency to a local bank in exchange for Rand, a demand for the Rand arises, with an oversupply of foreign currency arising in the market. The result: the Rand will strengthen and the foreign currency will weaken.

Interest rates: In the earlier discussion of interest rate parity theory it was pointed out that interest rates also impact on exchange rates. In terms of this theory, it is the difference in interest rates that results in the spot exchange rate changing in future. From time to time, an arbitrage opportunity can exist in the

market whereby it is worthwhile for investors to borrow in one country (at a lower interest rate) and to invest in another country (at a higher interest rate). This arrangement only works when the difference in interest rates is greater than the discount at which the latter country's exchange rate is being quoted in the market. The country in which the investment will be made experiences a demand for its currency, and will see the spot exchange improving.

If a country's central bank (such as the South African Reserve Bank in the case of South Africa), increases interest rates for instance to curb inflationary pressures in the country, this will create a demand for the local currency from foreign investors who see the higher interest rates as a good investment opportunity. In buying up local currency, this drives the demand for local currency resu ting in a strengthening of the local currency (strengthening of the spot rate).

Inflation rates: An increase in inflation rates results in local buying power reducing, which in turn will lead to a weakening of the local currency as investors sell off investments denomin ted in local currency so as to protect value by investing their funds elsewhere in the world. The opposite will occur where inflation rates decrease. If you refer back to our discussion of purchasing price parity theory, you will see that it is the difference in inflation rates which causes spot rates to change in future.

- *Intervention by the central bank*: In certain countries, it is the p licy f the central bank that monetary policy may dictate, that in order to protect the currency f that c untry the central bank may, from time to time, intervene in the currency market by either buying local currency and in doing so, sell off reserves of foreign currency (often held in US Dollars) so as to strengthen the local currency. Alternatively, the central bank may wish to weaken the local currency to create a competitive advantage for local exporters. It can do so by buying foreign currency and therefore investing in foreign reserves. This will weaken the local currency.

  Speculative transactions: In the free market system, as long as foreign exchange regulations permit it, speculators may buy and sell currency in order to make a speculative profit. When the speculator targets a specific currency and starts buying it, a demand for that currency arises and the currency is expected to strengthen. When the speculator at a later date starts selling off their stock pile of said currency, an oversupply of the currency arises in the currency market, resulting in the currency weakening.

  Investor sentiment: Sentiment in the market in respect of a particular country will also impact on the exchange rate. This will very often be linked to factors such as political risk. Incidents in a country, such as long protracted strikes or strikes which turn violent, are viewed in a negative light by foreign investors, who sell off local investments and invest in other parts of the world in what they see to be safer investments. This results in a depreciation of the local currency.

  Local economic conditions: The health of the local economy, as evidenced by key economic indicators, will also impact on exchange rates. The key economic indicators, and the impact thereof on the local currency, are discussed briefly below:

  – *Current account:* The current account balance reflects the *net amount of all inflows into South Africa and all outflows from South Africa* and is derived from the value of all goods and services exported from a country and the value of goods and services imported into a country. Transfer payments into and out of a country are also taken into account in the current account. Transfer payments into South Africa would in lude amounts payable to foreign employees working in South Africa paid by the foreign government or entity, as well as payments, for instance, to the South African government from a fo eign government. Transfer payments out of South Africa would include payments to South Af icans wo king overseas but paid from South Africa, payments by the South African government to foreign institutions such as the United Nations (UN), International Labour Organisation (ILO) and World Health Organisation (WHO). A drop in the current account balance will result in a weakening of the l cal currency whereas a strengthening in the current account balance will result in the local currency strengthening. Within the current account, the *trade balance* is also calculated. The trade balance indicates the difference between the export from and imports into a country. A *trade deficit* (exports < imports) will generally see a weakening in the value of the local currency.

  – Capital account: Capital inflows into or outflows from a country are accounted for in the capital account of that country. Obviously, where more capital is flowing into a country than out of the country, it will result in an appreciation of the local currency. One of the main objectives of South African exchange controls in the past has been to curb capital outflows from South Africa. This protectionist policy resulted in the Rand trading at stronger levels in the past and a sentiment that the Rand is not able to derive its true value.

    The difference between the *current and capital accounts* is known as the *official reserves* of the country. As the official reserves increase, it is likely that the local currency will strengthen.

These three accounts discussed above are collectively referred to as the *balance of payments*. An improvement in the balance of payments will be reflected in a strengthening of the local currency, or *vice versa*.

The following diagram ties together all of the factors identified above and will assist you in remembering them:

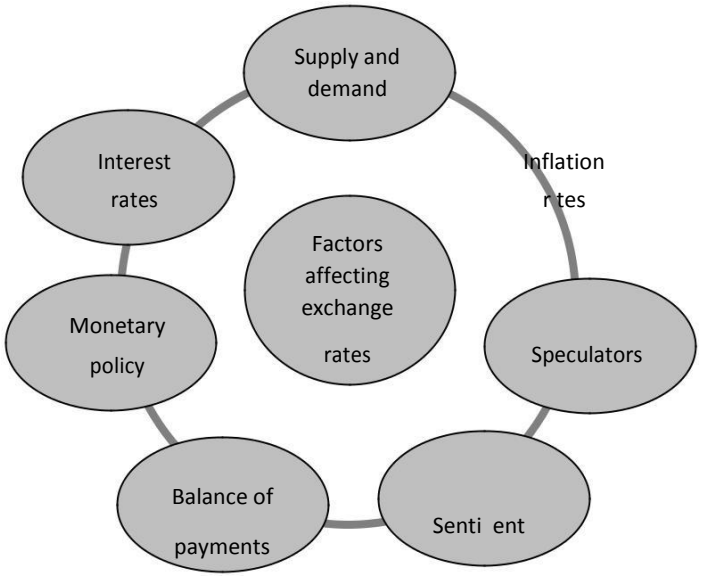


Figure 15.4: Factors affecting exchange rates

15.5 Hedging of currency risk

In preceding sections, the existence of three forms of currency risk in the market is identified as –

transaction risk;

translation risk; and

economic risk.

An enterprise will generally want to *reduce* its exposure to these risks. The technique applied is what is known as *hedging* which in risk-management terms is seen to be a risk reducing strategy.

Various hedging strategies exist:

A *defensive strategy* which entails hedging any foreign exchange transaction – whether currency risk exists in resp ct of the transaction or not. This is a risk-averse strategy and is very costly.

A *predictive strat gy* which entails only identifying those transactions where currency risk exists and only hedging them. This is a more cost-effective approach than a defensive strategy.

A *maximum limit strategy* which entails setting a maximum limit of foreign currency exposure. In short, the ente p ise will determine the amount of foreign exchange exposure it is willing to tolerate. It *absorbs* any cu ency losses on this amount. However, exposure beyond this amount is hedged. For example, Company A is willing to at any time be exposed to the equivalent of R5 million's worth of foreign currency transactions. On 2 October, the treasury division of Company A measures that it is exposed to R8 million's worth of foreign currency transactions. Company A will then hedge the equivalent of R3 million of the R8 milli n in terms of this type of hedging strategy. The upside to this strategy is that a limit can be set to the c st f hedging. The downside is you can suffer currency losses on the portion (the maximum limit) not hedged.

An *off etting or matching strategy* which entails matching foreign receipts denominated in the same currency as the foreign payment and only hedging the net amount, if currency risks exists in respect of the net amount. This strategy is also known as natural hedging.

A diversification strategy applies particularly to economic risk exposure. Enterprises with a diverse foreign customer and foreign supplier base are less susceptible to currency risk as not all currencies move in the same direction at the same time. Similarly, enterprises importing and exporting in a range of currencies will also hedge themselves to a certain extent, as would having foreign assets and foreign debt denominated in a range of foreign currencies.

As mentioned under the offsetting or matching strategy, an enterprise will as far as possible always apply matching of foreign receipts and foreign payments, foreign assets and foreign debt, where they are denominated in the same foreign currency. The reason being that this form of hedging, known as a *natural hedge* arises automatically from the operations, investing and financing activities of the enterprise and is free of charge – the hedging does not carry a cost and as such hedging costs will be limited. Natural hedging will be used as far as possible to reduce the cost of hedging.

Before discussing the more complex hedges, the table below elaborates on a few basic forms of hedging to reduce currency risk.

Form of risk reduction	Explanation
Currency of invoice	A local exporter may decide to invoice their foreign sales in Rand and not in foreign currency. In doing so, they are passing the exposure to transaction risk on to the foreign customer. The benefit is th t the loc l supplier does not incur hedging costs – the local supplier might howe er lose foreign customers who are not willing to take on the foreign exchange exposure. A local importer might convince their f reign suppliers to invoice all goods/services supplied to the l cal imp rter, in Rand rather than in foreign currency. The local importer will benefit from not being exposed to foreign currency risk.
Leading and lagging	A local enterprise may elect to pay its foreign suppliers earlier than the credit terms granted by them require, thereby reducing its transaction risk. They will effectively buy curr ncy imm diately (at a cheaper rate) than they would otherwise have done, had th y paid their foreign creditors later. This is known as *leading*. Another form of leading is convincing foreign debtors to pay earlier than the credit terms granted to them require, if the expectation is that the local currency of the enterprise is going to strengthen against the currency of the foreign debtor in future. This reduces currency risk but would come at the cost of either having to offer a discount or souring the relationship with the foreign debtor (a strategic risk for the enterprise). *Lagging* on the other hand entails delaying a foreign payment if it is expected that the local currency is going to strengthen against the foreign currency, or delaying a foreign receipt (getting a foreign debtor to rather pay later). The latter would be the case where the local currency is expected to weaken in future.
Netting	This occurs in respect of inter-company transactions. Amounts owing by divisions in a group are typically matched against amounts owing to the different divisions. The result is that only the net amounts owing by or owed to a particular division need to be settled. This reduces the currency risk exposure as only the net amount needs to be hedged, as well as reducing bank charges on foreign currency transactions as only the *net amount* needs to be purchased or sold. Two important requirements exist for netting to be effective: l Netting will be more effective where a *centralised treasury division* exists. l One single currency will need to apply to all transactions – the functional currency of the enterprise (or the US Dollar) will be applied, with all foreign amounts being converted into this single currency in order for netting off to occur.

Figure 15.5: Forms of risk reduction

15.6 Money-market hedges

A money-market hedge entails making use of money market instruments (short-term borrowing facilities and short-term investments) to create or manufacture a foreign currency hedge. Money- market hedges are based on interest rate parity theory, which states that the spot exchange rate will change in future, given the interest rate differential between the two countries involved in the exchange rate.

Money-market hedges can be cheaper than other forms of hedging given that currency dealers are by-passed when final cashflow settlement of the transaction needs to take place.

Setting up a money- market hedge will differ depending on whether the objective of the money-market hedge is to hedge a foreign receipt or foreign payment. These are discussed separately below.

15.6.1 Money-market hedges: hedging a foreign payment

In setting up a money-market hedge, an enterprise will effectively borrow money in one currency, and immediately thereafter (on day 1 of the transaction) convert the borrowed funds into a different currency and invest the funds in a different country.

Where a foreign payment is to be made, it would make no sense borrowing funds overseas, converting the borrowed funds into Rand and investing the funds locally in South Africa. The foreign exchange risk remains – it is merely shifted from the foreign creditor to the foreign borrowing. The process is depicted diagrammatically below:

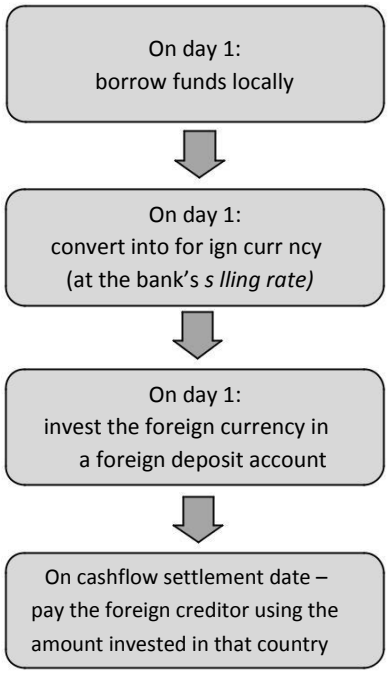


Figure 15.6: Hedging foreign payments using money-market hedges

The diagram above needs to be applied in the example which follows.

Example: Money-market hedge – foreign payment

ABC Limited ('ABC') is a lo al South African company with the South African Rand as functional currency. ABC imports a component that it uses in its local manufacturing process, from a United States supplier. On 26 September 20X2 the company received an invoice for USD100 000 payable on 25 November 20X2.

Assume the following spot rate applies in the South African currency market on 26 September 20X2:

	ZAR/USD1
Sp t rate (bank's selling rate in South Africa)	8,3809

The f ll wing details are known regarding interest rates in South Africa and the United States of America:

South African borrowing rates (for a 60-day borrowing) = 8% per annum

South African investment rates (for a 60-day investment) = 4% per annum

United States borrowing rates (for a 60-day borrowing) = 2% per annum

United States investment rates (for a 60-day investment) = 1% per annum.

Interest on the borrowings and investments is determined and added to the borrowing/investment at the end of the term.

Required:

Using a money-market hedge, determine:

The Rand-amount of the payment on 25 November 20X2.

The effective exchange rate applicable to the transaction on 25 November 20X2.

Solution:

Setting up the hedge	Calculations
On 26 September 20X2 ABC will borrow funds locally in South Africa. *How much needs to be borrowed?*	As interest will only be added at the end of the period an 'n' of 1 is used.
On 25 November 20X2 ABC needs USD100 000 in the investment account in the USA. *How much does ABC need to invest on 26 September 20X2 for 60 days*, which will earn a return of 1% per annum, so that on 25 November 20X2, USD100 000 is available?	*Calculation of present value* Using the following inputs into your calculator: FV = USD100 000; n = 1; i = 1% × $\frac{60}{360}$; COMP PV ***Note: if you have an HP then you need to set the P/YR to 6*** PV = USD99 833,61
This needs to be converted into South African and at the *bank's selling rate* on 26 September 20X2	Bank's selling rate is used as ABC will need to buy USD. USD99 833,61 × ZAR8,3809/USD1 = ZAR836 695,51
ABC will need to borrow ZAR836 695,51 on 26 September 20X2 from a local bank. *What will the amount of the South African borrowing be on 25 November 20X2*?	On 26 November 20X2 the SA borrowing's value will be: PV = ZAR836 695,51; n = 1; i = 8% × $\frac{60}{360}$; COMP FV FV = ZAR847 851,45
The effective exchange rate 'manufactured' on 25 November 20X2 is:	ZAR/USD1: $\frac{\text{ZAR847 851,45}}{\text{USD100 000,00}}$ = ZAR8,4785/USD1

The investment in US ollars will yield precisely the USD100 000 required to pay the US creditor on 25 November 20X2 so the transaction risk has been eliminated. On 25 November 20X2 the investment will yield a Rand amount so no transaction risk exists on this leg of the money-market hedge either. The only risk which does exist is that int r st rat s could change after setting up the money-market hedge. As the money-market hedge will be short-term in nature, the interest rates on the borrowing and investment can be fixed up-front to remove the possible interest rate risk which could arise.

Having had a look at setting up a money-market hedge using interest rate parity theory principles, these principles will now be applied to the interest parity formula referred to earlier. When setting up a money-market hedge to hedge a *foreign payment*, it will be recalled that money was borrowed locally, converted at the bank's selling rate and invested abroad. Using the information provided in the example above, the rate of exchange is derived as follows:

$$\text{ZAR8,3809} \times \frac{1 + (0{,}08 \times \frac{60}{360})}{1 + (0{,}01 \times \frac{60}{360})} = \text{ZAR8,4785/USD1}$$

This is identical to the rate calculated when setting up a money-market hedge – it is the bank's selling rate which was calculated.

15.6.2 Money-market hedges: hedging a foreign receipt

In this case, where a foreign amount is to be received in future which the receiving enterprise would like to hedge using a money-market hedge, it would now make sense to borrow funds overseas as the amount owing on the foreign borrowing can be repaid using the foreign receipt denominated in the same currency. If the funds are now borrowed overseas then they would need to be invested locally in South Africa in terms of a money-market hedge. To eliminate currency risk, the money-market hedge will be set up as follows:

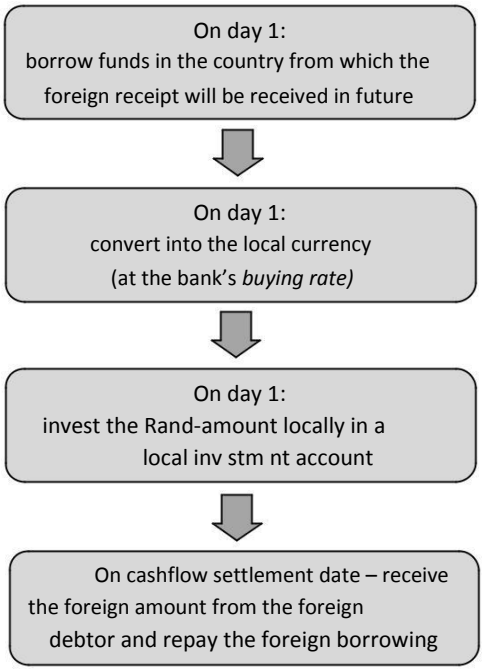


Figure 15.7: Hedging foreign receipts using money-market hedges

The example below illustrates how a money-market hedge is set up to hedge a foreign receipt.

Example: Money-market hedge – foreign receipt

ABC Limited ('ABC') is a local South African company which exports goods to customers based in the United States of America. As per the sales agreement entered into with the United States customers, these customers are invoiced in US Dollars for all goods sold to them and they are granted 60 days credit from the date of sale.

On 26 September 20X2, ABC sold USD50 000 worth of goods to a customer based in Dallas, Texas, and invoiced them immediately.

Assume the following spot rate applies in the South African currency market on 26 September 20X2:

	ZAR/USD1
Spot rate (bank's selling rate in South Africa)	8,3809
Spot rate (bank's buying rate in South Africa)	8,0559

The f ll wing details are known regarding interest rates in South Africa and the United States of America:

S uth African borrowing rates (for a 60-day borrowing) = 8% per annum

South African investment rates (for a 60-day investment) = 4% per annum

United States borrowing rates (for a 60-day borrowing) = 2% per annum

United States investment rates (for a 60-day investment) = 1% per annum.

Interest on the borrowings and investments is determined and added to the borrowing/investment at the end of the term.

Required:

Using a money-market hedge, determine:

The Rand-amount of the receipt on 25 November 20X2

(b) The effective exchange rate applicable to the transaction on 25 November 20X2.

Solution:

Setting up the hedge	**Calculations**
On 26 September 20X2 ABC will borrow funds in the United States of America. *How much needs to be borrowed?* On 25 November 20X2, ABC expects to receive USD50 000 from the US debtor. ABC will therefore have USD50 000 available on said date to repay the US borrowing. Interest will be added to the capital on 25 November 20X2 such that the *total outstanding* on the borrowing after 60 days will be USD50 000. Hence ABC will need to borrow the present value of this amount on 26 September 20X2 in the USA. This needs to be converted into South African and at the *bank's buying rate* on 26 September 20X2. ABC will invest ZAR401 456,81 on that date with a local South African bank. What will the amount of the South African investment be on 25 November 20X2? Effective exchange rate on 25 November 20X2 is:	As interest will only be added at the end of the period an 'n' of 1 is used. *Calculation of present alue* Using the following inputs into your calculator: FV = USD50 000; n = 1; i = 2% × $\frac{60}{360}$; COMP PV *Note: if you have an HP then you need to set the P/YR to 6* PV = USD49 833,89 Bank's buying rate is used as ABC will need to sell USD. USD49 833,89 × ZAR8,0559/USD1 = ZAR401 456,81 On 26 November 20X2 the SA investment's value will be: PV = ZAR401 456,81; n = 1; i = 4% × $\frac{60}{360}$; COMP FV FV = ZAR404 133,19 ZAR/USD1: $\frac{\text{ZAR404133,19}}{\text{USD50 000,00}}$ = ZAR8,0827/USD1

We can now revisit the interest rate parity theory formula, and apply the same principles in setting up a money-market hedge for a *foreign receipt*, forecast the bank's *buying rate* for 25 November 20X2:

$$\text{ZAR8,0559} \times \frac{1 + (0{,}04 \times \frac{60}{360})}{1 + (0{,}02 \times \frac{60}{360})} = \text{ZAR8,0827/USD1}$$

This is identical to the rate calculated when setting up a money-market hedge – it is the bank's buying rate which was calculated.

15.7 U ing forward exchange contracts (FECs) to hedge currency risk

A forward exchange contract (or FEC as they are commonly known) allows an enterprise to *fix* the rate at which they wi *buy foreign currency* from, or *sell foreign currency* to a foreign exchange dealer, on a *future date.* The following important aspects relating to an FEC need to be taken note of:

An FEC is a *binding contract* between the enterprise and the foreign exchange dealer (normally a bank). This means that on the future date ('settlement date') referred to above, both parties to the contract must perform in terms of the contract. If by settlement date the enterprise no longer needs to buy/sell the specified amount of foreign currency, the FEC requires them to contractually still perform accordingly.

The FEC specifies the foreign amount to be bought or sold, the rate at which the transaction will take place (being the rate built into the contract) and the date on which the transaction will take place (the cashflow settlement date).

The greatest benefit of entering into an FEC is it removes the uncertainty as to what the rate might be in the currency market, on the date in future when the enterprise needs to convert local currency into foreign currency or *vice versa*.

The disadvantages associated with an FEC would include the following:

The cost (premium) incurred in using an FEC as a hedge. The enterprise wi have to pay the bank for removing the uncertainty referred to above and for the bank to transfer the currency risk onto the bank.

As mentioned above, should something unforeseen have taken pl ce nd th t by cash settlement date the enterprise no longer needs to purchase/sell the amount of foreign currency specified in the FEC, then the enterprise will still have to deliver in terms of the agreement. This issue is discussed in more detail below.

To determine the Rand-equivalent of the future payment or receipt, when using an FEC is relatively easy. The bank that the enterprise enters into the FEC with, will normally qu te a premium above the spot exchange rate applicable on the date on which the FEC is entered into, in determining the rate which is to apply on the cash settlement date. The student must be able to deal with each of the following scenarios:

Scenario 1:

The FEC rate is given and hence the student just ne ds to apply it.

Scenario 2:

The student needs to calculate the FEC rate, by applying the following principle:

FEC rate = spot exchange rate (on date of entering into FEC) + FEC premium

Note: If the premium quoted by the bank is an annual premium, the pro-rata equivalent for the period of time covered by the FEC, will need to be calculated.

Example: Forward exchange contract

ABC Limited ('ABC') is a local South African company with the South African Rand as functional currency. ABC imports a component that it uses in its local manufacturing process, from a United States supplier. On 26 September 20X2 the company received an invoice for USD100 000 payable on 25 November 20X2. The chief financial officer (CFO) of ABC has indications that the Rand is likely to depreciate against the US Dollar in the near future. To reduce this currency risk, the CFO of ABC has decided that the enterprise should enter into a forward exchange contract (FEC) with its local bank. The FEC will be entered into on 26 September 20X2.

Assume the following spot rate applies in the South African currency market on 26 September

20X2: ZAR/USD1: 8,0559 – 8,3809

ABC's bankers are quoting the FEC rates for 25 November 20X2 at a premium

of: ZAR/USD1: 0,1268 – 0,1976.

Required:

Calculate the c st in Rand terms, of settling the foreign creditor on 25 November 20X2 using an FEC.

Solution:

USD100 000 × (ZAR8,3809 + ZAR0,1976) = ZAR857 850

Comment:

The b nk's *selling* spot rate is used as the basis for the calculation –remember that with a *direct quote* which his is, the bank always sells high. Furthermore, the premium is quoted in the same notation – hence, the second premium in the notation provided (which also happens to be the bigger premium) will apply to the selling rate.

As mentioned previously, the enterprise might no longer wish to buy/sell the amount of foreign currency on the agreed on date, for one of the following reasons:

The transaction for which the foreign currency was to be bought or sold has been cancelled.

The goods received by the local enterprise, for which payment needs to be made, are not according to specification and the local enterprise does not want to pay for these goods.

The foreign supplier made a short delivery meaning that the local enterprise received fewer goods than had been ordered and they only wish to pay for the goods received.

The shipment of the goods to the local enterprise is delayed and due to this, it would delay the payment of the foreign creditor.

The local enterprise disputes the amount owing and would like to del y the payment to the foreign creditor, which might also be for an amount which will differ from th t greed to in the FEC.

The foreign debtor whose payment is being hedged by means of the FEC defaults and does not pay the local enterprise.

The foreign debtor might delay the payment to the local enterprise as the delivery of the order has been delayed.

The goods received by the foreign debtor are not according to specification and consequently the foreign debtor does not make the expected payment to the local enterprise.

The foreign debtor might dispute the amount owing to the local enterprise. Payment is consequently delayed and when payment does take place, it might be for a different amount.

The foreign debtor might make a short payment due to having received fewer goods than had been ordered.

In respect of any of the preceding cases, the local enterprise will still need to *close out* the FEC. Assuming there was one case that required the buying of foreign currency and another case the selling of foreign currency, each case would entail the following:

Case 1: The enterprise had agreed to buy a fixed amount of foreign currency from the local bank. In this case, the bank will sell the fixed amount of currency to the local enterprise as agreed in terms of the FEC. This will happen at the rate agreed to in the FEC.

In terms of the FEC, the enterprise will now have to sell the foreign currency back to the bank at the *prevailing spot buying rate* of the bank as the enterprise does not need the foreign exchange. In the process, the enterprise is expected to incur additional costs which would otherwise have been avoided.

Case 2: The enterprise had agreed to sell a fixed amount of foreign currency to the bank on a specified date. As the enterprise does not receive the foreign currency from the foreign debtor they cannot supply the local bank with the foreign currency.

Consequently th y will n d to buy the foreign currency from the local bank at the bank's *prevailing spot selling rate*. Now they can deliver the foreign currency to the bank as agreed to in the FEC. They would then be required to sell the foreign currency to the bank at the *FEC rate*. Again, it is likely that the enterp ise will in ur additional costs which would otherwise have been avoided.

Example: Closing o t the FEC

ABC Limited ('ABC') is a local South African company with the South African Rand as functional currency. ABC imp rts a c mponent that it uses in its local manufacturing process from a United States supplier. On 26 September 20X2 the company received an invoice for USD100 000 payable on 25 November 20X2. The chief financial fficer (CFO) of ABC decides to enter into a forward exchange contract (FEC) with its local bank on 26 September 20X2 due to currency risk which exists. The FEC rate applicable to this transaction is ZAR8,5785/USD1 (i.e. as per previous example ZAR8,3809 + ZAR0,1976).

By 25 November 20X2, when payment needs to be made in terms of the FEC, ABC has returned the goods to the United States supplier given that they are defective and as a result, ABC no longer needs to make the USD100 000 payment to the United States supplier.

On 25 November 20X2, the following rates apply in the local currency market:

	ZAR/USD1
Spot rate (bank's selling rate in South Africa)	8,5950
Spot rate (bank's buying rate in South Africa)	8,1626

Required:

Indicate the net cost of closing out the FEC for ABC.

Solution:

In terms of the FEC on 25 November 20X2: USD100 000 × (ZAR8,3809 + ZAR0,1976) = ZAR857 850
ABC will then sell the USD100 000 back to the bank: USD100 000 × ZAR8,1626 = ZAR816 260

The net loss resulting for ABC from the transaction is (ZAR857 850 – ZAR816 260) ZAR41 590.

The local enterprise, as soon as it becomes aware of the fact that it will not be able to perform in terms of the FEC, can hedge itself against the transaction risk exposure which n w arises by doing the following:

In respect of *Case 1* above: Enter into an additional FEC with the local bank to *sell* the same amount of currency on the same date, as they would be buying from the bank in terms of the existing FEC. The benefit of this is the rate at which they would be selling the currency back to the bank, will be fixed in advance.

In respect of *Case 2* above: Enter into an additional FEC with the local bank to *buy* the same amount of foreign currency on the same date from the local bank, as had been agreed to in terms of the existing FEC. The benefit of this is that the rate, at which the local enterprise would be buying the foreign currency in future, will be fixed into the additional FEC.

15.8 Using foreign exchange futures contracts to hedge currency risk

A foreign exchange futures contract ('forex future') is a *standardised contract* which allows the parties to the contract to *buy or sell* a fixed amount of foreign currency at a fixed rate in future. The following aspects regarding forex futures need to be emphasised for the student to understand how they function:

An investor will either invest in a forex futures contract to *hedge currency risk* or to *speculate*. The investor's intention will in both cases be to make a gain on the futures contract.

Forex futures contracts trade in the *derivative market.* This means that the value of the contract is derived from the change in value of an underlying asset (such as a share or index) or commodity (such as gold) or the foreign exchange rate (the change in the exchange rate at which the forex future is quoted). This means that the inv stor makes a gain or loss (depending on the position they have taken up in respect of the futur s contract) as the price of the contract changes. As mentioned, this price change occurs as the price of the underlying asset from which the instrument is derived, changes.

In South Afri a, forex futures contracts trade in the currency derivative market of the JSE Securities Exchange – this ma ket is known as the *Yield-X*.

As forex futu es contract trade, it implies that these contracts must be bought and sold by an investor. J st as an electronic goods retailer cannot expect to profit by not selling a TV set bought from a supplier onto a c stomer, so too can an investor in a forex future not expect to gain (or make a loss for that matter) unless they *buy and sell the contract*.

15.8.1 The mechanics of a forex future

The inve tors into a futures contract will take up one of the two positions identified above. The currency derivatives market brings the buyer and seller together, who then enter into a contract of a standard size:

One of the two contracting parties will be *buying the contract*. Those buying take up a *long position* in the futures market. They remain invested in the contract until they decide to close out their position by finding a buyer to whom they can sell the contract or on the date on which the futures contract officially closes out on the currency derivatives exchange. On this date, all parties who have bought futures contracts must sell them.

One of the two contracting parties will take up a *selling position* and sell the futures contract to the other contracting party who is the buyer of the futures contract. This seller has taken up a *short position*. They are selling something they do not own yet. To close out their position they will either have to find an investor to take up their position in the derivatives market or on close out date of the futures contract they will have to buy the contract.

Which position should one take up? If one wishes to gain from changes in price in the futures market, then one needs to take up the correct position. All currency futures trading in the South African currency derivatives market are denominated in a foreign currency, with Rand movements creating a gain or loss for an investor.

Example: Currency appreciation or depreciation

	Scenario 1 ZAR/USD1	Scenario 2 ZAR/USD1
Quoted on 26 September 20X2	8,2808	8,2808
Quoted on 11 October 20X2	8,7652	8,1856

Required:

In each of the two scenarios illustrated above, which currency appreciated (increased in value) and which currency depreciated (lost value)?

Solution:

Scenario 1: On 11 October 20X2 it is clear that more Rand would be needed to buy a US Dollar or alternatively stated, the US Dollar buys more Rand on 11 October 20X2 than on 26 September 20X2. The US Dollar has strengthened (appreciated) while the Rand has weakened (depreciated).

Currency quotes in the futures market will indicate how the exchange rate is expected to move. If the Rand is forecasted to depreciate, one would *gain by taking up a long position* – buying the future now (low) and selling it later (high). The pattern illustrated by *Scenario 1* would be the case then.

Scenario 2: On 11 October 20X2 it is clear that less Rand would be needed to buy a US Dollar or alternatively stated, the US Dollar buys less Rand on 11 October 20X2 than on 26 September 20X2. The US Dollar has weakened (depreciated) while the and has strengthened (appreciated). In this case, one would *gain by taking up a short position* – selling the future now (high) and buying it later (low). The pattern illustrated by *Scenario 2* would be the case then.

In both cases above, the expectation of how the respective currencies are going to perform in future will guide investors as to which position to take up in the futures market.

Forex futures are cash settled, meaning that an investor buying a forex futures contract does not have to deliver the physical value in cash of the contracts being bought. In other words when buying 10 000 USD contracts of USD1 000 ach, the investor does not pay the Rand equivalent of USD10 million to the trader. On selling the contra t, the seller of the forex futures contract would also not be required to physically deliver the sum of curren y that they are selling to the buyer of the contract. The Currency Derivatives Market of the JSE Securities Exchange p escribes two margins which need to be deposited:

Initial ma gin: This margin represents only a percentage of the value of the contracts and is paid when taking p either a long or short position. This is paid in Rand and is deposited with the clearing house. This red ces risk and creates liquidity in the market.

Variati n margin: Each day the difference in value of the contract(s) will be revalued or marked-to-market (M-T-M). Any gain will be paid to the investor whose contract(s) increased in value since the previous measurement (M-T-M) while investors making losses, have to make good their loss by paying the amount of the loss to the clearing house.

The fact that forex futures are cash settled and trade in the derivative market has one further very important implication, which is addressed in more detail later.

Note: ***As the physical delivery of the currency is not required, on settling the underlying transaction (paying or receiving foreign currency), the enterprise will need to buy or sell the foreign amount in the currency market at the spot rate on that date. The physical currency bought or sold to settle the transaction does not take place at the rate being quoted in the futures market.***

Only the following parties (referred to as qualifying clients) may invest in currency futures contracts traded in the currency derivatives market in South Africa –

South African individuals or corporates with no limits applicable;

a South African financial services provider or South African collective investment scheme insofar as their foreign portfolio allowances permit;

a South African pension fund subject to their foreign portfolio allowance;

a South African short-term or long-term insurer subject to their foreign portfolio allowance; and

a foreign individual or foreign corporate with no limits applicable.

15.8.2 Forex futures – market data

The following table has been constructed from the market data provided by the JSE Securities Exchange Currency Derivative Market:

Contract	Bid qty	Bid	Offer	Offer qty	Latest trade	High	Low	Volume	Open interest
14 DEC 12 AU$/R	250	8,9595	8,9705	250	8,9541	0	0	0	10 636
18 MAR 13 AU$/R	200	9,0035	9,0215	200	9,0031	0	0	0	4 458
14 JUN 13 AU$/R	150	9,0465	9,0685	150	9,0471	0	0	0	11
16 SEP 13 AU$/R	100	9,0785	9,13	100	9,0933	0	0	0	2 150
14 DEC 12 CAD/R	50	8,919	8,962	50	8,9613	0	0	0	25
18 MAR 13 CAD/R	50	9,007	9,054	50	9,0545	0	0	0	0
14 DEC 12 YUAN/R	0	0	0	0	1,3899	0	0	0	0
18 MAR 13 YUAN/R	0	0	0	0	1,3966	0	0	0	0
14 DEC 12 €/R	100	11,321	11,3362		11,3438	11,3438	11 259	370	73 915

Figure 15.8: Currency derivatives market data

The data contained in the table is interpreted as follows:

Contract: this indi ates the contract type. Various currency futures are available for trade in the JSE Securities Ex hange Currency Derivatives market. They include: Australian Dollar (AU$), Canadian Dollar (CAD), New Zealand Dollar (NZ$), US Dollar ($), Euro (€), British Pound (£), Japanese Yen (¥), Swiss Franc (CHF) and Chinese Yuan (Yuan) amongst others.

The *standard size* of each contract is 1 000 units of the *foreign currency*. For example the Euro denominated contract's standard size is € 1 000. A $/R Maxi contract is also available. This contract t gether with the ¥/R contact are the only contracts where the standard contract size differs from the standard f 1 000 units of foreign currency – the standard contract size is USD100 000 per contract and ¥100 000 per contract respectively.

When reading the table the notation used thus far in this chapter must be amended. For the AU $/R as quoted here, the currency on the left of the quote is the base currency. This is still a direct quote and in terms of the format used thus far it can also be quoted as R/AU$1.

Each contract type has a date. This date will either be in March, June, September or December and is the date on which the contract expires. Contract close out (expiry date) is always two business days before the third Wednesday of that particular month.

Bid quantity: Bid quantity refers to the number of contracts sold by investors.

Bid and Offer: The Bid price is the price at which the market buys a contract; alternatively the price at which the investor will sell the contract. The Offer price is the price at which the market will sell a contract to an investor or alternatively the price at which the investor buys a contract.

The price quoted in the JSE Securities Exchange Currency Derivatives market is the *amount of Rand* per one unit of the foreign currency. The denomination of all contracts listed on said exchange is in the foreign currency. This means that the price movement will be in *Rand terms* resulting in the gain or loss when re-measuring the futures contract being in *Rand.*

Note: The currency quotes in the table above, as well as in Figure 15.2 ear ier are indicated to four decimal points. This fact is very important when dealing with forex futures as we as forex option contracts.

Offer quantity: Offer quantity refers to the number of contracts bought by investors.

Latest trade: Refers to the price at which the latest trade took place, while the *High* and *Low* refers to the highest price and lowest price applicable to trades on the day.

Volume: Refers to the number of contracts traded on the particular day.

Open interest: Refers to any long (or equivalent short) p siti ns existing which have not yet been closed out.

'*Pip', 'Point' or 'Tick' size*: This is not specifically shown in the table, but is derived from it. The smallest change to an exchange rate is a change in the *fourth deci al* of the exchange rate being quoted. If the ZAR/USD1 exchange rate today is ZAR8,7000 then the s allest change from today to tomorrow would be *one movement up or down* resulting in the xchange rate being ZAR8,7001/USD1 or ZAR8,6999/USD1 tomorrow.

A one decimal (fourth decimal) movement in the exchange rate is referred to as a pip/point/tick movement in the exchange rate. This one decimal movement will create a gain or loss for the investor. The value of such a pip/point/tick movement is calculated as follows:

Standard contract size × 0,0001 = value per pip/point/tick

Example: Tick movement

Use the €1 000 contract trading on the JSE Securities Exchange Currency Derivative market.

Required:

What will the currency of this pip/point/tick movement be?

Solution:

It will always be in the t rm/r ference currency. €1 000 × ZAR0,0001/€1 = ZAR0,10 per one pip/point/tick movement on the contract.

Example: Hedge urren y derivative

ABC Limited ('ABC') is a local South African company with the South African Rand as functional currency. ABC imports clothing f om an Australian supplier, and retails these clothes through its South African operations. On 26 September 20X2, ABC received an invoice for AU$52 600 payable on 25 November 20X2. The chief financial officer (CFO) of ABC is concerned that given the depreciating Rand at present, ABC will need to hedge this payment, and has decided to make use of forex futures trading on the JSE Securities Exchange Yield-X market (Currency Derivatives market).

The following rates apply in the local currency market:

	26 September 20X2 AU$/ZAR1	25 November 20X2 AU$/ZAR1
Spot rate (bank's selling rate in South Africa)	0,1128	0,1096
Spot rate (bank's buying rate in South Africa)	0,1216	0,1122

Assume that the data provided in Figure 15.8 applies on 26 September 20X2, and assume also that on 25 November 20X2, ABC is able to close out the contracts at ZAR9,02 (ZAR/AU$1).

Required:

Calculate the net outcome of the hedge in South African Rand (ZAR).

Solution:

Issue	Solution
Which contract will ABC use?	As they need to settle an Australian Dollar amount owing, they will match this with the available contracts – namely AU$/R. The 14 DEC 12 (14 December 20X2) contracts will be chosen. (**Note 1**)
What position should ABC take up (long or short)?	The risk is that the R nd will we ken – this will mean that the number of Rand required per AU$ will INCREASE – this will be evidenced in the exchange rate. *ABC will want to take up a l ng p siti n and buy AU$ contracts.*
How many contracts will they want?	$\frac{AU\$52600}{AU\$1000}$ = 52,6 contracts rounded off to 53. (Note 2)
What is the pip/point/tick size?	ZAR0,0001/AU$1
What is the value per pip/point/tick?	AU$1 000 × ZAR0,0001/AU$1 = ZAR0,10

Note 1: As a rule the contract chosen should either close out on the cash settlement date of the underlying transaction or thereafter BUT not before as the transaction will not be effectively hedge.

Note 2: We always round this number off according to our normal rounding rules.

Outcome of the hedge:

	ZAR
Sold each contract at	9,0200
Bought each contract at	8,9705
Gain per contract	0,0495
Total gain (53 contacts × 495 pips/points/ticks × ZAR0,10	2623,50
Payment to the Australian supplier (AU$52 600/AU$0,1096)	479927,01
Less: gain made in the forex futures market	– 2623,50
Net payment	477303,51

Further notes:

As the Rand is depre iating, ABC went long. This means that it initially bought contracts (the market would sell the contracts to them f om the market's perspective at the offer price on Day 1, namely 26 September 20X2. To close out the cont act, ABC would need to sell the contracts (the market would be buying them at the bid price).

The difference between the price at which ABC bought and sold the contracts = ZAR0,0495 per contract. Reading from right to left results in decimal movement of 495 (pips/points/ticks) per contract. This multiplied by the pip/p int/tick value multiplied by the number of contracts = the total gain or loss.

Finally, ABC still needed to buy (the bank would be selling) the physical Australian Dollars in the currency market. The currency quote in the currency market is an *indirect quote* (hence divide the Australian Dollar amount by the currency quote AND NOT multiply which would have been done had it been a direct quote).

15.9 Using foreign exchange option contracts to hedge currency risk

The biggest drawback of both a forward exchange contract (FEC) and a foreign exchange futures contract is that they contractually require settlement on a future date, regardless of whether the underlying transaction has changed or possibly been cancelled. Note the following:

FEC: The party being hedged needs to buy or sell foreign currency at the FEC rate.

Futures contract: On closing out the contract, the opposite of what was initially taken up must now be done. Hence sell if initially had taken up a long position, or buy if initially taken up a short position.

What is the solution then? A party wishing to hedge an underlying transaction wou d ike the flexibility to be able to decide on settlement date, whether they still would like to hedge or not. A *foreign exchange option contract* ('forex options') provides this flexibility.

The following sets out the main attributes of a foreign exchange options contract:

It gives the option holder the *right to exercise (but not the obligation) to buy or sell* an amount of foreign currency on a future date.

- The option to buy an amount of foreign currency is known as a *call ption* whilst the option to sell a fixed amount of foreign currency is known as a *put option*.

The date on which the option may be exercised is known as the *strike or exercise date* and is fixed when the option is written or created.

The rate built into the call or put option at which the fix d amount of currency will be bought or sold in future is referred to as the *strike or exercise rate.*

Before an option can be used, it has to be bought and so on acquiring the option (on day 1); the hedging party will need to *pay a premium* to buy the option. This results in an immediate cash outflow for the relevant party. Even if the hedging party does not exercise the option, they will still have incurred the premium.

Over-the-counter (OTC) options versus traded options

An enterprise wanting to hedge itself using foreign exchange option contracts, against currency risk, may use one of two kinds of options:

An *over-the-counter (OTC) option* is a customised option created specifically for the party wanting to hedge in the particular currency, for the exact settlement date and exact amount of foreign currency as needed by the hedging party.

Traded options trade in the currency derivatives market, and like forex futures, are of a standardised size, apply to a specific period of time (in terms of strike date) and are only written for selected currencies. They are ther fore l ss fl xible than an OTC option. However, a traded option can be sold after having been bought on the xchange, hence it is marketable.

The advantage of the OTC option is that it brings flexibility, but in so doing a premium must be paid. The premium in urred on an OTC option will be higher than that incurred when purchasing traded options.

15.9.2 Forex options trading in the JSE Securities Exchange Currency Derivatives market

The following table is a summary of the attributes of traded currency options in South Africa:

Attribute	Explained
Currency derivative market	Trade on the *Yield-X* (just as currency futures do)
Strike/exercise price	Yield-X allows for a strike/exercise price in intervals of ZAR0,05
Contracts	The following exist: US Dollar, British Pound, Euro, Australian Dollar, Canadian Dollar and Japanese Yen
Exercise dates	March, June, September and December (two business days before the third Wednesday of these months)

Figure 15.9: Attributes of foreign currency option contracts

The same criteria as listed under foreign exchange futures contracts apply on the Yield-X regarding the use of currency options.

A traded call option gives the investor the right to *buy a foreign exchange futures contract on a fixed date in the future* at the strike price. A traded put option gives the investor the right to *sell a foreign exchange future contract on a fixed date in the future* at the strike price.

An option has two values:

Values	Explanation
Intrinsic	A call option has intrinsic value (positive value) where the spot rate in the market exceeds the strike rate (said to be in-the-money). A put option has intrinsic value (positive value) where the spot r te in the market is less than the strike rate (said to be in-the-money).
Time	The time value of an option is the amount an investor is willing to pay (premium) above the intrinsic value of an option. If the intrinsic value is nil, then the time value of the option will always equal the premium payable. This aspect of the value of an option is driven by the elements of the Black and Scholes pricing model and include the following for a currency option: l *Changes in the value of the underlying currency*: As the value of the underlying currency, on which the option is written changes in the arket, so will the value of the option. l *Volatility of the underlying currency*: Options written on currencies which are very volatile (value of currency is volatile or chang s r gularly) will always have a higher value than options written on less volatile curr nci s. l *Strike price*: The value at which the holder can strike or exercise the option will also impact on the value of the option. l *Time to expiry or exercise*: The longer the time to expiry, the greater the chance of the underlying currency changing to such an extent that the holder will exercise the option. Therefore the greater the time factor, the bigger the time value of the option. l *The risk-free rate*: The model used to value an option discounts the exercise price from a future date to today to value the option. The risk-free rate is the discount rate used. If the risk-free rate decreases, then the value of the put option will increase and a call option will decrease. If the risk-free rate of return increases, then it has the opposite effect.

Figure 15.10: Factors affecting the value of currency options

Let us look at the following example to see how a foreign currency option contract will function.

Example: Foreign curr ncy option contract

ABC Limited ('ABC') is a local South African company with the South African Rand as functional currency. ABC imports clothing from an Australian supplier, and retails these clothes through its South African operations. On 26 September 20X2, ABC re eived an invoice for AU$52 600 payable on 14 December 20X2. The chief financial officer (CFO) of ABC is concerned that given the depreciating Rand at present, ABC will need to hedge this payment, and has decided to make use of foreign currency option contracts, by firstly weighing up the OTC options and traded options *before* selecting the most optimal solution.

The following rates apply in the local currency market:

	26 September 20X2 AU$/ZAR1	14 December 20X2 AU$/ZAR1
Spot rate (bank's selling rate in South Africa)	0,1128	0,1080
Spot rate (bank's buying rate in South Africa)	0,1216	0,1102

Assume that a foreign exchange option contract exists for December 20X2, with the following strike/exercise r tes:

	Call option	Put option
ZAR/AU$1	9,03	8,00

The premium for a December call option is ZAR0,52/AU$1 while the premium on the December put option is ZAR0,20/AU$1. Assume a spot rate in the currency market of ZAR9,1000 on strike/exercise date.

A local bank, for a premium of ZAR0,65 per AU$1 is willing to create an OTC currency option for ABC for 14 December 20X2. The bank is offering ABC a call option at ZAR9,08/AU$1 and a put option of ZAR8,10/AU$1.

Required:

Calculate the net outcome of each of the proposed hedges in South African Rand (ZAR).

Solution:

Issue	Solution
Which contract will ABC use?	As they need to settle an Australian Dollar amount owing, they will match this with the available contracts, namely AU$/R. The December option contract is ch sen since this is when the payment needs to be made.
Call or put option?	The risk is that the Rand will weaken while the Australian Dollar will strengthen – *ABC will want the right to buy AU$ contracts as they will need to physically buy AU$ in the market. Therefore they would want a call option on the AU$.*
How many contracts will they want?	$\frac{\text{AU\$52600}}{\text{AU\$1000}}$ = 52,6 contracts rounded off to 53[2]
What is the pip/point/tick size?	ZAR0,0001/AU$1
What is the value per pip/point/tick?	AU$1 000 × ZAR0,0001/AU$1 = ZAR0,10
What is the premium on the contract?	ZAR0,52/AU$1 × AU$1 000 = R520 per contract

Outcome of the traded option hedge:

On 14 December 20X2, the option holder will strike/exercise as the spot rate exceeds the strike price of the call option. The outcome will be as follows:

	ZAR
Total gain (53 contacts × 700 pips/points/ticks × ZAR0,10	3 710,00
Payment to the Australian supplier (AU$52 600/AU$0,1080)	487 037,04
Premium (ZAR0,52/AU$1 × AU$1 000 × 53 contracts)	27 560,00
Less: gain made in the for x futures market	– 3 710,00
Net cost	510 887,04

OTC option alte native:

The over-the- counter currency option will entail a physical delivery of the underlying currency. On strike date, 14 December 20X2, the spot rate in the market is AU$0,1080/ZAR1 or ZAR9,2593/AU$1. Hence ABC will strike and physically b y the Australian Dollars at ZAR9,08 each.

	ZAR
AU$52 600 × R9,08 per AU$1	477 608,00
Premium (ZAR0,65/AU$1 × AU$52 600)	34 190,00
	511 798,00

The OTC hedge above is customised for the exact amount of the exposure, in the same currency as the exposure – not like the currency futures where the standard size contract of AU$1 000 exists and 53 contracts h d to be used.

Furthermore, a physical delivery will take place; the foreign currency is physically purchased at the strike rate. Given the added flexibility, the OTC transaction will normally be more costly than using traded currency options.

15.10 Using currency swaps to hedge currency risk

A currency swap entails an agreement entered into *between two parties* to *contractually* swap an amount (of cash) denominated in one currency for an *equivalent amount* (of cash) denominated in another currency. Currency swaps are over-the -counter transactions – in other words, this form of currency derivative does not trade on an exchange, which is the case with currency futures and trade currency options. A currency swap will typically be regulated by means of an ISDA agreement (a standard type of agreement drafted by the International Swaps and Derivatives Association). Currency swaps normally entail physically swapping a principal amount denominated in one currency for a principal amount denominated in another currency.

It is important to note that *counterparty risk* exists in respect of a currency swap. Counterparty risk is the risk that one of the two contracting parties (in this case the parties to the swap agreement), do not perform in terms of the contractual agreement and as such, the hedge becomes ineffective. It is therefore important to consider (amongst other issues) the creditworthiness of the counterparties in ensuring that an effective hedge arises.

We discuss two broad categories of currency swaps in the following two sub-sections.

15.10.1 Long-term currency swaps

A long-term currency swap, also often referred to as back-to-back loans, entails a contractual agreement between two parties, to hedge their exposure to currency risk over the long term. The drivers of a long-term currency swap are –

firstly, to minimise borrowing costs; and

secondly, to hedge currency exposure.

Example: Long-term currency swap

Amanzi Limited (Amanzi), a listed South African company has identified an investment opportunity in the United States of America (USA), which will cost the company USD10 million. Amanzi Limited can borrow locally at 8% per annum in Rand terms or borrow in the USA at 2% plus a 2% premium (in US Dollar terms) as the company is foreign. Water-Works Incorporated (Water-Works) is a US company which intends investing ZAR83,5 million into a South African investment. Water-Works can borrow at 2% per annum (in US Dollar terms) in the USA or borrow at 8% plus a premium of 2% per annum in South Africa.

Required:

Show how the long-term currency swap arises and how the different cashflows are swapped during the duration of the swap agreement.

Solution:

From a cost effe tiveness perspective, it would make sense for Amanzi to borrow in South Africa where they are known to the market, while in the case of Water-Works, it would make sense, for the same reason, to borrow in the USA. The problem arises though that neither enterprise will be receiving the borrowed funds in the currency of the country into which these funds need to be invested. The solution for the two companies is to enter into a c rrency swap agreement (on the assumption that the two enterprises are aware of the other party's needs) . Note however that each of the respective parties remains indebted to their respective banks in respect of the borrowings incurred by them. They cannot swap out this indebtedness.

Assume that n the date of inception of the currency swap agreement, the ZAR/USD1 exchange rate is ZAR8,350. The f llowing takes place in terms of the swap:

Day 1 (Year 0)	Amanzi pays ZAR83,5 million to Water-Works and in exchange receives USD10 million	⇄	Water-Works pays USD10 million to Amanzi and in exchange receives ZAR83,5 million

The two parties now have the correct amount of foreign currency to be able to make the respective investments. Amanzi and Water-Works agree to the following in terms of the swap agreement:

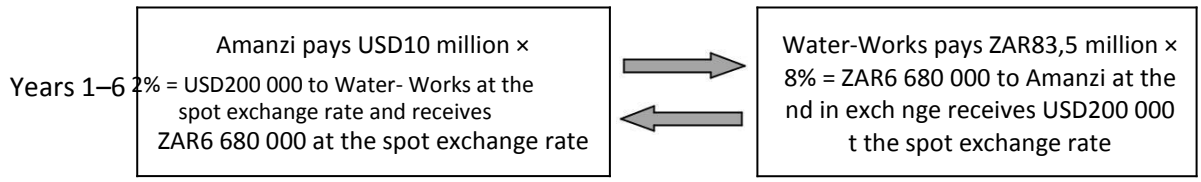
Amanzi will pay Water-Works interest at 2% per annum in US Dollar terms on the US Dollar amount it received from Water-Works. This will take place annually in arrears.

Water-Works will in turn pay Amanzi interest at 8% in Rand terms, on the Rand amount swapped with Amanzi.

The parties agree that the exchange rate which will apply on the interest swap dates will be the spot exchange rate on each cash settlement date.

The term of the currency swap will be six years.

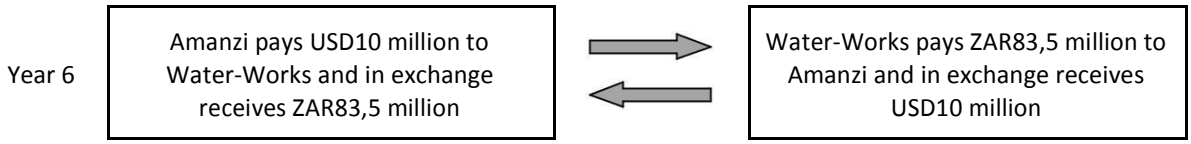
On each interest payment date, the following will take place:



Assume that at the end of Year 1, the spot exchange rate is ZAR8,80/USD1. Con erting the USD amount owing by Amanzi, they would owe ZAR1 760 000, while Water-Works w uld we Amanzi ZAR6 680 000. In practice, the swap would entail netting the two amounts off against each ther, resulting in Water-Works having to purchase ZAR4 920 000 and paying this amount over to Amanzi. The benefit for the two parties – through the netting off, Amanzi is saved from having to purchase any foreign currency, while the currency which Water-Works needs to purchase is limited, limiting the transaction costs as well.

At the end of the term of the currency swap agreement, the two parties will swap back the initial principal swapped; this taking place at the exchange rate which pr vail d at the inception of the agreement – in this case at ZAR8,3500/USD1.

And so, at the end of the six-year term, the following cashflow takes place:



15.10.2 Short-term currency swaps

These would typically be used by banks where a mismatch occurs on a forward exchange contract (FEC), forcing the bank's client to have to close out the forward contract. This would typically be the case where a client (a local exporter) has entered into a forward exchange contract with the bank to sell foreign currency on a future date to the bank at a specified rate. On settlement date, the client has however not received the foreign amount due to a delayed payment from the foreign debtor. The local exporter therefore has to close out the contract by *purchasing the for ign amount* from the local bank at spot and selling it back to the bank at the FEC agreed rate. *What probl m do s this create for the bank?*

It creates a liquidity issue for the bank – the bank would need to plug a temporary hole which arises in having to deliver the foreign amount to the local exporter before the exporter can sell it back to the bank. The result is that the bank will bo ow the foreign amount from a foreign bank and swap this amount with the local exporter. Two c ucial things happen now:

The local exporter will now deliver the foreign currency in terms of the FEC.

In terms of the swap, the local bank retains the Rand amount which it has to pay to the local exporter in terms f the FEC and invests it in local deposit account.

On the date n which the local exporter finally receives the payment from the foreign debtor, they swap this amount with the local bank in exchange for the amount in the Rand deposit account. The swap has allowed the bank to manage two issues:

The liquidity problem arising due to the local exporter not being able to perform in terms of the FEC.

Eliminating the need to rollover the FEC. The swap (in essence a short-term back-to-back loan) fulfils the role which the rolling of the FEC would do.

15.11 Valuing forward exchange contracts (FECs)

Given that forward exchange contracts (FECs) are the most widely used foreign exchange hedges in South Africa, it is important that the reader be aware of the process of valuing these contracts for financial reporting purposes. The purpose of this section is to explain how these contracts create or destroy value over time and based on the valuation, whether the contract would be reported as a financial asset or financial liability.

As point of departure, we need to revisit the functioning of forward exchange contracts. These contracts are entered into between the party seeking the hedging and their bank. The FEC fixes the rate in advance, at which the party seeking a hedge will buy a fixed amount of foreign currency from the counterparty (the bank) or sell a fixed amount of foreign currency to the counterparty (the bank), on a specified future date.

How then does the contract create or destroy value for the hedged p rty? On entering into the FEC, the hedged party's rate at which they will buy or sell foreign currency from/to the counterparty, is fixed. After this date however the forward rate at which the hedged party could buy the s me mount of foreign currency from the counterparty at, or sell the same amount of foreign currency to the counterparty at, *on the same date as that specified in the existing FEC,* differs from that set in the existing FEC as forward rates fluctuate in the currency market resulting from changing conditions in said market. *The value created by the FEC is therefore the difference between the rate fixed in terms of the FEC and the f rward rate on valuation date at which the hedged party could enter into an FEC for the same date and same am unt f foreign currency, as the existing FEC.*

Given that the difference between the forward rate fixed into the FEC and the forward rate (on valuation date) applicable to the same future settlement date, relates to a future point in time, one needs to consider whether or not this difference would need to be discounted in fair valuing the FEC. The answer to this lies in the time to settlement of the hedged transaction. It can be argu d that as in most cases the time to settlement will be short-term (less than one year), this difference would not need to be discounted as the time value of money can be ignored over the short-term. The reader must however be alerted to the fact that if settlement of a FEC were to take place in the medium term, in other words on a date exceeding 12 months from valuation date, it would be advisable to discount this benefit in calculating the fair value of the hedge.

International Financial Reporting Standards (IFRS) dictate the treatment of hedges. In terms of IFRS, the hedge could either be a cash flow hedge or a fair value hedge. This classification would determine the treatment of the hedge as either being processed through profit and loss (through the Statement of Profit and Loss and other comprehensive income) or affecting the equity of the company.

The following two examples clarify the various issues relating to the valuation of FEC hedges.

Example: Fair value ignoring time value of money

Toys-Galore imports a range of toys from the United States of America. Desiree De Weer, the chief financial officer of Toys-Galore has just become aware of an order amounting to USD101 684,25. The invoice will need to be settled on 15 February 20X5. On 11 November 20X4, the day on which Desiree becomes aware of the transaction, the spot ZAR/USD1 xchange rate is R11 3573. Given that indications in the forward market are that the South African Rand is xpected to depreciate against the US Dollar going forward, she enters into a FEC with the local bankers of Toys -Galore. In terms of this FEC, Toys-Galore will purchase USD101 684,25 from the bank on 15 February 20X5 at a rate of R11 3840. The financial year-end of Toys-Galore is 31 December. On 31 December 20X4, the lo al bank quotes a rate of R11 4360 to sell the amount of US Dollars to Toys-Galore on 15 February 20X5 in te ms of a FEC.

The following wo ld represent the various values at which the FEC would need to be accounted:

On 11 November 20X4

The fair value f the hedge will be Rnil (the rate at which the FEC has been entered into and the FEC rate qu ted f r 15 February 20X5 on that date, are the same).

On 31 December 20X4

On the assumption that the time value of money can be ignored, the FEC will be valued

at: USD101 684,25 × (R11 4360 – R11 3840) = R5 287 58

The r te built into the FEC is more beneficial to Toys-Galore than the rate would be on valuation date if they were to enter into a FEC on that date. As a result, Toys-Galore's FEC would be accounted for as a financial asset in their accounting records.

Toys-Galore would account for the fair value of the FEC at R5 287 58 on 31 December 20X4.

Example: Fair value incorporating time value of money

The following example deals with a scenario where ignoring the time value of money in determining a fair value for a FEC would be incorrect.

Utility Corporation of South Africa (U-Corp) is in the process of constructing a new electricity generating plant, which needs to join the electricity grid at the end of March 20X6. In order for the plant to be functional, a piece of equipment will have to be imported from France. On 31 May 20X4, an order was placed with the French supplier of the equipment. Delivery of the equipment is set for the end of December 20X5. Delivery date and settlement date for the acquisition price are one in the same.

Given the high cost overruns on the project already, the head of the treasury division of U-Corp has insisted that U-Corp enter into a forward exchange contract (FEC) with its bankers. This was done on that date on which the part was ordered. The piece of equipment costs EUR50 000 000. The loc l b nk fixes a rate of R15 40 per EUR1 into the FEC on 31 May 20X4.

On 30 June 20X4, the first financial year-end of the public utility after entering into the FEC, the local bank quotes an FEC rate of R15 22 for a settlement date of 31 December 20X5.

What is the fair value of the FEC which U-Corp has entered into?

As the rate quoted on 30 June 20X4 is less than that fixed into the FEC, the FEC will be a financial liability in the annual financial statements of U-Corp. U-Corp will exposed to a loss on that date of:

EUR50 000 000 × (R15 22 – R15 40) = R9 000 000

As this loss relates to the settlement date of 31 D c mb r 20X5, this difference should be discounted to valuation date in order to fair value the FEC. Assuming that a 1-month JIBAR on valuation date is 8% per annum, and that interest on medium-term debt and investments is compounded monthly, the fair value of the FEC would be calculated as follows:

Set financial calculator on 12 P/YR

FV	=	R9 000 000
N	=	18
I/YR	=	8%
SOLVE: PV	=	R7 985 463 36

Important note:

Given that the rate to be used should be compounded monthly, the number of periods (n) is represented by the number of months from valuation date to cash settlement date. Discounting the value to a fair value on this basis accommodates a compounding of the rate.

JIBAR is used as risk-free rate. As the FEC rates would accommodate counterparty risk already, the discount rate should exclude risk (otherwise a double counting of risk would arise in the valuation process). You should remember from the arli r chapters dealing with valuations, that risk can either be accommodated into the cash flows/returns b ing valu d or into the rate used in the valuation, but never in both.

Practice questions

Question 15–1: Translating foreign amounts *(Fundamental)*

Moto Manufacturers (Moto) has the following transactions all taking place on 11 November20X4:

Transaction 1: Receives EUR120 668 48 from a French debtor in full settlement of their account.

Transaction 2: Moto need to pay GBP5 600 00 to Stratham Manufacturers in the United Kingdom.

Transaction 3: Moto needs to pay Dietikon GmBH in Switzerland CHF8 904 22 to settle an invoice received from them.

The following currency quotes have been provided by Moto's bankers on 11 November 20X4:

Currency quotes/Exchange rates	Bank's buying rate	Bank's selling rate
ZAR per British Sterling (GBP) 1	17 3624	17 8779
ZAR per Euro (EUR) 1	13 7447	14 1892
CHF per ZAR1	0 0893	0 0825

Required:

Calculate the equivalent South African Rand (ZAR) amount for each transaction.

Solution 15–1

Transaction 1

This is a direct quote against the Euro. As Moto received Euros from the French debtor they will be selling them to the bank (from the bank's perspective they will be buying them). As such Moto will translate the foreign amount by multiplying it by the bank's buying rate.

EUR(€)120 668 48 × R13 7447 = R1 658 552 06

Transaction 2

This is a direct quote against the British Sterling and as a result the foreign amount will be multiplied by the bank's selling rate given that Moto need to purchase GBP (the bank will be selling GBP):

GBP5 600 × R17 8779 = R100 116 24

Transaction 3

As this is an indirect quot , the Swiss Franc amount will be divided by the bank's *selling rate* as Moto needs to purchase Swiss Francs.

$$\frac{\text{CHF8 904.22}}{\text{CHF0.0825}} = \text{R107 929 94}$$

Question 15–2: T anslating foreign amounts *(Fundamental)*

Mr Keelan Pillay is the chief financial officer of Data-Trix Limited (Data-Trix), located in Johannesburg. The company specialises in developing enterprise -wide IT- platforms for large corporate customers. As part of the pr cess f devel ping such an IT-platform for SA Bank Limited (SA Bank), Keelan has to travel to Europe. While on his trip he will be visiting the offices of Technik GmBH in Frankfurt, Germany, as well as the offices of Springli GmBH located in Zurich, Switzerland. Keelan has asked the finance department of Data-Trix to purcha e the following cash amounts of each of the respective foreign currencies:

€500 (being EUR 500)

CHF300 (being Swiss Franc 300)

SA B nk will supply Data-Trix with the foreign exchange on 13 November 20X4. SA Bank's commission charged on the sale of all foreign exchange in notes (cash) amounts to 2,5% of the South African Rand amount.

Required:

Calculate, using the details provided in the table below, the amount in South African Rand (ZAR) which Data-Trix will need to pay SA Bank for the purchase of the foreign currency.

Standard Bank

FOREX CLOSING INDICATION RATES FOR 13 November 20X4 as at 16:00

Rates for amounts up to R 200 000

Closing rate history for date : 2014-08-07 16:17:38.0 Load

		Bank Buying			Bank Selling	
Country	**Cur**	**T/T**	**Cheques**	**Foreign Notes**	**Cheques and T/T**	**Foreign Notes**
QUOTATIONS ON BASIS RAND PER UNIT FOREIGN CURRENCY						
BRITISH STERLING	GBP	17.3624	17.3220	17.2399	17.8779	17.9729
EURO 1	EUR	13.7447	13.7045	13.6182	14.1892	14.2149
UNITED STATES DOL	USD	11.0398	10.9901	11.0323	11.3573	11.3573
QUOTATIONS ON BASIS FOREIGN CURRENCY PER R1						
ARAB EMIRATES DIR	AED	.3587		.3425	.2957	.3199
AUSTRALIAN DOLLAR	AUD	.1061	.1076	.1071	.0978	.0968
BOTSWANA PULA	BWP	.8850	.8907	.8850	.7708	.7708
CANADIAN DOLLAR	CAD	.1078	.1082	.1108	.0939	.0939
SWISS FRANC	CHF	.0893	.0896	.1003	.0825	.0785

'Cheques' denotes Travellers cheques, Personal cheques, Drafts and Clean items.

Exchange rates supplied by Corporate and Investment Banking Division

(Source: Standard Bank)

Solution 15–2

As the South African Rand is quoted per Euro, this would be a *direct quote* and as such the Euro amount needs to be multiplied by the curr ncy quote to translate it into South African Rand:

€500 × R14 2149 = R7 107 45

The Swiss F an /Rand quote is an *indirect quote* – given this, the Swiss Franc amount needs to be *divided* by the currency quote as follows:

$$\frac{\text{CHF300}}{\text{CHF0.0785}} = \text{R3 821 66}$$

The t tal am unt owing to SA Bank can now be calculated as follows:

	R
Euros purchased	7 107 45
Swi Francs purchased	3 821 66
	10 929 11
Commission (2,5% on Rand total above)	273 23
Total owing to SA Bank	11 202 34

Question 15–3: Identifying foreign exchange risk (*Intermediate*)

R-AND- G METAL (PTY) LTD (R&G) is located in Johannesburg. R&G manufactures different products using metal sheets. The production process is reasonably automated. On 11 November 20X4, R&G placed an order with the distributors of a sheet metal pressing machine. The distributor is located in the United States of America and the machine costs USD1 000 000. R&G will be invoiced in US Dollars (USD) once the machine is loaded on a ship destined for South Africa. Payment is likely to be made three months from the date of ordering the machine.

Mr Thabo Mokoena, the financial manager of R&G, on paging through a local newspaper on the 11 November 20X4, came upon the following table:

FORWARD RATES				
Currency	**Spot rate**	**1M**	**3M**	**6M**
USD	11,2198	11,2816	11,4179	11,6140
EUR	14,0034	14,0839	14,2613	14,5173
GBP	17,8417	17,9362	18,1466	18,4414
JPY	10,19	10,13	10,00	9,83

Thabo is uncertain as to what the implications of the infor ation provided in the table are and what his response should be.

Required:

Advise Thabo on what his response to this information should be.

Solution 15–3

R&G will be exposed to foreign currency risk (more specifically transaction risk) in respect of the machine which the company has ordered from the United States supplier. This is the case given that the 3-month forward rate is R11 4179 while the spot rate (the rate on 11 November 20X4) is R11 2198. This indicates that the South African Rand is expected to depreciate within the next three months.

The South African Rand is currently being quoted at a *premium* in the forward market, amounting to:

$$\frac{\text{R11.4179-R11.2198}}{\text{R11.2198}} \times \frac{12}{3} = 7{,}06\% \text{ per annum}$$

This indicates that the South African Rand is expected to depreciate at a rate of 7,06% per annum against the US Dollar. Hence, the South African Rand is being quoted as a premium to the US Dollar.

Given the above, R&G will nd up paying more in South African Rand terms for the acquisition. On 11 November 20X4, the cost of the machine is USD1 000 000 × R11 2198 = R11 219 800 (at the spot rate). The 3-month forward rate on said date is R11 4179 and based on this exchange rate, the expected cash flow on settlement date (three months hence) is USD1 000 000 × R11 4179 = R11 417 900, resulting in an additional payment of R198 100.

Thabo's response should be to *hedge* against the transaction risk by using any form of foreign exchange hedge.

Question 15–4: Money market hedge (*Intermediate*)

LCM Radi l gists operate a radiology practise in Pretoria. The partners in the practice have just decided to replace the s nar machine which they use in their practise with a new machine which they are importing from Germany. The cost of the machine is €1 200 000 and the practise will be invoiced in Euros (€) for the equipment.

On 13 November 20X4, the date on which the order for the new machine was placed with the German supplier, the spot ZAR/€1 exchange rate was R13 7447 (bank buying rate) and R14 1892 (bank selling rate). The practise will h ve to settle the outstanding amount on 12 January 20X5, which is 60 days after the date on which the order was placed. The financial advisor of the practise is concerned that the Rand will weaken during the period leading up to the settlement of the outstanding amount and has recommended that the partners hedge the outstanding amount.

On 13 November20X4, the date on which the hedge is to be set up, the following details are known regarding interest rates in Europe and South Africa:

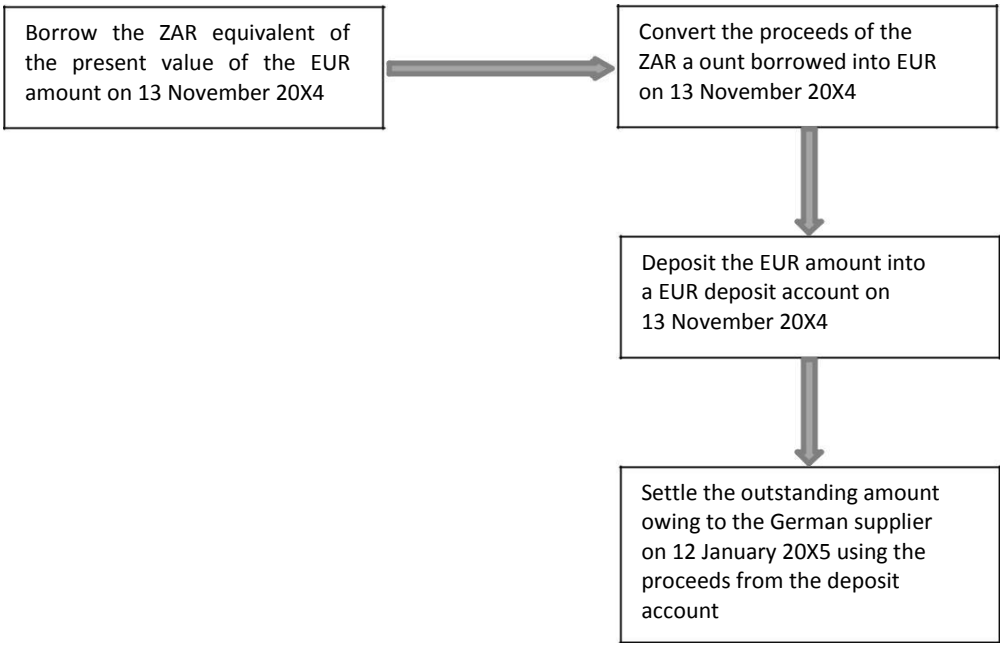
	Europe	South Africa
Borrowing rate (per annum)	1,5%	9%
Deposit rate (per annum)	0,5%	4,5%

Required:

Assuming that the practise makes use of a money market hedge and sets this up on 13 November 20X4, determine the amount which the practise will pay in South African Rand for the new sonar machine. Work on a 360-day year basis.

Solution 15–4

In setting up the money market hedge, the point of departure will be to identify that LCM Radiologists will be making a *foreign payment* and as such the money market hedge will be c nstructed as follows:



Step 1: determine the amount to be borrowed in South Africa

Set the financial al ulator on 6 P/YR

FV = €1 200 000
N = 1
I/YR = 0,5% (*European deposit rate*)
SOLVE: PV = €1 199 000 83

Step 2: c nvert the Euro amount into South African Rand (on 13 November 20X4)

€1 199 000 83 × R14 1892 *(the bank selling rate)* = R17 012 862 61

Step 3: determine the value of the South African borrowing on 12 January 20X5

Set the financial calculator on 6 P/YR

PV = R17 012 862 61
N = 1
I/YR = 9% (*South African borrowing rate*)
SOLVE: FV = R17 268 055 55

Note:

Although not required in terms of answering the question, the effective exchange rate (also referred to as the *manufactured exchange rate*) can be calculated as follows:

$$\frac{\text{R17268 055.55}}{\text{3900 €1200 000}} = \text{R14}$$

Remember that this rate is calculated in the same format as the exchange rate used – namely South African Rand / Euro.

Question 15–5: Foreign currency futures contract (*Intermedi te*)

Lombela Concession Company (Lombela) owns the rights to operate the Rapid Train Link (RPL) linking Pretoria, Johannesburg and OR Tambo Airport. Lombela's directors recently decided to acquire a number of new train carriages at a total cost of GBP4 402 300 from the Great British Train Manufacturers (GBTM) located in Leeds, England. The order was placed on 13 November 20X4 when the bank's selling rate for the South African Rand (ZAR) per British Sterling (GBP) was quoted at R17 8779. Settlement needs to take place on 15 February 20X5. Cindy Mabena, the chief financial officer of Lombela, is concerned given media reports, that the South African Rand is likely to weaken further given the market's assess ent of the political risk in South Africa.

Cindy has therefore decided that an appropriate risk response would be to hedge against the foreign exchange risk (transaction risk) and has identified the following Rand/British Sterling foreign currency futures contracts which trade in the currency derivative market of the Johann sburg Stock Exchange:

	R/GBP1
December 20X4 R/GBP1 contract	17 8244
March 20X5 R/GPB1 contract	18 0788
June 20X5 R/GBP1 contract	R18 1805

The standard size of the ZAR/GBP contracts is GBP1 000.

Required:

Set up the hedge using the foreign currency futures and determine the outcome of the hedge and net cost of the train carriages if the following applies:

The exchange rate in the futures market on the day on which Lombela close out the contracts is R18 1544.

The following spot rates exist in the currency market on 15 February 20X5 when settlement occurs:

Bank buying rate (ZAR/GBP1): R18 0844

Bank selling rate (ZAR/GBP1): R18 2312

Solution 15–5

Firstly, the hedge needs to be set up as follows:

Which contracts?

As settlement will occur on 15 February 20X5, the *March 20X5* contracts will be chosen as these close out after settlement date and Lombela will be hedged at least until settlement date.

As the exposure is in British Sterling, it would be appropriate to use ZAR/GBP contracts to hedge the exposure.

Po ition to be taken up in the futures market

Long position

(As the Rand is expected to depreciate against the British Sterling, the latter will increase in value – so by going *long* and buying the contracts initially and selling the futures on close out, Lombela should gain from a long position)

How many contracts should be used?

$$\frac{\text{GBP4 402300}}{\text{GBP1000}} = 4\ 402\ 3 \text{ contracts (rounded } \textit{down}\text{) } 4\ 402 \text{ contracts}$$

Tick/pip size:

R0,0001/GBP1

Tick/pip value:

GBP1 000 × R0 0001/GBP1 = R0 10

Outcome of the hedge

Sell futures	R18 1544
Bought futures	R18 0788
Gain *per contract* in ticks	R0 0756

This translates into 756 ticks per contract

Total gain: 4 402 contracts × 756 ticks × R0,10 per tick = R332 791 20

Net payment for the machine

	R
Purchase GBP4 402 300 in the currency mark t at R18 2312	80 259 211 76
Gain from futures market	–332 791 20
Net cost of the machine	79 926 420 56

> ***Note:***
>
> Although not required in terms of answering the question, it is important to note that had Cindy not hedged the payment, Lombela would have ended up paying R80 259 211 76 for the new train carriages.

Question 15–6: Hedging by weighing up various hedging alternatives (*Advanced*)

Stereo Corporation Limited (Stereo Corp) is a retailer of televisions, sound equipment and other household appliances. An order was placed with a supplier in China for 500 television sets at an average price of USD180 per set. Jiangtsu Suppliers, located in Nanjing, China, will be invoicing Stereo Corp in US Dollars for the consignment.

On the date on which the order was confirmed, 11 November 20X4, the following spot rates applied in the currency market in South Africa:

SA Bank

FOREX CLOSING INDICATION RATES FOR 11 November 20X4 as at 16:00

Rates for amounts up to R 200 000

Closing rate history for date : 2014-09-22 16:01:07.0 Load

		Bank Buying			Bank Selling	
Country	**Cur**	**T/T**	**Cheques**	**Foreign Notes**	**Cheques and T/T**	**Foreign Notes**
QUOTATIONS ON BASIS RAND PER UNIT FOREIGN CURRENCY						
BRITISH STERLING	GBP	17.3624	17.3220	17.2399	17.8779	17.9729
EURO 1	EUR	13.7447	13.7045	13.6182	14.1892	14.2149
UNITED STATES DOLLAR	USD	11.0398	10.9901	11.0323	11.3573	11.3573

'Cheques' denotes Travellers cheques, Personal ch qu s, Drafts and Clean items.

Exchange rates supplied by Corporate and Investm nt Banking Division

Lindsay Smith, the chief financial officer of Stereo Corp, developed a hedging policy a number of years ago. In terms of this policy, if rates in the forward market indicate the likely depreciation of the South African Rand (ZAR), then any one of the following hedges can be used, with the pre-requisite being that the cheapest hedging alternative be selected:

A forward exchange contract (FEC);

A money market hedge;

Leading; or

Traded foreign exchange options trading in the currency derivatives market of the Johannesburg Stock Exchange.

Lindsay accessed the following information which will allow her to set up the hedge:

Forward exchange contract

SA Bank, Stereo Corp's bank, have quoted a forward rate of R11 48 per USD to hedge Stereo Corp's exposure to the US Dollar, given a payment settlement date of 19 March 20X5.

Traded currency options

The following t aded US Dollar currency options are available on 11 November 20X4:

ZAR/USD1 option contracts with a strike date of	**Premium ZAR per USD**		**Strike rate (ZAR/USD1)**
	Call	**Put**	
17 December 20X4	25 04c	12 25c	11 2500
19 March 20X5	28 25c	13 50c	11 4500
17 June 20X5	30 40c	14 25c	11 6500

The standard size of the US Dollar currency futures trading on the Johannesburg Stock Exchange's currency deriv tive market is US1 000.

Additional information

The normal nominal borrowing cost of Stereo Corp is 11% per annum.

The following interest rates apply:

	United States of America	South Africa
Borrowing rate (per annum)	1,75%	11%
Deposit rate (per annum)	0,4%	4%

Required:

Calculate which option is the most cost of effective to hedge the exposure to the US Dollar on the Jiangtsu Suppliers order. Assume on the strike date chosen that the US Dollar currency futures are trading at R11 50 (selling) and R11 40 (buying).The bank's selling rate in the currency market on 19 March 20X5 is R11 5850 per USD and its buying rate is R11 4850. Work on a 365-day year.

On the assumption that Stereo Corp decided to enter into a f rward exchange contract (FEC) with SA Bank at the rate identified in the scenario, determine the fair value f the FEC for financial reporting purposes, if the financial year end of Stereo Corp is 31 Dece ber. On valuation date being 31 December 20X4, Stereo Corp could enter into an FEC with SA Bank at R11 54 per USD to hedge its exposure.

Solution 15–6

Approach to answering this part of the question

A difference in cash flow dates exists – the lead and the premium on the currency options takes place immediately on 11 November 20X4, while the strike on the currency options and FEC take place on 19 March 20X5. The money market hedge has cash flows on both of these dates. In order to compare the different hedging options, the approach taken in the solution is to compare the options on 19 March 20X5.

Using an FEC

Invoice amount: 500 television sets × USD180 = USD90 000

Cost in terms of the FEC: USD90 000 × 11 48 = R1 033 200 (on 19 March 20X5)

Money market hedge

As a foreign payment needs to be made in US Dollars, Stereo Corp would need to borrow locally, the South African Rand equivalent of the US Dollars which need to be invested in a US Dollar deposit on 11 November 20X4.

Assuming that no compounding of interest takes place, the *n* to be used in the calculation is one period, and as a result the interest rate needs to be adjusted as follows:

US deposit ate: $0{,}4\% \times \frac{128}{365} = 0{,}14\%$

SA borrowing rate: $11\% \times \frac{128}{365} = 3{,}86\%$

Step 1: Am unt to be invested in the USA

FV = USD90 000
N = 1
I = 0,14%
SOLVE: PV = USD89 873 93

Step 2: ZAR equivalent

USD89 873 93 × R11 3573 = R1 020 725 19

Step 3: Value of the South African borrowing

PV = R1 020 725 19
N = 1
I = 3,86%
SOLVE: FV = R1 060 100 01 (on 19 March 20X5)

Leading

Leading would involve making an immediate payment, given an expected depreciation in the South African Rand. This would entail Stereo Corp immediately purchasing the required US Dollar amount:

USD90 000 × R11 3573 (bank's selling rate) = R1 022 157

This however represents the value on 11 November 20X4 and so in order to compare values, the assumption is made that Stereo Corp would need to borrow R1 022 157 on 11 November 20X4 at 11% for 128 days resulting in the following future value on 19 March 20X5:

PV = R1 022 157
N = 1
I = 3,86%
SOLVE: FV = R1 061 587 06

Traded currency options

As Stereo Corp needs to purchase US Dollar and th curr ncy options are US Dollar options, Stereo Corp will need a **call option**. As Stereo Corp needs to s ttle the outstanding amount on 19 March 20X5, a strike date of 19 March 20X5 is required. As a result, Stereo Corp should select the March contracts.

Number of currency option contracts required: $\frac{\text{USD90 000}}{\text{USD1000}}$

= 90 contracts Premium payable immediately on 11 November 20X4:

R0 2825 × USD1 000 × 90 contracts = R25 425

Assuming that Stereo Corp needs to borrow these funds in order to be able to pay the premium, the value of the borrowing would be as follows on 19 March 20X5:

PV = R35 425
N = 1
I = 3,86%
SOLVE: FV = R26 405 78

On 19 March 20X5, the strike date, the following will take place:

As Stereo Corp can strike at R11 45 while the futures are trading at R11 50 per USD (Stereo Corp can buy a future on that date at R11 50 per USD), they would gain by striking at R11 45.

The gain resulting from this is as follows:

	R
Buy futu es contract in the market at	11,50
Strike at	11,45
Gain	0,05

This represents a 500 tick/pip movement

Value per tick/pip: USD1 000 × R0,0001/USD = R0,10

Outcome of the option:

	R
Purchase UD90 000 at spot rate of R11,5850	1 042 650 00
Less: gain from the traded option (90 × 500 ticks × R0,10)	-4 500 00
Plus: cost of premium	26 405 78
Total cost	1 064 555 78

Recommendation:

The cheapest alternative is to enter into an FEC with SA Bank at a forward rate of R11,48 per USD.

As Stereo Corp has already entered into an FEC at R11,48 this creates a benefit of R0,06 per USD for the company – if they had to enter into an FEC on valuation being 31 December 20X4, this would be at R11,54.

The FEC is therefore a **financial asset** for Stereo Corp and would be valued as follows (ignoring the time value of money effect):

Fair value: USD90 000 × (R11,54 – R11,48) = R5 400

Chapter 16

Interest rates and interest rate risk

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- identify the factors impacting on interest rates;
- identify the factors impacting on the term structure of int r st rates;
- discuss the interest rate yield curve and distinguish between a normal and inverted yield curve;
- distinguish between the capital, debt and money markets;
- discuss the functioning of a number of key money market instruments;
- discuss the different techniques which an enterprise can apply in managing its exposure to interest rates (natural hedges);
- discuss the use of forward rate agreements (FRAs) in hedging interest rate risk and perform relevant calculations to calculate the outcome of a FRA when being used as a hedge;
- differentiate between short-term interest rate futures and bond futures;
- set up an interest rate hedge using short-term interest rate futures as well as bond futures;
- discuss the use of options when hedging interest rate risk;
- calculate the outcome when hedging interest rate risk using an option (both traded as well as over-the-counter options);
- discuss the use of an int r st rate swap as hedging technique; and
- construct an int r st rate swap and split the gain arising from an interest rate swap between the counterparties to the swap agreement.

The purpose of this chapter is to make the student aware of how the interest rate mechanism functions, the different base interest rates which exist in South Africa and how, in particular, the Johannesburg Inter-bank Agreed Rate (JIBAR) is determined. It also defines interest rate risk and illustrates its existence under various conditi ns. Further, a discussion of the nature and characteristics of some of the securities that are traded in the m ney market, the method of trading and the advantages of dealing in some of the securities is also undertaken. Examples are presented to highlight trading techniques used when interest rates are rising and declining. Finally, different techniques to manage interest rate risk are discussed, in particular the use of derivative in truments to hedge this form of risk.

16.1 Interest rate risk defined

Interest bearing investments, as well as interest bearing debt instruments, have the potential to expose an enterprise to interest rate risk. The treasury function of an enterprise will need to monitor the enterprise's exposure to interest rates and where appropriate, hedge the enterprise against this risk.

Interest rate risk is the risk of financial loss resulting from changes in interest rates.

The extent of the exposure to interest rates will depend on whether we are looking at *interest bearing investments* or *interest bearing debt* or a combination of the two. Furthermore one would need to know whether the interest rate being earned on the interest bearing investments is fixed or floating (variable). Similarly, in respect of interest bearing debt, one would need to know whether the interest rate applicable to the borrowing is fixed or floating.

Any enterprise which borrows or lends money has to consider the following:

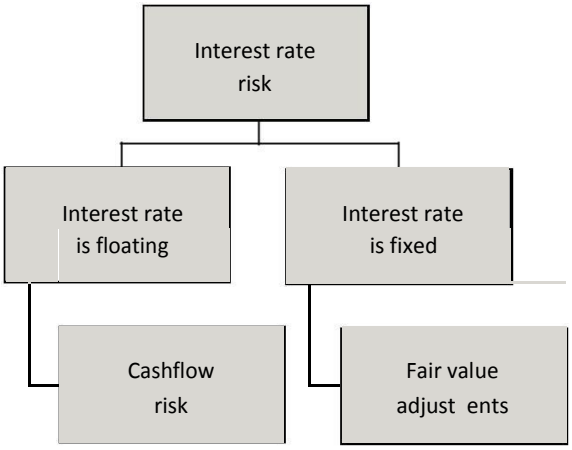


Figure 16.1: Impact of interest rate risk

In considering Figure 16.1 above, the key question is how much interest rate risk the enterprise is exposed to. The level of interest rate risk exposure will normally be determined using what is commonly referred to as *stress testing*. Stress testing involves using scenario analysis to determine the impact of various percentage (%) changes in interest rates on the profitability of an enterprise. The bigger the impact of such a change, the more sensitive the enterprise is to changing interest rates. This would also indicate the need of the enterprise to hedge itself against interest rate risk. This hedging could entail making use of natural hedges or using derivative instruments.

The benefit of natural hedges is that they are free as is highlighted in the previous chapter. These should always be considered when faced with interest rate risk as the profits of the enterprise would not drop given that the cost of hedging in this context would be zero.

16.1.1 Interest bearing debt and interest rate risk

An enterprise fund d by floating rate debt will be exposed to interest rate risk when interest rates *increase*. The higher interest rat s r sult in a higher cash outflows. If the enterprise had however *fixed* its interest rate it would not be exposed to interest rate risk as the rate at which the enterprise pays interest, is fixed regardless of what movements o ur in the interest rates in the market.

If however ma ket ates should reduce, then an enterprise with floating rate debt would benefit from lower finance cha ge cashflows. If the enterprise however has fixed rate debt, the rate at which the enterprise will have to pay interest would remain unchanged. In the case of the latter, the enterprise would be exposed to interest rate risk.

16.1.2 Interest bearing investments and interest rate risk

When the interest being earned on an investment is at a floating rate, the enterprise will be exposed to interest rate ri k when interest rates *decrease*. If at the same time the enterprise has floating rate debt, they would benefit from declining interest rates.

The converse would be true when interest rates increase – in such a case the enterprise benefits from higher fin nce income being earned on its investments but would incur higher finance charges on its borrowings.

As interest on investments can also be earned at a fixed rate, the enterprise would be exposed to interest rate risk when interest rates increase as they would not benefit from the increasing interest rate. The opposite would hold true where the interest rate earned on the investment is fixed and interest rates start declining.

16.1.3 Listed interest bearing debt and interest bearing investments

An enterprise with listed debt instruments in issue, in respect of which fixed interest rates apply, is not subjected to a cashflow risk resulting from a change in interest rates, but would rather be exposed to the risk of fair value adjustments having to be made in respect of the fair value at which the debt is accounted for in the financial statements. This form of interest rate risk impacts on the assets and liabilities (Statement of Financial Position) whereas the other forms of interest rate risk referred to earlier directly affect the profit and loss of the enterprise (Statement of Comprehensive Income).

16.2 The interest rate mechanism and the different interest rate base rates

All floating rates are quoted relative to a *base rate*. This base rate can be the repo r te (repurchase rate), JIBAR, or the prime rate. Interest rate risk therefore arises when changes to the pplic ble b se rate occurs.

The following is an explanation of the three different base rates that exist in the South African interest rate market that the student needs to be aware of:

16.2.1 Repo rate

The repo rate is the rate at which the South African Reserve Bank (SARB) lends to local banks at. A specified portion of all local banks funding is borrowed by the local banks from the SARB.

The Monetary Policy Committee (MPC) of the SARB meets on a regular basis and reviews this benchmark rate. The MPC is committed to managing inflation and as such the committee may decide from time to time to adjust this rate. If inflation is climbing then the MPC may d cide to hike the repo rate in order to dampen demand for credit, thereby easing inflationary pressures. If inflation is dropping, then the MPC may decide to lower the repo rate to increase demand for credit thereby stimulating the economy. Movements in the repo rate are expressed in 'basis points', with 100 basis points equating to 1%.

The prime rate is determined from the repo rate. The prime rate at end of 2012 was 8,50% while the repo rate was 5,00%. Local banks therefore lend at a rate of 3,50% above repo to local clients (minimum differential) than they borrow at from the SARB.

16.2.2 JIBAR

This is the base rate for *corporate lending*. JIBAR is the benchmark rate for money market interest rates in South Africa. JIBAR is calculated on a daily basis, with the following rates being published: one-month, three-month, six-month and 12 -month JIBAR. As the money market is the market providing financing for short-term funding needs (up to one year), the rates quoted are all *short-term rates*.

Five local banks and four foreign banks operating in South Africa are involved in the setting of JIBAR (hence nine contributors). The input th y provide is bid and offer quotes on tradable instruments, like negotiable certificates of deposit (NCD's). The *offer quote* indicates the rate at which the bank is willing to *sell* the instrument at to a client, whilst the *bid quote*, is the rate that the bank is willing to *buy* the tradable instrument at. An average rate is determined between the bid and offer quotes per contributor. The contributions from the nine contributors a e anked from highest to lowest. The highest and lowest contributions are then eliminated and the remaining seven contributions are averaged, to calculate the relevant JIBAR rate. The JSE Securities Exchange (JSE), a self-regulatory organisation, oversees the process.

It is important to note that, whereas similar benchmark rates overseas like LIBOR (London Interbank Offered Rate) are set according to the rates which the banks believe they will borrow at from each other, or lend to each ther at, JIBAR is based on the actual rates that the tradable instruments will trade at in the South African ney market.

Prime rate

This is the base rate for *consumer lending*. Individuals seeking financing from a local bank will borrow at a r te derived from the prime rate. Depending on the risks which the bank will be exposed to in respect of the particular client, they will determine an interest rate by adjusting the prime rate.

16.3 The capital, debt and money markets

A distinction is made between the following three markets:

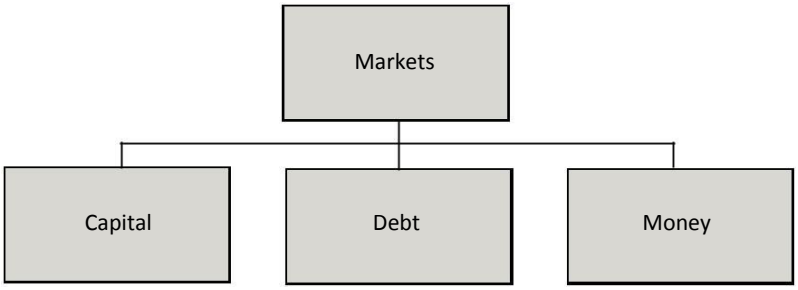


Figure 16.2: Markets making up the financial markets

16.3.1 Money market

All short-term investing and short-term funding is addressed by the oney market. Money market instruments therefore include all short-term investments (investments ature within a 12-month period) and funding needs of up to 12 months are addressed in this market.

16.3.2 Debt market

All listed bonds (listed debt instruments) with a term of longer than one year are normally said to trade in the debt market. Corporate bonds issues are listed on the JSE's Interest Rate Market where these instruments trade. Most corporate bonds have a term of three to five years and would be classified as medium-term funding and medium-term investment instruments.

16.3.3 Capital market

All long-term instruments, which include listed debt instruments with a term of more than seven years as well as equity, trade in the capital market. The JSE's Equity Market and the JSE's Interest Rate Market are the constituents of the capital market.

A number of instruments trading in the money market will now be discussed, once the factors impact on interest rates have been identified and discussed.

16.4 The level of interest rates in the financial markets

Understanding the caus s of int rest rate fluctuations and how interest rates change through the use of the interest rate me hanism as a monetary policy instrument is a complicated exercise. A full analysis of this is outside of the scope of this textbook, however the student is required to have a basic understanding of the key factors as well as how yields over the longer term are likely to have an impact.

16.4.1 Key general factors impacting on interest rates

Inflation

An increase in the inflation rate is generally coupled with an increase in interest rates:

Fir tly, as mentioned previously, the MPC of the SARB uses the interest rate mechanism to control inflation. As price levels increase, the committee may decide to increase interest rates to curb inflation. It then becomes more expensive to borrow money to fund demand – people buy less and this impacts on the inflation rate.

Secondly, as inflation increases, investors' returns in real terms decrease. To satisfy the need of an investor for a real return, interest rates will need to increase. The real return required by an investor will however depend on the amount of risk the investor is taking.

Thirdly, greater uncertainty regarding future inflation rates can also drive interest rates upwards.

The primary factor impacting on the rate of interest charged is the risk that the lender takes – the higher the risk that they might not be repaid, the higher the rate of interest which they will charge. However, a second factor also drives risk – *time*. As risk and time correlate, the longer the term of the loan the higher the rate of interest which the lender will expect. The *preference for liquidity* (discussed below) is also addressed in the process.

Preference for liquidity

Investors will always prefer a shorter payback period on an investment to a longer one. We therefore say that they have a *preference for liquidity*. Investors need to be compensated for investing surplus funds for longer periods of time. As such, longer term investments and longer term borrowings tend to be subject to higher rates of interest.

Demand for credit

As consumer and corporate demand for credit facilities increases, interest rates will tend to also increase. The MPC carefully monitors the demand for credit in the market – upward trends signal alarm bells and can result in an increase in the repo rate and subsequently the prime rate. It then becomes more expensive to borrow and the demand for credit starts reducing.

Exchange rates

If the Rand weakens, all imported goods start costing ore and inflation starts to creep upwards. Continued Rand weakness can result in the MPC increasing the interest rates (as referred to above) in order to curb the local demand for goods and services thereby reducing imports and hence lessening the demand for foreign exchange. This in turn will lead to a strengthening of the Rand, which will in turn fuel a rise in imports. From this one can see how it ends up being a continuous circle as the strengthening of the Rand will once again lead to an increased demand for imports thereby having the potential to fuel inflation.

Monetary policy of the central bank

As mentioned previously, the MPC uses the interest rate mechanism to manage the inflation rate in South Africa. This objective is part of the SARB's monetary policy.

Trends in international interest rates

South African interest rates tend to follow a similar pattern/trend that foreign interest rates do. If foreign interest rates increase, it would cause an outflow of capital from South Africa, with investors seeking higher returns overseas. To limit an outflow of capital, local interest rates would adjust upwards, resulting in the capital remaining invested in the South African market.

16.4.2 The term structure of interest rates and other factors impacting on interest rates

Whilst it is important to und rstand the factors that cause a general shift in interest rates, one must also consider how interest rat s are charged to specific or individual borrowers.

Risk

The primary factor impacting on the rate of interest charged is the risk that the lender takes – the higher the risk that they might not be repaid, the higher the rate of interest which they will charge. However, a second factor also drives risk – *time*. As risk and time correlate the longer the term of the loan the higher the rate of interest which the lender will expect, therefore incorporating the *preference for liquidity*.

If s me f rm f security is required by the lender (such as a mortgage bond being registered over a property financed by the bank), this reduces risk as well as the interest rate charged. This explains why long-term debt is cheaper than short-term debt. It all revolves around the provision of security to reduce risk over the long-term.

Term of the loan/borrowing

As mentioned above, the longer the term to maturity of the loan/borrowing, the higher the interest rate will tend to be.

The amount of the borrowing

The amount borrowed as well as transaction costs to be incurred will also impact on the effective interest rate applicable to the facility.

16.4.3 The interest yield curve

The interest yield curve (a graph) indicates the yields earned over different periods of time for a similar interest bearing security. As mentioned previously, the interest earned on an interest bearing security will depend amongst others on the term to maturity of the investment – in other words the length of time before the investment matures.

The yield curve should normally be an upward sloping curve – the longer the term to maturity, the higher the interest rate applicable to the investment. This results in the following pattern:

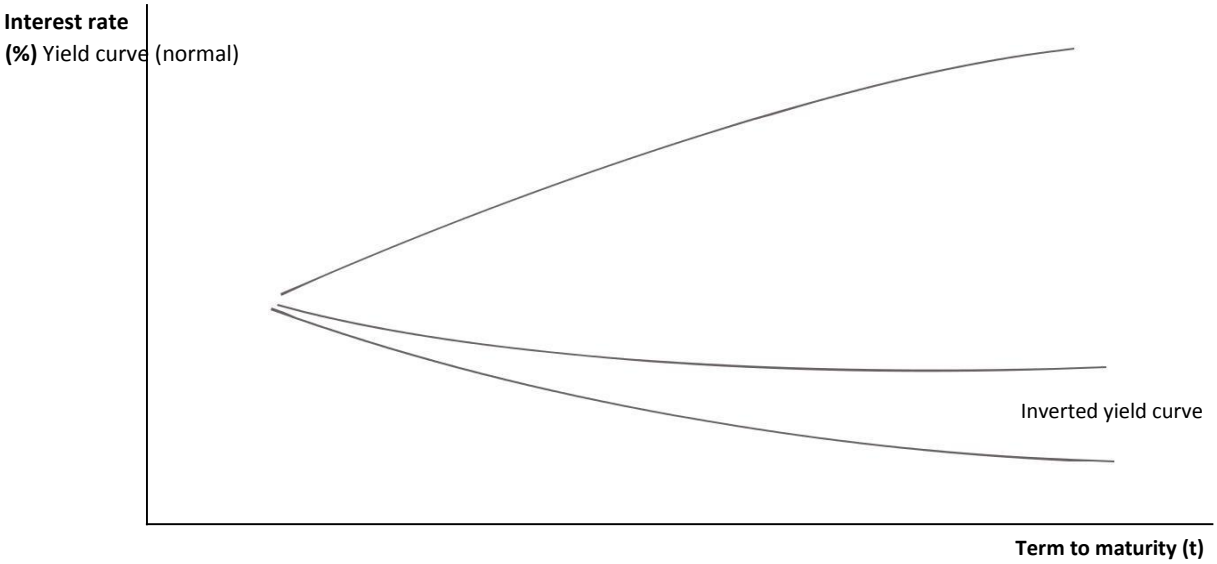


Figure 16.3: Interest yield curve

How does the inverted yield curve (short-term interest rates > long-term interest rates) arise?

It revolves around the expectation regarding the future trend in interest rates. An expectation of a slow-down in the economy in future will result in lower interest rates in future. This can result in long-term interest rates dropping below the level of short-term interest rates.

16.4.4 Managing interest rate risk

An enterprise can manage its exposure to interest rate risk using the following techniques:

Maintaining a portfolio of interest bearing debt and interest bearing investments

The impact of changing int r st rates on an enterprise's debt portfolio will to some extent be offset against the impact of increasing int r st rat s on the portfolio of interest bearing investments. If interest rates increase, then the increased finan e income can be offset against the higher finance charges being incurred. This hedging technique is referred to as *matching*.

The enterp ise will need to *match* term and duration of the debt and investments as far as possible for hedging benefits to arise. The enterprise would also need to be in a position of having both floating rate debt and floating rate investments, for natural hedging to arise.

Maintaining a mix of floating and fixed rate debt

By maintaining a mix of floating and fixed rate debt, the enterprise would only be exposed to interest rate risk on one portion of its debt portfolio. For instance during a period of increasing interest rates, the enterprise will only be exposed to interest rate risk on its floating rate debt – there will be *no exposure* on the fixed rate portion of the debt portfolio. This hedging technique is referred to as *smoothing*.

Simil rly, the same principles would apply to maintaining a mix of floating and fixed rate investments.

Pooling of cash surpluses within a group

A further hedging technique is that of *pooling*. Pooling would apply to a group scenario, where the treasury function (typically located at head office – in other words a centralised treasury), would be able to monitor cash balances and overdraft facilities. Treasury would be able to channel cash surpluses in one

subsidiary/division in the group, by means of a loan account, to a subsidiary/division experiencing cash shortages. In this way the group would not expose itself unnecessarily to interest rate risk as they would not be entering into loan agreements unnecessarily. This would reduce the exposure of the group to interest rate risk in the process.

Group treasuries can also borrow in bulk and invest in bulk resulting in more favourable interest rates being negotiated with financial institutions.

Pooling, like matching and smoothing, is considered to be a natural form of hedging.

16.4.5 The inter-relatedness between interest rate risk and other risks

The inter-relatedness between interest rate risk and the following risks needs to be explored:

Currency risk

Borrowing funds in a foreign currency creates an additional risk. Not only would the enterprise be exposed to interest rate movements in the foreign country where the funds were borrowed, but the enterprise would also be exposed to currency fluctuations – movements in the exchange rate between the enterprise's functional currency and the currency in which payments on the borrowing need to be made. Currency risk would amplify the effect on the enterprise's profitability of increased interest rates.

As a result, funding should only be obtained abroad if the enterprise earns returns in the same currency as the currency of the borrowing so that matching can be applied.

Credit risk

A further risk exacerbated by interest rate risk is credit risk. An enterprise providing credit facilities to its customers will be exposed to a heightened level of credit risk when interest rates are on the increase. Customers are under pressure when having to make payments on their accounts as the higher interest rates result in higher repayments. This can inevitably result in increased bad debts.

Liquidity (cashflow) risk

Increasing interest rates have a negative impact on the cashflows of the company. If nothing is done to hedge the enterprise against interest rate risk then the enterprise could eventually achieve 'financial distress' status.

16.4.6 Derivative instruments which can be used to hedge interest rate risk

The following derivative instruments can be used to hedge against interest rate risk:

Forward rate agreements (FRAs).

Interest rate futures contracts.

Interest rate option contract.

Interest rate swap agreements.

Each of these inst uments are discussed and illustrated with an example AFTER the conventional instruments (Treasury Bills, Banke s' Acceptances and Negotiable Certificates of Deposit) have been discussed. These follow in the next sections.

16.5 Treasury Bills

A Treasury Bill is a negotiable instrument issued by National Treasury and is normally made out to Bearer. They erve as a ource of liquidity for government. The Bill represents an obligation of the government to pay the bearer holding the instrument a fixed amount on date of maturity, usually 91 days from the date of issue. As such Treasury Bills are short-term debt instruments on the part of the issuer (government) and hence they trade in the money market.

Tre sury Bills are issued weekly on a competitive tender basis, and the return obtained is the difference beween the purchase price and the face value of the Bill. Under the tender system, Treasury Bills are made available by the Reserve Bank in denominations of R10 000, R20 000, R50 000, R100 000, R200 000, R500 000, R1 million and R2 million. Any person or institution may tender for the Bills, which are offered on a Friday. Tenders must, however, cover a minimum amount of R100 000 for any one bid.

The successful tenderers are then required to take up and pay for their Bills on any day from Monday to Friday following the tender day. An important advantage is the tradability of Treasury Bills - Discount Houses have to hold large quantities of Treasury Bills to help balance their books. The Reserve Bank offers an accommodating facility to the Discount Houses, whereby Treasury Bills are re-discounted by the Reserve Bank in multiples of R100 000 to liquidate any daily shortage they may experience. Consequently, Discount Houses are willing buyers and sellers of Treasury Bills of varying length, which can at any time be sold to or purchased from the Reserve Bank.

16.5.1 The tender

To obtain Treasury Bills directly from the Treasury, an investor applies to the Reserve Bank on a Friday, stating the amount of Bills he wishes to take up, the price which he is prepared to p y nd the day in the following week upon which he wishes to take up the Bills.

Example:

Investor A tenders for R1 000 000 Treasury Bills at a price of R96,05; R600 000 to be taken up on the Wednesday following the tender and the remaining on the Thursday.

If his tender is successful, he will be required to pay R576 300 on the Wednesday following the tender day and R384 200 on the Thursday. On maturity, the Reserve Bank will redeem the Bills for R600 000 and R400 000 respectively.

Tender price	R96,05
Discount rate	15,84%

$$\frac{3{,}95}{100} \times \frac{365}{91} \times \frac{100}{1} = 15{,}84\%$$

Interest	R39 500

The tender price is another way of stating the discount rate, which is always lower than the effective yield on a particular investment.

Example:

Tender price	Discount rate	Effective yield
R97,15	11,43	11,77
R96,05	15,84	16,49
R95,85	16,64	17,36

16.5.2 Trading in Tr asury Bills

The main advantag s of trading in Treasury Bills from an investor's point of view are:

There is an extremely a tive market for Treasury Bills.

Investo s can buy and sell in bundles as small as R10 000.

Treasury Bills have a low risk profile.

Treasury Bills are always traded at a discounted rate, not on the effective yield to maturity basis. Although Treasury Bills are normally held for the full 91 days to maturity by most investors, the yield on a Bill can be impr ved by trading in times of declining interest rates.

16.5.3 Trading when interest rates are declining

Investor A successfully tendered for R1 000 000 in Treasury Bills on 24/9/20X2 at a price of

95,93. M rket discount rates over the period of maturity were

24/09/20X2 16,32%

24/10/20X2 15,65%

24/11/20X2 14,55%

The options open to Investor A are –

to hold investment until maturity; or

to trade before maturity.

If held until maturity

Price	R959 300
Discount rate	16,32%
Effective yield	17,01%

$$\frac{40\,700}{959\,300} \times \frac{365}{91} \times \frac{100}{1} = 17{,}01\%$$

If sold after 30 days at a discount rate of 15,65%

Purchase price		R959 300
Selling price		R973 845
1 000 000 – (1 000 000 × 15,65% × 61/365)	=	R973 845
Interest for 30 days		R14 545
Yield for period held		18,45%

$$\frac{14\,545}{959\,300} \times \frac{365}{30} \times \frac{100}{1} = 18{,}45\%$$

The shorter the period one holds an investment wh n int r st rates are declining, the greater the capital gain will be.

If sold after 61 days at a discount of 14,55%

Purchase price		R959 300
Selling price		R988 041
1 000 000 – (1 000 000 × 14,55% × 30/365)	=	R988 041
Interest for 61 days		R28 741
Yield for period held		17,93%

Although the discount rate moved down faster between October and November than it did between September and October, the best trading day was 24/10/20X2. The reason for this statement is that by selling on 24/10/20X2, one will make a 61-day capital gain, whereas by selling on 24/11/20X2, one only makes a 30-day capital gain. However, if interest rates are rising, selling a Treasury Bill before maturity will result in a capital loss or a decrease in the effective yield over the period held.

16.6 Bankers' Acc ptances

A Bankers' Acceptan e is a bill of exchange drawn on and accepted by a bank, with a stated maturity date. The bill usually uns for between 90 and 120 days, and is employed to finance the movement of goods within and between count ies. A bank, by accepting a bill, becomes liable for the bill in the event of default by the party given the credit.

Bankers' Acceptances are usually regarded as prime money market instruments on the strength of the bank's name, th s making them one of the most actively traded instruments in the money market, and a major asset in the p rtf lio f financial institutions. The lowest denomination in which Bankers' Acceptances are normally issued is R50 000, although there is no statutory regulation governing the amount. Tradability in Bankers' Acceptances has always been strong, but it was further strengthened from 1 January 1978, when the SARB introduced a change in the method of assisting the Discount Houses.

In terms of the change, Discount Houses are granted the facility to re-discount liquid Bankers' Acceptances which have not more than 91 days to run, in multiples of R50 000, with the SARB for the minimum and maximum periods of seven and 14 days respectively. The effect of this assistance by the Reserve Bank is that it gives offici l recognition to the Bankers' acceptance as an important money market instrument.

The two types of acceptances traded are liquid and non-liquid acceptances. In order to qualify as a liquid acceptance, a Bankers' Acceptance has to meet, *inter alia*, the following requirements:

The aggregate amount of an acceptance facility must bear a relationship to the turnover of the drawer which satisfactorily establishes the self-liquidating nature of the bill, with due allowance for credit which is obtained by the drawer in other ways or from other sources.

A Bankers' Acceptance must be drawn under an authority of credit which restricts its use solely to the provision of working capital required in respect of goods in which the drawer trades in the normal course of his business, and which he has already bought or sold.

The acceptance must be enclaused, quoting the relevant authority, and stating the nature of the goods concerned.

The acceptance must be drawn for not more than 120 days, and must be re-discountable by the SARB.

Non-liquid Bankers' Acceptances take the same form as liquid acceptances and are classified non-liquid because they do not comply with the conditions specified above, in other words they may be issued for longer than 120 days. Non-liquid Bankers' Acceptances are generally issued as a form of a loan. Note that the creditworthiness of the client does not affect the classification of a bill as liquid r non-liquid. The market for non-liquid acceptances is much smaller than the market for liquid acceptances and they also trade above the rate applicable on liquid acceptances.

16.6.1 Trading in Bankers' Acceptances

Investing in Bankers' Acceptances has the following advantag s:

Security: The risk of an investor holding a Bankers' Acceptance is minimal. If an acceptance is bought via the money market, it usually bears the names of three institutions which can be held liable to pay, in other words the drawer, the accepting bank, and the Discount House which endorsed the bill. No capital loss has ever been incurred by an investor in Bankers' Acceptances.

Rate: Acceptances are traded at attractive market-related rates. The rate on liquid acceptances might be lower than on a negotiable certificate of deposit or non-liquid acceptance, but usually compares favourably with term deposits with the same maturity.

Marketability: There is an active market in acceptances and the maturity structure can be altered to meet changing requirements and interest rate expectations. A capital profit or loss can however be made by selling the acceptance before maturity, depending on the movement of interest rates.

Bankers' Acceptances are traded in the same manner as Treasury Bills, at a discount rate, although capital profits are often better than those achieved on Treasury Bills, due to the length of acceptances.

16.6.2 Trading when interest rates are declining under a normal yield curve

A normal yield curve m ans that the longer the investment period is, the higher the return on that investment will be.

	Discount rates	
	November	**December**
120 days	15,30%	15,05%
90 days	15,25%	15,00%
60 days	15,20%	14,90%

Invest r A purchases R1 000 000 Bankers' Acceptances in November for 120 days

C nsiderati n	R949 698
Di count rate	15,30%
Yield if held to maturity	16,11%

If so d after 30 days at ruling market rates

New investor pays	R963 013
Discount rate to new investor	15,00%
Yield to new investor	15,58%
Interest received by Investor A	R13 315 (963 013 – 949 698)
Effective yield to Investor A	17,06%

16.6.3 Trading when interest rates are declining under an inverse yield curve

An inverse yield curve means that the later the maturity date on an investment, the lower the return on that investment will be.

In addition to our earlier discussion, the following points are highlighted as reasons for the existence of an inverse yield curve:

Borrowers' reluctance to issue long-dated paper, as they feel that interest rates will drop in the near future.

Investors taking the view that interest rates will drop, and so increase their demand on longer paper in the hope of making a capital gain.

Excess liquidity in the market, causing investors to shift part of their funds from short-term instrument into longer-term investments.

Where one has an inverse yield curve, the yield on an investment can still be improved, as long as all the rates are moving down.

	Discount rates	
	November	**Dece ber**
120 days	15,30%	15,00%
90 days	15,50%	15,10%
60 days	15,60%	15,30%

Investor A purchases R1 000 000 Bankers' Acceptanc s in Nov mber for 120 days

Consideration	949 698
Discount rate	15,30%
Yield if held to maturity	16,11%

If sold after 30 days at ruling market rates

New investor pays	R962 767
Discount rate to new investor	15,10%
Yield to new investor	15,68%
Interest received by Investor A	R13 069
Effective yield to Investor A	16,74%

Had Investor A purchased a 30-day Bankers' Acceptance initially, and held it to maturity, his yield would not have been as high as that achieved by buying longer-dated paper that will give him a capital profit with declining interest rates. As with Treasury Bills, if interest rates are rising, selling a Bankers' Acceptance before maturity will decrease the ff ctive yield over the period held.

16.7 Negotiable Certificates of Deposit

A Negotiable Ce tificate of Deposit (NCD) is an instrument issued by a bank or merchant bank, certifying that a deposit has been made with it. The certificate is invariably made payable to Bearer, and states the amount orig-inally invested, the rate of interest, and the amount of capital plus interest payable on maturity. Banks issue the certificates when they wish to raise funds for periods of between three and 18 months, although they can be issued f r as l ng as five years when money market conditions are easy.

The interest n a certificate that runs for up to 12 months is normally paid on maturity, while longer certificates carry a ix-monthly interest payment. Although there is no minimum amount at which an NCD can be issued, they are eldom placed for less than R250 000. Unlike Treasury Bills and Bankers' Acceptances, NCDs do not qua ify as liquid assets in terms of the Banks Act 94 of 1990, nor are they re-discountable by the SARB.

Due to the above constraint on this type of instrument, the rate of interest is more sensitive and reacts more strongly to changes in the liquidity situation in the money market than is the case with Treasury Bills and Bankers' Acceptances.

16.7.1 Trading in Negotiable Certificates of Deposit

The main advantages of investing in this type of asset are that –

an investor who holds an NCD with a five-year maturity date can market the instrument at any time;

interest rates are relatively high, compared to ordinary fixed time deposits; and

liquidity is maintained through secondary market selling.

NCDs are traded on a yield to maturity, not on a discount basis. Where the interest on a certificate is payable at six-monthly intervals, difficulty is sometimes encountered in calculating the se ing price of the certificates.

16.7.2 Calculating the selling price

The following example illustrates the calculation of the selling price on certific te already in issue, and also the extent to which capital gains can be made by the seller of the certificate.

Example:

Investor A purchased a R1 000 000 NCD directly from a bank at a yield to maturity of 15,5%; interest payable semi-annually.

Issue date	08/07/20X1
Redemption date	08/01/20X4
Interest rate	15,5%

Interest payments

08/01/20X2	R77 500
08/07/20X2	R77 500
08/01/20X13	R77 500
08/07/20X13	R77 500
08/01/20X4	R77 500

Investor A sold the certificate on 23/11/20X2 at a rate of 13,45%.

Calculating the selling price

Redemption value on 08/01/20X4 1 077 500

$$\text{using FV} = PV\left(1 + \left(i \times \frac{d}{365}\right)\right)$$

where:

FV = Future value
PV = Pr s nt value
I = Interest rate
d = Number of days

	R
Redemption value	1 077 500
PV at 08/07/20X13 6 months at 13,45%	1 009 604
Pl s: Ann al interest 08/07/20X13	77 500
	1 087 104
Future value at 08/07/20X13	1 087 104
PV at 08/01/20X13 6 months at 13,45%	1 018 603
P us: Annual interest 08/01/20X13	77 500
PV 08/01/20X13	1 096 103
PV at contract date 23/11/20X13 46 days at 13,45%	1 077 833

Therefore the contract selling price of the NCD is R1 077 833.

Return to seller

	R
Purchase price	(1 000 000)
Interest 08/01/20X2	77 500
Interest 08/07/20X2	77 500
Selling price	1 077 833
Return on investment	232 833

Period held	503 days
Yield over period held	16,90%
Capital profit	R19 230

Had Investor A held the certificate for a shorter period, the capital profit would h ve been higher.

For example, selling the above investment at a yield to maturity of 13,45% to buyer would have given the following yields over the period held:

Contract date	Selling date	Period held	Capital profit	Yield
08/07/20X1	08/10/20X1	3 months	37 502	30,5%
08/07/20X1	08/01/20X2	6 months	34 936	22,5%
08/07/20X1	08/04/20X2	9 onths	29 853	19,5%
08/07/20X1	08/07/20X2	12 onths	27 035	18,2%

16.8 Forward rate agreements

A forward rate agreement (FRA) is generally an over-the-counter agreement – in other words, forward rate agreements do not normally trade on an exchange. A forward rate agreement is entered into between the enterprise wishing to hedge itself against interest rate risk and a third party (the hedge counterparty), very often a bank.

Why enter into a forward rate agreement? If an enterprise is going to be borrowing money in future, and indications are that interest rates are going to increase in future, then the risk exists that *before* the enterprise physically borrows the money from the bank that interest rates will have increased, and a higher rate of interest would be paid on the future borrowing. Remember, the enterprise will only be able to fix the rate at which it borrows on entering into the loan agreement with the bank. Until then they remain exposed to interest rate risk. Similarly if an investor is concerned that interest rates could drop before they are able to fix the interest rate on an investment, they could potentially end up earning less interest unless they hedge against the interest rate risk.

What is the solution then? By entering into a forward rate agreement, the rate of interest which will apply on the future date (normally the date on which the enterprise will borrow the funds from the bank or invest funds with the bank) is *fixed* in terms of the agreement. When interest rates are increasing the party wishing to hedge (the borrow r) will *buy a fixed rate* in terms of the forward rate agreement. When interest rates are decreasing the party wishing to h dge (the investor) will *sell a fixed* rate in terms of the forward rate agreement. The counterparties agree as well that the forward rate agreement will apply to a specified *notional amount*. This is the nominal value on which the difference in interest rates will be applied. On the future date specified in the forwa d ate ag eement, the following sequence of events, take place:

Step 1: The two parties compare the difference between the rate fixed into the agreement (FRA) and the market rate on that date. If market rate > FRA rate, then the third party will settle the difference in cash with the enterprise.

If h wever the market rate < FRA rate, then the enterprise will have to pay an amount over to the third party. *The preceding is the case for a borrowing being hedged – the opposite decision rules would apply in the case of an investment.*

Step 2: The enterprise physically enters into a loan agreement with the bank and fixes (if it is still concerned that further interest rate increases could occur) the rate to apply to the borrowing. *Alternatively, in the case of an investment, the investor would enter into an agreement with the bank to fix the rate of interest to be received on their investment.*

Some of the key attributes of forward rate agreements are:

They can be arranged with reasonable ease and be tailor-made to meet the precise nominal value of the future borrowing amount. They can also be customised in terms of the period of time for which hedging is required.

The cost of hedging is limited as no premium is required when entering into such an agreement.

The agreement is binding – performance has to take place in terms of the contract on termination date of the contract.

The agreement creates an effective hedge in a case where the interest rate risk materialises as expected (refer to the first outcome in the example which follows to illustrate this point).

If interest rate risk does not materialise as expected then the enterprise will not be able to benefit from the more favourable interest rates in the market.

Example: Forward rate agreement

Fashion-ista Limited ('Fashion-ista') is a local retailer of clothing apparel. The company intends on building up inventories for the festive season and intends on borrowing R100 milli n in three months' time (on 1 July 20X2) from a local bank.

The head of Fashion-ista's treasury, Mr Vusi Mahlangu, is concerned that all indications in the market point to expected increases in interest rates in future. This would have a negative impact on borrowing costs in future.

Mr Mahlangu decides that Fashion-ista should hedge its lf against increasing interest rates by entering into a six-month forward rate agreement on 31 March 20X2 (today) for a period of six months starting on 1 July 20X2 and ending on 31 December20X2. Cash settlement in terms of the forward rate agreement is set for 1 July 20X2. The forward rate fixed in the contract is 8% per annum. On 1 March 20X2, JIBAR amounted to 7% per annum.

Required:

Determine the outcome of the forward rate agreement on 31 December 20X2 and the resulting effective interest rate on the loan, if JIBAR is as follows on settlement date:

JIBAR has increased to 8,50% per annum

JIBAR has decreased to 6,50% per annum.

Assume that Fashion-ista enters into a loan agreement with a local bank on 1 July 20X2 for the borrowing of R100 million.

Solution:

If JIBAR has increas d to 8,50%

The rate locked into the forward rate agreement is 8% per annum. As this is less than the market rate of 8,50%, Fashion-ista will *re eive* the following cash settlement from the counterparty on 1 July 20X2 and pay the resulting interest on the loan:

$$\text{Compensation payment} = \text{Notional amount} \times \frac{(\text{FRArate} \;\; \text{reference rate}) \;\; \text{days/basis}}{1 \;\; (\text{referencerate} \;\; \text{days/basis})}$$

$$= \text{R100 million} \times \frac{(8\% \; 8.5\%) \; 6\text{m}/12\text{m}}{15 \; 1 \; (8.5\% \; 6\text{m}/12\text{m})} = \text{R239 808}$$

In terms of the forward rate agreement, Fashion-ista will receive the *present value* of the difference between the rate fixed in terms of the forward rate agreement and the market rate on settlement date. Fashion-ista reduces the amount which they need to borrow, by the compensation payment received. The result is as follows:

		R
FRA compensation payment		239 808 15
Borrow from the bank on 1 July 20X2	(R100m – R239 808 15)	99 760 191 85
Interest paid on borrowing	R99 760 191 85 × 8,5% × 6/12	4 239 808 15
		104 000 000 000

$$\text{This results in an effective interest rate of } \left(\frac{\text{R104m}}{\text{R100 m}} - 1\right) \times \frac{12}{6} = 8\%$$

Fashion-ista, by means of the forward rate agreement has managed to reduce its borrowing cost from 8,50% to 8% per annum and has effectively fixed the rate on the borrowing n 31 March 20X2.

If JIBAR has decreased to 6,50%

The rate locked into the forward rate agreement (the FRA rate) is 8% per annum. As this is more than the market rate of 6,50%, Fashion-ista will have to make a cash pay ent to the counterparty on 1 July 20X2:

$$\text{Compensation payment} = \text{Notional amount} \times \frac{(\text{FRArate r f r nce rate}) \text{ days/basis}}{1 \text{ (referencerate days/basis)}}$$

$$= \text{R100 million} \times \frac{(8\% \; 6.5\%) \; 6\text{m}/12\text{m}}{25 \; 1 \; (6.5\% \; 6\text{m}/12\text{m})} = \text{R726 392}$$

Fashion-ista will now not only have to borrow the R100 million from the bank to finance its working capital needs, but they will also have to borrow the funds to settle the compensation payment.

		R
FRA compensation payment		726 392 25
Borrow from the bank on 1 July 20X2	(R100m + R726 392 25)	101 726 392 25
Interest paid on borrowing	R101 726 392 25 × 6,5% × 6/12	3 273 607 75
		104 000 000 000

$$\text{This results in an ff ctive interest rate of } \left(\frac{\text{R104m}}{\text{R100m}} - 1\right) \times \frac{12}{6} = 8\%$$

In both cases it would probably be more accurate to use a days' convention as basis instead of months. However, no matter whether days or months are used, the same outcome is achieved.

Fashion-ista, has in effect fixed the rate on the borrowing on 31 March 20X2 at 8% per annum when the forward rate agreement is entered into. The interest rate risk which Mr Mahlangu expected to arise never materialised. As a res lt of the hedge, the cost of borrowing of Fashion-ista is more than the market rate. This is expected as no interest rate risk materialised.

16.9 Interest rate futures contracts

An intere t rate futures contract is a financial derivative, the value thereof being driven by the change in a particu ar interest rate. The interest rate futures contracts have a *standard notional value* (in other words contract size) nd the contracts trade on the Yield-X market of the JSE Securities Exchange (JSE).

16.9.1 Short-term interest rate (STIR) futures contracts

The first type of interest rate future that we will look at is what is known as a *short-term interest rate (STIR) future*. These contracts are linked to the three-month JIBAR rate and are known as *JIBAR futures* with the value of these futures being derived from the movement in the three-month JIBAR rate. The following are the characteristics of JIBAR futures as traded on the Yield-X market:

Characteristic	Explanation
Notional size	R100000
Quote	According to the rate on the 3-month JIBAR (this is known as the *yield*)
Pricing	Priced according to the following formula: 100 – yield = price
Value per basis point movement	R2,50 per basis point movement – as interest r tes s norm lly quoted as x,xx% (to two decimals), the smallest movement in the rate will be a one movement up or down in the second decimal – this would be a *one basis point* increase or decrease

Physical delivery of the underlying contract, in other words the R100 000 value of the contract is not required. Instead an initial margin is paid to a clearing house – this amount is a 'g d faith deposit' and is a fraction (percentage) of the value of the contract. This margin ensures that the market remains liquid at all times – in other words that investors into futures contracts who have ade gains, can withdraw their gains from the market without the market losing liquidity.

Through marking-to-market (M-T-M), the gains or losses on the futures contracts will be measured on a daily basis. The difference between today's M-T-M value and the pr vious M-T-M value is known as a *variation margin*. Investors making gains will have a positive variation margin which they can withdraw. Where losses are made the variation margin is negative – these investors will have to 'make good for their losses' by depositing the value of the loss with the clearing house.

Two types of JIBAR-futures contracts exist:

Quarterly contracts – these contracts are quoted for a two-year cycle and close out in March, June, September and December.

Serial contracts – these contracts are in addition to the quarterly contracts indicated above. *Four* serial contracts are listed at any given point in time. With the exception of these expiry dates of these contracts, they are identical to quarterly contracts. The only difference – they expire in months other than the four standard months of March, June, September and December.

The benefit of the serial contracts is they result in a better matching of the futures contracts to the interest rate risk being hedged. We will however stick to the quarterly contracts from here onwards in this chapter.

Position to be taken up on interest rate futures contract

You will recall from our discussion in the previous chapter, of Forex Futures Contracts, that investors either take up a long position (buy the future upfront and sell the future on close out or expiry) OR investors take up a short position (sell the future upfront and buy the future on close out or expiry of the contract). Exactly the same applies to an interest rate futures contract. However, the position to be taken up by an investor or wishes to *hedge* using futures, will be determined as follows:

An ente p ise which has *borrowed* funds and is paying a floating rate will be exposed to interest rate risk when interest rates are expected to *increase in future*. If interest rates increase (so would the yield), the pricing mechanism of interest rate futures results in the value of the interest rate future ***dropping*** – to benefit from the drop in value of the futures contracts one would need to sell the con-tract upfr nt and buy it later (based on the expectation of increasing interest rates). This means that b rr wers wishing to hedge interest rate risk (increasing interest rates) will have to go *short* in the fu-tures market.

An enterprise which has *invested* money at a floating rate will be exposed to interest rate risk when intere t rates are expected to *decrease in future*. If interest rates decrease (so would the yield); the pricing mechanism of interest rate futures results in the value of the interest rate future ***increasing*** – to benefit from the increase in value of the futures contracts one would need to buy the contract upfront nd sell it later (based on the expectation of decreasing interest rates). This means that investors wishing to hedge interest rate risk (decreasing interest rates) will have to go *long* in the futures market.

Contracts can be closed out by other taking up an opposite position (i.e. if the party hedging went short then they would need to buy the contract to close out their position or *vice versa* if they had gone long on the

contract) or they could merely let the contract expire – in which case they would be forced to take up the opposite position on the contract, to the position they are currently in.

Example: Using STIR futures to hedge interest rate risk

Fashion-ista Limited ('Fashion-ista') is a local retailer of clothing apparel. The company intends on building up inventories for the festive season and intends on borrowing R100 million in six months' time from a local bank. The head of Fashion-ista's treasury, Mr Vusi Mahlangu, is concerned that all indications in the market point to expected increases in interest rates in future. This would have a negative impact on borrowing costs in future.

Initial dilemma:

Mr Mahlangu is aware the Fashion-ista could make use of interest rate futures (JIBAR futures) as the future borrowing will be short-term. He, however, is not sure of what position F shion-ista would need to take up in the interest rate futures market.

Assuming that the three-month JIBAR is quoted at 6,50% at present (known as a spot rate – it is the rate applicable today) and the forward three-month JIBAR rate is quoted at 7,50% f r six months from now, the following would happen to the value of the futures contract:

Today:	100 – 6,50 = 93,50
Six months from now:	100 – 7,50 = 92,50

When interest rates are expected to increase, the value of the short-term interest rate futures will decrease in future and as such to benefit from this, Fashion-ista would need to take up a ***short position*** *in the interest rate futures market.*

Problem resolved:

Fashion-ista intends entering into the borrowing agreement with the bank on 15 September 20X2 at which point in time Fashion-ista will fix its rate for the duration of the 12-month term of the borrowing. However Mr Mahlangu is very concerned that interest rates will increase before then – he wants to hedge against the impact of higher interest rates on the finance charges for the 12-month period. It is currently June, and Fashion-ista can make use of a three-month JIBAR contract which will close out on 15 September 20X2. Assume that the yield quoted at present on the three-month JIBAR contract is 6,50% and Fashion-ista lets the contract expire on 15 September when the yield is 7,25%. Calculate the net borrowing cost on the loan if on 15 September 20X2 they fix the rate of interest on the borrowing at 7,25%.

Look carefully at how an interest rate hedge using interest rate futures would be set up:

Which contract will be used? *Risk is short-term – hedge using a short-term interest rate future*

(in case of South Africa this would be the three-month JIBAR contract)

Which position (long/short)? *Based on our earlier discussion – expectation of higher interest rates – so go short*

How many contra ts? Each contract has a notional value of R100 000 and Fashion-ista intends on borrowing R100 million for 12 months

$$\frac{\text{R100 m}}{\text{R100 000}} \times \frac{12}{3} = 4\,000 \text{ contracts}$$

Exposure — Term of borrowing versus length of contract

N te: Fr m the above you can see that we try to cover the full exposure of Fashion-ista in terms of the value f the borrowing and in terms of term (length) of the borrowing.

Value per decimal (tick) movement: R2,50 (as per the Johannesburg Stock Exchange (JSE) derivatives market)

Outcome of the hedge:

Sold at 6,50% yield (price: 100 – 6,50)	93,50
Bought at 7,25% yield (price: 100 – 7,25)	92,75
Gain	0,75

This equates to a 75 tick movement (0,75% movement in the interest rates) in the price of *each contract*.

Net impact on finance charges:

	R
Finance charges: R100m × 7,25%	7 250 000
Gain from futures market: 75 ticks × R2,50 per tick × 4 000 contracts	(750 000)
Net finance charges	6 500 000

Comments:

The gain arising in the futures market indicates that the correct position was taken up – to go short – and that the hedge was effective, as interest rates did increase (as can be seen from the increasing yield on the three-month JIBAR contract).

With relatively little cost involved (only the initial margin which is a fr ction of the value of each contract), Fashion-ista was able to hedge itself against the increasing interest rates.

As Fashion-ista was hedging a multiple of the contract size of R100 000, they obtained a perfect match – a per-fect match in terms of the futures contracts might not always arise and y u will have round off the number of contracts to be used. This can be to your detriment as you will n t have a perfect hedge.

The period when the exposure ended *happened* to be the date on which the futures closed out. If they expired any earlier then a later contract would have to have been used.

Finally, Fashion-ista managed to *match the base rate on its borrowing (JIBAR)* with a contract quoted using the same interest rate (JIBAR). If this match did not exist th n the h dge would have been less effective.

16.9.2 Bond futures contracts

A bond futures contract is a contractual obligation in terms of which the contract holder, depending on the position they have taken up, has to buy or sell a bond (debt instrument similar to a debenture) at a pre-determined price on a specified future date.

A contract holder who has gone long on a bond future is obliged to buy the underlying bond at the specified price on expiry of the contract. A contract holder who has taken up a short position is obliged to sell the under-lying bond at a specified price on expiry of the contract.

Whereas the short-term interest rate futures do not require physical delivery of the underlying asset, a bond future requires physical delivery of the underlying bond on expiry of the contract.

The following table highlights a number of key attributes of a bond future:

Attribute	Explanation
Contract size	R100 000 nominal of the underlying bond
Physical delivery date	Thr days after expiry of the futures contract – contracts expire in: February, May, August and November
Mark-to-market	Just as is the case with the JIBAR futures, bond futures are marked-to-market (M-T-M) daily
Underlying bonds	Bond futures are offered in respect of the following bonds: R153, R157, R186, R203, R204, R206 and R209
Quoted	Yield-to-maturity basis (IRR) just as the underlying bonds would be
Initial margin	Depositing of an initial margin ('good faith margin') with a clearing house is required
Variation margin	At each mark-to-marketing the variation margin (gain or loss resulting from a change in the market price of the future since the previous M-T-M)

The yield-to-maturity quoted on a bond futures contract is converted into an all-in-price. This is normally quot-ed per R100 000's nominal value. A decreasing yield-to-maturity which is symptomatic of decreasing interest r tes results in an increasing all-in-price. As a result, if forecasts indicate a period of decreasing interest rates will occur, then a long position (buying position) must be taken up. If increasing interest rates are forecasted then a selling position needs to be taken – in other words going short on the bond futures, as yield-to-maturities will increase and the all-in-price will decrease.

Should the contract holder wish to close out their position before expiry of the contract then they need to take up the opposite position to their current position on the bond futures contract.

The pricing on a bond futures contract works as follows – the bond futures price is derived from the spot price of the underlying bond (the price at which the underlying bond is trading) plus cost of carrying the bond (the interest incurred on funding used to acquire the bond) minus income stemming from the coupon payments (interest earned on the bond). The closer in time to the physical delivery of the underlying bond in terms of a bond futures contract we move, the spot price on the bond and the futures price on the bond future tend to converge.

Bond futures contracts can be used to hedge interest rate risk. The better the match between the choice of future and the underlying debt or investment being hedged in terms of base rates, the more effective the hedge will be.

Example: Using bond futures contracts

A Limited invested R10 million surplus cash into R209 bonds. As interest rates appear to be entering a down-ward spiral, the head of treasury of A Limited has decided to make use f bond futures. Ms Naidoo, head of treasury, is aware the R209 bond futures trade on the JSE Securities Exchange (JSE) Yield-X interest rate market and makes the decision to use said bond futures.

She decides to go long and purchase the bond futures – on that day the value per R100 nominal value on the underlying is R128,68. She purchases an adequate nu ber of futures contracts to cover the investment into the R209 bonds. One month after having taken up a long position, the value per R100 nominal value on the underlying is R129,28.

Required:

Calculate the gain or loss made on the bond futures contracts, by firstly setting up the hedge.

Solution:

Which contract will be used? *R209 will only be redeemed over the medium- to long-term. As a R209 bond future is available one can match the investment to the hedge by using said bond future*

Which position (long/short)? *As interest rates are entering a downward spiral, any interest rate derivative will experience an increase in value over time – hence A Limited should enter a buying position (in other words go long)*

How many contracts? Each contract has a value of R100 000

$$\frac{\text{R10 m}}{\text{R100 000}} = 100 \text{ contracts}$$

Outcome of the hedg :

	R
M-T-M today: 100 ontracts × R100 000 × R129,28 / R100	12 928 000
Previous M-T-M (on entering into the contract): 100 contracts × R100 000 × R128,68	12 868 000
Gain	60 000

This gain arising from using bond futures contracts will be offset against the drop in interest income which A Limited will earn on its R209 bonds in which it has invested.

16.10 U ing interest rate options to hedge interest rate risk

Options are contracts that grant the holder a right to buy (a 'call option') or to sell (a 'put option') a particular sset at a specific price and within a predetermined period of time. In terms of interest rate options, we will focus on the position of the buyer of an interest rate option. The buyer of an interest rate option will either purchase an option giving them the right to 'buy a particular interest rate', namely a call option, or alternatively he right to 'sell a particular interest rate', a put option.

There are two types of options, a 'call option' and a 'put option' and two parties to a contract, the 'option seller' and the 'option buyer'.

Before explaining options any further, we need to highlight some important terminology relating to options.

16.10.1 Options terminology

Option	A negotiable contract in which the writer, for a certain sum of money called the option premium, gives the buyer the right to demand, within a specified time, the purchase or sale by the writer of a specified amount of the underlying asset, at a fixed price ca ed the strike price.
Call option	A call option grants the buyer of the option the right to buy a specific asset within a fixed period of time.
Put option	A put option grants the buyer of the option the right to sell a specific underlying asset within a fixed period of time.
Strike price or exercise price	The price at which an opti n is exercisable, in other words the interest rate that the buyer of a call pti n w uld like to fix the interest rate at for a transaction, or the interest rate that the writer of the option must pay the holder of a put option at.
Option buyer	The individual or financial institution that buys options.
Option writer	The individual or financial institution that sells or writes options, giving the buyer the right to x rcise the option.
Option premium	The price of an option contract. The amount payable by the option buyer for the right accruing to him. This amount is an immediate cash outflow and takes place at time period 0 (in other words cf_0).
Expiration date	The date after which an option is void.
European option	Exercise date is a specific future date, for example 10 May 2094.
American option	Exercise date is during a specific future period, for example within the next six months.
In the money	Where the strike price (interest rate) is more favourable than the market interest rates.
Out of the money	Where the strike price (interest rate) is less favourable than the market rate interest rates.

16.10.2 Interest rate options

An interest rate option provid s the buyer of the option the right, not the obligation, to transact at a rate or price (strike rate or exer ise price). The option is the only derivative which provides the buyer of the option with flexibility. Whe e the option is 'out of the money', in other words the strike price is less favourable than the market ates/p ices, then the buyer will merely let the option lapse and not exercise it. In such a case the buyer would ather t ansact at the market rate.

Example: Option Scenarios

A Limited b ught an option allowing it to transact at a strike rate of 7,5% to fix the interest on an amount it intends b rr wing.

Required:

What would A Limited do in each of the following scenarios?

( ) Scenario 1: interest rates in the market are 7,8% on exercise date

Scenario 2: interest rates in the market are 7,2% on exercise date.

Solution:

Scenario 1:

A Limited would exercise the option and fix the interest rate at 7,5% in terms of the strike rate. They would be in a better position accordingly.

Scenario 2:

A Limited would be worse if they exercised the option to fix the rate at 7,5% where the market rate is only 7,2% – they would therefore not exercise the option – in other words they would et the option lapse.

Remark:

The flexibility offered by the option does not come free of charge. A Limited will h ve to pay a premium when buying the option. In terms of hedging costs, this makes the option the most expensive of the different derivatives instruments.

The premium referred to above will always be a cost to the buyer f the ption, while from the option writer's perspective, the premium will be income to them.

Option contracts will either be over-the-counter or traded options. An over-the-counter option is an option specifically customised or tailor-made to hedge the specific risk of the buyer of the option. As the option is tailor-made, the premium payable will be higher than the pre ium paid when purchasing a traded option.

Interest rate options will effectively allow the holder of the option:

In the case of a put option, to set a cap – this is an int r st rate ceiling – the point beyond which the option holder will not want interest rates to increase. Technically the option would be a put option (the right to sell) as during periods of increasing interest rates, the value of interest rate derivative instruments drop. The holder benefits by fixing a maximum interest rate which they would be willing to be exposed to. The writer of the option would then have to compensate the buyer of the option for the difference between the interest rate cap and the market rate. The buyer of the option will be paying the market rate on the underlying borrowing, but will be compensated by the option writer for the difference between the strike rate and the market rate.

In the case of a call option, to set a floor – this is the minimum interest rate which the buyer of the option contract is willing to receive. Technically the option has to be a call option (the right to buy) as when interest rates fall, the value of interest rate derivatives increases. As a result, in hedge placing the enterprise wanting to hedge in a buying position would result in the option being 'in the money' from the buyer of the option's perspective.

A collar is an option contract which combines the floor and cap into a single option. It entails the buyer of the option buying a floor (call option) and selling a cap (put option). The buyer of the option will benefit from the interest rate being capped while the seller benefits from the floor, a minimum rate of interest set.

The following graph indicat s the functioning of a collar option contract:

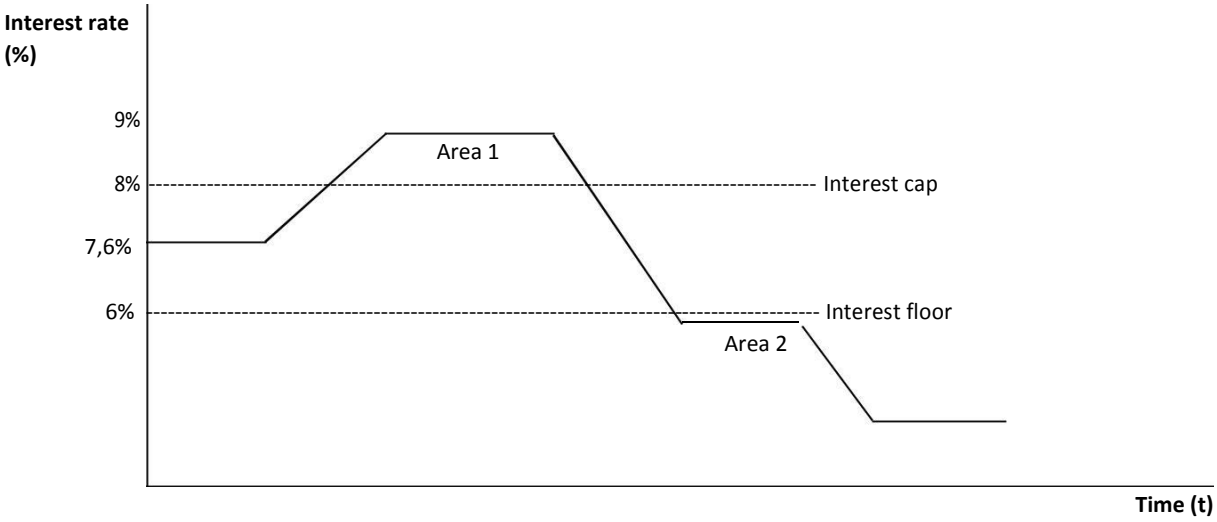


Figure 16.4: Interest collar contract

The buyer of the option will initially pay an interest rate of 7,6% on its borrowings. When interest rates increase beyond 8%, the cap option will be exercised by the buyer of the option. The option writer then compensates the buyer of the option by paying them the difference between the strike rate and the market rates (this will happen for as long as the market rates exceed the interest cap. When interest rates in the market drop below the cap the option holder will not benefit from exercising the option – they will pay market rates until the rates drop below the interest floor. When 'area 2' is triggered, the option writer will exercise their rights in terms of the interest floor which they hold and 'fix' the rate of interest they receive at the minimum 'floor' rate. The option writer will receive the market related interest rate on the underlying loan, but in addition to this, they will receive from the buyer of the option, the difference between the market rate and the strike rate, in this case the interest rate floor. This will continue on each strike date in terms of the option until interest rates increase in the market and exceed the interest rate floor set in terms of the cap option.

The buyer of the option enjoys the upside of increasing interest rates, while the option writer benefits when the interest rates decrease to levels below the interest rate floor.

The buyer of the interest rate collar will be paying a premium to buy the right to sell the interest rate it pays on its borrowings and in doing so sets the interest rate cap. The counterparty to the option contract however buys the call option to set a minimum – they will have to pay a premium to do so. If these two premiums are equal, then a zero cost collar contract arises.

Example: Interest rate cap

A Limited is concerned that market indications of increasing interest rates in future could have a significant impact on the company's profitability. The company's tr asury function has advised management of the need to hedge against rising interest rates and have sugg st d that the company consider buying an interest cap.

A Limited's bank has indicated that it is willing to write an interest rate cap option subject to the following conditions:

> The nominal amount to be hedged is R50 million which is equal to the nominal value of the corporate bonds which A Limited issued.
>
> The strike rate on the option will be 8% based on the three-month JIBAR. The option will hedge A Limited against the movement in interest rates over the quarter identified below.
>
> The bank will charge A Limited a premium of 0,15% per annum, which is payable on entering into the option contract with the bank.
>
> The strike date will be 15 March when the quarterly interest payments on the bonds need to be made. The interest rate on the corporate bonds is the three-month JIBAR plus 100 basis points. Cashflow settlement will take place immediately on 15 March.

When purchasing the option, the three-month JIBAR was 7%. By 15 March, strike date, the three-month JIBAR has moved to 8,2%.

Required:

Determine the out ome of the hedge.

Solution:

The interest rate cap option would entail A Limited buying a put option – it wants to set a maximum interest rate (in terms of JIBAR only) that it will pay. The interest rate cap will hedge the movement in only the three-m nth JIBAR. The 100 basis point premium is linked to the company's credit risk and has nothing to do with interest rate risk. The hedge will therefore be designated as being only the movement in the three-month JIBAR.

Will A Limited exercise the option on 15 March? As the three-month JIBAR spot rate of 8,2% exceeds the strike rate of 8%, the company will definitely exercise the option. This results in the following outcome:

	R
Interest payable on the bonds: (8,2% + 1%) × R50m × $\frac{3}{12}$	(1 150 000)
Cash settlement from the option writer: (8,2% - 8%) × R50m × $\frac{3}{12}$	25 000
Premium: 0,2% × R50m × $\frac{3}{12}$	(18 750)
Net finance charges incurred (after hedging)	(1 143 750)

The interest rate cap has had the effect of reducing the financing costs through setting a ceiling of 8% beyond which JIBAR cannot move.

This scenario can be diagrammatically illustrated as follows:

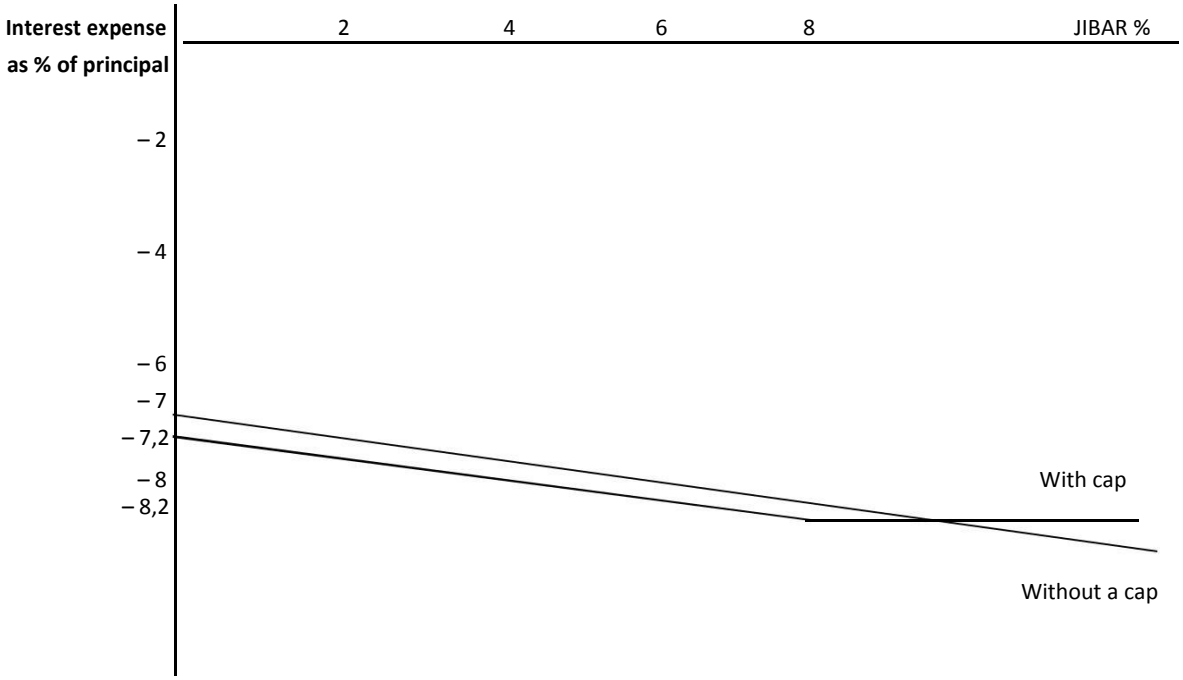


Figure 16.5: Payoff diagram of an interest rate cap

From the current JIBAR of 7% the interest expense as a % of principal would just continue increasing beyond the 8% cap – however, no premium 0,2% would be incurred. The premium would be incurred of 0,2% irrespective of whether or not the option is exercised. The break-even point for A Limited is 8,2% (strike of 8% + 0,2% premium). As soon as JIBAR exceeds 8,2%, the premium is also covered.

Example: Call option

Investor A holds R1 million nominal stock, with a current market price of R100 and a yield to maturity of 18%. He expects interest rates to rise to 18,5%, which (if they do) will result in a book loss of R10 000. At the same time, h wever, he believes that interest rates will not drop below 17,2% within the next six months.

Options available to Investor A:

1 Se the call option with a strike price below the current market price and a high premium; or **2**

sell the call option with a strike price equal to the current market price; or

3 sell the call option with a strike price above current market price, and a small premium.

Market price			R100			
Strike price		R90	R100	R110		
Interest	19%	18,5%	18%	17,5%	17,2%	17%
Premium		R10 000	R5 000	R2 000		
		In the Money	At the money	Out of money		

Option period – six months

Nominal amount – R1 000 000

Sell at a strike price of R90 with an option premium of R10 000

Option seller

If interest rates rise to 18,5% or higher, the option seller will gain R10 000.

If interest rates remain at 18%, then the option buyer will exercise his option, as he will be buying at the strike price of R90 and then selling on the market at R100. The option seller, however, will receive R10 000 premium and lose the differential between the strike price of R90 and the current market price of R100.

If interest rates drop as low as 17,2%, Investor A gains R10 000, but loses on the difference between the market price of 17,2% yield to maturity and the strike price of R90. If he has correctly calculated the op-tion premium, he should break even. The buy r of the stock will also break even.

Any drop below 17,2% will result in a loss to the option seller and a profit to the option buyer.

Option buyer

A strike price of R90 with a premium of R10 000 is said to be 'in the money', as the buyer of the option can exercise his option immediately and recover part of the premium. He will buy at R90 and sell at the current market price of R100. In this example, he would recover R5 000 of the premium paid.

Interest rates will have to drop below 17,2% before he makes a profit. He will exercise his option within the six-month option period, as long as the market price is higher than R90 (or lower than 18,5% inter-est).

Sell at a strike price of R100 with an option premium of R5 000

Option seller

- The premium in this situation is only R5 000, compared to the R10 000 at a strike price of R90, as the option is 'at the mon y' (i.e., the strike price is equal to the market price). Any rise in interest rates above 18% will m an that the option writer makes a profit of R5 000 on the option deal. A drop in in-terest rates below 18% will reduce the profit on the option. Assuming a break-even rate of 17,2%, a drop below this rate will mean a loss to the option seller.

  Note however that this loss is not on the option premium, but on the opportunity that the holder of the stock would have had to sell his stock on the market at a high return (i.e. opportunity cost).

Option b yer

- The pti n buyer will exercise his option only if interest rates drop below the strike price of 18%. He will reduce his R5 000 loss situation up to 17,2% and, if rates drop below this level, he will make a prof-it. If interest rates rise above 18%, he will not exercise his option, as this would mean buying the stock at R100 and then selling it on the market at a lower price.

3 Se at a strike price of R110 with an option premium of R2 000

Option seller

The option premium is very low, as the strike price is said to be 'out of the money'. The seller has re-duced his risk of an interest rate drop. This risk is only reduced up to 17,5%. As long as interest rates remain at 17,5% or higher during the option expiration period, the option buyer will not exercise the option and the option seller will make a profit of R2 000.

Option buyer

The option is out of the money to the option buyer, as he must wait for interest rates to drop more than 0,5% before he will recoup any part of the R2 000 premium. The break-even interest rate is 17,2%, after which any further drop in rates will result in a profit to the option buyer.

The graph that follows illustrates the basic investment characteristics of a call option from the respective viewpoints of the buyer and the writer.

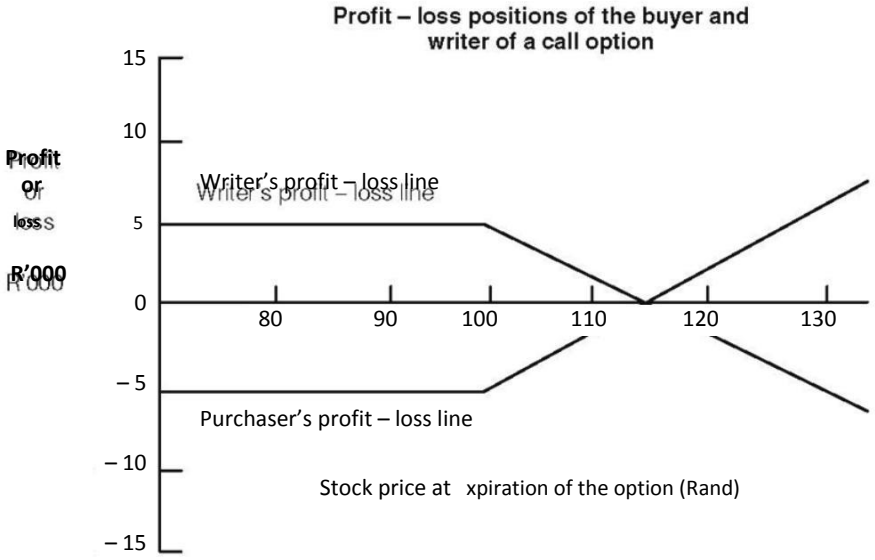


Figure 16.6: Profit/loss positions of the buyer and writer of a call option

An option buyer can never lose more than the premium paid for the option contract. However, if the price of the underlying asset rises substantially (i.e. interest rates fall) over the period of the call option, the buyer's potential profit is theoretically unlimited. This is illustrated above by the line labelled 'Purchaser's profit – loss line'.

The 'uncovered' call writer's position is the exact opposite of the call buyer's position. If the underlying asset's price remains the same or drops during the life of the option, then the writer keeps the premium. However, if the underlying asset's price rises above the exercise price during the option life, part (or all) of the premium will be lost. In return for the option premium received, the writer of the call option agrees to sell the underlying asset at the strike price, no matter how high the underlying asset's price may go. If the writer does not own the underlying asset (uncovered call option), his position deteriorates for every R1 increase in the underlying asset's price above the x rcise price.

An uncovered call writ r can arn no more than the option premium but is accepting a highly variable risk. The call buyer, by ontrast, has a fixed risk equal to the option premium and a profit potential that varies with the market price.

16.10.3 Interest rate put options – payoff diagram

Much like call options, put options can be traded 'in the money', 'at the money' or 'out of the money'. The buyer f a put ption obtains the right to sell the underlying to the writer of the option at a fixed strike price, during a fixed period (e.g. six months). The writer undertakes the contingent obligation to purchase the underlying ecurity from the option buyer at the exercise price during the duration of the option or on the exercise date if the option is duly exercised.

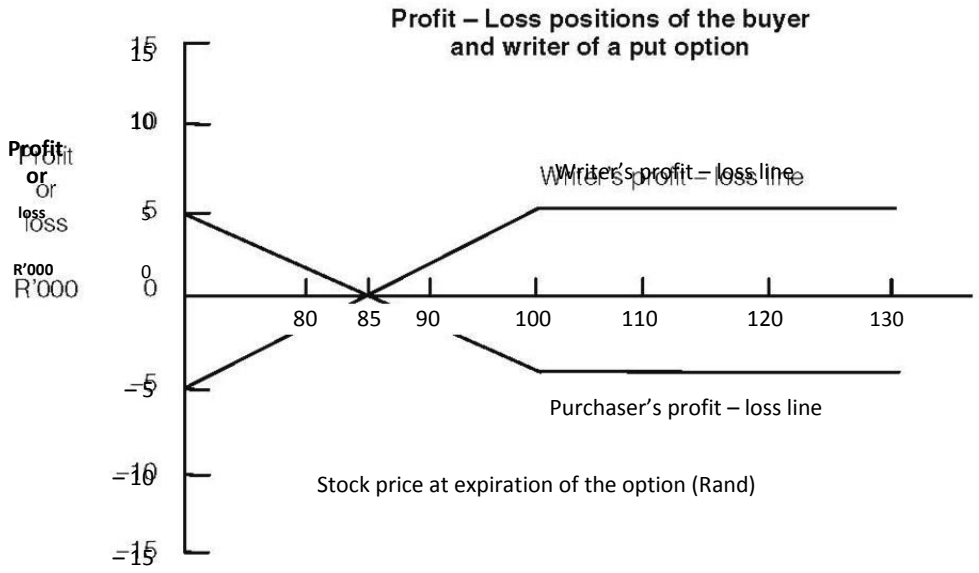


Figure 16.7: Profit/loss positions of the buyer and writer of a put option

In return for a fixed premium, the buyer of a put option obtains the right to sell the underlying to the option writer, which increases his reward as the price drops. As can be seen from Figure 16.7, the profit or loss is fixed to the right of the strike price, while the return to the left of the strike price is variable. Any loss to the option writer is exactly offset by the profit accruing to the option buy r, and vice versa.

The effect of any option transaction is simply the re-allocation of risk and reward between buyer and seller.

Although it is true that the option writer accepts a risk in return for a premium, in an overall portfolio, the risks and rewards can change dramatically. An example is where a covered call writer (holding the underlying instrument) writes an option, which in effect reduces the volatility or market risk of his portfolio if market prices decline. His gain is also limited on the up-side, due to his obligation to perform under the contract. Both parties to a particular option transaction can reduce their portfolio risk simultaneously through a combination of securities, option, and short-term debt positions.

16.10.4 Traded interest rate options

Traded interest rate options allow the buyer of the option to take up a particular position on a bond futures contract:

> The buyer of a call option would be in a position to *buy a bond futures contract* at a specified price on a specified future date.
>
> The buyer of a put option would be in a position to *sell a bond futures contract* at a specified price on a specified future date.

To purchase this ight, the buyer will have to pay the option writer a premium. For traded interest rate options which trade on the JSE Securities Exchange Yield-X, the premium of the option is quoted – it will always equal the value of the option and is the value at which the option trades on the Yield-X. The more volatile the underlying is, the higher the value of the option.

In deciding whether or not to exercise the option, the option holder will compare the strike rate that they have b ught with the market rate (in this case the market interest rate). If the strike rate is more favourable, they w uld exercise the option.

Examp e: Traded interest rate option

A Limited intends borrowing R10 million at the beginning of May 2013. This borrowing will be for a period of six months. The company's treasurer is concerned that interest rates could increase by then and wishes to make use of an interest rate cap. He is aware of traded interest rate options which would create an interest rate cap for A Limited. He has decided that the company should purchase 200 put option contracts, each with a nominal value of R100 000 per nominal value of the underlying bond. The strike date of the option is 2 May 2013. The option premium per contract, as quoted on the Yield-X of the JSE Securities Exchange is R110 per contract with

the strike rate on the option being 7,39%. Assume that the option allows for the fixing of the interest rate on striking for a period of three months.

On strike date, the actual interest rate in the market is 8%.

Required:

Calculate the effective annual borrowing cost for A Limited if they make use of the traded interest rate option.

Solution:

Important comments to consider:

The 200 option contracts would have been calculated as follows:

$$\frac{\text{R10m}}{\text{R100 000}} \times \frac{\text{6 months}}{\text{3months}} = 200 \text{ contracts}$$

The decision to purchase *put options* makes sense given the interest rates are decreasing. As the option gives the holder the right to sell an interest rate future, this is indeed the position the holder would want to be in – increasing interest rates result in a decrease in the value of interest rate futures – hence you would want to be in a selling position.

The decision the option holder would take is to exercise the option – and in so doing fix the rate (through the interest cap at 7,39%). The decision-making criteria would be: market rate of 8% > interest cap of 7,39%.

The effective finance charge would amount to:

	R
Finance charges resulting from the interest rate cap: 10m × 7,39% × $\frac{6}{12}$	369 500
Premium: 200 contracts × R110	22 000
Net finance charges incurred (after hedging)	391 500

As this represents the finance costs for six months, the annualised cost would be:

$$\text{R391 500} \times \frac{\text{12 months}}{\text{6 months}} = 783\,000 \text{ resulting in an effective cost of } \frac{\text{R783 000}}{\text{R10m}} = 7{,}83\%$$

This includes the hedging costs – the interest rate cap has however reduced the effective cost of the borrowing to below the 8%, which is the spot rate on exercise date.

16.10.5 Advantag s and disadvantages of interest rate options

The following *advantages* exist when using options as a hedge:

The buyer of the option has the right but not the obligation to exercise. As risks can change, if the risk being hedged does not exist when the hedge needs to be effected, the buyer of the option will not want to exercise the option. They can therefore take advantage of the market (interest rates in this case) having moved in their favour.

By making use of over-the-counter options, the option buyer can get a tailor-made solution for the risks they are exposed to.

Where traded options exist, the cost of the hedge can be limited – this is normally a cheaper alternative than u ing over-the-counter options.

The fo owing *disadvantages* exist:

Whether the option is exercised or not, the buyer of the option will have to incur the premium in order to buy the right in terms of the option.

With a traded option a perfect hedge might not be possible in terms of the contract size of the traded options and the value being hedged. Furthermore there may not be a perfect match between the base rate of interest being hedged and the interest rate built into the option.

Valuation of interest rate options

Options are priced according to the relative supply and demand for specific underlying assets. The most widely used option pricing model is the Black-Scholes model. The explanation and derivation of the model are beyond the scope of this text book.

16.11 Interest rate swap agreements

Of all the interest rate derivative instruments discussed, interest rate swap agreements are the most widely used for hedging purposes, in practice in South Africa. These agreements are entered into between two counterparties, and so, just as is the case with any interest rate hedge, counterp rty risk exists. This is the risk that one of the counterparties to the agreement does not perform according to the terms of agreement. Before entering into such an agreement, the credit rating of the counterparty will need to be considered. Very often, one of the counterparties to the interest rate swap agreement will be a bank.

An interest rate swap agreement entails the *swapping of cashflows* – this exchanging of cashflows results in one of the counterparties *paying a specified amount through* to the ther counterparty *in exchange for the receipt of a cashflow* determined on a different basis. An ISDA (Internati nal Swaps and Derivatives Association) agreement will regulate the relationship between the counterparties involved in the interest rate swap agreement.

The construction of the swap will be illustrated in the following exa ple. The swap agreement will ultimately result in each counterparty to the agreement simulating the other counterparty's borrowing (or if an investment is being hedged they would simulate the count rparty's inv stment).

The following steps would essentially be involved in setting up an interest rate swap agreement:

Step 1: Identify the existence of interest rate risk and that an interest rate swap agreement can be used as hedging technique.

Step 2: Identify a suitable counterparty to the interest rate swap agreement. This counterparty could typically be a related party. Unless the counterparty is a bank then the only way that a hedging party would be aware of a third party having an opposite hedging need would be if they were related parties.

Step 3: What cashflows need to be exchanged? For example: A Limited has a borrowing on which it is paying a floating interest rate. A Limited's chief risk officer believes that interest rates are going to increase in future. Ideally, A Limited should be paying a fixed rate of interest under these conditions. For some or other reason, B Limited wishes to pay a floating rate of interest on its debt (B Limited could be a bank that would be willing to do this for a fee).

A Limited would therefore *want to pay a fixed rate of interest* applied to a notional amount agreed on by both parties. As an interest rate swap agreement is an exchange of cashflows, A Limited would be exchanging its paym nt at a fixed rate for *receiving a cashflow (or series of cashflows) determined at a floating rate*.

How would this serve as an effective hedge for A Limited? As interest rates increase, so too will the cashflow re eived by A Limited from B Limited. The increasing cash receipts will be used by A Limited to se vice the increasing interest payments on its borrowings resulting from increasing interest rates.

Step 4: The counterparties will need to set the fixed and floating rates which will apply to the swap agreement. Swap agreements will normally create an advantage for both parties – in essence by 'borrowing from each other' and not from a bank, the parties' borrowing costs would reduce. This advantage is *shared between the parties*.

This issue is highlighted in the example which follows.

Step 5: Once the agreement has been entered into, the cashflows are exchanged on the date(s) indicated in the swap agreement.

The fo owing example illustrates the construction of an interest rate swap agreement and the sharing of the g in rising from the swap, between the swap counterparties.

Example: Using interest rate swap agreements

Fashion-ista Limited ('Fashion-ista') can borrow funds at a fixed rate of 8% or at a floating rate of JIBAR (cur-rently 6%) plus a credit risk premium of 200 basis points. Trendy Limited ('Trendy'), an associate of Fashion-ista,

has a lower credit rating. It can borrow at a fixed rate of 9% per annum or at a floating rate of JIBAR plus 260 basis points.

Fashion-ista believes that the likelihood of interest rates decreasing in future is very good and as such it would ideally need to borrow at a floating rate. A very large portion of Trendy's debts are floating rate and so to create a balanced portfolio of both floating and fixed rate debt, it needs to borrow at a fixed rate.

Both companies need to borrow R50 million.

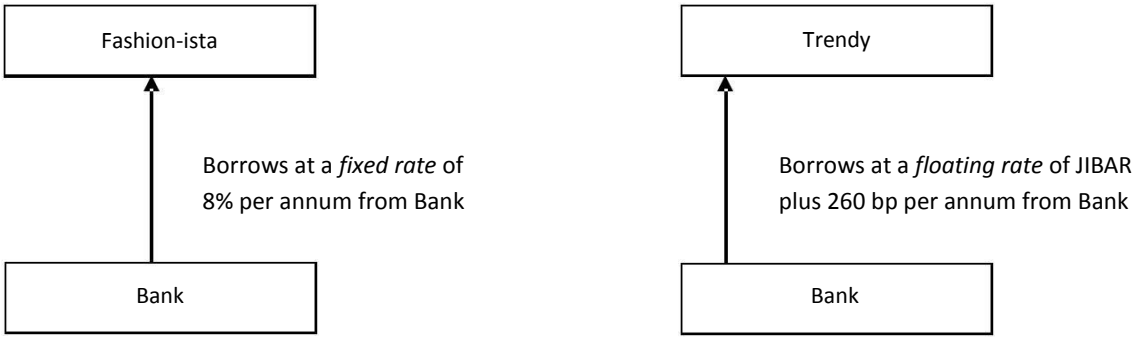
Required:

Set up a hedge using an interest rate swap agreement and determine the rates at which Fashion-ista and Trendy will exchange cashflows in terms of this agreement.

Solution:

The following rationale applies to the swap agreement to be entered into. Gi en Fashion-ista's stronger credit rating, it would make sense for Fashion-ista to borrow at a fixed rate – it can borrow at 8% per annum whereas Trendy could only borrow at 9% per annum. As Fashion-ista's fixed and fl ating rates are the same, they would be indifferent between a fixed or floating rate in the absence f interest rate risk. Fashion-ista will borrow at a fixed rate while Trendy would then have to borrow at a floating rate for the swap agreement to make sense. Fashion-ista and Trendy would then swap cashflows *but not the legal obligations with the bank(s) in terms of the underlying borrowings*.

The following loan agreements will be entered into:



Fashion-ista would then through the interest rate swap agreement want to *pay floating* in exchange for *fixed receipts* from Trendy.

The following gain arises:

	Fashion-ista	**Trendy**	**Difference**
Borrow at a fix d rate of	8%	9%	1%
Borrow at a floating rate of	JIBAR + 200bp	JIBAR + 260bp	–60bp = –0,6%
			0,4%

To create the 1% gain on the fixed rate, Trendy has to borrow at a floating rate – the 0,6% is therefore negative as Trendy has to bo ow at a higher rate relative to that applicable to Fashion-ista.

The 0,4% difference will be shared between Fashion-ista and Trendy. For purposes of this example it is assumed that the swap benefit will be shared equally. In setting the terms of the swap, we will essentially foll w f ur steps:

- **Step 1:** Identify the party with the better credit rating (i.e. the party which can borrow at the lower rate) – in this case that would be Fashion-ista.

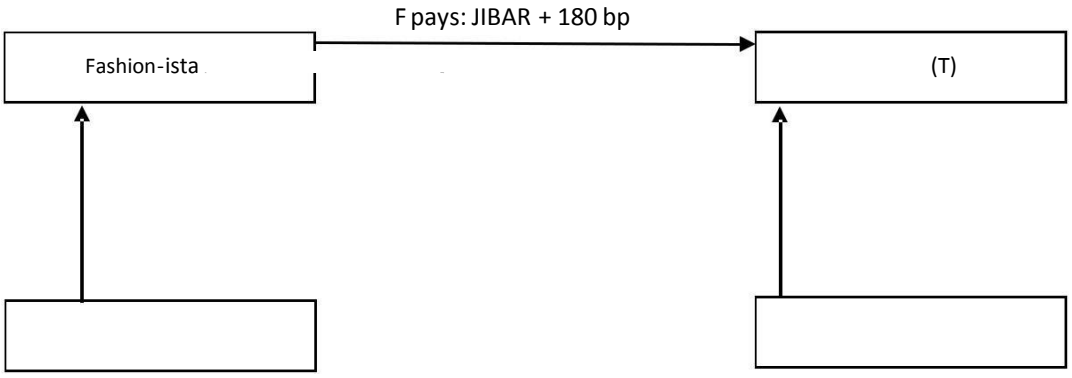
  Step 2: Identify the swap benefit – in this case the 0,4% identified earlier.

  Step 3: Identify the position which each counterparty would like to take up in the swap agreement – in this case Fashion-ista wants *exposure to a floating rate so it must end up paying a floating rate* while Trendy wants to *fix its rate – it must end up paying a fixed rate.*

  Step 4: Reverse engineer the rate which will apply to the counterparty with the weaker credit rating – i.e. borrow at the higher rate – in this case Trendy.

Fashion-ista:	**Rate**	**Trendy:**	**Rate**
Borrowed floating from bank	JIBAR + 200bp	Pays the bank on actual borrowing	JIBAR + 260bp
Less: swap benefit	20bp	Receives from Fashion-ista	JIBAR + 180bp
Floating-leg of swap agreement	JIBAR + 180bp	Discrepancy	80bp
		Could borrow at a fixed rate	9,0%
		Adjust for:	
		Swap benefit	–0,2%
		Discrepancy	–0,8%
		Fixed-leg of sw p greement	8,0%

The interest rate swap agreement will be structured as follows:



16.12 Valuing interest rate swaps

The concluding section of this chapter focuses on the valuation of an interest rate swap. Given that interest rate swaps are the most widely used of the interest rate hedges, the process of determining a fair value for these swaps needs to be focused on in more detail.

In terms of International Financial Reporting Standards (IFRS), hedges are to be measured and recognised at *fair value*. In this section we are firstly going to focus on the drivers of value of an interest swap agreement. Thereafter we will focus on the process of valuing the cash flows taking place in terms of an interest rate swap agreement.

In understanding how value is created through an interest rate swap agreement, one needs to revisit the nuts and bolts making up such an agreement. In essence, any swap agreement ent ils sw pping or exchanging cash flows. From the perspective of each of the counterparties to a swap agreement, there would be a *paying leg* for the swap and a *receiving leg* being that which the paying leg is being exchanged for. This fair exchange takes place on the future settlement dates as specified in terms of the swap agreement. Swap agreements take the form of a standard derivative agreement which is known in practice as an ISDA.

The swap terms set for the paying and receiving legs for each f the c unterparties (as illustrated in the exam-ple in section 16.11 of this chapter) will be incorporated into this d cument. One key difference will however arise for valuing the swap for financial reporting purposes. As the credit risk spread incorporated into an inter-est rate does not represent interest rate risk but rather credit risk, the designated hedge for financial reporting purposes will *exclude the credit risk premium*.

So what drives or creates value in terms of an inter st rate swap agreement? The value created for each of the counterparties will lie in the *difference between the two cash flows on a given settlement date* – in other words the difference between the paying and receiving legs. Taking the basic valuation principles which the discount-ed cash flow approach you used when valuing financial instruments into account, as this net cash flow will arise on a future date, the difference needs to be discounted to a present value in the process of determining a fair value for the designated hedge.

Example: valuing an interest rate swap

A Limited and B Limited entered into an interest rate swap agreement to swap cash flows on a number of fu-ture settlement dates. The terms of the swap agreement are as follows:

Notional amount of the swap: 50 million.

Cash settlement dates: 15 March, 15 June, 15 September and 15 December for the duration of the agreement.

Termination date: 15 June 20X6.

A Limited will pay B Limited at JIBAR + 20bp while B Limited will pay A Limited a fixed rate of 8,2% per annum. *These rates exclude any credit risk spread.*

The floating l g of the swap is pre-fixed and post-paid.

A Limited's finan ial year-end is 31 December.

The following JIBAR ates are available:

Spot rate 31.12.20X4	**Forward rates**					
	15.03.20X5	**15.06.20X5**	**15.09.20X5**	**15.12.20X5**	**15.03.20X6**	**15.06.20X6**
7,00%	7,25%	7,50%	7,50%	7,75%	8,00%	8,25%

Required:

Determine the fair value(s) of the interest rate swap for purposes of recognising the interest rate swap in the financial statements of A Limited on 31 December 20X4.

Solution:

Looking into the future on 31 December 20X4, the following are the cash settlement dates which will need to be valued: 15 March 20X5, 15 June 20X5, 15 September 20X5, 15 December 20X5, 15 March 20X5 and 15 June 20X5, after which the agreement terminates.

One of the important terms of the agreement is that the swap will be pre-fixed and post-paid. This means that the *floating rate* will be set at the start of the period leading up to the cash settlement date – in other words at the *start of each quarter* (pre-fixed) while the actual settlement of the difference will take place at the end of each quarter (post-paid).

This is very important as this will determine which JIBAR rate we will use in the valuation. For purposes of the example we will assume that a year consists of 12 equal months to keep things simple:

Cash settlement date	Floating cash flow
15.03.20X5	R50m × (**7,00%+0,2%**) × $\frac{3}{12}$ m = R900 000
15.06.20X5	R50m × (**7,25%+0,2%**) × $\frac{3}{12}$ m = R931 250
15.09.20X5	R50m × (**7,50%+0,2%**) × $\frac{3}{12}$ m = R962 500
15.12.20X5	R50m × (**7,50%+0,2%**) × $\frac{3}{12}$ = R962 500
15.03.20X5	R50m × (**7,75%+0,2%**) × $\frac{3}{12}$ m = R993 750
15.06.20X5	R50m × (**8,00%+0,2%**) × $\frac{3}{12}$ m = 1 025 000

The fixed leg on the swap will result in the following quarterly cash flows: R50m × **8,20%** × $\frac{3}{12}$ m = R1 025 000

	15.03.20x5	15.06.20x5	15.09.20x5	15.12.20x5	15.03.20x6	15.06.20x6
		R	R	R	R	R
Receiving - fixed	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00
Paying - floating	-900,000.00	-931,250.00	-962,500.00	-962,500.00	-993,750.00	-1,025,000.00
	125,000.00	93,750.00	62,500.00	62,500.00	31,250.00	-
Present value	***359,844.71***	240,279.86	151,035.11	91,367.02	30,637.25	-
Future value	365,279.86	244,785.11	153,867.02	93,137.25	31,250.00	-
I (rate) - annual	7.25%	7.50%	7.50%	7.75%	8.00%	8.25%
I (rate) - per discounting p riod	1.51%	1.88%	1.88%	1.94%	2.00%	2.06%
n (number of periods)	1.00	1.00	1.00	1.00	1.00	1.00

A few impo tant comments on the discounting in the table above:

Each cash flow difference needs to be discounted to arrive at a fair value using a JIBAR applicable to that partic lar date.

Given that any risk relating to the swap will have already been priced into the respective legs of the swap, JIBAR is used as a risk-free discount rate.

As the forward rates differ, we are confronted with a dilemma for discounting purposes – using multiple rates. The impact thereof is that we need to discount the last net cash flow back to the point where JIBAR changed – in other words the previous date on which JIBAR was reset. The future value will there-fore be the net cash flow for the particular cash settlement date plus the present value of the cash flows fter the date, which has been discounted to that particular cash settlement date.

The first period is not a full quarter – from 31 December 20X4 to 15 March 20X5 is approximately 75 days. We therefore adjust the discount rate on a days' basis of 75/90 – in other words the rate for a full quarter is 7,25%/4 = 1,81% × 75/90 days = 1,51%

The fair value calculated being positive reflects a *financial asset*.

Can you detect anything strange regarding the cash flows and resulting value? Look carefully at the cash flows relating to the first period! The first **15 days** of the cash flow for the first quarter starting building up **prior to valuation date**. We therefore say that the fair value we have just calculated is **dirty fair value** as a portion of the value relates to the period prior to valuation date. This is known as an all-in value which in this case amounts to R359 844,71. For financial reporting purposes we however only reflect the fair value arising beyond valuation date. Hence we need to adjust the cash flows for the first period as follows:

Receiving leg: R1 025 000 × 75/90 days = R854

166,67 Paying leg: R900 000 × 75/90 days = R750 000

The above now reflects the value created after valuation date. Recalculating the fair va ue, yields the following result:

	15.03.20x5	**15.06.20x5**	**15.09.20x5**	**15.12.20x5**	**15.03.20x6**	**15.06.20x6**
	R	**R**	**R**	**R**	**R**	**R**
Receiving - fixed	**854,166.67**	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00
Paying - floating	**-750,000.00**	-931,250.00	-962,500.00	-962,500.00	-993,750.00	-1,025,000.00
	104,166.67	93,750.00	62,500.00	62,500.00	31,250.00	-
Present value	***339,321.36***	240,279.86	151,035.11	91,367.02	30,637.25	-
Future value	344,446.53	244,785.11	153,867.02	93,137.25	31,250.00	-
I (rate) - annual	7.25%	7.50%	7.50%	7.75%	8.00%	8.25%
I (rate) - per discounting period	1.51%	1.88%	1.88%	1.94%	2.00%	2.06%
n (number of periods)	1.00	1.00	1.00	1.00	1.00	1.00

Note that only the cash flows which have changed have been bolded in the table above – you will see that it will ***always*** *only be the first period's cash flow which is affected by this problem.*

The R339 321 36 is the **clean fair value** of the swap agreement and only includes value originating beyond valuation date.

Finally, how would the valuation have differed if the terms of the swap agreement determined that the floating leg was post-fixed and post-paid?

This would mean that the floating leg is set at the rate applicable **at the end of each quarter** and not the rate at the start. The floating legs (we will only look at a clean fair value so note the changes to period 1's cash flows) will be:

Cash settlement date	**Floating cash flow**
15.03.20X5	R50m × **(7,25%+0,2%)** × $\frac{3}{12}$ m = R931 250 × 75/90 days = R776 041 67
15.06.20X5	R50m × **(7,50%+0,2%)** × $\frac{3}{12}$ m = R962 500
15.09.20X5	R50m × **(7,50%+0,2%)** × $\frac{3}{12}$ m = R962 500
15.12.20X5	R50m × **(7,75%+0,2%)** × $\frac{3}{12}$ m = R993 750
15.03.20X6	R50m × **(8,00%+0,2%)** × $\frac{3}{12}$ m = R1 025 000
15.06.20X6	R50m × **(8,25%+0,2%)** × $\frac{3}{12}$ m = R1 056 250

The valuation is as follows:

	15.03.20x5	15.06.20x5	15.09.20x5	15.12.20x5	15.03.20x6	15.06.20x6
	R	R	R	R	R	R
Receiving - fixed	**854,166.67**	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00	1,025,000.00
Paying - floating	**-776,041.67**	-962,500.00	-962,500.00	-993,750.00	-1,025,000.00	-1,056,250.00
	78,125.00	62,500.00	62,500.00	31,250.00	-	-31,250.00
Present value	***197,870.96***	122,734.63	62,535.91	1,208.46	-30,018.13	-30,618.49
Future value	200,859.63	125,035.91	63,708.46	1,231.87	-30,618.49	-31,250.00
I (rate) - annual	7.25%	7.50%	7.50%	7.75%	8.00%	8.25%
I (rate) - per discounting period	1.51%	1.88%	1.88%	1.94%	2.00%	2.06%
n (number of periods)	1.00	1.00	1.00	1.00	1.00	1.00

This represents a financial asset of R197 870,96 for financial rep rting purp ses

This chapter has focused on the interest rate mechanism and which fact rs have an impact on interest rates. A distinction was made between the repo, JIBAR and prime rates as being the respective base rates which exist in South Africa. Interest rate risk was defined and different ethods of anaging interest rate risk were discussed – namely matching, smoothing, pooling and finally, through the use of different derivative instruments, the different formal hedges were addressed.

Practice questions

Question 16–1: Forward rate agreement *(Intermediate)*

R&B Investments (R&B) has an investment amounting to R60 million which will mature on 1 April 20X4. Today is 31 January 20X4 and the chief financial officer (CFO) of R&B is concerned that interest rates in the market are going to drop by the time the investment will be reinvested. To hedge against this potential interest rate risk, the CFO enters into a forward rate agreement with a counterparty on 31 January 20X4. The forward rate (FRA rate) is set at 4% per annum. As the underlying investment will be invested for a period of nine months, the forward rate agreement will cover the period 1 April 20X4 to 31 December 20X4. Cash settlement in terms of the forward rate agreement is set for 1 April 20X4. On 1 April 20X4 the market rate for investments for the same period and amount as that of R&B is 3,5%.

Required:

Determine the outcome of the h dge, both in terms of Rand-value and effective interest rate. *Use months as the basis for the al ulation.*

Solution 16–1

$$\text{Compensation payment} = \text{Notional amount} \times \frac{(\text{FRArate} \;\; \text{referencerate}) \;\; \text{days/basis}}{1 \;\; (\text{referencerate} \;\; \text{days/basis})}$$

$$= \text{R60 million} \times \frac{(4\% \;\; 3{,}5\%) \;\; 9\text{m}/12\text{m}}{1 \;\; (3{,}5\% \;\; 9\text{m}/12\text{m})} = \text{R219 244,82}$$

The counterparty will have to make a compensation payment to R&B of R219 244,82 which R&B will invest together with the amount of the investment which will mature and be reinvested on 1 April 20X4.

		R
FRA compensation payment		219 244 82
Invest on 1 April 20X4	(R60m + R219 244,82)	60 219 244 82
Interest received	R60 219 244,82 × 3,5% × 9/12	1 580 755 18
Value of the investment		61 800 000

This results in an effective interest rate of $\left(\frac{\text{R61,8m}}{\text{R60 m}} - 1\right) \times \frac{12}{9} = 4\%$

Question 16–2: Short-term interest rate futures *(Intermediate)*

Big Retail Limited (Big) will need to borrow R250 million on 1 N vember 20X4 in order to finance the build-up of inventory levels and trade receivables during the Christmas peri d. The term of the borrowing will be six months. Today is 1 June 20X4 when 3-month JIBAR futures are trading at:

	%
June contract	7,40
September contract	7,65
December contract	7,90

Big's head of treasury, is of the opinion that all indications are that interest rates will increase between today and 1 November 20X4. As such the head of treasury believes that the interest rate risk needs to be hedged and would like to use the 3-month JIBAR futures to hedge this risk. The notional value of each contract is R100 000 and according to the derivatives market dealers of the Johannesburg Stock Exchange, each decimal movement in the interest rates on these contracts is worth R2,50 and each contract has a 3-month term.

Required:

Set-up the hedge for the head of treasury and determine the outcome of the futures contracts if at close out, the 3-month JIBAR was quoted at 8%.

Solution 16–2

Which contract will be used? ecember contracts will be chosen as these contracts expire after the date on which the borrowing agreement will be entered into

Which position (long/short)? As interest rates are expected to increase (the trend in respect of the interest quotes on the different contracts confirms this), a **short position** should be taken up

How many cont a ts? Each contract has a notional value of R100 000 and Big intends on borrowing R250 million for six months

$$\frac{\text{R250 m}}{\text{R100 000}} \times \frac{6}{3} = 5\,000 \text{ contracts}$$

Value per decimal (tick) movement: R2,50 (as per the Johannesburg Stock Exchange (JSE) derivatives market)

Outcome of the hedge:

So d at 7,90% yield (price: 100 – 7,90)	92,10
Bought at 8% yield (price: 100 – 8,00)	92,00
Gain	0,10

This equates to a 10 tick movement (0,1% movement in the interest rates) in the price of *each contract*.

Net impact on finance charges:

	R
Finance charges: R250m × 8% × 6/12m	10 000 000
Gain from futures market: 10 ticks × R2,50 per tick × 5 000 contracts	(125 000)
Net finance charges	9 875 000

This results in an effective interest rate of $\frac{\text{R9,875m}}{\text{R250 m}} \times \frac{12}{6} = 7{,}9\%$

Question 16–3: Interest rate swap agreement (*Advanced*)

Retailer Limited (Retailer) is a large retailer of clothing and foodstuffs. Tru-Ret il Limited (Tru-Retail) is a retailer of clothing only. Both companies have a need to manage their interest rate risk and as such they approach Big Bank Limited (BB) to come up with a solution.

Both companies need to borrow funds in order to bolster their w rking capital levels. Retailer would ideally like to be exposed to a floating rate of interest while Tru-Retail w uld like to be exposed to a fixed rate of interest. The following is known regarding the rates at which the two co panies could borrow:

Floating rates		**Fixed rates**	
	Basis points (bp)		**%**
Retailer	JIBAR + 120	R tail r	8,0
Tru-Retail	JIBAR + 170	Tru-Retail	9,2

JIBAR is currently 6,5% per annum.

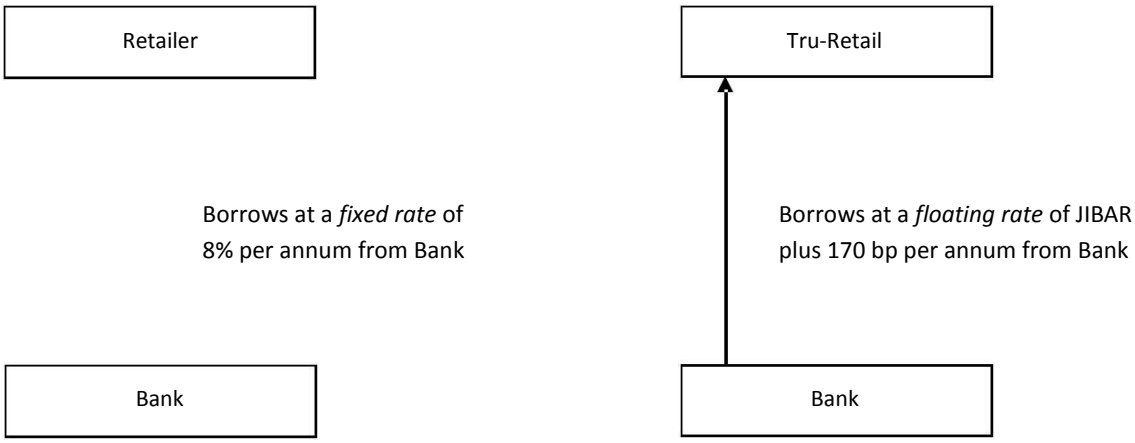
BB has suggested that Retailer borrow at a fixed rate from it and that Tru-Retail borrow at a floating rate and that through a swap agreement, the two counterparties be placed in the position in which they ultimately would like to be in terms of interest rate exposure. BB will charge a 10bp fee for structuring the swap.

Required:

Set-up the swap agreement between etailer and Tru-Retail, clearly indicating the respective legs of the swap and what each party will end up paying the other.

Solution 16–3

The following loan agreements will be entered into:



This net swap bene
(Tru

The following swap benefit arises:

	Retailer	Tru-Retail	Difference
Borrow at a fixed rate of	8%	9,2%	1,2%
Borrow at a floating rate of	JIBAR + 120bp	JIBAR + 170bp	–50bp = –0,5%
Swap benefit			0,7%
Less: structuring fee			–0,1%
Net benefit arising through the swap			0,6%

receives: 8%

Each of the counterparties will then pay the bank their portion of the structuring fee – assuming this too is split 50:50, the following would be the resulting impact on their respective parties' borrowing costs:

Retailer: JIBAR + 85bp (as per the swap) + 5bp (portion of the structuring cost) = JIBAR +

90bp Tru-Retail: 8,85% (as per the swap) + 0,05% (portion of the structuring fee) = 8,9%

The net effect of the swap on each of the two respective parties is that they were able to reduce their borrowing cost by 0,3%, being the net swap benefit.

Question 16–4: Valuation of an interest rate swap (*Advanced*)

Assume that Retailer Limited (Retailer) and Tru-Retail Limited (Tru-Retail) referred to in Question 16-3 enter into the following swap fixed for floating interest rate swap agreement:

Notional amount of the swap: R100 million

Cash settlement dates: 15 March, 15 June, 15 September and 15 December for the duration of the agreement

Termination date: 15 December 20X5

Retailer pays Tru-Retail JIBAR + 90bp while Tru-Retail pays Retailer a fixed rate 8,9%. A credit risk spread of 80 basis points has been included in each of these rates.

The floating leg of the swap is pre-fixed and post-paid.

Retailers' financial year-end is 31 December.

The following JIBAR rates are available:

Spot rate 31.12.20X4	**Forward rates**			
	15.03.20X5	**15.06.20X5**	**15.09.20X5**	**15.12.20X5**
6,75%	7,00%	7,25%	7,50%	7,75%

Required:

Determine a clean fair value for the interest rate swap to be accounted for by Retailer in its annual financial statements for the year-ended 31 December 20X4.

Solution 16–4

Excluding the credit risk premium, the floating leg will be at JIBAR + 90bp – 80bp = JIBAR + 10bp while the fixed rate will be 8,9% - 0,8% = 8,1%

Calculation of the floating payments to be made by

Cash settlement date	**Floating cash flow**
15.03.20X5	R100m × **(6,75%+0,1%)** × $\frac{3}{12}$ m = R1 712 500 × 75/90 days = R1 427 083,33
15.06.20X5	R100m × **(7,00%+0,1%)** × $\frac{3}{12}$ m = R1 775 000
15.09.20X5	R100m × **(7,25%+0,1%)** × $\frac{3}{12}$ m = R1 837 500
15.12.20X5	R100m × **(7,50%+0,1%)** × $\frac{3}{12}$ m = R1 900 000

The fixed leg on the swap will result in the following quarterly cash flows: R100m × **8,10%** × $\frac{3}{12}$ m = R2 025 000

Calculation of the clean fair value:

	15.03.20x5	**15.06.20x5**	**15.09.20x5**	**15.12.20x5**
	R	**R**	**R**	**R**
Receiving - fixed	**1,687,500.00**	2,025,000.00	2,025,000.00	2,025,000.00
Paying - floating	**-1,427,083.33**	-1,775,000.00	-1,837,500.00	-1,900,000.00
	260,416.67	250,000.00	187,500.00	125,000.00
Present value	***793,392.80***	544,546.45	304,416.35	122,624.16
Future value	804,963.11	554,416.35	310,124.16	125,000.00
I (rate) - annual	7.00%	7.25%	7.50%	7.75%
I (rate) - per discounting period	1.46%	1.81%	1.88%	1.94%
n (number of periods)	1.00	1.00	1.00	1.00

The clean fair value of the interest rate swap agreement at 31 December 20X4 from Retailer's perspective is R793 392,80.

Chapter 17

Business plans

AFTER STUDYING THIS CHAPTER, THE STUDENT SHOULD BE ABLE TO –

- define the purpose of a business plan;
- identify suitable sources of financing and relate the context of each source to respective audiences for whom the plan developed;
- understand the different audiences' information needs;
- describe the common components of a business plan; and
- evaluate a business plan in respect of:
  - the business strategy and strategic plan;
  - stakeholders;
  - strengths and weaknesses;
  - risks, including environmental, social and governance issues, and long-term sustainability;
  - sources needed to execute the plan;
  - calculations regarding input costs and revenue streams; and
  - assumptions clearly outlined.

One of the key roles of the professional accountant and financial manager is to develop and evaluate business plans. Business plans (sometimes called business proposals) are one of the key planning, resource allocation and communication tools for entrepreneurs and organisations to obtain financing. This can be either for a new start-up, for major expansions of existing activities or to undertake a merger or acquisition. In this chapter the purposes, sources of financing, audience and components of a business plan are discussed.

This chapter should also be read closely together with chapters 1 and 2 as the role of the financial manager, establishing strategies, risk identification and risk management techniques are discussed in those chapters and are relevant to the formulation of a business plan as well. Also refer to chapters 4 and 7 for the detailed discussion on sources and forms of finance and the advantages and disadvantages of each.

17.1 Purpose and sources of financing

A business plan is a road map or blueprint of how a business intends to achieve its vision and objectives in the medium term (3–5 years). Standard Bank (2012) defines a business plan as "a detailed overview of the current position of a business, where it wants to go, and how it plans to achieve its goals. It is a summary of a business's past, present and future". Sanlam (2012, 1) describes the primary purpose of the business plan as "to guide you in successfully setting up and operating your business. Preparing the plan forces you to consider all aspects of your business and to confront any problems the plan highlights . . . while your business is still on paper". There is an old adage that says: fail to plan and plan to fail! Preparing the business plan therefore forces the owner(s) or founder(s) to consider all aspects of the business and get their 'ducks in a row', meaning that all possible issues are thought through and addressed in the plan.

The business plan should be distinguished from the annual budget or day-to-day operational plan of an existing business or other organisation. Business plans are usually developed when an entrepreneur or organisation wants to obtain financing to –

start-up a new business;

undertake a major expansion in either its existing markets or new markets or launch new products; and

merge with or acquire another entity.

Most small businesses start up with the entrepreneur's own funds, for example savings, an inheritance or retrenchment package. Sometimes he/she can obtain additional funding from the three F's, friends, family and fools! Depending on the scale of the operations, these funds might not be enough and the initial owners will have to approach the capital markets for additional funding. This might t ke the form of equity (issuing additional shares via a private placement or Initial Public Offering (IPO) or p rtnership interests to new investors) or debt funding (bank loans). Please refer to chapter 7 for further in-depth discussion of sources of funding available at various stages of the life cycle of the organisation.

These capital providers need to be convinced about the feasibility (can it be done) and viability (is it sustainable) of the business idea and that they will earn sufficient returns n their investments. This is the primary goal of the business plan.

That said, once the business or expansion is up and running, the business plan and strategies should be revisited frequently to make sure the organisation is still on track to eet its objectives. Changes to strategies or courses of action might be required. The initial business plan eventually becomes embedded as the organisation's operational plan takes effect. However, operating in a dynamic business environment means that budgets and forecasts should ideally be prepared on a rolling tw lve-month basis.

17.2 Intended audiences and their information needs

It is very important that the 'message' in the business plan is tailored for the audience. If the intended audience is debt providers, they will need to be convinced that the organisation will earn enough after tax free cashflow so that their capital (the loan) will be repaid and interest payments will be serviced. The riskier the investment and longer the loan period, the higher the interest rate would be as uncertainty regarding future cashflows increases. Debt providers will also be interested in any collateral or security that can be provided by the applicants.

If the intended audience is equity partners/investors, they will need to be convinced that the organisation will earn enough after tax free cashflow to service debt AND to provide for dividends and future capital growth on their investment. Remember that in case of liquidation, the capital invested by the owners of the organisation is only repaid after all debt and other claims have been settled (if at all). For this higher risk, they expect to earn a higher return.

Although the word 'busin ss' is used, the principles pertaining to compiling 'business plans', can also be applied for non-profit organisations and even government programmes. These principles contained in the business plan stay the same, only the audience (fund providers) will differ. In case of not-for-profit organisations, the audience will be donor funders and the beneficiaries of the programme. Although donors don't expect to be repaid, they a e inte ested in how efficiently the donation will be spent. In the case of government programmes the audience might be tax-payer associations, civil organisations and international funders such as the World Bank or International Monetary Fund. The audience will once again be interested in the efficiency with which the f nds are spent and in the case of loans, the ability to repay it.

Irrespective f the audience, they will primarily be interested in the product/service and its market or beneficiary, the fact rs that should contribute to the success, the needs, interests and expectations of all the stake-h lders, the p tential risks and the actions taken to manage these risks and the amount and timing of the funding required. The fund providers want to see a 'bankable plan' that provides confidence that –

there is a more than reasonable chance that the business/expansion will succeed given the product and the market/industry analysis;

there is a reasonable return that is aligned with the risks they will be taking (refer to chapter 5 for a discussion on risk and return); and

the business will generate cash (not only profits).

The components of the business plan that addresses these information needs are now discussed.

17.3 Role players and components of the business plan

Who are the role players? Compiling the business plan requires a multi-disciplinary task team. Inputs are required from the –

marketing manager or the marketing firm used by the organisation;

technology and production manager (for manufacturing) or service manager (for services);

human resource manager;

finance manager; and

information technology manager (depending on type and size of business).

Where the business plan is developed for a small start- up, these functions might h ve to be fulfilled by the original founder only or shared by the owner and his/her partners. Depending on the life- stage of the business, these functions might eventually be embedded in different specialist managers in the organisation. A large established business, preparing a business plan for expansion purposes, will normally have such a functional organisational design.

It is important to note that the business plan is the prime 'marketing t l' to the potential providers of capital. The organisation/entrepreneur has to convince the fund providers that this is a 'bankable' plan! It should reflect care and attention to critical details. Proper research into the product/service and the competitive environment of the industry is a pre-requisite before one can co ence to write the plan. Generally the soliciting for funds process gives only one chance to make a good i pression.

Most business plans will have at least the following s ctions –

executive summary;

business description;

ownership and management team;

product/service offered;

market/industry analysis and sales strategy;

facilities and resources;

business model;

capital required and milestones;

financial data and forecasts;

stakeholders and sustainability;

risks and risk manag m nt; and

appendices.

What should be ommuni ated in each section will now be explored. These are not hard and fast rules, but rather suggestions or guidelines. As long as the issues discussed below is considered and addressed somewhere (in a logical manne) in the plan, the plan should serve its purpose.

17.3.1 Exec tive summary

The executive summary is a summary of two to three pages of the salient points of the plan. This is the first pages that the p tential investors/lenders see and they have to be interested enough to read the rest of the business plan. It should clearly spell out what the business is about, its markets and marketing/promotional plan , the competitive advantage, who the management team is and the amount of financing required and how it will be used.

This is written last, once all the other details have been considered and recorded.

17.3.2 Business description

This section should describe the purpose or mission of the business as well as its long-term vision of where it is going. Describe the organisation's objectives and the strategies that will be employed to achieve it. Provide

some history and other background to the organisation. Provide some background to the industry: what the industry is about and how big it is.

Make the business case (why the business will succeed): why is this product/service needed? Who are the customers/clients? How will this product/service be delivered? What makes the product/service different to the competitors, that is, unique product, technology, distribution channel or location?

Some of these aspects are described in more detail in further sections of the business plan.

17.3.3 Ownership and management team

Provide details of the legal structure (for example, is it a partnership or a company?) of the business and who the founders are/were. Indicate the names and percentage ownership of the current owners as well as which owners are involved in the business and which are deemed 'silent partners'. The l tter are partners who are not involved at all in the day to day running of the entity, but have pro ided capital and hence expect a return on their capital. Details of share incentive schemes for management and employees should also be disclosed.

A very important aspect for potential investors or lenders is the expertise of the management team. Many businesses fail, not because of the product or lack of finance, but lack f proper leadership and day-to-day management. The management team is in charge of executing the plan and the investors/lenders trust them with the funds to be provided. Briefly describe the key attributes/skills/expertise and qualifications of each member of the management team. It must be clear to the reader how this contributes to the successful execution of the plan. Detailed Curriculum Vitae should be attached under the appendices section.

Include an organisational chart that indicates how the busin ss will be structured, that is divisional (independent business units for product ranges or geographic ar as) or functional (sales, production etc. covering all areas and all products). Indicate the number of support and operating staff in each functional unit.

17.3.4 Product/service offered

This section is used to describe the product or service offered. Point out what makes it unique or why it fills a gap in the market. Provide evidence of customer requests or feedback from satisfied customers and clients. If it is protected by patent law, elaborate on this as it is an indication of the security and duration of the future income streams to be derived from it. Describe the different applications of the product as that indicates the different customer sections being targeted. Having more than one application for the product might also lessen the risk of competitors coming to the fore and removing any competitive advantage in that only market. Provide details of any major contracts already concluded. Copies of contracts can be included in the appendices.

Provide background as to the technology involved to produce the product or deliver the service. This should also include a discussion on continued investment required into research and development. If the product is still in prototype stage, illustrate in a schedule how the project will progress until the product is ready for commercial use and sal s. Id ntify risks, by highlighting the critical paths, constraints and major milestones that need to be met.

The detailed analysis of the market, the competition and marketing or promotional strategies is discussed under the next se tion.

17.3.5 Market/industry analysis and sales strategy

The market/ind stry conditions are very important as it has a great influence on the success of the product or service. Pr vide details regarding the market size, the business's share of it and the potential for growth. Discuss new developments in the market, for example new regulation, trends and the like.

Provide an analysis of the competitive environment in which the business will compete. Porter's Five Forces (1980) is a very good tool for analysing the market or industry. The questions to ask are:

What are the barriers to entry?

What is the bargaining power of the customers?

What is the bargaining power of the suppliers?

Are there substitute products available to customers?

How fierce are the existing competition between players in this market/industry?

Porter also proposes various strategies to gain competitive advantage and for pricing the product/service.

The strategies to achieve growth of the product/service in this market should also be discussed. This can be done along the lines of the Ansoff's growth vector matrix which suggests strategies depending on whether the business intends marketing existing or new products in existing or new markets.

Various tools can be used for the strategic positioning of the organisation's product/service in its market/industry. A few have been briefly highlighted here. For an in depth discussion of these, please refer to chapter 2 (*Strategy and risk*). It may also be necessary to provide a life cycle analysis (namely, introduction, growth, maturity and decline) for the product/service and indicate projected sales volumes at the different stages. This should tie back to the financial data and forecasts.

Once it is clear how the new business/service will be marketed/positioned, a sa es or promotional plan must also be put forward. The promotions and advertisements that will be l unched s well as the media channel should be outlined. Details of the advertising agencies and/or public rel tions firms that the business will use should be provided. If the business plan revolves around a new product/ser ice, the details of what the actual launch to the public will entail should be given. Examples of ad ertisements, flyers and packaging can be included in the appendices.

17.3.6 Facilities and resources

In this section, the facilities and resources required to anufacture or provide the product/service should be described. The manufacturing process can be visually shown and briefly outlined in layman's terms. Provide a value-added analysis and high-level flow charts. If a service is being rendered, describe the steps involved in providing the service to clients. Describe the most important machines and equipment that are required for the manufacturing process or those used in the delivery of the s rvice.

The details of the main raw material or components required and the suppliers involved should also be provided and an indication should be given whether secure agreements have been concluded with the most critical suppliers. If continuation of supply is an issue, include a brief discussion of Service Level Agreements (SLA) concluded.

The quality of the human resources required is also critical. In addition to the management team which is covered in its own section, the skills/qualification/training of other personnel necessary and available should be outlined. A staffing plan which indicates the job descriptions, salary or wage ranges per post grade and head count required should be provided as well as an indication as to which of these posts are already filled and which still need to be filled.

The typical life cycle of the product/service should be given. An overview of the whole supply chain involved in delivering value to the customer/client is required. Provide a geographic chart which indicates all the facilities/offices of the organisation. escribe what type of support overhead services, that is debtors department, human resource department and so on, will be provided from a central or head office facility. If information technology is critical to the functioning of your operations, provide details of main hardware, software and network requirements.

Provide:

- a high-level ost breakdown of the product or service; and
- details of long-te m contracts already concluded for leasing of machinery, fleet, factories space, office space etc.

The information in this section should tie back to the financial data and forecast section.

17.3.7 Business model

The business m del describes how the value will be delivered to the customer or client, how sales will turn into ca h and how turnover will lead to profits. The business model is derived from the strategy of the business. O terwalder & Pigneur (2010: 14) defines a business model as the rationale of how an organisation creates, de ivers and captures value. They have developed a concept called the Business Model Canvas – a visual tem-pl te for developing new or documenting existing business models. The Business Model Canvas contains nine building blocks (Osterwalder & Pigneur, 2010: 16–17):

- *Customer segments*: An organisation serves one or several customer segments.
- *Value propositions*: It seeks to solve customer problems and satisfy customer needs with value propositions.

Channels: Value propositions are delivered to customers through communication, distribution, and sales channels.

Customer relationships: Customer relationships are established and maintained with each customer segment.

Revenue streams: Revenue streams result from value propositions successfully offered to customers.

Key resources: Key resources are the assets required to offer and deliver the previously described element.

Key activities: By performing a number of key activities the business model is imp emented.

Key partnerships: Some activities are outsourced and some resources are acquired outside the enterprise.

Cost structure: The business model elements result in the cost structure.

By answering questions posed under each building block, organisations can de elop new or record their existing business model. Various models are available. The details invol ed with each are beyond the scope of this book, but a few common business models are –

franchising;

direct marketing and sales;

cutting out the middle man;

bricks and clicks;

subscription; and

virtual stores.

Please refer to Chapter 1 for a more detailed description of a business model.

17.3.8 Capital required and milestones

In this section, the potential fund providers are being informed how much funding is required for the start-up or expansion. This can be provided in a draw-down table or Gantt chart indicating the milestones (timeline) and what the money will be used for. The level of funding already being provided by the founders/current owners and financial institutions should be shown as well as how much additional funding is required.

The information in this section should tie back to the financial data and forecast section.

17.3.9 Financial data and forecasts

The primary responsibility of the financial manager or accountant is the preparation of the financial data and forecasts. He/she should nsure that all the inputs provided in the other sections of the business plan by the other experts are conv rt d to Rand and cents and that everything ties together.

Primary assumptions for the forecast years should be provided, such as –

turnover g owth – prices;

turnover g owth – volume;

gross profit percentages;

average interest rates – overdraft;

average interest rates – long-term debt;

tax rates;

any accelerated wear and tear allowances or green fields tax allowances or holidays;

dividend payout ratio;

inflation – Consumer Price Index (CPI) or Producer Price Index (PPI);

industry indices, for example, the Steel and Engineering Industries Federation of South Africa (SEIFSA);

commodity indices, if major impact on your business, for example gold/platinum/copper prices, oil;

exchange rates, if the business is importing and/or exporting;

cash and operating cycles;

debtors and creditors credit terms;

wage increases;

capacity of plant and machinery; and

billable hours.

The following financial statements should also be provided:

Statement of Profit or Loss and Other Comprehensive Income ('income statement').

Statement of Financial Position ('balance sheet').

Cashflow Statement.

The income and cashflow statements should be provided for the following periods –

monthly for the first 12 months;

quarterly for Years 2 and 3; and

annually for Years 4 and 5.

The balance sheet is provided at the start (now) and thereafter annually. These timeframes are recommendations only, but the financial plan is usually not prepar d for p riods less than three years or longer than five years. Capital-intensive industries might have long r tim fram s as the business cycle may be longer and it takes longer to recoup huge amounts of investment. The inverse may apply for IT businesses where technology changes too fast to plan far ahead.

Provide ratio analyses, with comments that will address the main areas, for example, profitability, return, liquidity, and solvency. Equity providers will mostly be concerned with the 'return on investment' and 'return on equity' measures, whilst debt providers will mostly be interested in the debt to equity ratio and the interest cover ratio. Refer to chapter 8 (*Analysis of financial statements*) for detail on various ratios and what each means. These ratios should be benchmarked against main competitors and/or the industry.

In addition to the three regular financial statements provided, the following management information should also be provided:

Variable costing income statement (reconciling back to the profit before interest and tax in the Statement of Profit or Loss and Other Comprehensive Income).

Breakeven analysis, safety margins and other margins indicating sensitivity to price or costs.

Other key operational performance measures (critical success factors), for example throughput per hour, material yields, labour ffici ncies (if not listed under key assumptions).

The amount of detail provid d h re should also be considered. Some consultants advise that only the assumptions and highlights should be presented here, and the detailed financial statements are better placed in the appendices. That might be advisable for large complicated projects.

17.3.10 Stakeholders and sustainability

Any organisation that requires funding from external parties will face a changing business environment in which the focus is not on profit alone anymore. Organisations should operate in a sustainable manner by taking acc unt f the three P's that is people, planet, and profit! Refer to chapter 2 (*Strategy and risk*) for details on wh m the external and internal stakeholders of an organisation are and the concept of sustainability.

De cribe the main external and internal stakeholders of the organisation and the manner which they will be affected by the organisation's activities, positive and negative. If there are potential negative impacts, describe how this will be mitigated.

Provide a Value Added Statement. This indicates how the value added by the business (turnover less products/services bought in) is distributed between employees, equity holders, debt providers, the government and other stakeholders.

17.3.11 Risks and risk management

Assuming that the business plan has done enough to whet the appetite of the potential fund providers, they will also require assurance that the risks involved have been considered. Some of the risks might already have come to the fore in the discussion on stakeholders, but nevertheless a complete picture should be provided here. Risks might be identified with a 'strengths, weaknesses, opportunities, threats' (SWOT) analysis. An alternative method is a political, economic, socio-cultural, technological, legal, environmental, global and ethical factors (PESTLEGE) analysis. How the risks will be managed, how strengths will be maintained and opportunities grown should be clearly indicated.

Depending on the size of the business, the organisation may also be required to demonstrate that it has an official risk management structure in place. Refer to chapter 2 for a detailed discussion on risk identification, management and risk management structures and frameworks.

17.3.12 Appendices

This section contains details in support of information provided in earlier sections. Some examples are –

- product data sheets, including sketches or photos;
- patents;
- test results from standard setting organisations, for exa ple South African Bureau of Standards (SABS), or Council for Scientific and Industrial Research (CSIR);
- market research;
- advertisements and other promotional material;
- management and key personnel profiles;
- reviews of the product/service in trade and other magazines;
- list of equipment (owned or to be acquired);
- floor plans;
- copies of leases/rentals;
- copies of finance agreements;
- detailed financials (if not provided under the finance section); and
- attorneys and accountants.

17.4 Conclusion

A suggested format for a g n ral business plan has been presented. In practice, the whole of the plan must be considered. For instan e, some authors suggest discussing the vision and mission in the executive summary and others put it in the business description. It must always be remembered that the purpose of the business plan is to market the business idea and to make the investment/loan attractive for potential fund providers. The business plan also becomes the road map for the business so it is important that all the aspects discussed above are addressed somewhere in the plan!

Appendix A

Online resources for developing business plans

The internet is a vast resource where many additional guidelines for preparing business plans, MS Word templates and even examples of complete business plans in diverse industries can be found. Here are a few useful websites from a Google search on 'business plans':

http://www.bplans.com

*http://www.b**plans**.com/sample_**business_plans**.php*

*http://www.entrepreneur.com/**businessplan**/index.html*

http://bizconnect.standardbank.co.za/start/business-planning/reference-documents/business-plan-template.aspx

*http://southafrica.smetoolkit.org/sa/en/category/2944/**Business-Plans***

Practice questions

Question 17–1: Knysna Cabinets *(Fundamental)*

Knysna Cabinets manufactures custom cabinets for r sid ntial, r sort and the commercial market.

The extract from the business plan below is reproduced with the kind permission of Palo Alto Software, Inc., 1996-2014 All rights reserved. Minor modifications were made for the South African context. The full original business plan can be accessed at http://www.bplans.com/furniture_manufacturer_business_plan/company_summary_fc.php#.UJ-uGmcbI_c.

Executive Summary

Knysna Cabinets will be formed as a cabinet company specialising in custom cabinets for the high-end residential, resort, and commercial market. Its founders have extensive experience in the construction and cabinet industry.

Over some years of being involved with the construction of luxury homes, the company owners have seen a need for a cabinet line with a broad selection of design choices, high-end finishes, along with top of the line organisation, customer service, and quality. Knysna Cabinets will meet those customers' needs. Building a strong market position in the high-end residential, resort, and commercial development segments, the company projects revenues to grow substantially between FY 1 and FY 3. By maintaining an average gross margin of ov r 25%, the company estimates handsome net profits by FY 3.

The company own rs have provided the capital to cover the start-up expenses. The company currently seeks a three-year ommercial loan to cover the operating expenses.

Objectives

The company objectives are:

To be a top cabinet supplier to luxury homes in the regional market.

Revenues to more than double Year 1 levels by the end of Year 2.

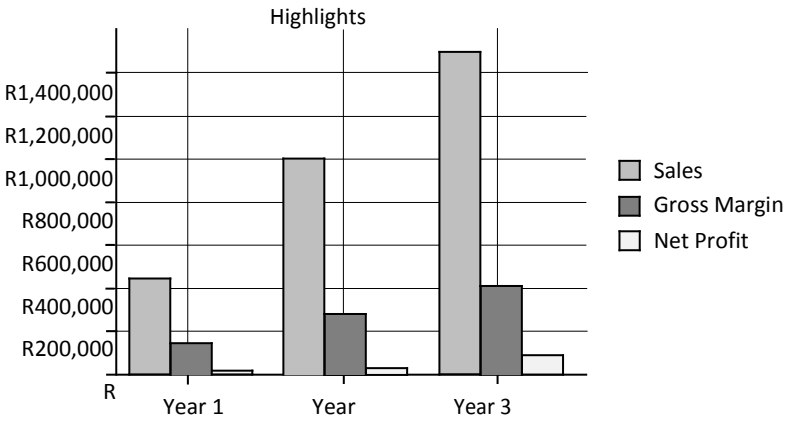
Aim to have 70% of sales in high-end residential customer segment.

20% of sales in mid-range residential customer segment. 10% of sales in commercial development segment.

To have a showroom within three months in a prominent retail space.

Mission

To deliver a high-quality product, on time and within budget while also providing a fast, error-free ordering system.



Required:

Evaluate whether the executive summary satisfies most of the requirements for a standard business plan.

Solution: Knysna Cabinets – Executive Summary

The following are identified from the extract provided –

what the product is about;

the key competitive advantage;

the markets that are targeted;

why the funding is required (its use); and

highlights from the financial data indicating the potential growth and profitability.

The executive summary however, neglects to mention who the owners are and the amount of funding that is required.

Question 17–2: Rashid's Catering *(Intermediate)*

Rashid's Catering provides Halaal catering for events and functions in the Muslim community.

The extract from the business plan below is reproduced with the kind permission of Palo Alto Software, Inc., 1996-2014 All rights reserved. Minor modifications were made for the South African context. The full original business plan can be accessed at http://www.bplans.com/catering_company_business_plan/company_summary_fc.php#.UJ-xkWcbI_c.

1.0 Company Summary

Rashid's Catering, lo ated in Durban, KwaZulu-Natal will offer high-end Halaal catering to the Durban Muslim community. Rashid's Catering will serve parties of 25–300 people with high-end Halaal foods that are cu ently only available in Cape Town. Rashid's Catering will offer a large menu repertoire, from traditional favo rites to creative inventions.

Rashid's Catering will rent space for the office and kitchen in an industrial area of Durban. Renting in the industrial area will significantly lower the cost. Since the space will be used for food production it is not relevant f r the store front to be aesthetically pleasing, or in a nice neighbourhood. Rashid's Catering is f recasted to generate R395 000 in profits for Year 3.

Start-up Summary

Rashid's Catering will incur the following start-up costs:

Two commercial stoves with ovens.

Dishwasher.

Two sets of cookware.

Two sets of dishware.

One van with rolling racks built in (a rolling rack is a wheeled rolling cart system that is insulated for both hot and cold food).

Assorted serving trays and utensils, knives and cutting boards (two each).

Desk and chair.

Computer with printer, CD-RW, Microsoft Office, and QuickBooks Pro.

Internet modem, router and data contract.

Copier and fax machine.

Table: Start-up

Start-up	
Start-up expenses	
Legal	R5 000
Stationery etc.	R1500
Brochures	R3 000
Rent x 3 months	R30 000
Salaries x 1 month	R15 000
Total Start-up expenses	R54 500
Start-up assets	
Cash required	R6 700
Non-perishable food inventory	R12 000
Non-current assets (equipment etc)	R320 500
TOTAL ASSETS	R339 200
Total Requirements	R393 700

Table: Start-up Funding

Start-up Funding	
Total Funding Required	R393 700
Less:	
Non-current assets – to be funded by leases	R320 500
Short-term funding required	R73 200
Available from:	
Rashid	R15 000
Family and fri nds	R10 000
Total Ov rdraft funding requested	R48 520

Required:

Evaluate whether the business description satisfies most of the requirements for a standard business plan.

Solution: Rashid's Catering – Business Description

The f ll wing are identified from the extract provided:

What the business will sell.

Its competitive advantage in terms of product (previously only in Cape Town). Its

competitive advantage in terms of cost (low rent in industrial area).

Where the business will operate.

However, the details regarding the start-up expenses, assets required and funding should rather be presented in the executive summary and the capital required and milestones sections. They could have elaborated a bit more on the industry and market in general (without too much detail, as the detail is discussed in the product and market/industry sections).

There is no description of the business' objectives and mission, except from the profit that should be generated by Year 3.

Question 17–3: GreenPET Plastics *(Intermediate)*

GreenPET Plastics is a recycler of plastic PET bottles, which is then used to manufacture plastic sheets and strappings.

The extract from the business plan below is reproduced with the kind permission of Palo Alto Software, Inc., 1996-2014 All rights reserved. Minor modifications were made for the South African context. The full original business plan can be accessed at http://www.bplans.com/plastics recyc ing_business_plan/executive _summary_fc.php#.UJ_PuWcbI_d.

1.0 Products

GreenPET Plastics will utilise two processes in the same facility to produce:

- Cleaned and recycled plastic PET flake (RPET), recovered fr m p st-consumer beverage bottles and manufacturing waste produced by its sheet customers.
- Extruded roll stock sheet PET.

Extruded PET high-strength strapping for securing large packages or pallet loads; each using 100% RPET produced in-house.

Product Description

Roll stock sheet will be sold to custom thermoformers primarily to be used to produce high-visibility packaging. It will also be sold to manufacturers of laminates and fabricated plastic products.

High strength PET packaging strapping is used to secure packages or pallets in such industries as lumber milling and corrugated and other paper production.

Both products will be extruded from post-consumer polyethylene terephthalate (PET) bottles. The recycling programs in Gauteng, Mpumalanga and North West collect in excess of 200 000 000 kilograms of PET bottles per annum. GreenPET's initial capacity will be 46 000 000 kilograms.

Using a patented process, GreenPET will clean and refine the PET material from the post-consumer bottle stock and post-industrial manufacturing waste. The PET flake resin produced will be extruded into roll stock sheet or high-strength strapping.

Although the company expects to convert its entire bottle feed stock into extruded products, any surplus flake will be sold to outside manufacturers.

Competitive Comparison

While quality and d liv ry are important factors to our potential clients, price is most often the determining factor in a buying decision. Good-quality packaging products manufactured from recycled (less expensive) resins, as lose as practical to the end customer's operations, will be most competitive and achieve a significant ma ket share. These factors have helped to determine the business parameters of GreenPET Plastics.

1.3 So rcing

In excess f 200 000 000 kilograms of post-consumer PET beverage bottles are collected and available as feed st ck for manufacturers who can re-process this material into commercial products. The company has excellent relations with the firms and associations that collect and distribute these materials and has been a sured that its requirements will be available for the foreseeable future.

The company has entered negotiations with a Gauteng based source of post-consumer bottles and is confident that sufficient volumes are available on a contract basis from this source to satisfy its requirements. In addition, the company intends to purchase production waste from its sheet customers and blend it into its feed stock.

Currently, the majority of the post-consumer PET bottles collected in Gauteng, North West and Mpumalanga are exported to China. The Chinese have absorbed the amounts surplus to the use in South Africa. Their interest has kept the industry in the position of being able to maintain a steady price range for this

bottle stock. A significant percentage of all sales of such bottle stock are managed by Plastics Recycling Corporation of Gauteng (PRCG), an industry funded marketing agency which operates similarly to a co-operative. They accept bids from potential buyers on behalf of the firms which act as 'consolidators', which accumulate stocks from the smaller, individual bottle-recycling depots. Some amount of the available stocks are regularly bought by recyclers in eastern South Africa who focus on the carpet manufacturers who use RPET resin in their process, but the high cost of transport from central South Africa makes eastern sources more desirable.

GreenPET has a good relationship with company B, one of the larger consolidators in Gauteng. Company B has indicated a desire to contract to supply GreenPET with all of its raw material needs. They prefer to deal with a local consumer such as GreenPET, rather than the uncertainty and extra preparation requirements of the export market.

There are other sources of post-consumer feed stock known to GreenPET, nd we are confident that we will have sufficient materials available for our production needs.

1.4 Technology

Sam McGuire, a key member of our Management team, is ne f the riginal innovators of cleaning and refining technology for post-consumer PET, and we will be utilising his patented process in our recycling facility. Sam has worked in the establishment and operation of facilities employing similar technologies over the last several years.

On the manufacturing side, Management has been an integral part of the advancement of industry practices over the last twenty years or so, and includ s in their knowledge base most, if not all, of the state-of-the-art available equipment and manufacturing t chniques.

Required:

Evaluate whether the product description satisfies most of the requirements for a standard business plan.

Solution: GreenPET Plastics – Product Description

The following are identified from the extract provided:

What the products are.

Patents involved.

Who the potential customers are.

Where the raw material will be sourced.

Experience with the technology used.

This is a very extensive product d scription and the readers will be well informed. There's not much that can be added.

Question 17–4: GreenPET Plastics – *continued*

We continue with the example of GreenPET. GreenPET Plastics is a recycler of plastic PET bottles, which is then used to man fact re plastic sheets and strappings.

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Market Analysis Summary

Strong demand for recycled plastics is working in the industry's favour. Major users of plastic packaging, pparently responding to consumer desires, have begun incorporating at least some recycled plastic content in their products as part of the growing interest in recycling. Recycled resin demand is on the rise as prices for the two major recycled resins, PET and HDPE, continue to hold value or appreciate against their virgin counterparts.

In volume, PET is currently the number one recycled resin. Supply of recycled PET is in excess of 800 million kilograms per year. This figure is expected to grow, reaching over 1 billion kilograms during the next few years. The plastics industry has developed new markets and applications for recycled resins from both post-consumer and post-industrial sources.

PET leads the recycled recovered resins as the most visible and valuable, and its use is increasing. Of the total 3,7 billion kilograms of PET consumed in 1997, just 16% was from recycled sources. Of the more than 90 billion kilograms of plastics produced annually in the RSA, less than 5% is from recycled sources. Plastics, after aluminium, represent the second highest value material in the waste stream and have the highest projected growth rate.

Markets and uses for recycled plastics are rapidly expanding. Plastic containers are being collected at the curb for recycling in nearly 500 communities, representing more th n 4 million households. SA demand for recycled plastic will continue to expand and new markets will develop s technologies permit the effi-cient segregation and reprocessing of high-purity resins. Improved quality of resins, environmental issues and higher prices for virgin resin will contribute to growth.

There is currently no independent extrusion plant of recycled p lyterephthalate (PET) sheet in that services the roll stock requirements of major custom and pr prietary formers. With the development of the recycling industry for PET starting in the eastern part f the country, and the preponderance of consumers of sheet there as well, development of independent extrusion facilities using RPET has been slow to develop. It appears that in order to attract such co panies, local sources of RPET would have to available. While there are customers in the central SA for the products, contracting a supply and shipping it from the east of SA makes the venture unattractive.

Our founders recognise that an opportunity xists and propose a vertically integrated conversion facility that will employ state-of-the-art technologies to produce extruded sheet and high strength strap-ping from 100% recycled PET post-consumer bottle stock, cleaned and refined in our own facility.

Target Market Segment Strategy

The company has chosen its target markets because recycled PET (RPET) is in high demand as flake resin by converters, as roll stock sheet used to produce high visibility packaging and as high strength strapping for the lumber industry. Sales are price-sensitive, so that proximity to markets and feed stock source pro-vide a competitive edge. GreenPET Plastics identified an opportunity to take advantage of both circum-stances in the central RSA.

RPET Flake

Total market demand is reported as 1,2 billion kilograms per year. Since only 800 million kilograms are processed in the RSA, consumers are forced to look at wide spec virgin PET (virgin resin that is outside of spec but still usable) which is normally sold at a discount to virgin prices, but still higher than recycled (RPET) pricing. Some manufacturers are also forced to import materials from Mexico, India and South America. Some conv rt rs are being forced to use more expensive virgin resin.

The current pricing for virgin resin is R0,65–0,73 per kg and R0,42–0,53 for RPET flake. The spread be-tween the two has traditionally been maintained at approximately R0,20 per kg.

PET Film and Sheet

The total epo ted market of extruded film and sheet is 872 million kilograms, of which identified industry usage of RPET is 160 million kilograms.

The reported market demand (to replace virgin PS, PVC and PET) if RPET was available is estimated at 1 billi n kil grams.

Current pricing for RPET sheet is R0,70–0,79 per kg.

RPET Strapping

The total reported domestic plastic strapping market is 240 million kilograms. Of this market, industry usage of virgin polypropylene is 132 million kilograms and of PET is 108 million kilograms.

It is generally accepted in the industry that less expensive strapping made from RPET could not only take over the polypropylene strapping market, but convert as much of the much larger and more expensive steel strapping market as RPET strapping was available.

Current pricing for RPET strapping is R0,90–1,08 per kg.

1.2 Market Segmentation

The primary market can be broken down as follows.

Consumers of PET in:

Gauteng: 62

North West: 8

Mpumalanga: 9

Consumers of HDPE in:

Gauteng: 73

North West: 10

Mpumalanga: 12

All information is based on industry research, and data provided by the South African Plastics Council.

Table: Market Analysis

Market Analysis							
		Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Potential Customers	Growth						CAGR
Central PET Buyers	1%	79	80	81	82	83	1,24%
Central HDPE Buyers	1%	95	95	95	95	95	0,00%
Total	0,57%	174	175	176	177	178	0,57%

Industry Analysis

Currently there is no direct competition in the central RSA for either of the two divisions of the company. Any production in the trading area remains captive and not available to our target market.

The ability of the company to obtain a source of post-consumer bottle stock is an integral component of the strategy to vertically integrate operations and manufacture products in demand by central consuming industries. Without the cleaning and refining division, it would be difficult to source sufficient RPET flake resin at costs that would allow the company to be competitive.

Barriers to Entry

Limited supply of raw material

Recycled PET (RPET) resins are in high demand, and demand is currently under-supplied. Many manufactur rs are delaying expansion because of uncertainty of supply. Entrants would have to consid r sourcing post-consumer or post-industrial waste and clean and refine it rather than at-tempting to purchase flake on the open market. Even at that, there is not an over-abundance of post- onsumer or post-industrial material in the marketplace.

Equipment costs are high and industry specific, resulting in a high exit cost.

Because of the scarcity of RPET flake, entrants may be forced to establish cleaning and refining facilities for post-consumer bottles. The equipment required is costly and very industry specific. It wo ld not easily be re-sold as a system.

There is a market for used extrusion equipment, which normally sees 60–70% of new value being realised.

Vertical integration is an important consideration and difficult to accomplish successfully.

Because of the scarcity of RPET resin, and to maximise profit potential, entrants must consider a two-stage production facility. Cleaning and refining post-consumer bottles and extruding the re-sulting flake into commercial products requires a management team such as GreenPET has, with a broad range of expertise, experience, industry contacts and knowledge in both areas.

Firm contracts for supply and sales.

GreenPET Management's industry contacts will allow us to secure contracts for both supply of feed stock and sale of finished goods.

Freight is a major cost of operations; proximity to source of supply and markets is crucial.

Hauling plastic materials is expensive so entrants will have to consider establishing facilities close to materials and markets. Entrants with existing operations would have to consider new separate facilities in many cases, reducing economies of scale and making management more difficult.

Competition and Buying Patterns

There has been a strong demand (sellers' market) for our products for several years. Traditional buying patterns in this industry are based on quality, price, reput tion of manufacturer, freight costs, delivery times and proximity to markets. During such sellers' m rket, buying patterns are often more influenced by availability.

Main Competitors

Currently in the central RSA, there is no direct c mpetiti n for cleaning and refining post-consumer or post-industrial PET. Nor is there any n n-captive extrusion of roll stock sheet.

The extruded sheet required by thermofor ers is currently supplied by:

Advance Extrusion, Edenvale.

Kama, Boksburg.

Plasti-Shell Packaging, Sasolburg.

Petco, Benoni.

Klockner, Benoni.

In a news release dated September 10, 2012, Itec Environmental Group announced their intention to open a PET and High Density Polyethelene (HDPE) recycling operation in Germiston. The news release states that the company's new and yet unproven technology lets it work with bottle streams others have to reject as too dirty. This company is familiar to our management, and is not considered a significant factor in any of our markets.

Required:

Evaluate whether the market analysis and sales strategy satisfies most of the requirements for a standard business plan.

Solution: GreenPET Plastics *continued* – Market Analysis and Sales Strategy

The following are id ntifi d from the extract provided:

The market size for ea h of the main products.

The potential g owth.

New t ends in ecycling.

Price ranges of the products.

The number of major consumers for each product.

Barriers to entry.

Details of competition.

The market analysis is very extensive and well researched. However, the plan did not expand on the sales strategy that will be followed for each product.

Appendix 1

Selected concepts, acronyms and terminology

This section contains brief descriptions of a selection of conc pts, acronyms and terminology, which are intended to enhance a student's knowledge and ability to place sc narios in a context.

Angel funding Finance provided by an individual, known colloquially as an 'angel investor', to a business venture that is generally still in the early phases of its development where a relatively high degree of risk is involved. The early business phases include the start-up phase (this type of finance is described as 'seed capital'), or early growth phase ('first stage financing'). Angel investors often invest in equity capital or mezzanine capital (see below) and, due to the high levels of risk involved, normally require high levels of return from their investment. Angel funding is similar to venture capital (see below), but the decision to invest is normally made by an individual, not a specialised organisation operated as a house or fund.

Basel III The name given to the latest set of banking reform measures proposed by the Basel Committee on Banking Supervision, which intends to better prepare the international banking sector for future financial crises. The Group of Twenty (G-20), a forum of important industrialised and developing economies – of which South Africa is a member – has committed itself to adopt Basel III by the end of 2011. The final Basel III reform measures are likely to include, amongst others, a r quirement to maintain higher levels of Tier 1 capital (comprising essentially equity and retained earnings) and minimum liquidity standards.

Black Swan Inspired by the graceful birds of this colour (*cygnus atratus*) – which were once thought of in the Western world as either non-existent or very scarce – Nassim Taleb describes a Black Swan (capitalised) as a random event with three attributes: 'rarity, extreme impact, and retrospective (though not prospective) predictability' (2007:xxi). Examples of Black Swans include the World Wars, the spread of the Internet, and the 9/11 attacks (Taleb, 2007).

BRICS A grouping acronym for the cooperative formation of emerging economies, comprising the following members: Brazil, Russian Federation, India, China and South Africa. The acronym 'BRIC' was coined by Jim O'Neill of Goldman Sachs in the year 2000 to describe the most significant emerging economies, which later became the first four members of this group. South Africa, a relatively small emerging economy, was a contentious recent addition following a formal invitation by the Chinese Chair of this group.

Brownfield investment	An investment replacing a previously dirty or polluting business venture, e.g. an office development replacing a refinery, or the upgrade of a factory building using new technologies that will significantly reduce its level of pollution. The term 'brownfield' therefore hints at the conditions that existed prior to this investment. Also see 'greenfield investment' and 'greyfield investment'.
Greenfield investment	Investment made in manufacturing facilities, offices, or other developments where no previous facilities existed. The term 'greenfield' therefore hints at the conditions that existed prior to this investment and is an adaptation of a construction term, where new construction rep aces actual 'green fields'. Also see 'brownfield investment' and 'greyfield investment'.
Greyfield investment	Investment made in existing real estate th t h s f llen into disuse, such as shopping malls that have lost key tenants, or industri l areas redeveloped for mixed use (such as the V&A Waterfront in Cape Town). The term 'greyfield' therefore hints at the expanses of concrete and empty tarmac that often accompany these sites before redevelopment. Also see 'brownfield investment' and 'greenfield investment'.
LIBOR	An acronym for the London interbank ffered rate. This is a benchmark rate that is calculated based on the average rate offered by leading banks in London when borrowing to other banks.
Mezzanine capital	The term 'mezzanine' is derived to an extent from the Italian word 'mezzan', meaning 'middle'. Mezzanine capital, in turn, ranks in the 'middle', between equity capital and oth r d bt, wh n compensating investors and other business partners in the case of liquidation. (In other words, mezzanine capital ranks senior to ordinary shares, but junior to all other secured debt and creditors (The Economist, 1999).) Examples of mezzanine capital include subordinated debt, subordinated convertible debt and preference shares. Mezzanine capital is often used by smaller business entities without access to alternative sources of finance. Due to the inherent risks, mezzanine capital is relatively expensive.
Nominal effective exchange rate of the Rand	The nominal effective exchange rate is expressed as an index of the weighted exchange rate of the Rand measured against a basket of the currencies of South Africa's fifteen most important trading partners, including the Euro, US dollar and Chinese yuan (SARB, 2008). This index shows, for example, that the Rand increased in value over the past (almost) two years, as follows: Index: June 2011 = 76; Index: July 2009 = 68; where Index: 2000 = 100 (SARB, 2011)
Primary vs. secondary market	The primary market is the capital market for the issue of *new* securities (Thus a source of new finance, e.g. the issue of new ordinary shares.) The secondary market allows for the trading of securities *after* the original issue. (Thus not a source of new finance, but important for price-setting, marketability and liquidity within the market. An example of dealings on the secondary market is for an investor to buy a bond from another investor.)
Prime overd aft ate	A benchmark rate used by banks when lending to the public (though usually at a rate above or below this rate, e.g. an overdraft facility offered at prime plus 6% to an individual).
Private equity business	A business enterprise held by private owners, including individuals and corporate entities (IPEV Board, 2010:8), which is therefore not publicly owned and, necessarily, not listed on a Securities Exchange. An example is a private company.
Private equity investment	Investment in a private equity business in all stages of its development, including early stage ventures, management buyouts, refinancing, growth capital and development capital (IPEV Board, 2010). Private equity investment is often made by a private equity fund or house, which is a designated pool of investment capital (e.g. Ethos Private Equity in South Africa).
Pure play business approach	A company devoted to a single business line.
Repo rate	Rate at which banks borrow Rand from the South African Reserve Bank.

SABOR	An acronym for the South African benchmark overnight rate on deposits. This rate provides the market with a benchmark for rates paid on overnight interbank funding in South Africa.
OTC market vs. formal market	An OTC (over the counter) market is a decentralised market where securities are traded by dealers over their 'counters' by using telephone, fax, email and other electronic networks. An OTC market should be clearly differentiated from a formal market (e.g. a Securities Exchange), which is highly regulated.
Rating agencies	Rating agencies offer independent credit ratings for debt issues (e.g. bond issues) by countries, governments and corporate entities. Even though the three main rating agencies, comprising Standard & Poor's (S&P), Fitch Ratings and Moody's, came under attack for their possible role in the financial crisis that started in 2007, they continue to perform this cruci l function. A credit rating, in turn, often has a direct impact on the interest premium payable by an entity (usually measured as the number of basis points [100 basis points equals 1%] above a risk-free rate). Recent newsworthy changes included the downgrade by S&P of the long-term credit rating f the USA by one notch from AAA (top rating) to AA+ in 2011, and of Greece fr m CCC (vulnerable) to CC (likely default) in July 2011.
Venture capital	Finance provided by a specialised organisation to a business venture that is generally still in the early phases of its development, including the start-up phase (this type of finance is described as 'seed capital'), or early growth phase ('first stage financing'), wh re a r latively high degree of risk is involved (The Economist, 1999). Such a sp cialised organisation is normally operated as a venture capital house or fund, and venture capital is normally invested in the form of equity capital or mezzanine capital (see above). Due to the high levels of risk involved, the providers of venture capital normally require high levels of return from their investments.

Appendix 2

PV and FV tables

TABLE A / TABEL A

PRESENT VALUE OF R1 AFTER N YEARS / TEENSWOORDIGE WAARDE VAN R1 NA N JAAR

Jaar/ Year N	1%	2%	4%	6%	8%	10%	12%	14%	15%	16%	18%	20%	22%	24%	25%	26%	28%	30%	35%
1	0,990	0,980	0,962	0,943	0,926	0,909	0,893	0,877	0,870	0,862	0,847	0,833	0,820	0,806	0,800	0,794	0,781	0,769	0,741
2	0,980	0,961	0,925	0,890	0,857	0,826	0,797	0,769	0,756	0,743	0,718	0,694	0,672	0,650	0,640	0,630	0,610	0,592	0,549
3	0,971	0,942	0,889	0,840	0,794	0,751	0,712	0,675	0,658	0,641	0,609	0,579	0,551	0,524	0,512	0,500	0,477	0,455	0,406
4	0,961	0,924	0,855	0,792	0,735	0,683	0,636	0,592	0,572	0,552	0,516	0,482	0,451	0,423	0,410	0,397	0,373	0,350	0,301
5	0,951	0,906	0,822	0,747	0,681	0,621	0,567	0,519	0,497	0,476	0,437	0,402	0,370	0,341	0,328	0,315	0,291	0,269	0,223
6	0,942	0,888	0,790	0,705	0,630	0,564	0,507	0,456	0,432	0,410	0,370	0,335	0,303	0,275	0,262	0,250	0,227	0,207	0,165
7	0,933	0,871	0,760	0,665	0,583	0,513	0,452	0,400	0,376	0,354	0,314	0,279	0,249	0,222	0,210	0,198	0,178	0,159	0,122
8	0,923	0,853	0,731	0,627	0,540	0,467	0,404	0,351	0,327	0,305	0,266	0,233	0,204	0,179	0,168	0,157	0,139	0,123	0,091
9	0,914	0,837	0,703	0,592	0,500	0,424	0,361	0,308	0,284	0,263	0,225	0,194	0,167	0,144	0,134	0,125	0,108	0,094	0,067
10	0,905	0,820	0,676	0,558	0,463	0,386	0,322	0,270	0,247	0,227	0,191	0,162	0,137	0,116	0,107	0,099	0,085	0,073	0,050
11	0,896	0,804	0,650	0,527	0,429	0,350	0,287	0,237	0,215	0,195	0,162	0,135	0,112	0,094	0,086	0,079	0,066	0,056	0,037
12	0,887	0,788	0,625	0,497	0,397	0,319	0,257	0,208	0,187	0,168	0,137	0,112	0,092	0,076	0,069	0,062	0,052	0,043	0,027
13	0,879	0,773	0,601	0,469	0,368	0,290	0,229	0,182	0,163	0,145	0,116	0,093	0,075	0,061	0,055	0,050	0,040	0,033	0,020
14	0,870	0,758	0,577	0,442	0,340	0,263	0,205	0,160	0,141	0,125	0,099	0,078	0,062	0,049	0,044	0,039	0,032	0,025	0,015
15	0,861	0,743	0,555	0,417	0,315	0,239	0,183	0,140	0,123	0,108	0,084	0,065	0,051	0,040	0,035	0,031	0,025	0,020	0,011
16	0,853	0,728	0,534	0,394	0,292	0,218	0,163	0,123	0,107	0,093	0,071	0,054	0,042	0,032	0,028	0,025	0,019	0,015	0,008
17	0,844	0,714	0,513	0,371	0,270	0,198	0,146	0,108	0,093	0,080	0,060	0,045	0,034	0,026	0,023	0,020	0,015	0,012	0,006
18	0,836	0,700	0,494	0,350	0,250	0,180	0,130	0,095	0,081	0,069	0,051	0,038	0,028	0,021	0,018	0,016	0,012	0,009	0,005
19	0,828	0,686	0,475	0,331	0,232	0,164	0,116	0,083	0,070	0,060	0,043	0,031	0,023	0,017	0,014	0,012	0,009	0,007	0,003
20	0,820	0,673	0,456	0,312	0,215	0,149	0,104	0,073	0,061	0,051	0,037	0,026	0,019	0,014	0,012	0,010	0,007	0,005	0,002
21	0,811	0,660	0,439	0,294	0,199	0,135	0,093	0,064	0,053	0,044	0,031	0,022	0,015	0,011	0,009	0,008	0,006	0,004	0,002
22	0,803	0,647	0,422	0,268	0,184	0,123	0,083	0,056	0,046	0,038	0,026	0,018	0,013	0,009	0,007	0,006	0,004	0,003	0,001
23	0,795	0,634	0,406	0,262	0,170	0,112	0,074	0,049	0,040	0,033	0,022	0,015	0,010	0,007	0,006	0,005	0,003	0,002	0,001
24	0,788	0,622	0,390	0,247	0,158	0,102	0,066	0,043	0,035	0,028	0,019	0,013	0,008	0,006	0,005	0,004	0,003	0,002	0,001
25	0,780	0,610	0,375	0,233	0,146	0,092	0,059	0,038	0,030	0,024	0,016	0,010	0,007	0,005	0,004	0,003	0,002	0,001	0,001
26	0,772	0,598	0,361	0,220	0,135	0,084	0,053	0,033	0,026	0,021	0,014	0,009	0,006	0,004	0,003	0,002	0,002	0,001	
27	0,764	0,586	0,347	0,207	0,125	0,076	0,047	0,029	0,023	0,018	0,011	0,007	0,005	0,003	0,002	0,002	0,001	0,001	
28	0,757	0,574	0,333	0,196	0,116	0,069	0,042	0,026	0,020	0,016	0,010	0,006	0,004	0,002	0,002	0,002	0,001	0,001	
29	0,749	0,563	0,321	0,185	0,107	0,063	0,037	0,022	0,017	0,014	0,008	0,005	0,003	0,002	0,002	0,001	0,001	0,001	
30	0,742	0,552	0,308	0,174	0,099	0,057	0,033	0,020	0,015	0,012	0,007	0,004	0,003	0,002	0,001	0,001	0,001		
40	0,672	0,453	0,208	0,097	0,046	0,022	0,011	0,005	0,004	0,003	0,001	0,001							
50	0,608	0,372	0,141	0,054	0,021	0,009	0,003	0,001	0,001	0,001									

TABLE B / TABEL B

PRESENT VALUE OF R1 PER ANNUM RECEIVED FOR N YEARS / TEENSWOORDIGE WAARDE VAN R1 PER JAAR VIR N JARE

Jaar/ Year N	1%	2%	4%	6%	8%	10%	12%	14%	15%	16%	18%	20%	22%	24%	25%	26%	28%	30%	35%
1	0,990	0,980	0,962	0,943	0,926	0,909	0,893	0,877	0,870	0,862	0,847	0,833	0,820	0,806	0,800	0,794	0,781	0,769	0,741
2	1,970	1,942	1,886	1,833	1,783	1,736	1,690	1,647	1,626	1,605	1,566	1,528	1,492	1,457	1,440	1,424	1,392	1,361	1,289
3	2,941	2,884	2,775	2,673	2,577	2,487	2,402	2,322	2,283	2,246	2,174	2,106	2,042	1,981	1,952	1,923	1,868	1,816	1,696
4	3,902	3,808	3,630	3,465	3,312	3,170	3,037	2,914	2,855	2,798	2,690	2,589	2,494	2,404	2,362	2,320	2,241	2,166	1,997
5	4,853	4,713	4,452	4,212	3,993	3,791	3,605	3,433	3,352	3,274	3,127	2,991	2,864	2,745	2,689	2,635	2,532	2,436	2,220
6	5,795	5,601	5,242	4,917	4,623	4,355	4,111	3,889	3,784	3,685	3,498	3,326	3,167	3,020	2,951	2,885	2,759	2,643	2,385
7	6,728	6,472	6,002	5,582	5,206	4,868	4,564	4,288	4,160	4,039	3,812	3,605	3,416	3,242	3,161	3,083	2,937	2,802	2,508
8	7,652	7,325	6,733	6,210	5,747	5,335	4,968	4,639	4,487	4,344	4,078	3,837	3,619	3,421	3,329	3,241	3,076	2,925	2,598
9	8,566	8,162	7,435	6,802	6,247	5,759	5,328	4,946	4,772	4,607	4,303	4,031	3,786	3,566	3,463	3,366	3,184	3,019	2,665
10	9,471	8,983	8,111	7,360	6,710	6,145	5,650	5,216	5,019	4,833	4,494	4,192	3,923	3,682	3,571	3,465	3,269	3,092	2,715
11	10,368	9,787	8,760	7,887	7,139	6,495	5,937	5,453	5,234	5,029	4,656	4,327	4,035	3,776	3,656	3,544	3,335	3,147	2,752
12	11,255	10,575	9,385	8,384	7,536	6,814	6,194	5,660	5,421	5,197	4,793	4,439	4,127	3,851	3,725	3,606	3,387	3,190	2,779
13	12,134	11,343	9,986	9,853	7,904	7,103	6,424	5,842	5,583	5,342	4,910	4,533	4,203	3,912	3,780	3,656	3,427	3,223	2,799
14	13,004	12,106	10,563	9,295	8,244	7,367	6,628	6,002	5,724	5,468	5,008	4,611	4,265	3,962	3,824	3,695	3,459	3,249	2,814
15	13,865	12,849	11,118	9,712	8,559	7,606	6,811	6,142	5,847	5,575	5,092	4,675	4,315	4,001	3,859	3,726	3,483	3,268	2,825
16	14,718	13,578	11,652	10,106	8,851	7,824	6,974	6,265	5,954	5,669	5,162	4,730	4,357	4,033	3,887	3,751	3,503	3,283	2,834
17	15,562	14,292	12,166	10,477	9,122	8,022	7,120	6,373	6,047	5,749	5,222	4,775	4,391	4,059	3,910	3,771	3,518	3,295	2,840
18	16,398	14,992	12,659	10,828	9,372	8,201	7,250	6,467	6,128	5,818	5,273	4,812	4,419	4,080	3,928	3,786	3,529	3,304	2,844
19	17,226	15,678	13,134	11,158	9,604	8,365	7,366	6,550	6,198	5,877	5,316	4,844	4,442	4,097	3,942	3,799	3,539	3,311	2,848
20	18,046	16,351	13,590	11,470	9,818	8,514	7,469	6,623	6,259	5,929	5,353	4,870	4,460	4,110	3,954	3,808	3,546	3,316	2,850
21	18,857	17,011	14,029	11,764	10,017	8,649	7,562	6,687	6,312	5,973	5,384	4,891	4,476	4,121	3,963	3,816	3,551	3,320	2,852
22	19,660	17,658	14,451	12,042	10,201	8,772	7,645	6,743	6,359	6,011	5,410	4,909	4,488	4,130	3,970	3,822	3,556	3,323	2,853
23	20,456	18,292	14,857	12,303	10,371	8,883	7,718	6,792	6,399	6,044	5,432	4,925	4,499	4,137	3,976	3,827	3,559	3,325	2,854
24	21,243	18,914	15,247	12,550	10,529	8,985	7,784	6,835	6,434	6,073	5,451	4,937	4,507	4,143	3,981	3,831	3,562	3,327	2,855
25	22,023	19,523	15,622	12,783	10,675	9,077	7,843	6,873	6,464	6,097	5,467	4,948	4,514	4,147	3,985	3,834	3,654	3,329	2,856
26	22,795	20,121	15,983	13,003	10,810	9,161	7,896	6,906	6,491	6,118	5,480	4,956	4,520	4,151	3,988	3,837	3,566	3,330	2,856
27	23,560	20,707	16,330	13,211	10,935	9,237	7,943	6,935	6,514	6,136	5,492	4,964	4,524	4,154	3,990	3,839	3,567	3,331	2,856
28	24,316	21,281	16,663	13,406	11,051	9,307	7,984	6,961	6,534	6,152	5,502	4,970	4,528	4,157	3,992	3,840	3,568	3,331	2,857
29	25,066	21,844	16,984	13,591	11,158	9,370	8,022	6,983	6,551	6,166	5,510	4,975	4,531	4,159	3,994	3,841	3,569	3,332	2,857
30	25,808	22,396	17,292	13,765	11,258	9,427	8,055	7,003	6,566	6,177	5,517	4,979	4,534	4,160	3,995	3,842	3,569	3,332	2,857
40	32,835	27,355	19,793	15,046	11,925	9,779	8,244	7,105	6,642	6,234	5,548	4,997	4,544	4,166	3,999	3,846	3,571	3,333	2,857
50	39,196	31,424	21,482	15,762	12,234	9,915	8,304	7,133	6,661	6,246	5,554	4,999	4,545	4,167	4,000	3,846	3,571	3,333	2,857

TABLE C / TABEL C

FUTURE VALUE OF R1 AFTER N YEARS / TOEKOMSTIGE WAARDE VAN R1 NA N JAAR

Jaar/ Year N	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%
1	1,0100	1,0200	1,0300	1,0400	1,0500	1,0600	1,0700	1,0800	1,0900	1,1000	1,1200	1,1400	1,1500	1,1600	1,1800	1,2000
2	1,0201	1,0404	1,0609	1,0816	1,1025	1,1236	1,1449	1,1664	1,1881	1,2100	1,2544	1,2996	1,3225	1,3456	1,3924	1,4400
3	1,0303	1,0612	1,0927	1,1249	1,1576	1,1910	1,2250	1,2597	1,2950	1,3310	1,4049	1,4815	1,5209	1,5609	1,6430	1,7280
4	1,0406	1,0824	1,1255	1,1699	1,2155	1,2625	1,3108	1,3605	1,4116	1,4641	1,5735	1,6890	1,7490	1,8106	1,9388	2,0736
5	1,0510	1,1041	1,1593	1,2167	1,2763	1,3382	1,4026	1,4693	1,5386	1,6105	1,7623	1,9254	2,0114	2,1003	2,2878	2,4883
6	1,0615	1,1262	1,1941	1,2653	1,3401	1,4185	1,5007	1,5869	1,6771	1,7716	1,9738	2,1950	2,3131	2,4364	2,6996	2,9860
7	1,0721	1,1487	1,2299	1,3159	1,4071	1,5036	1,6058	1,7138	1,8280	1,9487	2,2107	2,5023	2,6600	2,8262	3,1855	3,5832
8	1,0829	1,1717	1,2668	1,3686	1,4775	1,5938	1,7182	1,8509	1,9926	2,1436	2,4760	2,8526	3,0590	3,2784	3,7589	4,2998
9	1,0937	1,1951	1,3048	1,4233	1,5513	1,6895	1,8385	1,9990	2,1719	2,3579	2,7731	3,2519	3,5179	3,8030	4,4355	5,1598
10	1,1046	1,2190	1,3439	1,4802	1,6289	1,7908	1,9672	2,1589	2,3674	2,5937	3,1058	3,7072	4,0456	4,4114	5,2338	6,1917
11	1,1157	1,2434	1,3842	1,5395	1,7103	1,8983	2,1049	2,3316	2,5804	2,8531	3,4785	4,2262	4,6524	5,1173	6,1759	7,4301
12	1,1268	1,2682	1,4258	1,6010	1,7959	2,0122	2,2522	2,5182	2,8127	3,1384	3,8960	4,8179	5,3503	5,9360	7,2876	8,9161
13	1,1381	1,2936	1,4685	1,6651	1,8856	2,1329	2,4098	2,7196	3,0658	3,4523	4,3635	5,4924	6,1528	6,8858	8,5994	10,699
14	1,1495	1,3195	1,5126	1,7317	1,9799	2,2609	2,5785	2,9372	3,3417	3,7975	4,8871	6,2613	7,0757	7,9875	10,147	12,839
15	1,1610	1,3459	1,5580	1,8009	2,0789	2,3966	2,7590	3,1722	3,6425	4,1772	5,4736	7,1379	8,1371	9,2655	11,974	15,407
16	1,1726	1,3728	1,6047	1,8730	2,1829	2,5404	2,9522	3,4259	3,9703	4,5950	6,1304	8,1372	9,3576	10,748	14,129	18,488
17	1,1843	1,4002	1,6528	1,9479	2,2920	2,6928	3,1588	3,7000	4,3276	5,0545	6,8660	9,2765	10,761	12,468	16,672	22,186
18	1,1961	1,4282	1,7024	2,0258	2,4066	2,8543	3,3799	3,9960	4,7171	5,5599	7,6900	10,575	12,375	14,463	19,673	26,623
19	1,2081	1,4568	1,7535	2,1068	2,5270	3,0256	3,6165	4,3157	5,1417	6,1159	8,6128	12,056	14,232	16,777	23,214	31,948
20	1,2202	1,4859	1,8061	2,1911	2,6533	3,2071	3,8697	4,6610	5,6044	6,7275	9,6463	13,743	16,367	19,461	27,393	38,338
21	1,2324	1,5157	1,8603	2,2788	2,7860	3,3996	4,1406	5,0338	6,1088	7,4002	10,804	15,668	18,822	22,574	32,324	46,005
22	1,2447	1,5460	1,9161	2,3699	2,9253	3,6035	4,4304	5,4365	6,6586	8,1403	12,100	17,861	21,645	26,186	38,142	55,206
23	1,2572	1,5769	1,9736	2,4647	3,0715	3,8197	4,7405	5,8715	7,2579	8,9543	13,552	20,362	24,891	30,376	45,008	66,247
24	1,2697	1,6084	2,0328	2,5633	3,2251	4,0489	5,0724	6,3412	7,9111	9,8497	15,179	23,212	28,625	35,236	53,109	79,497
25	1,2824	1,6406	2,0938	2,6658	3,3864	4,2919	5,4274	6,8485	8,6231	10,835	17,000	26,462	32,919	40,874	62,669	95,396

TABLE D / TABEL D

FUTURE VALUE OF R1 PER ANNUM RECEIVED FOR N YEARS / TOEKOMSTIGE WAARDE VAN R1 PER JAAR VIR N JARE

Jaar/ Year N	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%
1	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
2	2,0100	2,0200	2,0300	2,0400	2,0500	2,0600	2,0700	2,0800	2,0900	2,1000	2,1200	2,1400	2,1500	2,1600	2,1800	2,2000
3	3,0301	3,0604	3,0909	3,1216	3,1525	3,1836	3,2149	3,2464	3,2781	3,3100	3,3744	3,4396	3,4725	3,5056	3,5724	3,6400
4	4,0604	4,1216	4,1836	4,2465	4,3101	4,3746	4,4399	4,5061	4,5731	4,6410	4,7793	4,9211	4,9934	5,0665	5,2154	5,3680
5	5,1010	5,2040	5,3091	5,4163	5,5256	5,6371	5,7507	5,8666	5,9847	6,1051	6,3528	6,6101	6,7424	6,8771	7,1542	7,4416
6	6,1520	6,3081	6,4684	6,6330	6,8019	6,9753	7,1533	7,3359	7,5233	7,7156	8,1152	8,5355	8,7537	8,9775	9,4420	9,9299
7	7,2135	7,4343	7,6625	7,8983	8,1420	8,3938	8,6540	8,9228	9,2004	9,4872	10,089	10,730	11,067	11,414	12,142	12,916
8	8,2857	8,5830	8,8923	9,2142	9,5491	9,8975	10,260	10,637	11,028	11,436	12,300	13,233	13,727	14,240	15,327	16,499
9	9,3685	9,7546	10,159	10,583	11,027	11,491	11,978	12,488	13,021	13,579	14,776	16,085	16,786	17,519	19,086	20,799
10	10,462	10,950	11,464	12,006	12,578	13,181	13,816	14,487	15,193	15,937	17,549	19,337	20,304	21,321	23,521	25,959
11	11,567	12,169	12,808	13,486	14,207	14,972	15,784	16,645	17,560	18,531	20,655	23,045	24,349	25,733	28,755	32,150
12	12,683	13,412	14,192	15,026	15,917	16,870	17,888	18,977	20,141	21,384	24,133	27,271	29,002	30,850	34,931	39,581
13	13,809	14,680	15,618	16,627	17,713	18,882	20,141	21,495	22,953	24,523	28,029	32,089	34,352	36,786	42,219	48,497
14	14,947	15,974	17,086	18,292	19,599	21,015	22,550	24,215	26,019	27,975	32,393	37,581	40,505	43,672	50,818	59,196
15	16,097	17,293	18,599	20,024	21,579	23,276	25,129	27,152	29,361	31,772	37,280	43,842	47,580	51,660	60,965	72,035
16	17,258	18,639	20,157	21,825	23,657	25,673	27,888	30,324	33,003	35,950	42,753	50,980	55,717	60,925	72,939	87,442
17	18,430	20,012	21,762	23,698	25,840	28,213	30,840	33,750	36,974	40,545	48,884	59,118	65,075	71,673	87,068	105,93
18	19,615	21,412	23,414	25,645	28,132	30,906	33,999	37,450	41,301	45,599	55,750	68,394	75,836	84,141	103,74	128,12
19	20,811	22,841	25,117	27,671	30,539	33,760	37,379	41,446	46,018	51,159	63,440	78,969	88,212	98,603	123,41	154,74
20	22,019	24,297	26,870	29,778	33,006	36,786	40,995	45,762	51,160	57,275	72,052	91,025	102,44	115,38	146,63	186,69
21	23,239	25,783	28,676	31,969	35,719	39,993	44,865	50,423	56,765	64,002	81,699	104,77	118,81	134,84	174,02	225,03
22	24,472	27,299	30,537	34,248	38,505	43,392	49,006	55,457	62,873	71,403	92,503	120,44	137,63	157,41	206,34	271,03
23	25,716	28,845	32,453	36,618	41,430	46,996	53,436	60,893	69,532	79,543	104,60	138,30	159,28	183,60	244,49	326,24
24	26,973	30,422	34,426	39,083	44,502	50,816	58,177	66,765	76,790	88,497	118,16	158,66	184,17	213,98	289,49	392,48
25	28,243	32,030	36,459	41,646	47,727	54,865	63,249	73,106	84,701	98,347	133,33	181,87	212,79	249,21	342,60	471,98

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Table of statutes

Page

Close Corporation Act 69 of 1984 504

Companies Act 61 of 1973 ..... 504, 537, 538

Companies Act 71 of 2008 ..... 250, 281, 393, 419, 421, 422, 504, 537, 538, 540, 541, 551, 573

Competition Act 89 of 1998 ..... 31, 504

Consumer Protection Act 68 of 2008 31

Corporate Laws Amendment Act 26 of 2006 504

Income Tax Act 58 of 1962 ..... 260, 261, 263, 267, 268, 269, 275, 387, 388, 389, 390, 391, 393, 394, 395, 397, 398, 399, 401, 403, 486, 559, 573

National Credit Act 34 of 2005 ..... 249, 256, 343, 344, 345, 392

National Environmental Management Act 107 of 1998 31

Occupational Health and Safety Act 85 of 1993 31

Securities Services Act 36 of 2004 504

Skills Development Act 97 of 1998 31

Usury Act 73 of 1968 345

Index

Page

A

absorptions and amalgamations 551
acceptance 45
acid-test (quick) ratio 286
acquisition 38
advantages of debt 255
aggressive financing 336
alliances 38
Alternative Exchange (AltX) 17
annuity due 66, 74
annuity 66, 73
Ansoff's Growth Vector Matrix 37
apply or explain 7, 8
arbitrage process 102
A-score model 312
asset beta 158
asset stripping 503
asset turnover 287
asset use efficiency 313
attitudes to risk 145
avoidance 45

B

backward integration 501
balanced score ard 315
bank loans 254
banker acceptance 271
Baumol model 340
B-BBEE 30
BCG Matrix 34
behavi ural implications 504
beta c efficient 156
beta 163
bill of exchange 272
bird-in-hand 574
B ack Economic Empowerment (BEE) lock-in discount 424
bond 397
bonus issues/share splits 569
book value method 15
brands 463
business model canvas 4
business model 4, 417

Page

business rescue plan ... 541
business rescue practitioner ... 540
business rescue ... 538
business risk ... 9, 93
business trust ... 419
business valuation principles ... 412
business vehicle ... 418
business ... 311

C

capital asset pricing model ... 155
capital budgeting ... 182
capital contribution ... 544
capital gearing ratio ... 286
capital growth ... 11
capital lost ... 546
capital market ... 17, 251
capital rationing ... 187, 190
capital requirements ... 543
capital structure and solvency ratios ... 286
capital structure ... 14, 91
capitalisation issues ... 578
CAPM and the investment appraisal decision ... 161
CAPM and weighted average cost of capital ... 160
carrying value ... 413
cash offers ... 511
cash operating cycle ... 337
change in revenue ... 291
cheap finance ... 270
chief financial officer ... 9
clean fair value ... 661
clientèle effect ... 574
close corporation ... 419
Code for Responsible Investing in South Africa (CRISA) ... 18
coefficient of variation ... 150
collection policy ... 346
Committee of Sponsoring Organisations of the Treadway Commission (COSO) ... 46
common size statements ... 282
company ... 419
comparative financial stat m nts ... 282
comparator entity ... 428
competitive environment ... 31
competitive st ategies ... 37
compound inte est fo mula ... 63
concentrated marketing ... 31
conditions for a reorganisation scheme ... 543
conglomerate acquisition ... 502
consci us capitalism ... 3
conservative financing ... 336
con ervative hedge ... 335
con tant dividend/earnings method ... 568
constant growth ... 78
contingent liabilities ... 463
control premium ... 411, 423
convertible debentures ... 83
convertible debt ... 400
convertible securities ... 255, 412
convertible ... 387

Page

correlation coefficient 151
cost leadership 37
cost of capital for foreign investments 115
cost of capital 107
coupons 397
covariance 151
credit policies 343
critical success factors (CSFs) 38
crowdfunding 272, 274
cumulative non-redeemable 389
cumulative 387
current multiple 429
current ratio 286
customer perspective 40

D

David Kaplan 315
David Norton and Robert Kaplan's Balanced Scorecard (BSC) 40
debt (solvency) ratio 95
debt advantage 92
debt covenants 393
debt disadvantage 93
debt to equity (D:E) ratio 95
debt 254, 392
debtor factoring 348
debtor finance 271
debtors' management 343
decision trees 217
deductive methods 446
degree of operating leverage 285, 293
designated advisor 18
different project life cycles 190
differential inflation 196
differentiated marketing 31
differentiation 37
direct and indirect quotes of exchange rates 218
dirty fair value 661
disadvantages of debt 255
discount rate for a for ign inv stment 115
discount rate 13, 200
discounted cashflow 384
discounted payba k period method 185
diversification 154
dividend decisions 573
dividend payo t ratio 287
dividend policy 570
dividend stability and information content 577
dividend tax (DT) 573
dividend yield 11
divi ible projects 188
down ide ri k 11
drivers of value 384, 386, 392
DuPont analysis 313

E

earnings multiples 428
earnings per share 285
earnings yield percentage (EY%) 432

Page

earnings-yield ... 288
economic efficiency effectiveness (3 Es) ... 2
economic environment ... 30
economic order quantity ... 350
economies of scale ... 502
Edward Altman ... 311
efficient frontier ... 153
enterprise risk management (ERM) ... 27, 46
entry into new markets ... 502
environmental, social and governance (ESG) ... 18
Equator Principles on Financial Institutions (EPFIs) ... 18
Equator Principles ... 217
equity beta ... 158
equity funds ... 251
equity ... 274
equivalent annual income ... 191
ESG ... 217
eurobonds ... 272
EVA® (Economic Value Added) ... 288, 308, 458
evaluating the projects at the Weighted Marginal Cost of Capital (WMCC) ... 183
expected return ... 143, 155
expected values ... 145, 216
explicit forecast ... 450
ex-post ... 149

F

failure prediction models ... 311
fair market value of a shareholding ... 440
fair market value ... 410
Fama-French Three-Factor Model ... 446
finance decision ... 14
finance lease ... 266
financial analysis ... 282, 283
financial decisions ... 543
financial distress ... 538
financial gearing ... 92, 95
financial leverage ... 313
financial measures ... 39
financial perspective ... 40
financial reasons ... 502
financial reporting prin iples ... 412
financial risk ... 10, 93
financial strategy ... 12
financing a missed dividend ... 570
fire sale ... 412
firm-specific risk ... 154
Five Forces Framework ... 38
fixed r variable dividend ... 387
fixed-rate b nd ... 398
focus trategy ... 37
foreign direct investment ... 218
foreign finance ... 270
forward integration ... 501
forw rd multiple ... 429
free c shflow ... 448
future value of an annuity ... 66
future value ... 62

Page

G

G4 guidelines ... 8
gap analysis ... 35
geared or levered beta ... 158
gearing ... 10
gearing ratio ... 95
general inflation ... 196
Global Reporting Initiative ... 8
goals ... 28
going concern ... 417
Gordon dividend growth model ... 388, 445, 451
growth rate ... 113
growth strategies ... 38

H

headline earning ... 433
headline earnings per share ... 295
hedging ... 334
hidden factors ... 422
historical cost ... 409
historical or trailing multiple ... 429
horizontal acquisition ... 501
hybrid capital ... 250, 273
hybrid instruments ... 397

I

income approach ... 415
independent events ... 187
independent projects ... 187
indexed financial statements ... 282
indivisible projects ... 188, 190
inflation ... 196
inherent risks ... 44, 45
initial public offering (IPO) ... 274
Institute of Directors in South Africa (Io SA) ... 18
integrated reporting ... 8
integrated thinking ... 9
Interest and interest-rate risk ... 393
interest cover ... 286
internal process perspe tive ... 40
internal rate of return (IRR) ... 259, 264
internal rate of etu n method ... 192
international capital budgeting ... 218, 219
International Integrated Reporting Committee ... 8
International Integrated Reporting Council ... 4
interpolation ... 192
intrinsic value ... 411
invent ry management ... 348
inventory turnover ... 286
inve tment decision ... 12, 196
investment opportunities ... 503
IPO ... 18
irredeemable debt ... 81

J

Johannesburg interbank agreed rate (JIBAR) ... 387
Johannesburg Securities Exchange ... 17

Page

John Argenti ... 312
JSE SRI Index ... 19
just in time ... 353

K

keep versus replacement ... 205
King Code of Governance Principles (King III) ... 6, 42
KPIs ... 8, 29, 38

L

Laszlo's Sustainable Value Matrix ... 36
leadership ... 502
learning and growth perspective ... 40
lease or buy decision ... 266, 267
level of control ... 421
levels of working capital ... 333
license to operate ... 6
limitations in using CAPM ... 164
liquidation value ... 412, 543
liquidity preference ... 337
liquidity ... 286
loan capital ... 255

M

macro risks ... 44
maintainable earnings ... 431, 437
management buy-outs ... 513
marginal analysis ... 207
marginal WACC ... 182
market capitalisation ... 411
market comparable approach ... 415
market price multiples ... 444
market pricing ... 38
market risk ... 154
market segmentation ... 31
market value method ... 15
market value ... 410
marketability discount ... 423
marketing gains ... 502
Markowitz ... 143
maturity-matching ... 334
McKinsey conve gence value-driver formula ... 452
mean ... 149
merger ... 500
mezzanine capital ... 273
mezzanine finance ... 250, 514
Michael P rter ... 37
micro risks ... 44
Miller and Modigliani theory ... 97, 101
Mi er and Modigliani ... 570
Mi er-Orr model ... 342
minority discount ... 423
mission ... 28
mitig tion ... 45
modified internal rate of return method ... 194
money cashflow ... 196
money market ... 251

Page

money rate of return 196
Monte Carlo analysis 215
multi-period capital rationing 187
mutually exclusive events 187
mutually exclusive projects 187
MVA 458
MVIC (market value of invested capital) 425
MVIC/EBITDA multiple 441
MVIC/Sales (MVIC/S) multiple 445

N

National Credit Act (NCA) 256
natural environment 32
net assets 462
net present cost (NPC) 259
net present value index method 188
net present value method 186
net present value 13
net working capital 334
no growth 77
nominal rates of return 198
non-constant growth 80
non-cumulative redeemable 391
non-cumulative 387
non-financial analysis 314
non-financial measures 39
non-redeemable (perpetual) 388
non-redeemable 387
normal distribution curve 147

O

off-balance sheet financing 266
open market principle 506
operating lease 213, 266
operational efficiency 313
opportunity costs and revenues 200
optimal capital structure 106
ordinary annuity 73
organic growth 38, 499
Osterwalder and Pigneur 4
owner level premiums and discounts 472

P

P/E multiple 288, 432
partnership 419
parts 256
payback peri d method 184
perfect hedge 335
perpetuity 76
PESTLEGE 29
p ant and equipment 463
p oughback 113
political environment 29
portfolio risk and return 150
portfolio theory 143
portfolio variance 151, 152
predatory pricing 38

Page

preference shares 82, 254, 386
preferential Ccpital funds 540
present value of a perpetuity 76
present value of an annuity 73
present value of debt 81
present value of shares 77
present value 68
price of recent investment 426
price skimming 38
price/book (P/B) multiple 445
pricing strategies 38
primary market 17
principles for responsible investment (UNPRI) 18
probabilities 145
probability theory 216
probability 215
product life cycle analysis 34
product-market strategies 37
profitability 285
property 463
public listing 17
publicly trading securities 422
purchasing power parity 218

Q

qualitative (non-financial) factors 217

R

RAFT 6
random numbers 215
ratios 284
real rates of return 198
reasonability test 415, 467
recoupment/scrapping allowances 201
redeemable debt 82
redeemable 389
regular 66
regulatory environm nt 30
relevant costs and r v nu s 198
replacement chains 190
replacement cost approa h 415
required rate of etu n 155
required retu n 11
residual risk 42, 45
resource a dit 35
responsible investment 18
retenti n ratio 113
return n capital employed 287
return n equity 287, 313
return on invested capital 287
return 144
rights issues 252
risk ppetite 41
risk ssessment 42
risk averse 41
risk capacity 41
risk committee 42
risk control 45

Page

risk culture 41
risk evaluation 45
risk financing 45
risk identification 42, 44
risk management policy 42
risk management strategy 42
risk management 41
risk mapping 45
risk mitigation 42
risk monitoring 46
risk neutral 41
risk premium 159
risk responses 42, 45
risk seeking 41
risk 144
risk 213
risk-averse 145
risk-free rate of return 155
risk-pro 145
risk-return methods 246
Robert Norton 315
role-players in business rescue 539

S

scrip dividends 578
secondary markets 17
secondary tax on companies (STC) 570
section 24J of the Income Tax Act 260, 393
secured finance 250
securities market line 155
security offered 393
security 398
selective or discriminatory pricing 38
sensitivity analysis 215
share offers 512
share options 412
share price 503
share repurchases 578
shareholder wealth maximisation 2
simulation 215
simultaneous liquidation of rossholding companies 555
single-period capital rationing 187
six capitals 4
skipped dividend 577
smart arg ment 509
SMART 28
social environment 30
sole pr priet rship 420
sources and f rms of new finance 271
ources of finance 251
South African Pension Funds Act 19
special dividend 577
stab e dividend payment method 568
st keholder engagement 7
s keholder theory 3
s andard deviation 148
statutory requirements 570
Stern Stewart & Co 308

Page

stewardship model ... 3
stock market listing ... 251
strategic analysis ... 28
strategic benefits ... 502
strategic planning ... 28
strategy ... 28
sustainability reporting ... 8
sustainable ... 2
Swiss Verein ... 420
SWOT ... 29, 35
synchronised inflation ... 196
synergy benefits ... 507
synergy ... 410, 502
systematic ... 154

T

tailor-made finance ... 250
takeover ... 499
target WACC method ... 16
target WACC ... 182, 184
tax allowances ... 201
taxation time lags ... 201
technological environment ... 30
technology ... 503
theory ... 98
time value of money ... 61
total debt ratio ... 286
traditional theory ... 97
traditional ... 98
treasury shares ... 412, 578
two-in-the-bush theory ... 574
types of liquidations ... 551

U

UN Millennium Development Goals ... 3
uncertainty and risk ... 213
uncertainty ... 213
undifferentiated mark ting ... 31
ungeared or unlev r d b ta ... 158
United Nations Conference on Sustainable Development (Rio+20) ... 8
unsecured finan e ... 250
unsystematic isk ... 154
upside risk ... 11
users of financial information ... 280

V

valuati n appr aches ... 415
valuati n meth dologies ... 416
valuation outlines ... 464
va uation premiums and discounts ... 423
va uation report ... 425
va uation ... 20
v lue analysis ... 3
v lue chain analysis ... 33
value creation model ... 4
value ... 408
variance ... 148

Page

vertical acquisition 501
vision 28
voluntary 551

W

WACC 15, 182, 418
weighted average cost of capital 12, 110
weighted average risk 157
Working capital changes 201

X

Y

yield to maturity method 260, 394
yields to maturity 258

Z

Z-score model 311