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Part one: Introduction
(Textbook: Chapters 1, 2 and 3)

CHAPTER 1: WHY STUDY MONEY, BANKING AND FINANCIAL MARKETS

Why study financial markets?

Securities - a claim on the issuer's future income or assets that is sold by a borrower to a lender. Securities may also be referred to as financial instruments. Financial instruments may be divided into two main categories: money market instruments (e.g. Negotiable Certificate of Deposit (NCDs), Commercial Papers; Retirement Annuity (RAs) and Bankers Acceptance (Bas)) and capital market instruments (e.g. bonds and shares).

Bonds - a specific type of security, namely a debt security that promises to make payments periodically for a specified period of time.

Interest rate - cost of borrowing or the price paid for the rental of funds. "The" interest rate is made up of a number of different interest rates that exist in an economy. E.g. mortgage, car loan etc

Bond Market is especially important to economic activity because it enables corporations and governments to borrow to finance their activities and it is where **interest rates are determined.**

Stock Market is the market in which claims on the earnings of corporations (**shares** of stocks) are traded. In SA we refer to the trading of shares rather than stocks.

Stock (share) - equity: a financial instruments representing part ownership of a corporate entity. Sometimes referred to as common stock as compared to the more specialized type of share, e.g. preference shares. Issuing shares is a way in which a company can raise funds.

Importance of stock /stock market: the price (value) of shares affects the amount of funds that can be raised by selling newly issued stock to finance investment spending. The higher the price of a firm's shares the more money can be raised to buy, e.g. machinery and equipment to increase production. Also, as per the study guide: *the stock market creates a facility for financial investors to invest their surplus funds and for firms to facilitate real investment.*

Why study financial institutions and banking?

Structure of the Financial System:
The financial system is complex, comprising many different types of private sector financial institutions (banks, insurance companies, mutual funds, finance companies, investment banks) all of which are heavily regulated by Government.

Financial Intermediaries - institutions that borrow funds from people (surplus units) who have saved and in turn make loans to others (deficit units).

Financial Innovation - shows how creative thinking on the part of financial institutions can lead to higher profits. To keep in touch with what is happening within the financial systems of the world it is necessary to study the changes that innovation has brought about. One example is the way in which dramatic improvements in information technology have brought about new means of delivering financial services electronically (e-finance).

Why study money and monetary policy?

Definition of money: money is defined as anything that is generally accepted in payment for goods and services (in terms of its function as a medium of exchange). In this course, the term money generally refers to the money supply.

Importance of Money: money is linked to changes in economic variables and is important to the health of the economy. Money plays an important role in generating business cycles: empirical data indicates that, in the USA, the rate of growth in money supply has declined before every recession; however, not every decline in money growth is followed by a recession. Inflation is believed to be caused by continuing increases in money supply. Money plays an important role in interest rate fluctuations.

Aggregate Output: gross domestic product (GDP) = the market (total) value of all final goods and services produced in a country during the course of a year.

Aggregate Income: total income received for the use of factors of production (land, labour and capital) used to produce all the goods and services in the economy during the course of the year.

Business Cycles: the upward and downward movement of aggregate output produced in the economy.

Aggregate price level: the average price of goods and services in an economy. Three commonly used measures are the GDP deflator (nominal GDP divided by real GDP), the consumer price index (CPI) and the personal consumption expenditure deflator (PCE).

Inflation: a continual increase in the aggregate price level in an economy. The price level and money supply generally rise together.

Monetary Policy: the management of money and interest rates by the central monetary authorities. Because money can affect many economic variables in the economy, politicians and policymakers care about the conduct of monetary policy.

Real versus Nominal GDP: nominal GDP indicates that current prices are used to measure GDP. Real GDP is nominal GDP adjusted to remove inflation and using constant prices from an identified base year.

Don't forget to study Appendix 1 at the end of the chapter!

Typical Examination questions

1.1 Explain briefly and in general terms what is the meaning of a security and how it facilitates direct lending and borrowing. (5)
1.2 Explain briefly what is a common stock, what purpose it serves and how it affects business investment decisions. (4)
1.3 List two ways in which the quantity of money may affect the economy. (2)
1.4 Explain the difference between nominal and real GDP and the purpose for which each should be used. (4)
1.5 List and define three commonly used measures of the aggregate price level. (6)

True or false review questions

Money:
1. Monetary economics primarily teaches students how to make money quickly and effortlessly.
2. A decrease in the interest rate normally increases the money stock in the economy.
3. Because money is complex, it is difficult to demonstrate the real advantages of money within the economy.
4. The use of money introduces sources of instability in the economy.
5. When interest rates rise, then all households are worse off.

Securities:
6. A security is a financial instrument. In simple terms it is a "piece of paper" which is sold by the issuer to investors in exchange for funds. The security promises to repay these funds (plus interest) over the term of the security by means of a number of (one or more) future payments to the holder of the security.
7. A security is issued mostly by firms and government that wish to borrow money.
8. The issuer of a security promises to make future payments to the holder (purchaser) of the security.
9. The purchaser of a security provides cash to the issuer of a security.
10. The purchaser of a security is the lender (provider of funds).
11. The issuer of a security is the borrower of funds.
12. The holder (purchaser) of the security receives future payment/s from the issuer of the security.

13. Securities can be traded on the financial market. When holder A of a security sells the security in the financial market at the going market price to B then B pays cash to A and B receives the remaining payments of the security.

CHAPTER 2: AN OVERVIEW OF THE FINANCIAL SYSTEM

Function of financial markets.

Functions and advantages of financial markets in general: they allow funds to flow from people who lack productive investment opportunities but have surplus funds, to people who have such opportunities but do not have the funds to make it happen

Direct financing: borrowers borrow funds directly from lenders in the financial markets by selling them securities. Remember that both borrowers and/or lenders can be households, businesses, government and foreigners.

Indirect financing: this refers to the activities of financial intermediaries such as commercial banks in facilitating and reconciling the different requirements of borrowers and lenders via the process of financial asset transformation. [Example: banks accept deposits from savers and lend that money out to borrowers.]

Financial markets are critical for producing an efficient allocation of capital.

Structure of financial markets

How does a debt instrument work?   A debt instrument is a contractual agreement by the borrower to pay the holder of the instrument fixed amounts at regular intervals (interest and principal payment) until a specified date when the final payment is made (maturity date).

Maturity of a debt instrument: number of years (term) until the instruments expires or becomes paid up. It is **short-term** if it is less than a year and **long-term** if it is ten years or longer with the **intermediate-term** being between one and ten years. In South Africa however, any financial instrument with a lifespan that is longer than a year is referred to as long-term and is traded in the capital market.

An equity instrument: is a claim to share in the income and net assets of a business. It is more commonly known as a stock or share. An **advantage** of such an instrument is that the holder owns part of the business. You essentially own a part of the business and are therefore awarded the right to vote on important issues to the firm as well as elect the directors. You will also benefit from an increase in the firms profitability or asset value. A **disadvantage** is that the holder is a residual claimant. This means that the business must pay its debt holders before it pays its equity holders. Such an instrument has no maturity date.

The structure of the different financial markets relates to the type of **functions and the type of financial instruments** that are found in each of them.

- Debt and Equity markets: Debt market is that market in which debt instruments are traded, while an equity market is a market in which equity instruments are traded, e.g. stock exchange.

- Primary and Secondary markets: Primary market is the market in which financial instruments are issued, while the secondary market is the market in which financial instruments are traded.

  - An important financial institution that assists in the initial sale of securities in the primary market is the **investment bank**. It does this by underwriting securities and guarantees a price for a corporations securities and then sells them to the public.

- Exchanges and OTC Markets: Secondary markets can be organised in two ways:

  - Exchanges: a place specifically designed for the meeting of buyers and sellers of securities.

  - Over-the-counter-markets: dealers at different locations who have an inventory of securities stand ready to buy and sell securities "over the counter" to anyone who comes to buy (e.g. US bond market).

- Money and Capital Markets: the money market is the market in which short-term financial instruments are traded, such as TBs, NCDs, CPs etc. The capital market is where longer-term financial instruments are traded e.g. stocks and long-term bonds.

Financial (Money) Market Instruments

Treasury Bills (TBs): short-term (1, 3, 6 month) debt instrument issued by government. It is a primary security. It represents a claim on the government payable at some future date. TBs are fully secured and guaranteed by the government in SA.

Negotiable Certificate of Deposit (NCD): a debt instrument sold by a bank to depositors that pays annual interest of a given amount and at maturity pays back the original purchase price. Negotiable NCDs are sold in the secondary market.

Commercial Paper: a short-term debt instrument issued by large banks and well-known corporations. In SA it is described as a short- or medium-term security (securities) issued by corporations and other non-banking institutions to acquire working capital.

Banker's Acceptances (BAs): a bank draft (a promise of payment) issued by a firm, payable at some future date, and guaranteed for a fee by the bank that stamps it. The firm issuing the instrument is required to deposit the required funds into its account with the bank to cover the draft.

Repurchase agreements (Repos or RAs): short-term loans (normally less than two weeks) for which TBs serve as collateral. Most notable lenders in this case is large corporations.

Capital Market Instruments

Debt and equity instruments have maturities of greater than one year (medium and long term) and are traded in the capital market. Prices of these instruments fluctuate more than those of money market instruments. Generally considered to be riskier investments.

Stocks: equity claims on the net income and assets of a corporation.

Mortgages: loans to households and/or firms to purchase housing, land or other real structures where the structure or land serves as collateral for the loans. The mortgage market is the largest debt market in the USA.

Corporate Bonds: long-term bonds issued by corporations with very strong credit ratings. Typical corporate bond will grant the holder an interest payment twice a year and pays off the face value when the bond matures (on maturity date).

Convertible Bonds: Work in the same way as corporate bonds with the added benefit of the holder being able to convert the bond into a specified number of shares of stock at any time up to the maturity date.

Government Securities: long-term debt instruments issued by the Treasury to finance deficits of the **central** government. They are the most widely traded bonds in the USA (and in SA). They are also the most liquid of the securities traded in the secondary market. Local government bonds are also referred to as municipal bonds. The market for these bonds in South Africa is very limited. In the US the income on these bonds is exempt from federal taxes and state taxes.

Function of financial intermediaries
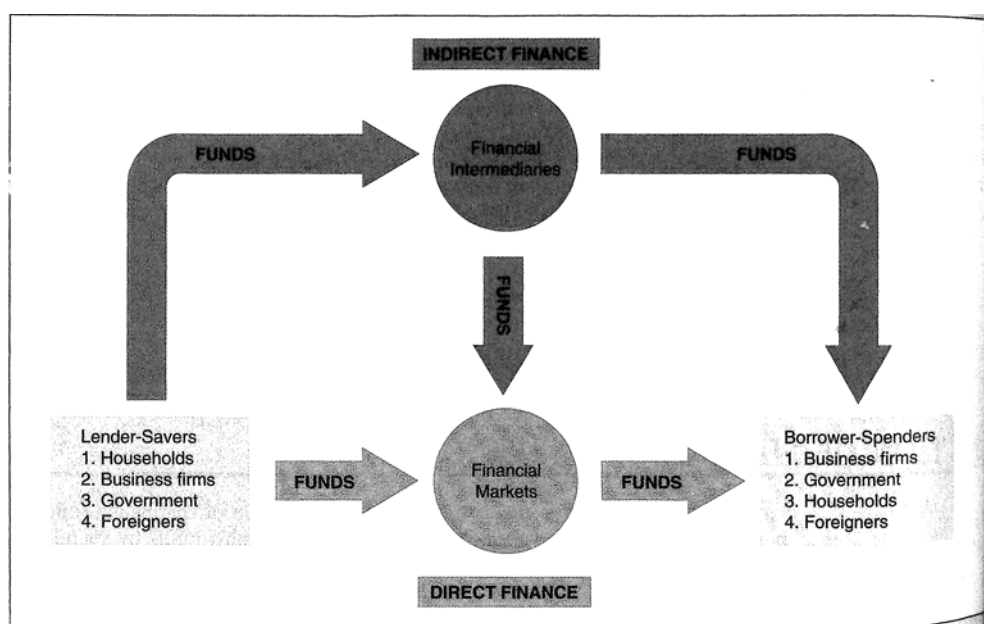
FIGURE 1   Flows of Funds Through the Financial System
The arrows show that funds flow from lender-savers to borrower-spenders via two routes: *direct finance*, in which borrowers borrow funds directly from financial markets by selling securities, and *indirect finance*, in which a financial intermediary borrows funds from lender-savers and then uses these funds to make loans to borrower-spenders.

The main function of financial intermediaries is moving funds between borrowers and lenders in the economy. This process is referred to as financial intermediation and is the primary way in which funds are moved from lenders to borrowers. In order to understand the importance of this form of "financing" it is necessary to consider the role of each of the following:

- transaction costs
- risk sharing
- information costs in financial markets

Transaction costs: financial intermediaries can substantially reduce transaction costs because they can take advantage of economies of scale. They can also provide customers with liquidity services which make it easier to conduct transactions e.g. cheque accounts and providing interest on these accounts.

Risk sharing: financial intermediaries can help reduce the exposure of investors to risk through the process of risk sharing. They create and sell assets with risk characteristics that people are comfortable with and then the financial intermediaries can use these funds to buy and sell other assets that are more risky. Costs are kept low by the fact that intermediaries are able to earn a profit on the spread between the returns they earn on risky assets and the payments they make on the assets they have sold. This may also be referred to as **asset transformation**. Risk sharing is also made possible by diversification which entails investing in a collection (portfolio) of assets, the returns of which do not all move in the same direction.

Information costs: this specifically refers to the problems that occur when the parties involved in a transaction do not have the same level of information. This is referred to as **asymmetric information.** Lack of information creates problems before the transaction is entered into (**adverse selection**) and after the transaction (**moral hazard**). [Ref page 41 TB]

    Adverse Selection:

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    Moral Hazard:

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Promoting efficiency in financial markets: financial intermediaries provide liquidity services, promote risk sharing and solve information problems, thereby also make it possible for small savers and borrowers to benefit from the existence of the financial markets.

Types of Financial Intermediaries

Depository institutions: commonly referred to as banks. These are institutions that accept deposits from individuals and other non-bank institutions and make loans.
They include: commercial banks; savings and loan associations (S & L); mutual savings banks, credit unions.

Contractual Savings institutions: financial intermediaries that acquire funds at periodic intervals on a contractual basis. Liquidity of assets is not as important to these institutions and they tend to invest their funds primarily in long-term securities. They include life insurance companies; short-term insurers (fire and casualty); pension and retirement funds.

Investment intermediaries: which include finance companies (raise funds by selling commercial paper and stocks and bonds); mutual funds (sell shares to individuals and use the funds to invest in a diversified portfolio of stocks and bonds); money market mutual funds (characteristics of a mutual fund but also function as a depository institution).
Investment banks: are not banks or financial intermediaries in the ordinary sense. They do not lend out their deposits. Investment banks help corporations issue securities by advising them on what securities are best to issue ie: stocks or bonds and then helps sell (underwrite) the securities by buying them from the corporations and reselling them in the market.

Regulation of the financial system

The purpose of regulation is to:
(a) Increase information to investors, and
(b) To ensure the soundness of financial intermediaries and their different forms, etc.

Typical Examination questions

2.1 Briefly explain the function of financial markets, the meaning of direct and indirect financing and the meaning of a financial intermediary. (5)
2.2 Explain the differences between debt and equity markets, primary and secondary markets, exchanges and OTC markets, and money and capital markets. (10)
2.3 List and explain the operation of any three money market instruments. (3x5=15)
2.4 List and explain the operation of any three capital market instruments. (3x5=15)
2.5 Explain the functions performed by financial intermediaries and how and why these promote economic efficiency in financial markets. (8)
2.6 Explain the broad purpose and methods used in government regulation of the financial system. (6)

True or false review questions

1. If a firm borrows money from a bank to finance its debt, it is an example of indirect finance.
2. If government sells treasury bills to investors to finance a deficit, then it engages in direct financing.
3. If a firm issues a bond that repays the debt over a five-year period, then the firm engages in indirect financing.
4. The term to maturity of a bond remains constant over the term of the bond.
5. The existence of a well-functioning secondary market for a financial instrument ensures the liquidity of the financial instrument.
6. Over-the counter-markets which simultaneously operate in different locations, buy and sell at fixed prices and ignore market conditions.
7. US government securities are long-term debt instruments and are the most liquid securities traded on the capital market.
8. Primary bond markets are more important than secondary bond markets. New lending and borrowing occur in primary markets only, and it is these new issues which are ultimately important. The secondary market does not create new lending and borrowing.
9. In a world of no information and transaction costs, financial intermediaries would not exist.
10. If there were no asymmetry in the information that a borrower and a lender had, there could still be a moral hazard problem.

CHAPTER 3: WHAT IS MONEY?

Meaning of money

Define money: economists define money as anything that is generally accepted in payment for goods and services or in repayment of debts. Money does not mean the same as wealth or income. In a modern economy money consists of two major components: currency plus deposits (M = C + D)

Wealth: consists of money but also includes assets such as stocks, bonds, houses, cars etc.

Income: is the flow of earnings per unit of time. Money on the other hand is a stock at a given point in time.

Functions of money

Medium of Exchange: money serves as a medium of exchange allowing it to be used as payment for goods and services. As such it promotes economic efficiency by reducing the time taken for transactions to take place.

Money needs the following characteristics:
1. Standardised: simple for everyone to ascertain its value.
2. Widely accepted
3. Divisible: so that it is easy to make change.
4. Easy to carry
5. Not deteriorate quickly

Unit of Account: used to measure value of goods and services in an economy and helps to reduce transaction costs by reducing the number of prices that need to be considered.

Store of Value: serves as a store of purchasing power from the time the income is earned to the time it is spent.

Wealth = total collection of pieces of property that serve to store value.

Income = Flow of earnings per unit of time.

Evolution in the payment system

The history of money is closely linked to the payment system. Several hundred years ago, the payments system in all but the most primitive societies was based primarily on precious metals. The introduction of paper currency lowered the cost of transporting money. The next major advance was the introduction of cheques which lowered the transaction costs still further. Currently the move is towards an electronic payments system in which paper is eliminated and transactions are handled by computers. This will likely lower

transaction costs still further. The following table explains the different terms in relation to the different types of payment systems and the related concepts:

Description	Advantages	Disadvantages
Commodity Money: money made up of precious metals or other valuable commodities.	An early medium of exchange that was universally acceptable.	This form of money is very heavy and is hard to transport from place to place.
Fiat Money: paper currency decreed by government as legal tender. Largely dependent upon trust of the value of currency.	Much lighter than precious metals or even coins.	Easily stolen. Can be expensive to transport in large quantities.
Cheques: an instruction from you to your bank to transfer money from your account to someone else's account.	Allow transactions to take place without carrying around large sums of money. Improved the efficiency of the payment system. Loss from theft is greatly reduced.	Takes time to get cheques from place to place. The administration required to support the use of cheques is expensive.
Electronic payments: transmit payments via the internet. "Money" moves directly from one persons account to that of another.	It is quick and efficient. It is a cheap means of payment.	Problems of making errors in transmission do exist and are really difficult to reverse. While security is good, there is a risk of "hackers" being able to intervene in transactions.
E-Money: substitute for cash and exists only in electronic form. The debit card is a form of e-money.	Efficient and convenient.	Expensive to set up. Electronic means of payment raise security and privacy concerns. Leaves an electronic trail which contains personal data.

NOTE: The following must be studied from the study guide:

C7 Measuring money in South Africa

The customary measures of money are M1, M2 and M3. Learn the descriptions from Study Guide, pages 11 - 14.   Note the following:
- The measures are all based on the relationship: $M = C + D$ and differ according to which types of deposits are included. Make sure you can describe each of them (M1, M2, M3)

C8 What causes money stock to increase?

- Net increases in bank loans to the private sector contribute, by far, most of the increase in M3.
- M = C + D where D is deposits held by the private nonbank sector with the banks. Only when D changes does the stock of money change. These deposits change because of the following:
  - Banks' loans to firms and individuals
  - Transactions in financial assets between banking sector, central bank and private sector.
  - Government transactions with the private nonbank sector (pays for services or changes taxes).
  - Foreign exchange transactions (exports +, imports -)

C9 Can government print money?

Make sure you are able to answer this question, specifically compare the two ways in which the money supply is increased. Refer to pages 15 - 17 in the study guide.

1. Printing banknotes and coins.
   a. Only SARB has right to print money
   b. SARB sells new money to the banks and pays proceeds to government.
   c. Banks use extra money to replace old worn notes or will issue it to private sector when they need it in exchange for deposits. *Money stock has still not increased yet.*
   d. Only when government decides to spend extra money (build a school) then deposits of private building contractor and therefore money stock will increase.

This process can be dangerous if government is corrupt and misuses printing press to create excessive money.

2. Forcing central bank to buy excessive issues of government securities (government borrows excessively from central bank) – monetization of government debt.
   a. Government issues new government securities to central bank
   b. Government spends newly acquired deposits, say by paying its employees, then private sector deposits (money stock) increases.
   c. Consequences: MV = PY. If V and Y are constant then increases in M cause increases in P
   d. Hyperinflation occurs when this process is repeated many times over. E.g. Zimbabwe

Typical Examination questions

3.1 Provide a formal definition of money. Then explain how the money stock is measured in principle. (5)
3.2 Briefly distinguish between money and income, and money and wealth. (4)
3.3 List and explain the three primary functions of money. (3x2=6)

3.4 Explain the meaning of the following terms as well as the advantages/ disadvantages of each in facilitating payments: (5x3=15):
Commodity money, fiat money, cheques, electronic payment, e-money.
3.5 Define the following measures of aggregate money stock in South Africa: M1A, M1, M2, M3.(4x2=8)
3.6 Explain the meaning and implications of the government "printing" money. (10)

True or false review questions

1. In principle, economists are not exactly sure how to measure money.
2. The use of a credit card to purchase goods does not affect the money stock.
3. The following transactions typically increase the money stock:
   a. trade credit
   b. payment of taxes
   c. government expenditure
   d. exports
   e. imports
4. An increase in the interest rate will cause increases in M1A and M3.

Part two: Financial markets
(Textbook: chapters 4, 5 and 6)

CHAPTER 4: UNDERSTANDING INTEREST RATES

Measuring interest rates _(Calculations not included)_

Interest rates are most accurately measured by the concept **yield to maturity**.

Present value (PV):   is a concept used to compare one kind of debt instrument with another. This is based on the notion that a rand (dollar) paid to you one year from now is less valuable to you then, than a rand (dollar) paid to you today. Also referred to as **present discounted value**.

Four types of credit market instruments: these are categorized according to the **timing** of their cash flow payments:

1. **Simple loan**: the lender provides the borrower with an amount of funds (the principal) which must be repaid to the lender at the maturity date, along with an additional payment for interest. Money market instruments are of this type. **For simple loans the simple interest rate equals the yield to maturity**.

Formula (SG pg 21): $PV = CF/(1 + i)^n$

(where CF is cash flow at end of period n)

2. **Fixed payment loan**: lender provides the borrower with an amount of funds, which must be repaid by making the same payment every period, consisting of part of the principal and interest for a set number of years. Example: mortgage payments on houses or cars.

   In this case the fixed yearly payment and the number of years until maturity are known quantities, only the yield to maturity is not. For example, if you borrowed $1000, a fixed-payment loan might require you to pay $126 every year for 25 years. (Refer textbook page 111).

Formula: (SG pg 21): $LV = \dfrac{FP}{1+i} + \dfrac{FP}{(1+i)^2} + \dfrac{FP}{(1+i)^3} + \ldots.. + \dfrac{FP}{(1+i)^n}$

(where i is interest rate per period, LV is the Loan Value, FP is Fixed Payments)

3. **Coupon bond**: pays the owner of the bond a fixed interest payment (coupon) every year until the maturity date, when a specified final amount (face value/ par value) is repaid. Four pieces of information are required for a coupon bond: 1) the issuing party (government or corporation), 2) The maturity date of the bond 3) The coupon rate 4) Face value of the bond.

Three important facts relating to coupon bonds:
- (i) When the coupon bond is priced at its face value, the yield to maturity equals the coupon rate.
- (ii) The price of a coupon bond and the yield to maturity are negatively related (when the yield to maturity rises, the price of the bond falls).
- (iii) The yield to maturity is greater than the coupon rate when the bond price is below its face value.

A higher interest rate implies that the future coupon payments and final payment are worth less when discounted back to the present, therefore, the price of the bond must be lower.

Formula (textbook pg 115): $P = \dfrac{C}{(1+i)} + \dfrac{C}{(1+i)^2} + \dfrac{C}{(1+i)^3} + \ldots + \dfrac{C}{(1+i)^n} + \dfrac{F}{(1+i)^n}$

Where C is coupon rate and F is final payment or face value of bond

C, F and n are fixed when the bond is issued. The current market price then determines i: the yield to maturity of the coupon bond.

4. **Discount bond (also called zero-coupon bond)**: bought at a price below its face value (at a discount) and the face value is repaid at the maturity date. A discount bond does not make interest payments, it only pays the face value. The yield to maturity is negatively related to the current bond price.

Formula (textbook pg 118): $i = \dfrac{F-P}{P}$ (where i is yield to maturity)

The borrower receives P (current price of discount bond at beginning of period), he repays F (face value of bond) at end of period (one year's time).

The concept of PV is used to compare these different types of instruments based on their respective yield to maturity.

Yield to Maturity: of the several common ways to calculate interest rates, the most important is the yield to maturity, *the interest rate that equates the PV of cash flow payments received from a debt instrument with its value today.* This is the most accurate measure of interest rates.

Distinction between interest rates and returns

The **rate of return** can be defined as *payments to the owner plus the change in its value, expressed as a fraction of its purchase price.*
The return on a bond is not necessarily equal to the yield to maturity on a bond. The return on a security shows how well you have done by holding this

security over a stated period of time and it can differ substantially from the interest rate measured by the yield to maturity.

Because of fluctuating interest rates, the capital gains and losses on long-term bonds can be large. [When an investor sells a financial instrument before its maturity date, the sale will be subject to market rates. These market rates mean that the instrument might be sold at a profit or a loss depending on whether prices have increased or decreased.]

E.g. With a $1000 face value coupon bond with a coupon rate of 10% that is bought for $1000, held for one year and then sold for $1200.

The payments to owner are the yearly coupon payments of $100 and the change in its value is $1200 - $1000 = $200. Adding these together and expressing them as a fraction of the purchase price of $1000, gives us the one-year holding-period **return** for this bond:

$$\frac{\$100+\$200}{\$1000} = \frac{\$300}{\$1000} = 0.30 = 30\%$$

*This demonstrates that the **return on a bond** will not necessarily equal the **yield to maturity** on that bond.*

Therefore, the return on a bond held from time t to time t + 1 is:

$$R = \frac{C + P_{t+1} - P_t}{P_t}$$

Where C = coupon payment
P_t = price of bond at time t

The following factors are important:
  (i)   Rise in interest rates is associated with a fall in bond prices, resulting in capital losses on bonds where the terms to maturity are longer than the holding period.
  (ii)   The more distant a bond's maturity, the greater the size of the percentage price change associated with an interest-rate change.
  (iii) The more distant a bond's maturity, the lower the rate of return that occurs as a result of the increase in interest rate.
         [P↓→i↑]
  (iv)   Even if a bond has a substantial initial interest rate, its return can turn out to be negative if interest rates rise.

Maturity and volatility of bond returns: prices and returns for longer-term bonds are more volatile than those for shorter-term bonds. The riskiness of an asset's return that results from interest rate changes is so important that it has been given a special name: **interest-rate risk.**

Bonds that have a maturity that is longer than the holding period are subject to interest-rate risk. The only time this risk is eliminated is when the holding period and the maturity period are the same. This is because the price at the

end of the holding period is already fixed at the face value. The change in interest rates can then have no effect on the price at the end of the holding period for these bonds, and the return will therefore be equal to the yield to maturity known at the time the bond is purchased.

Distinction between nominal and real interest rates

Nominal interest rates: makes no allowance for inflation.
Real interest rates: interest rate is adjusted by subtracting expected changes in price level.

When real interest rates are low there are greater incentives to borrow and fewer incentives to lend.

Indexed Bonds: a bond whose interest and principal payments are adjusted for changes in price levels and whose interest rate thus **provides a direct measure of real interest** rates. These bonds are useful to policy makers, because by subtracting their interest rate from a nominal interest rate on a non-indexed bond, they generate more insight into expected inflation, a valuable piece of information.

Typical Examination questions

4.1 Explain the meaning of the following four types of credit market instruments (4x3=12)
Simple loan, fixed payment loan, coupon bond, discount bond.
4.2 Explain the meaning of the following concepts in the context of a coupon bond: coupon rate, yield to maturity and the return on a bond. (7)
4.3 Distinguish between the nominal and the real interest rate. Which one is more important and why?(5)

True or false review questions

1. The yield to maturity (i) of each of the four types of credit market instruments and its price (P, PV or LV, whatever applies) are inversely related.
2. Investors cannot ever be worse off when investing in bonds.
3. A negative real interest rate on coupon bonds implies that the interest earned on the bond does not fully compensate for the loss of purchasing power of money. Thus the investor is worse off.

CHAPTER 5: THE BEHAVIOUR OF INTEREST RATES

The **supply and demand analysis for bonds provides one theory** of how interest rates are determined. It predicts that interest rates will change when there is a change in demand because of changes in income (or wealth), expected returns, risk or liquidity, or when there is a change in supply. An **alternative theory** of how interest rates are determined is provided by the **liquidity preference framework**, which analyses the supply of and demand for money. It shows that interest rates will change when there is a change in the demand for money because of changes in income or the price level or when there is a change in the supply of money.

Determinants of demand for assets and direction of effect of changes

Factors that determine the demand for assets: an asset is a piece of property that is a store of value. These include, inter alia, money, bonds, stocks, art, land, houses, farm equipment and manufacturing machinery. The following are the factors that will influence a person's demand for assets:

- **Wealth**: total resources owned by the individual, including all assets. Holding everything else constant (ceteris paribus), an increase in wealth raises the quantity demanded of an asset - **positively related**.

- **Expected return**: on one asset relative to alternative assets. An increase in an asset's expected return relative to that of an alternative asset, ceteris paribus, raises the quantity demanded of that asset - **positively related**.

- **Risk:** (the degree of uncertainty associated with return) on one asset relative to other assets.   Ceteris paribus, if an asset's risk rises relative to that of alternative assets, the quantity demanded of that asset will fall - **negatively related.**

- **Liquidity:** (the ease and speed whereby an asset can be turned into cash) relative to alternative assets. The more liquid an asset is relative to alternative assets, ceteris paribus, the more desirable it is and the greater will be the quantity demanded - **positively related**.

The **Theory of Portfolio Choice:** therefore states that, ceteris paribus:
   (1)   the quantity demanded of an asset is positively related to wealth
   (2)   the quantity demanded of an asset is positively related to its expected return relative to alternative assets.
   (3)   the quantity demanded of an asset is negatively related to the risk of its returns relative to alternative assets.
   (4)   the quantity demanded of an asset is positively related to its liquidity relative to alternative assets.

Supply and demand in the bond market

One approach to the determination of interest rates looks at the supply and demand for bonds, to see how the price of bonds is determined.

The demand curve for bonds: at different points on the demand curve, the price of a bond and its interest rate are inversely related. The demand curve for bonds shows the relationship between the price of bonds (and interest rate) and the quantity demanded. This is an inverse relationship and is illustrated by a downward sloping (negative) demand curve.

The equation that would be used as a basis to the derivation of the demand curve for bonds may be written as (refer textbook, 10th edition, pg 134; 9th edition, pg 94):

$$i = R^e = \frac{F - P}{P}$$

Where i   = interest rate = yield to maturity
         R^e = expected return
         F = face value of discounted bond
         P = initial purchase price of the discount bond

By substituting different prices, given a specific face value, it can be shown that as the price of the bond decreases, the interest rate increases or vice versa. This would enable one to plot the relevant demand curve for the specific bond onto a set of axes. Refer Figure 1 pg 134 (chapter 5). Make sure you can derive such a demand curve. **NB:** Pay careful attention to the information on the vertical axis, namely price of the bond and interest rate.

Supply curve for bonds: in this case, when the price of bonds is low, fewer bonds will be supplied, because these bonds will have a higher interest rate. At a higher price more bonds will be supplied. There is a positive relationship between the price of bonds and the quantity supplied. [This implies a negative relationship between the interest rate and the quantity of bonds supplied – as the interest rate decreases (price of bonds increases) it becomes less costly to borrow by issuing bond.]

Market Equilibrium price and quantity of bonds: in the bond market this is achieved when the quantity of bonds demanded is equal to the quantity of bonds supplied at a specific price. If the price of the bonds is above the equilibrium price, then the quantity of bonds supplied will exceed the quantity demanded (excess supply). This will cause the price of bonds to fall and force the price towards equilibrium price.

If the price of bonds is lower than the equilibrium price, then the quantity demanded of bonds will be greater than the quantity supplied (excess demand). This will cause the price of bonds to rise and force the price up towards equilibrium price. This will continue until an equilibrium price is

reached.   NOTE: this can also be expressed in terms of changes in interest rates because each price corresponds to a particular interest rate.

NOTE: supply and demand are always in terms of stocks (amounts at a given point in time) of assets, not in terms of flows. This asset market approach is the dominant methodology used by economists. Use the space below to draw a supply and demand curve for bonds and show how equilibrium in the bond market is reached.

Figure 1pg 134: Supply and demand for bonds

P

Q
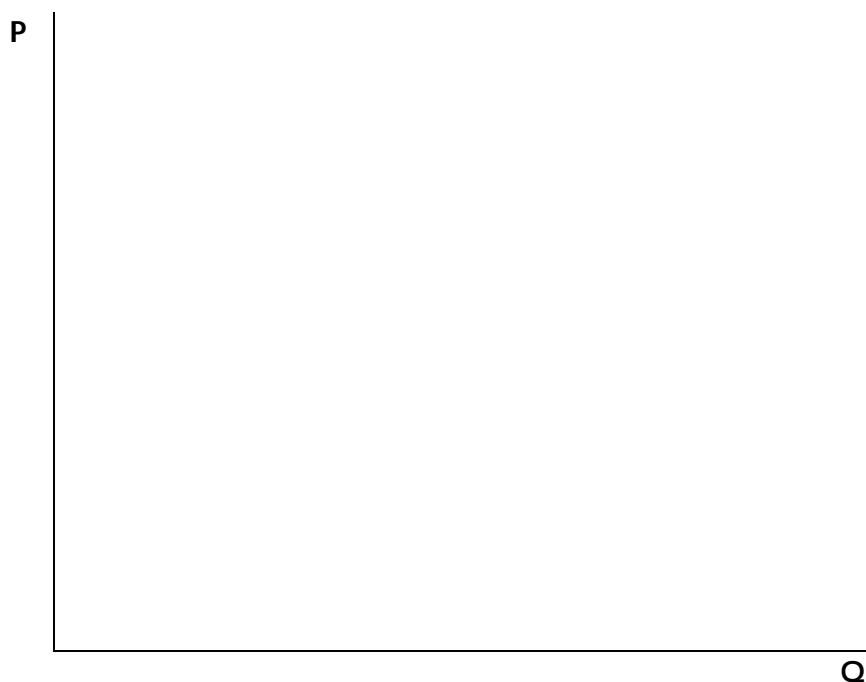
Changes in equilibrium interest rates

It is important to remember the difference between a movement along the curve and a shifting of the curve.   If the **price of a bond** or the interest rate changes, the **movement will be along** the existing curve indicating a change in quantity demanded. A shift of the demand or supply curve indicates that the quantity demanded or supplied at each given price and interest rate has changed by some other factor besides the bonds price or interest rate. When this happens, there will be a new equilibrium for the interest rate.

Factors that cause a shift of the demand curve: refer to table 2 PG 138 and record the effect of changes of each of the following determinants:

- Decrease in **wealth**:   a decrease in the demand for bonds

- A decrease in the **expected interest rate**: increase in the demand for bonds

[Remember in this case the interest rate decreases, the price of the bonds increases and the opportunity for making a profit on the sale of the bonds increases]

- An increase in **expected inflation**: when inflation is expected to increase, the demand for bonds will decrease because other assets become more attractive as a hedge against inflation. [When expected inflation rises, the supply curve shifts to the right and the demand curve shifts to the left. The result is that the equilibrium bond price decreases and the equilibrium interest rate rises. This in turn means that when expected inflation rises then interest rates also rise == **Fisher effect.**]

- An increase in the **riskiness of bonds** relative to other assets: the demand for bonds will decrease.

- The **liquidity of bonds** increases (more people traded bonds →easier to sell bonds quickly) relative to other assets: demand for bonds will increase. Similarly, increased liquidity of alternative assets lowers demand for bonds.

Factors that cause a shift of the supply curve: the following factors will cause a shift of the supply curve for bonds:
- **Expected profitability of investment opportunities**: in a business cycle expansion, firms are more willing to borrow, the supply of bonds increases and the supply curve shifts to the right. Likewise in a recession, the supply of bonds decreases (fewer expected profitable investment opportunities) and the supply curve shifts to the left.

- **Expected inflation**: an increase in expected inflation causes the supply of bonds to increase and the supply curve to shift to the right. When the expected inflation increases, the real cost of borrowing, measured by the real interest rate, falls.

- **Government budget**: government issues bonds to finance government deficits, when the deficit is large, the government will issue more bonds and the quantity of bonds supplied at each price will increase.

APPLICATION:

(1)   In a business cycle expansion, the amount of goods and services produced increases and so national income increases. Business will be more willing to borrow and the **supply of bonds** will increase. In addition the expansion is likely to increase wealth and therefore the **demand for bonds** will also increase. However, depending on whether the supply or demand curve shifts more, the new equilibrium interest rate is either higher or lower. Data says that we normally see a higher interest rate.

(2)   If expected inflation rises, the expected return on bonds relative to real assets falls for any given bond price and interest rate. Demand for bonds then falls and demand curve shifts left. The rise in expected inflation also shifts the supply curve right as the real cost of borrowing has declined. **Fisher effect:** when expected inflation rises, interest rates will rise.

The Liquidity Preference framework: supply and demand in the money market for money

An alternative method for determining the equilibrium interest rate, developed by John Maynard Keynes, is the liquidity preference framework. This framework uses the demand and supply of money to determine the prevailing interest rate.

Money is a special type of asset: Keynes based the liquidity preference framework on the assumption that there are two main categories of assets that people use to store wealth: **money and bonds.** Therefore the total wealth in an economy must be equal to the sum of money and bonds. This can be expressed as follows:

$$B^s \; + \; M^s \; = \; B^d \; + \; M^d$$

Rewrite the equation to show how it is possible to illustrate that if the money market is in equilibrium, then the bond market must also be in equilibrium:

$$B^s \; - \; B^d \; = \; M^s \; - \; M^d$$

Simplifications (assumptions) of the liquidity preference framework: the demand and supply of bonds framework is easier to use when analyzing the effects from changes in expected inflation, while the liquidity preference framework is easier to use when analyzing the effects of changes in income, price level and the supply of money.

This framework assumes the following:
- Wealth is stored in a combination of money and bonds. Real assets are ignored.
- Money has a zero rate of return. Bonds have an expected return equal to the interest rate (i). As the interest rate rises, ceteris paribus, the expected return on money falls relative to the expected return on bonds and so the quantity of money demanded will fall.
- The concept of opportunity cost can also be used to explain why the demand for money and interest rates are inversely related. At a higher interest rate the opportunity cost of holding money is greater than it would be at a lower interest rate.
- The supply of money is fixed by the central bank. The supply curve is vertical.

Equilibrium in the money market implies equilibrium in the bond market: the position where the quantity of money demanded equals the quantity of money supplied occurs at the point of intersection of the demand and supply curves for money.

If there is an excess supply of money (that is the interest rate is above the equilibrium interest rate) then people are holding more money than they desire and will want to buy bonds. They are therefore likely to bid up the price of bonds and the interest rate will fall towards the equilibrium rate.

In the case of excess demand for money, people wish to hold more money and will therefore wish to sell bonds. As a result the supply of bonds will increase and the price will drop which will push the interest rate up towards the equilibrium rate.

Refer to Figure 8 pg 148 and use a graph to illustrate equilibrium in the money market.
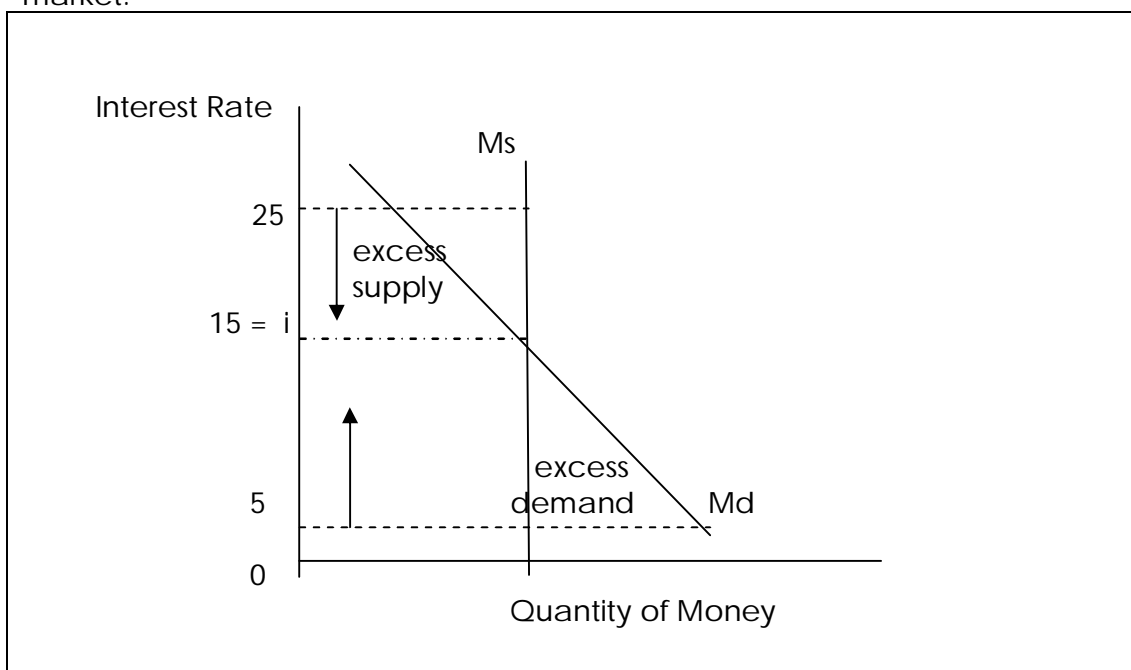
Changes in equilibrium interest rates in the liquidity preference framework

Money Demand curve shifts because of:
- Income effect: a higher level of income causes the demand for money at each interest rate to increase and the demand curve to shift to the right.

- Price-level effect: a rise in the price level causes the demand for money to increase and the demand curve to shift to the right. (people care about amount of money they hold in real terms)

Money Supply curve shifts because of:
- Changes in money supply: an increase in the money supply due to expansionary monetary policy implies that the supply curve for money will shift to the right. When the supply of money increases, ceteris paribus, the interest rate will decline (liquidity effect). When the supply of money decreases, ceteris paribus, the interest rate will rise.

Assumption of all other factors being equal may not necessarily hold, given an initial increase in money supply, why?

Refer to the section in the textbook, pg114. Milton Friedman acknowledged that the liquidity preference analysis is correct and referred to the fact that an increase in the money supply lowered the interest rate as the liquidity effect. However, he also noted that an increase in the money supply might nullify the ceteris paribus assumption.

This may be summed up as follows: "there are four possible effects of an increase in the money supply on interest rates: the liquidity effect, the income effect, the price-level effect and the expected-inflation effect. The liquidity effect indicates that a rise in money supply growth will lead to a decline in interest rates, the other effects work in the opposite direction. The evidence seems to indicate that the income, price-level, and the expected-inflation effects dominate the liquidity effect such that an increase in money supply growth leads to higher rather than lower interest rates" [Mishkin F, The economics of Money, Banking and Financial Markets. 2007. Boston: Pearson Education Inc.]

C5 How is the interest rate determined in South Africa?

Refer to the study guide and answer this question, pg 34.

A: As far as the bond market is concerned, the demand and supply of assets that explained bond interest rates is a good approximation of reality in South Africa.

However the liquidity preference theory does not apply in SA. The Reserve Bank cannot and does not control the money supply but rather the interest rate (repo). The level of the repo rate determines the demand for money – the amount the private sector wishes to borrow.

Typical Examination questions

5.1 Briefly explain how four major factors affect the demand for an asset. (4x2=8)
5.2 Derive a bond demand curve (price of bond versus its quantity demanded) and a bond supply curve and explain how the equilibrium P and Q for the bond is determined using the asset market approach. Explain which curve may be associated with borrowers/lenders respectively. Illustrate graphically. (10)
5.3 Briefly explain the demand/supply for assets framework and then use it to predict (provide reasons) how the demand for and supply of bonds are affected by each of the following:
　　a A business cycle expansion (also predict the equilibrium P,Q as well as i) (5)
　　b An increase in the public's propensity to save (2)
　　c Higher expected future interest rates (maturity of bond n>1) (2)
　　d An increase in the expected inflation rate (also predict the equilibrium P,Q) as well as i) (6)
　　e An increase in the riskiness of bonds relative to other assets (2)
　　f An increase in the government's budget deficit (2)

5.4 Explain Keynes' liquidity preference framework, that is, its simplifying assumptions, the derivation of the demand and supply curve and how equilibrium is determined. (8)
5.5 Explain how Keynes' liquidity preference framework can be used to explain the effects of an increase in income, a rise in the price level and an increase in the money supply (assume that all other economic variables

remain constant). Then explain why an increase in money supply does not necessarily lead to a decrease in interest rates over the longer term. (12)

True or false review questions

Bonds: Asset demand and supply

1. The demand curve for bonds indicates the willingness of lenders to buy bonds. If a lender buys a bond then the lender supplies funds to the borrower, which the borrower must repay over time. The price of bonds in figure 1 (p 134 of the prescribed text book) is the discount price the lender pays for the bond (the term discount bond applies in the case of a simple one-year bond). The lower the price, the greater is the discount, the higher is the interest rate ($P=F/[1+i]$) and the more willing lenders are to purchase bonds – and to supply funds to the issuers of bonds (the borrowers).
2. The supply curve for bonds indicates the willingness of borrowers to sell bonds. When a bond is sold to an investor, then the investor provides funds to the borrower. The price of a bond in figure 1 (p 134 of the prescribed text book) is what the borrower receives for the bond. The higher the price of bonds, the more the borrower receives and the lower the interest rate which the borrower must pay.
3. If the interest rate is expected to increase, then the price of bonds can be expected to fall. In the case of longer-term bonds, this may imply a lower return on bonds than initially expected. This will shift the demand curve for bonds to the left and the supply curve of bonds to the right.
4. A higher expected inflation rate will shift the demand curve for bonds to the left and the supply curve of bonds to the right. The demand curve will shift to the left because investors will be less willing to supply funds. The supply curve will shift to the right because this allows borrowers to obtain funds at a lower real cost.
5. The more liquid a bond, the more desirable it becomes for borrowers.
6. When a bond price increases, its yield also increases, because yield is calculated as a fixed percentage of price.
7. The Fisher effect unambiguously states that when the inflation rate is expected to increase, both the quantity and the price of bonds will decrease.
8. A business cycle expansion is likely to lead to a decrease in the supply of bonds because of a reduced need for bonds.

Liquidity preference

9. When the central bank increases the money supply, the initial short-term effect is that the supply curve of money shifts to the right, so that the interest rate falls. This is called the liquidity effect.
10. When the interest rate falls, then over time, this has an expansionary effect on the economy. When income increases, then the demand curve for money will shift to the right, which causes an increase in the interest rate.

11. When income increases then this might also cause an increase in the general price level. The expected increase in inflation, according to the liquidity preference model, leads to an increase in interest rates.

12. The short-term expansionary effect of an increase in the money supply may thus be partly reduced or even completely overcome by longer-term increases in the interest rate due to the income and expected-inflation effects.
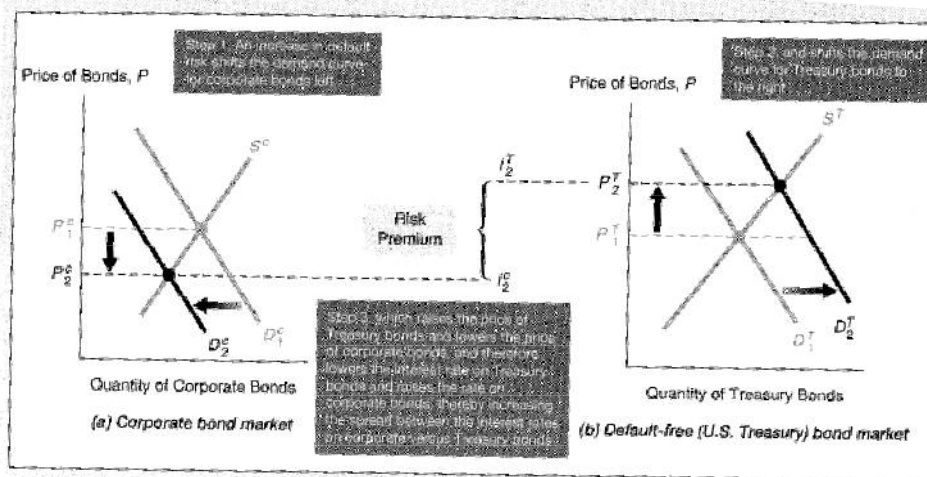
CHAPTER 6: THE RISK AND TERM STRUCTURE OF INTEREST RATES

Risk structure of interest rates

Meaning of risk structure of interest rates: *the relationship between interest rates on bonds with the same maturity.* Factors such as risk, liquidity and income tax rules play a role in determining the risk structure of different bonds.
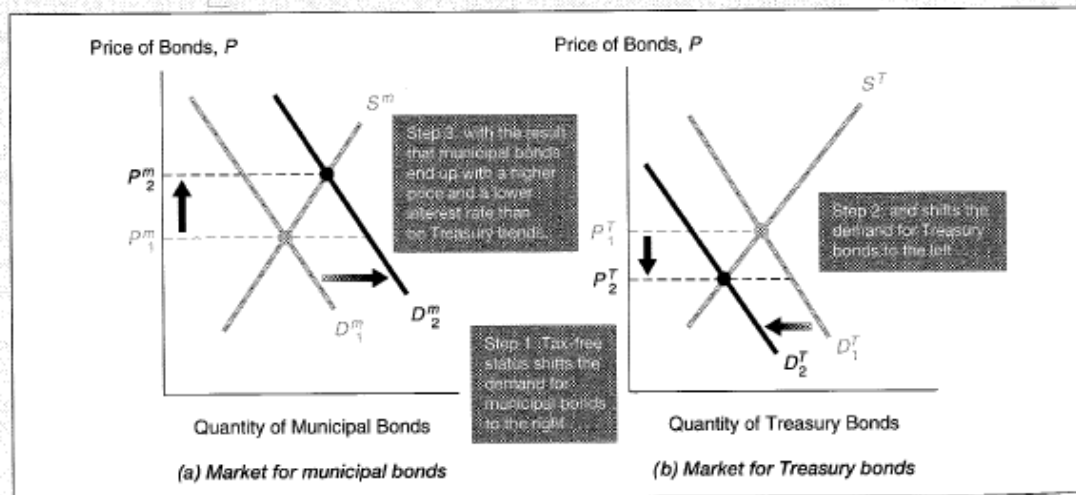
Consider the factors that influence the risk structure:
- **Risk of defaulting**: bonds that have no default risk are referred to as default-free bonds. The spread between default-free bonds and bonds with default risk is referred to as the **risk premium**. This refers to how much additional interest a bond must earn in order to make a person willing to hold it. A bond with default risk will always have a positive risk premium, and an increase in its default risk will raise the risk premium. [APPLICATION: refer to figure 2 on page 162 in the textbook to understand an application that illustrates the response to an increase in a default risk].

- **Liquidity of bonds:**   the more liquid an asset is the more people will wish to hold it. The greater the liquidity of a bond, the lower the interest rate required. The spread between a bond with high liquidity and one with low liquidity is also referred to as a **risk premium**.

- **Tax treatment**: the fact that interest payments on municipal bonds in the USA are tax free has the same effect on the demand for these bonds as an increase in their expected returns. The demand for municipal bonds tends to be higher than a Treasury bond, even though they are riskier and less liquid, therefore prices are higher and interest rates have been lower (implying lower risk) than the Treasury bonds. Refer to figure 3 (9th pg 129, 10th ed. Pg 166).

Price of Bonds, P

Step 1: An increase in default risk shifts the demand curve for corporate bonds left.

S^c

P_1^c

P_2^c

D_2^c D_1^c

Quantity of Corporate Bonds

(a) Corporate bond market

i_2^T

Risk Premium

i_2^c

Step 3: which raises the price of Treasury bonds and lowers the price of corporate bonds, and therefore lowers the interest rate on Treasury bonds and raises the rate on corporate bonds, thereby increasing the spread between the interest rates on corporate versus Treasury bonds.

Price of Bonds, P

Step 2: and shifts the demand curve for Treasury bonds to the right.

S^T

P_2^T

P_1^T

D_1^T D_2^T

Quantity of Treasury Bonds

(b) Default-free (U.S. Treasury) bond market

FIGURE 2   Response to an Increase in Default Risk on Corporate Bonds

Initially $P_1^c = P_1^T$ and the risk premium is zero. An increase in default risk on corporate bonds shifts the demand curve from D_1^c to D_2^c. Simultaneously, it shifts the demand curve for Treasury bonds from D_1^T to D_2^T. The equilibrium price for corporate bonds falls from P_1^c to P_2^c, and the equilibrium interest rate on corporate bonds rises to i_2^c. In the Treasury market, the equilibrium bond price rises from P_1^T to P_2^T, and the equilibrium interest rate falls to i_2^T. The brace indicates the difference between i_2^c and i_2^T, the risk premium on corporate bonds. (Note that because P_2^c is lower than P_2^T, i_2^c is greater than i_2^T.)

Price of Bonds, P

S^m

Step 3: with the result that municipal bonds end up with a higher price and a lower interest rate than on Treasury bonds.

P_2^m

P_1^m

D_1^m D_2^m

Step 1: Tax-free status shifts the demand for municipal bonds to the right.

Quantity of Municipal Bonds

(a) Market for municipal bonds

Price of Bonds, P

S^T

Step 2: and shifts the demand for Treasury bonds to the left.

P_1^T

P_2^T

D_2^T D_1^T

Quantity of Treasury Bonds

(b) Market for Treasury bonds

FIGURE 3   Interest Rates on Municipal and Treasury Bonds

When the municipal bond is given tax-free status, demand for the municipal bond shifts rightward from D_1^m to D_2^m and demand for the Treasury bond shifts leftward from D_1^T to D_2^T. The equilibrium price of the municipal bond rises from P_1^m to P_2^m, so its interest rate falls, while the equilibrium price of the Treasury bond falls from P_1^T to P_2^T and its interest rate rises. The result is that municipal bonds end up with lower interest rates than those on Treasury bonds.

Credit rating agencies are important providers of information on risk premium.

Bond Ratings by Moody's, Standard and Poor's, and Fitch			
Moody's	**Rating S&P**	**Fitch**	**Definitions**
Aaa	AAA	AAA	Prime Maximum Safety
Aa1	AA−	AA−	High Grade High Quality
Aa2	AA	AA	
Aa3	AA−	AA−	
A1	A+	A+	Upper Medium Grade
A2	A	A	
A3	A−	A−	
Baa1	BBB+	BBB+	Lower Medium Grade
Baa2	BBB	BBB	
Baa3	BBB−	BBB−	
Ba1	BB+	BB+	Noninvestment Grade
Ba2	BB	BB	Speculative
Ba3	BB−	BB−	
B1	B−	B−	Highly Speculative
B2	B	B	
B3	B−	B−	
Caa1	CCC+	CCC	Substantial Risk
Caa2	CCC	—	In Poor Standing
Caa3	CCC−	—	
Ca	—	—	Extremely Speculative
C	—	—	May Be in Default
—	—	DDD	Default
—	—	DD	—
—	D	D	

TABLE 1

Term Structure of interest rates

Another factor (aside from those considered above) that can influence interest rates is a bond's **term to maturity.**

Meaning of term structure: *bonds with identical risk, liquidity and tax characteristics may have different interest rates because of <u>different times remaining to maturity.</u>*

Characteristics of yield curves: a plot of the yields on bonds with differing terms to maturity but the same risk, liquidity and tax considerations is called a yield curve. See pg 168.
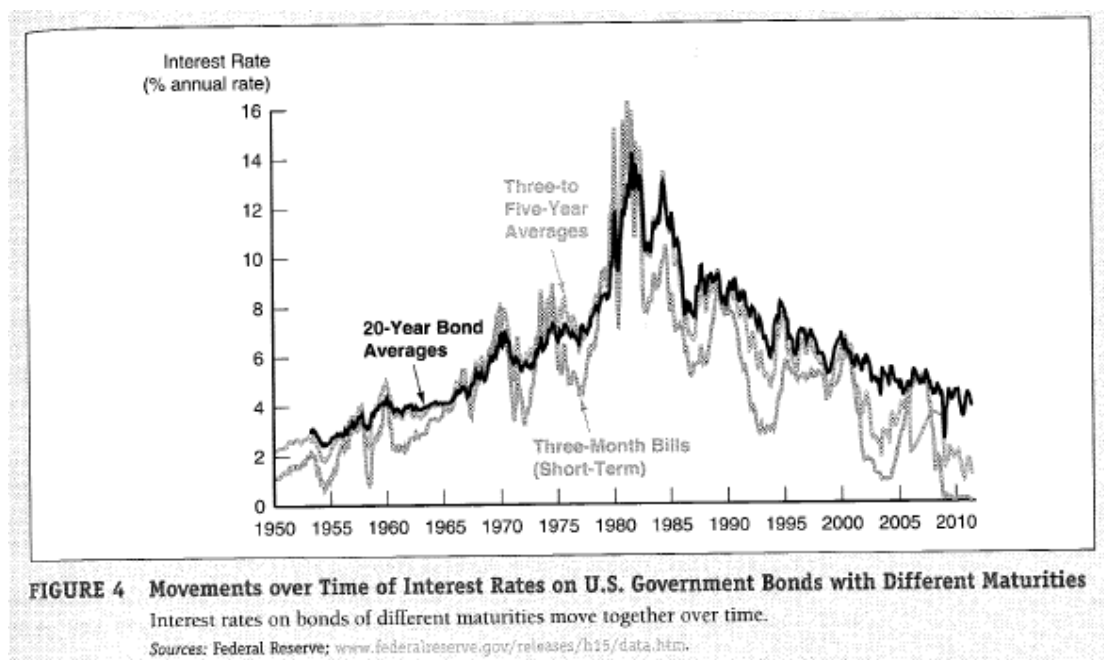
- When a yield curve slopes upwards (most common): long-term interest rates are above short-term interest rates
- When a yield curve is flat: short- and long-term interest rates are the same.

- When a yield curve slopes downwards (inverted): long-term interest rates are below short-term rates.

The following <u>empirical facts relating to yield</u> curves are also important:
1. Interest rates on bonds of differing maturities move together over time. *See figure 4pg 169*
2. When short-term interest rates are low, yield curves are more likely to have an upward slope; when short-term rate are high, yield curves are more likely to slope downwards and be inverted.
3. Yield curves almost always slope upward.

FIGURE 4   Movements over Time of Interest Rates on U.S. Government Bonds with Different Maturities
Interest rates on bonds of different maturities move together over time.
Sources: Federal Reserve; www.federalreserve.gov/releases/h15/data.htm.

Different theories: there are three theories that are used to explain the term structure of interest rates:

1. **Expectations theory**: "the interest rate on a long-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond."
   The **key assumption** behind this theory is that buyers of bonds do not prefer bonds of one maturity over another, so they will not hold any quantity of a bond if its expected return is less than that of another bond with a different maturity. Bonds that have this characteristic are said to be *perfect substitutes – if bonds with different maturities are perfect substitutes, the expected return on these bonds must be equal.*

   To prove this consider two investment strategies:
   - Purchase a 1-year bond and when it matures in one year, purchase another 1-year bond.
   - Purchase a 2-year bond and hold it until maturity
   Because both strategies have the same expected return, the interest rate on the 2-year bond must equal the average of the two 1-year interest rates.

The expectations theory is able to explain facts (1) and (2) above but is unable to explain fact (3). When the yield curve is upward sloping, the theory suggests that short-term interest rates are expected to rise in the future.

2. **Segmented market theory**: markets for different-maturity bonds are seen as completely separate and segmented. The interest rate for each bond with a different maturity is determined by the supply and demand for that bond, with no effects from expected returns on other bonds with other maturities.
   The **key assumption** in this case, is that bonds of different maturities are *not substitutes* at all, so the expected return from holding a bond of one maturity has no effect on the demand for a bond with another maturity. Investors have strong preferences for the bonds of one maturity but not for another, so they will be concerned only with the expected returns for bonds of the maturity they prefer.

   The segmented market theory is able to explain fact (3) above but is unable to give an adequate explanation for (1) and (2) as it views the market for bond of different maturities as completely segmented therefore there is no reason that a rise in interest rates for one bond would affect the rates of another maturity .

3. **Liquidity premium theory** (preferred): this theory states that the "interest rate on a long-term bond will equal an average of short-term interest rates expected to occur over the life of the long-term bond plus a liquidity premium that responds to supply and demand conditions for that bond."
   The **key assumption** is that bonds of different maturities are substitutes, which means that the expected return on one bond **does** influence the expected return on a bond of a different maturity, but it allows investors to prefer one bond maturity over another. Investors tend to prefer shorter-term bonds because of less interest-rate risk and so investors must be offered a liquidity premium to induce them to hold longer-term bonds.

   Closely related to this theory is the **preferred habitat theory** which **assumes that investors will have choice preferences** and will only be persuaded to move to another choice if they can expect higher returns.

These two theories (liquidity premium and preferred habitat) combine the features of the expectations theory and the segmented market theory and are then able to **explain all three facts relating to yield curves**. They view long-term interest rates as equaling the average of future short-term rates expected to occur over the life of the bond plus a liquidity premium.

Note:
- **please read over Application: Interpreting yield curves 1980-2011 on pg 178**
- **from SG, go through additional explanation of SA yield curves on pg 30**

Typical Examination questions

6.1 Explain the meaning of the risk structure of interest rates. List and explain the three factors which affect the risk structure of interest rates using a supply of/demand for bonds-framework. (18)
6.2 Explain the meaning of the term structure of interest rates and the yield curve. Draw a normal yield curve and explain why its shape applies. List three empirical observations of the yield curve. (10)
6.3 Explain the assumptions and predictions of the expectations theory and how well it explains the three empirical observations of the yield curve. (9)
6.4 Explain the assumptions and predictions of the segmented market theory and how well it explains the three empirical observations of the yield curve. (7)
6.5 Explain the assumptions and predictions of the liquidity premium theory of the term structure and the preferred habitat theories of the term structure and how well they explain the three empirical observations of the yield curve. (18)

True or false review questions

For each of the following questions, which one of the options is the most correct?
1. The risk structure of interest rates explains why the interest rate on bonds differs because the
   (a) quality of bonds are different although their time to maturity is similar
   (b) time to maturity is different but their quality is similar

2. The R157 bond was issued during 2005 and it matures in September 2015. In March 2009, the term to maturity of the R157 bond was approximately
   (a) cannot be derived
   (b) 10 years
   (c) 6½ years
   (d) 5¼ years

3. Which of each of the following is confirmed by chart 6.1 (SG pg 30)?
   (a) the interest rates on bonds of different maturities tend to move together
   (b) the typical form of a yield curve is upward sloping
   (c) when short-term interest rates are low, the yield curve is upward sloping; and when short-term interest rates are high, yield curves tend to be downward sloping

4. Which characteristics apply to the yield curve? In each case select the most appropriate one of the two options which are underlined.

   A yield curve shows the
   (a) relationship / difference between
   (b) the yield to maturity / current return
   (c) measured in terms of percentage per year / a price index

(d) and the <u>remaining</u> / <u>original</u> term to maturity

(e) of <u>bonds</u> / <u>three bonds</u>

(f) of <u>similar quality</u> / <u>different quality</u>

(g) <u>on a specific date</u> / <u>over a specified period</u>

Which of the following is true?

5. The yield curve can change significantly over time.
6. The expectations theory assumes that the yield on long term bonds is related to the yields of short-term bonds.
7. An assumption of the segmented market theory is that the yield on long term bonds is independent of the yield on short-term bonds.
8. The liquidity premium theory offers relatively better explanations than the expectations and segmented market theorems.

PART THREE: FINANCIAL INSTITUTIONS
(Textbook: Chapter 8, 9 and 10)

CHAPTER 8: AN ECONOMIC ANALYSIS OF FINANCIAL STRUCTURE

Basic facts about financial structure throughout the world

Mishkin highlights eight basic facts about financial structure (refer to study guide). You must learn these:

1. Stocks are not the main source of external financing.
2. Marketable securities (stocks) are not the primary source of finance.
3. Indirect finance (using financial intermediaries) is more important than direct finance.
4. Banks are the principal source of external funds (loans).
5. The financial system is heavily regulated
6. Only large, well-established firms have access to securities markets.
7. Collateral is prevalent in debt contracts
8. Debt contracts have numerous restrictive covenants.

A deeper understanding of the problems that are incorporated in these basic facts can be obtained by considering each of the specific problems of **transaction costs, asymmetric information** and the resulting adverse selection and moral hazard problems in detail.

Transaction Costs

The costs of investing on an individual basis are high, for example the smallest denomination for a bond investment in the USA is $10 000. When investing in shares there are often minimum requirements by brokers. Even when there are no minimum requirements, individuals with small amounts of savings to invest, are limited in the number of shares they are able to purchase and thus are unable to diversify.

Financial intermediaries can help to **reduce transaction costs** in two main ways:

- Through **economies of scale**:   bundle the funds of investors together and reduce transaction costs e.g. mutual fund – financial intermediary that sells shares to individuals and then invests the proceeds in bonds or stocks.

- **Expertise:** for example expertise in computer technology enables financial intermediaries to offer customers convenient services. E.g toll free numbers for information on investments or ability to write cheques on their accounts.

Asymmetric Information

This occurs in situations where one party's insufficient knowledge about the other party involved in a transaction makes it impossible to make accurate decisions when conducting transactions.

- **Adverse selection** is a problem arising from asymmetric information and occurs before the transaction takes place.   Potential bad credit risks are the individuals that most actively seek out loans. Adverse risk increases the chances that a loan might be made to a bad credit risk and so lenders might decide not to make any loans.

- **Moral hazard** occurs after the transaction has taken place. Lender runs the risk that the borrower will engage in undesirable or risky behavior and make it less likely that the loan will be paid back

- The analysis of how the above asymmetric problems affect economic behavior is referred to as **agency theory.**

The lemons problem: how adverse selection influences financial structure

Lemons in stock and bond markets: this problem is what prevents the securities markets from being effective in channeling funds from savers to borrowers.

Because an investor cannot necessarily tell which firms are good risks and which are bad, he (or she) is likely to estimate his buying price based on an average taking into account good and bad. Firms that know that they are good will be unlikely to sell their securities to the investor at the average price and will ask more. This will be higher than the investor is prepared to pay, and only the securities from bad (poor) risk firms fall into his price range. If the investor is sensible he will not wish to buy these securities and will end buying none at all.

In the bond market, investors will wish to pay prices low enough to ensure interest high enough to compensate for average default risk. Knowledgeable owners of a good firm realize they will be paying a higher interest than they wish to and so decide not to raise finance through bonds.

Tools to help solve adverse selection problems:

- **Private production and sale of information**: private companies collect and publish information that helps to distinguish good firms from bad. This info is then sold. However, another problem arises, the **free-rider problem**.   People who do not pay for the information provided are able to benefit from it.
- **Government regulation to increase information**: government could be responsible for releasing relevant information. However, this could be a politically sensitive matter. Another way in which

government may assist would be to regulate the securities markets in ways that encourage participants to reveal honest information about themselves. This would take the form of audits by reputable auditing firms. However, such regulation did not prevent the Enron scandal (pg 212).

- **Financial intermediation** by banks that become experts of companies in various industries helps to solve the problem. Banks can acquire deposits and lend the money to good firms by making private loans. Such loans are not traded and therefore no-one else will be able to interfere with the price/interest involved (no free-rider problem). Banks hold mainly **nontraded loans**.

- **Collateral**, property promised to the lender if a borrower defaults, reduces the consequence of adverse selection. **Net worth (equity capital)** is the difference between a firm's assets and its liabilities and can perform a similar role to collateral.

FYI   The Enron Implosion

Until 2001, Enron Corporation, a firm that specialized in trading in the energy market, appeared to be spectacularly successful. It had a quarter of the energy-trading market and was valued as high as $77 billion in August 2000 (just a little over a year before its collapse), making it the seventh-largest corporation in the United States at that time. However, toward the end of 2001, Enron came crashing down. In October 2001, Enron announced a third-quarter loss of $618 million and disclosed accounting "mistakes." The SEC then engaged in a formal investigation of Enron's financial dealings with partnerships led by its former finance chief. It became clear that Enron was engaged in a complex set of transactions by which it was keeping substantial amounts of debt and financial contracts off its balance sheet. These transactions enabled Enron to hide its financial difficulties. Despite securing as much as $1.5 billion of new financing from J. P. Morgan Chase and Citigroup, the company was forced to declare bankruptcy in December 2001, up to that point the largest bankruptcy in U.S. history.

The Enron collapse illustrates that government regulation can lessen asymmetric information problems, but cannot eliminate them. Managers have tremendous incentives to hide their companies' problems, making it hard for investors to know the true value of the firm.

The Enron bankruptcy not only increased concerns in financial markets about the quality of accounting information supplied by corporations, but also led to hardship for many of the firm's former employees, who found that their pensions had become worthless. Outrage against the duplicity of executives at Enron was high, and several of them were convicted and sent to jail.

How moral hazard affects the choice between debt and equity contracts

Moral hazard in equity contracts (the principal-agent problem): the separation of ownership (shareholders) and management (do not own shares) in companies gives rise to the **principal-agent problem**.
Managers (agents) may act in their own interests rather than the interests of the shareholders (principals). The degree of the problem will be affected by the level of integrity of the agents involved.
Internationally and even locally, managers have frequently been accused (and found guilty) of diverting funds for their own private benefit. Managers might also follow strategies that allow them to increase their own personal power in a company, rather than for material benefit, or even in the interests of the company itself.

Tools to help solve the Principal-Agent problem:

- **Production of information**: the monitoring process and the production of sufficient information to ensure the elimination of moral hazard problem is costly in terms of money and time: **costly state verification**.
  The free-rider problem can decrease monitoring because if an individual knows that other stockholders are paying to monitor the activities of a company in which he holds shares, he can take a free ride on their activities. But what if everyone does this?
- **Government regulation to increase information**: laws enforcing companies to meet standard accounting principles make profit verification easier. Strict criminal penalties on people committing fraud.
- **Financial intermediation** through, e.g. a venture capital firm helps to reduce the moral hazard problem. **Venture capital** firms pool the resources of their partners and use the funds to help budding entrepreneurs start new businesses. In exchange for the use of capital, the firm receives an equity share in the new business. Venture capital firms normally have some members of their own on the board of directors and this protects the interests of the investors. Because only the people involved know about the specific companies and profits, etc. the free-rider problem is eliminated.
- **Debt contracts:** an equity contract is a claim on profits in all situations. However, a debt contract is an agreement by the borrower to pay the lender fixed amounts at periodic intervals. The lender therefore, does not particularly worry as to whether the company is making more or less profit, as long as it is able to meet its commitment. It is only when the company is unable to meet its payments that the investors would require verification. This involves a lower cost of monitoring and verification. It explains why debt contracts are used more frequently than equity contracts to raise capital.

How moral hazard influences the financial structure in debt markets

Debt contracts are still subject to moral hazard. Because borrowers have an incentive to make higher profits, there is the tendency to take on riskier investment opportunities and this can result in unnecessary losses.

Tools to help solve moral hazard in debt contracts:

- **Net worth and collateral**: when borrowers have more at stake because their net worth is high or the collateral they have pledged to the lender is valuable, the risk of moral hazard is reduced.
- **Monitoring and enforcement of restrictive covenants:**
  a. covenant to discourage undesirable behaviour;

b. covenant to encourage desirable behaviour;

c. covenant to keep collateral valuable;

d. covenants to provide information.

Refer to Summary (Table 1) on page 220 in textbook. Complete the 2 tables in SG on pg 37-38 to secure your understanding of this chapter!!

SUMMARY TABLE 1

Asymmetric Information Problems and Tools to Solve Them

Asymmetric Information Problem	Tools to Solve It	Explains Fact Number
Adverse selection	Private production and sale of information	1, 2
	Government regulation to increase information	5
	Financial intermediation	3, 4, 6
	Collateral and net worth	7
Moral hazard in equity contracts (principal–agent problem)	Production of information: monitoring	1
	Government regulation to increase information	5
	Financial intermediation	3
	Debt contracts	1
Moral hazard in debt contracts	Collateral and net worth	6, 7
	Monitoring and enforcement of restrictive covenants	8
	Financial intermediation	3, 4

Note: List of facts:
1. Stocks are not the most important source of external financing.
2. Marketable securities are not the primary source of finance.
3. Indirect finance is more important than direct finance.
4. Banks are the most important source of external funds.
5. The financial system is heavily regulated.
6. Only large, well-established firms have access to securities markets.
7. Collateral is prevalent in debt contracts.
8. Debt contracts have numerous restrictive covenants.

Typical Examination questions

8.1 List eight basic facts about financial structure throughout the world. (8)

8.2 Explain the role of financial intermediaries by referring to the problem of high transaction costs in financial transactions and the role of financial expertise. (10)

8.3 Explain why marketable securities (debt and equity) are not the primary source of financing for businesses and how financial intermediaries and government regulation can partly overcome the problem of asymmetric information (adverse selection). (10)

8.4 Explain, in general, why indirect financing is more important than direct financing and, in particular, why banks are the most important source of external finance for financing businesses. Then comment on the two statements: "The role of banks in lending will probably decline in future" and "The more established a firm is, the more likely it will issue securities to raise funds". (10)

8.5 Explain why the presence of adverse selection in credit markets explains the fact that collateral (or net worth) is important in debt contracts. (4)

8.6 Explain why moral hazard explains why stocks are not the most important source of financing for businesses and why debt contracts may be preferable. (Hint: In your answer, amongst others, refer to the principal agent problem.) (12)

8.7 Explain the meaning of the concept of moral hazard and why it explains that debt contracts are complicated legal documents that place substantial restrictions on the behaviour of the borrower (also list the four types of restrictive covenants). Are monitoring and restrictive covenants necessarily effective? Can you explain why financial intermediaries play a more important role in channeling funds from lenders → borrowers than marketable securities? (12)

8.8a Explain the meaning of conflicts of interest (a type of moral hazard), and why they may arise in financial institutions. (5)

8.8b Explain why conflicts of interest arise in underwriting and research in investment banking. (6)

8.9 Explain why underdeveloped financial systems in developing and transitional economies face several difficulties that restrict their efficiency, and why certain practices in developing and transitional countries reduce economic efficiency. (6)

CHAPTER 9: FINANCIAL CRISES IN ADVANCED ECONOMIES

This section makes use of **agency theory** to see why financial crises occur and why they have such devastating effects on the economy. *[Agency theory = the economic analysis of the effects of asymmetric information (adverse selection and moral hazard) on financial markets and the economy].*

What is a financial crisis?

A financial crisis occurs when an increase in **asymmetric information** from a disruption in the financial system causes severe adverse selection and moral hazard problems that render financial markets incapable of channeling funds efficiently from savers to households and firms with productive investment opportunities. These barriers to efficient allocation of capital are called **financial frictions.** When financial markets fail to function efficiently, economic activity contracts sharply.

Dynamics of Financial Crises in Advanced Economies *See figure1 pg 229*

Stage one: Initiation of financial crisis.
Several possible ways:

- **Mismanagement of financial liberalization/innovation:** the elimination of restrictions on financial markets and institutions, or when new innovations are introduced. Often there is a lack of understanding of the changing situations which leads ultimately to banks taking greater risks and then having to face the consequences of bad debts arising from these risks. When this occurs banks are forced to restrict lending (deleveraging) and this puts pressure on the economy, leading to a severe decrease in economic activity. Lending boom becomes a lending crash

- **Asset price booms and busts:** "irrational expectations" tend to drive asset prices above the real value of these assets. Asset-price bubbles (tech stock market 1990s, house prices 2007) are often driven by **credit booms**, where the large increase in credit is used to fund purchases of assets, thereby driving up their price. When "reality" eventually prevails, the assets are largely devalued and the consequences for an economy can be devastating.

- **Increase in uncertainty**: during periods of uncertainty (after a recession, stock market crash or failure of major financial institution) accurate information is harder to obtain and consequently the problems of adverse selection and moral hazard increase, financial frictions increase, lending declines and economic activity decreases.

Stage Two: Banking Crisis: deteriorating balance sheets and tougher business conditions lead some financial institutions into insolvency. Depositors begin to withdraw their funds from banks and a banking crisis or **bank panic** ensues, in which multiple banks go out of business. This may force banks to sell off assets quickly to raise the necessary funds – **fire sales.** The resulting decline in the number of banks results in a loss of information capital (creditworthiness), worsening adverse selection and moral hazard problems in credit markets and a further downward spiral of the economy. Uncertainty in the market declines when healthy and insolvent banks are sorted through. Adverse selection and moral hazard problems subside and stage is set for an **economic recovery**.

Stage Three: Debt Deflation: if however the downturn in the economy leads to a **general decrease in prices**, this can lead to a decrease in the net value of firms – **debt deflation**. In most advanced economies with debt contracts with fixed long term interest rates, the unanticipated decline in price level raises the value of borrowing firms' debt in real terms but does not raise the real value of borrowing firms' assets. The borrowing firms' net worth in real terms thus declines. When this happens the adverse selection and moral hazard problems can become so severe that lending, investment spending and aggregate economic activity remain depressed for a long time. One of the most famous of these types of financial crisis is the Great Depression in the United States.

Application: The Great Depression pg 231

- **Stock market crash**
  In 1928 and 1929, prices doubled in the U.S. stock market. Federal Reserve officials viewed the boom as excessive speculation and to curb it they pursued a tightening of monetary policy to raise interest rates to limit the rise in stock prices. However the stock market crashed in October 1929, falling by 40%.

FIGURE 2
Stock Prices During the Great Depression Period

Stock prices crashed in 1929, falling by 40% by the end of 1929, and then continued to fall to only 10% of their peak value by 1932.

Source: Dow-Jones Industrial Average (DJIA). Global Financial Data; www.globalfinancialdata .com/index_tabs.php?action= detailedinfo&id=1165.
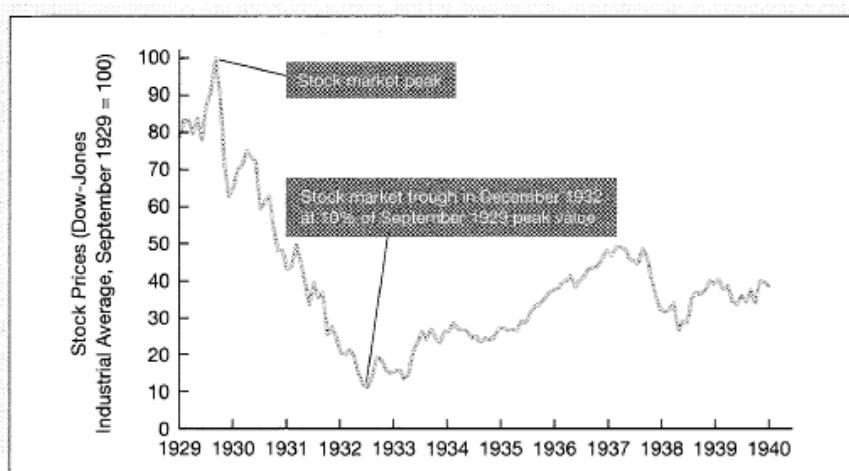
FIGURE 3

Credit Spreads During the Great Depression

Credit spreads (the difference between rates on Baa corporate bonds and U.S. Treasury bonds) rose sharply during the Great Depression.

Source: Federal Reserve Bank of St. Louis FRED database; http://research.stlouisfed.org/fred2/categories/22.
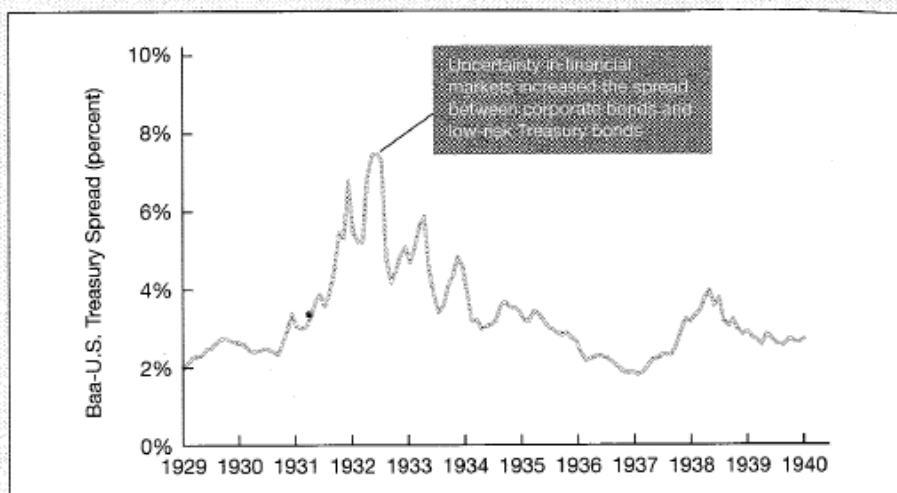
- **Bank panics**
  By the middle of 1930, stocks had recovered almost half their losses and credit markets conditions stabilized. However, when severe droughts in the Midwest led to sharp declines in agricultural production, the result was that farmers were unable to pay back their bank loans. The mortgage defaults led to large loan losses on bank balance sheets. The weakness of the economy and banks prompted substantial withdrawals from banks, building to a full-fledged panic in November 1930. By March 1933, more than one-third of U.S. commercial banks had failed.

- **Continuing decline in stock prices**
  Stock prices kept falling and the increase in uncertainty from the unsettled business conditions created by the economic contraction worsened adverse selection and moral hazard problems in financial markets. A manifestation of the rise in financial frictions is that lenders began charging businesses much higher interest rates to protect themselves from credit losses.

- **Debt deflation**
  The ongoing deflation that started in 1930 eventually led to a 25% decline in price level. The resulting decline in net worth led to a prolonged economic contraction in which unemployment rose to 25% of the labour force.

- **International dimensions**
  Bank panics in the US also spread to the rest of the world, and the contraction of the U.S economy sharply decreased the demand for foreign goods. The worldwide depression caused great hardship, with millions upon millions of people out of work, and the resulting discontent led to the rise of fascism and World War II.

Application: The Global financial Crisis of 2007-2009 pg 234

Causes of the crisis:

- **Financial innovation in the mortgage markets**
  Before 2000, only the most credit worthy (prime) borrowers could obtain mortgages. However, with advances in computer technology and statistical risk analysis techniques, banks (with the help of securitization) were able to offer subprime mortgages to borrowers with less than stellar credit records. *See FYI box on pg 235*

- **Agency problems in the mortgage markets**
  Mortgage brokers did not make a strong effort to evaluate whether the borrower could actually pay back the loan, since they would simply sell (distribute) the loan to investors in the form of mortgage backed securities. This **originate-to-distribute** model was exposed to **principal-agent problems** where the mortgage brokers acted as agents for the investors but did not have their best interest at heart. Once the broker had earned his fee, why should he care if the borrower keeps up to date on their payments? Compounding this problem was lax regulation of originators, who weren't required to disclose info to borrowers that would've helped them assess whether they could afford the loans.

- **Asymmetric information and credit rating agencies**
  Credit rating agencies were subject to conflicts of interest because they earned large fees from advising clients on how to structure complex financial instruments like CDOs as well being responsible for rating these same products on their probability of default. Therefore they had no incentive to make sure their ratings were accurate.

Effects of the crisis:
- **Residential housing prices: Boom and Bust**
  Aided by low interest rates, the asset price boom in housing helped stimulate the growth of the subprime mortgage market. With housing prices rising, subprime borrowers were also unlikely to default as they could always sell the house to pay off the loan. Eventually the housing price bubble burst. With housing prices falling drastically, the value of many subprime borrowers' houses fell below the amount of the mortgage. Struggling homeowners had large incentives to walk away from their homes.

FIGURE 4

Housing Prices and the Financial Crisis of 2007-2009

Housing prices boomed from 2002 to 2006, fueling the market for subprime mortgages and forming an asset-price bubble. Housing prices began declining in 2006, falling by more than 30% subsequently, which led to defaults by subprime mortgage holders.

Source: Case-Shiller U.S. National Composite House Price Index; www.macromarkets.com/ csi_housing/index.asp.
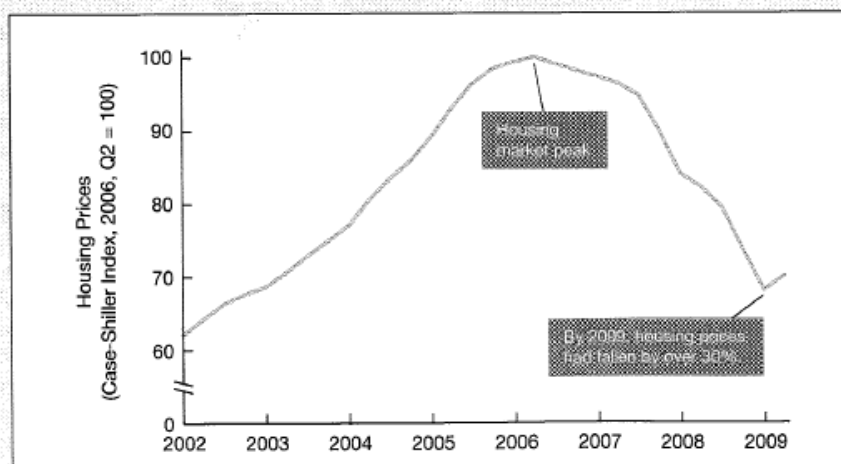
- **Deterioration of Financial Institutions' Balance Sheets**
  With rising defaults on mortgages, the value of mortgage-backed securities and CDOs collapsed, leaving banks with a lower value of assets and a decline in their net worth. This caused them to sell off assets and restrict lending. Financial frictions then increased in financial markets.

- **Run on the shadow banking system**
  This is composed of hedge funds, investment banks and other non-depository financial firms, which are not as tightly regulated as banks. With the values of mortgage-backed securities falling, the same amount of collateral would allow financial institutions to borrow only half as much. Thus to raise funds, they needed to engage in fire sales which further lowered asset prices. The decline in asset prices in stock market (fell by over 50% from Oct 2007 – Mar 2009) and the more than 30% drop in house prices, along with fire sales, weakened both firms' and households' balance sheets

FIGURE 5

Stock Prices and the Financial Crisis of 2007-2009

Stock prices fell by 50% from October 2007 to March 2009.

Source: Dow-Jones Industrial Average (DJIA). Global Financial Data; www.globalfinancialdata. cm/index_tabs.php?action= detailedinfo&id-1165.
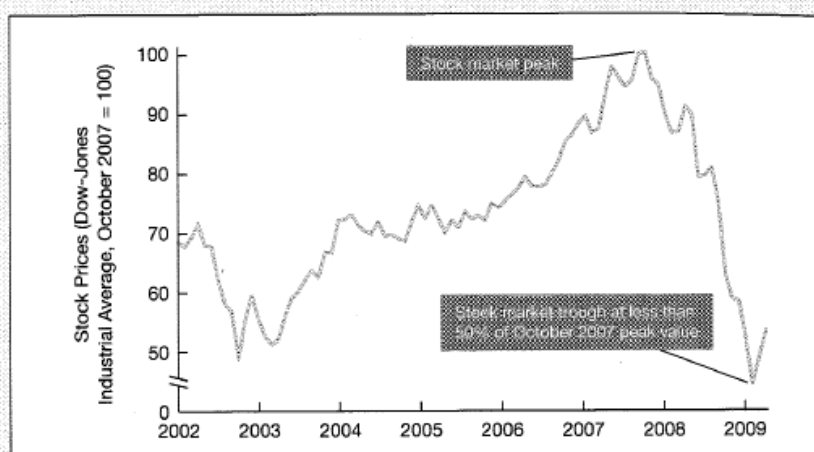
- **Global financial markets**
  Although the problem originated in the US, a sign of how extensive the globalization of financial markets had become was when the crisis hit Europe.

- **Failure of high profile firms**
  The sale, failure and bail out of firms like Bear Sterns, Fannie Mae, Freddie Mac, Lehman Brothers and AIG etc.

The 2007-2009 financial crisis did not lead to a depression because of aggressive Federal Reserve actions and worldwide government intervention through bailouts of financial institutions.

Global Worldwide Government Bailouts During the 2007–2009 Financial Crisis

The spreading bank failures in Europe in the fall of 2008 led to massive bailouts of financial institutions: the Netherlands, Belgium, and Luxembourg injected $16 billion to prop up Fortis, a major European bank; the Netherlands injected $13 billion into ING, a banking and insurance giant; Germany provided a $50 billion rescue package for Hypo Real Estate Holdings; and Iceland took over its three largest banks after its banking system collapsed. Ireland's government guaranteed all the deposits of its commercial banks as well as interbank lending, as did Greece. Spain implemented a bailout package similar to the United States' to buy up 50 billion euros ($70 billion) of assets in its banks in order to encourage them to lend.

The U.K. Treasury set up a bailout plan with a similar price tag to that of the U.S. Treasury's plan of 400 billion pounds ($699 billion). It guaranteed 250 billion pounds of bank liabilities, added 100 billion pounds to a facility that swaps these assets for government bonds, and allowed the U.K. government to buy up to 50 billion pounds of equity stakes in British banks. Bailout plans to the tune of over $100 billion in South Korea, $200 billion in Sweden, $400 billion in France, and $500 billion in Germany, all of which guaranteed the debt of their banks as well as injecting capital into them, then followed. Both the scale of these bailout packages and the degree of international coordination was unprecedented.

**Inside the Fed** Was the Fed to Blame for the Housing Price Bubble?

Some economists—most prominently, John Taylor of Stanford University—have argued that the low interest rate policy of the Federal Reserve in the 2003–2006 period caused the housing price bubble.* During this period, the Federal Reserve relied on easing of monetary policy to set the federal funds rate well below the level that the Taylor rule, discussed in Chapter 17, suggested was appropriate. Taylor argues that the low federal funds rate led to low mortgage rates that stimulated housing demand and encouraged the issuance of subprime mortgages, both of which led to rising housing prices and a bubble.

In a speech given in January 2010, Federal Reserve Chairman Ben Bernanke countered this argument.[†] He concluded that monetary policy was not to blame for the housing price bubble. First, he said, it is not at all clear that the federal funds rate was below what

the Taylor rule suggested would be appropriate. Rates seemed low only when current values, not forecasts, were used in the output and inflation calculations for the Taylor rule. Rather, the culprits were the proliferation of new mortgage products that lowered mortgage payments, a relaxation of lending standards that brought more buyers into the housing market, and capital inflows from countries such as China and India. Bernanke's speech was very controversial, and the debate over whether monetary policy was to blame for the housing price bubble continues to this day.

*John Taylor, "Housing and Monetary Policy," in Federal Reserve Bank of Kansas City, Housing, Housing Finance and Monetary Policy (Kansas City: Federal Reserve Bank of Kansas City, 2007), 463–476.
†Ben S. Bernanke, "Monetary Policy and the Housing Bubble," speech given at the annual meeting of the American Economic Association, Atlanta Georgia, January 3, 2010; www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm.
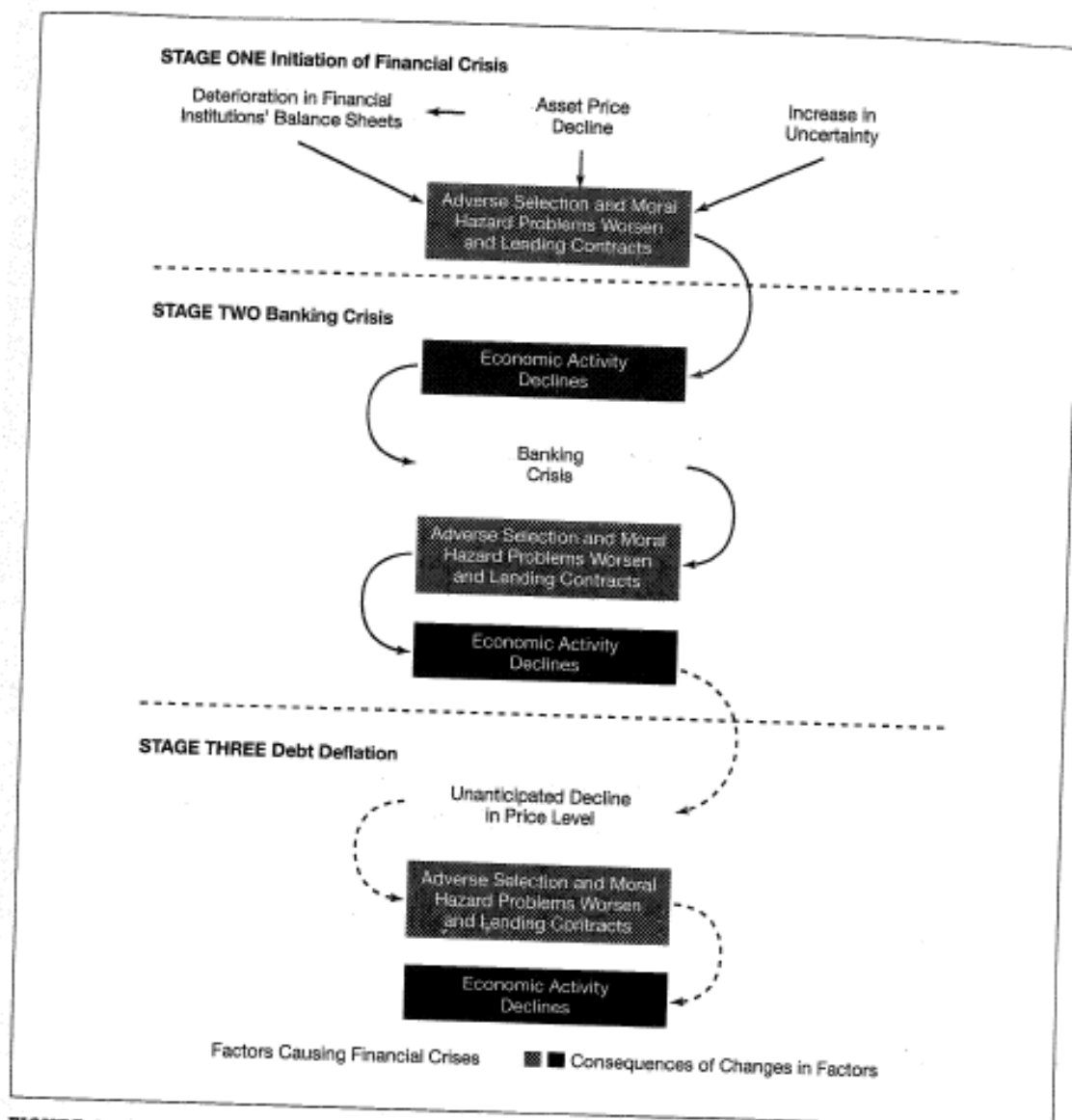
FIGURE 1   Sequence of Events in Financial Crises in Advanced Economies
The solid arrows trace the sequence of events during a typical financial crisis; the dotted arrows show the additional set of events that occur if the crisis develops into a debt deflation. The sections separated by the dashed horizontal lines show the different stages of a financial crisis.

Typical exam questions

9.1 Explain six factors that may cause financial crises and explain why financial crises lead to contractions in economic activity. (30)

9.2 Explain the dynamics of past financial crises in the US as they progressed along three stages.
Focus on financial institutions. (15)

True or false Review Questions

1. When an asset-price bubble bursts and asset prices realign with fundamental economic values, there is a resulting decline in the net worth of firms and firms have incentives to take on risk at the lender's expense.
2. A lower net worth of a firm means there is less collateral, so adverse selection increases.
3. An unanticipated decline in the price level leads to firms' real burden of indebtedness increasing. The resulting decline in a firm's net worth increases adverse selection and moral hazard problems facing lenders.
4. When a domestic firm's debt contracts are denominated in foreign currency, and when there is an unanticipated decline in the value of the domestic currency, then the debt burden of the firm increases.
5. A lower net worth means there is less collateral and so adverse selection increases.
6. When there are simultaneous failures of financial institutions, there is a loss of information production in financial markets and a direct loss of banks' financial intermediation.
7. A failure of a major financial institution, which leads to a dramatic increase in uncertainty in financial markets, makes it hard for lenders to screen good from bad credit risks. The resulting inability of lenders to solve the adverse selection problem makes them less willing to lend.
8. Individuals and firms with the riskiest investment projects are those who are willing to pay the highest interest rates. If increased demand for credit drives up interest rates sufficiently, good credit risks are less likely to want to borrow while bad credit risks are still willing to borrow.
9. When there is weak bank regulation and supervision, then financial institutions will take on excessive risk because market discipline is weakened by the existence of a government safety net.

Chapter 10: Dynamics of Financial Crises in Emerging Market Economies

Stage one: Initiation of financial crisis

- **Mismanagement of financial liberalization/globalization**. The opening up of economies to flows of capital and financial firms from other nations is called globalization. Problems arise when institutional weakness (fiscal imbalances, ineffective screening and monitoring of borrowers and lax government supervision of banks) prevents a country from successfully handling the liberalization or globalization process. Only when prudent regulation and supervision are strong, the lending boom and bust that often follows the opening up the emerging market economies will not occur.

- **Severe fiscal imbalances**. Governments that run up high deficits often persuade or even force the banks to purchase government debt (bonds). When investors lose confidence in the ability of the government to repay the bonds, the price of the bonds plummets and this means that banks that are holding such bonds have a serious decrease in the value of their assets. With less capital, lending will decline and a worsening of adverse selection and moral hazard problems will occur.

- **Some additional factors**: rise in interest rates from events abroad which are most likely to be agreed to by riskier firms. The loans that are made therefore become high risk.

Stage two: Currency crisis
As the effects in stage one build on each other, participants in the forex market sense an opportunity: they can make huge profits if they speculate with the currency and they bet on the currency **depreciating**. As a result the currency is subject to **speculative attack** where speculators engage in massive sales of the currency. The market is flooded with currency, supply far outstrips demand, the value of the currency collapses and a currency crisis occurs. Countries are unable to defend their currency when it becomes impossible to raise interest rates or the central bank has exhausted all its forex reserves. A currency crisis can also be triggered by government deficits that spin out of control. Foreign investors start doubting the government's ability to honour its debt and start pulling their money out of the country and thus selling the domestic currency.

Stage three: Full-fledged financial crisis
When debt contracts are denominated in foreign currency and then the value of the domestic currency depreciates, the amounts owing on these debt contracts increase. The debt burden of firms and government increases substantially. The value of debt increases more than the value of assets and firms' net worth declines. The collapse of the currency can also lead to higher inflation. Developing country CBs have less credibility as inflation fighters, thus a sharp depreciation of the currency leads to immediate upward pressure on import prices. A dramatic rise in both actual and

expected inflation will follow. The resulting increase in interest payments causes reductions in firms' cash flow and this in turn leads to asymmetric information problems. Banks also suffer from loss of value in terms of their assets while their liabilities rise. The risk of a bank crisis is increased.

Note:

The financial crises in **emerging market economies** have relevance for South Africa. South Africa was to some degree shielded from the 2007-2009 Subprime crisis because of strict and effective banking regulation. However, South Africa remains a small open economy which has experienced currency crises in the past.

FIGURE 1
Sequence of Events in Emerging-Market Financial Crises
The solid arrows trace the sequence of events during a financial crisis. The sections separated by the dashed horizontal lines, show the different stages of a financial crisis.
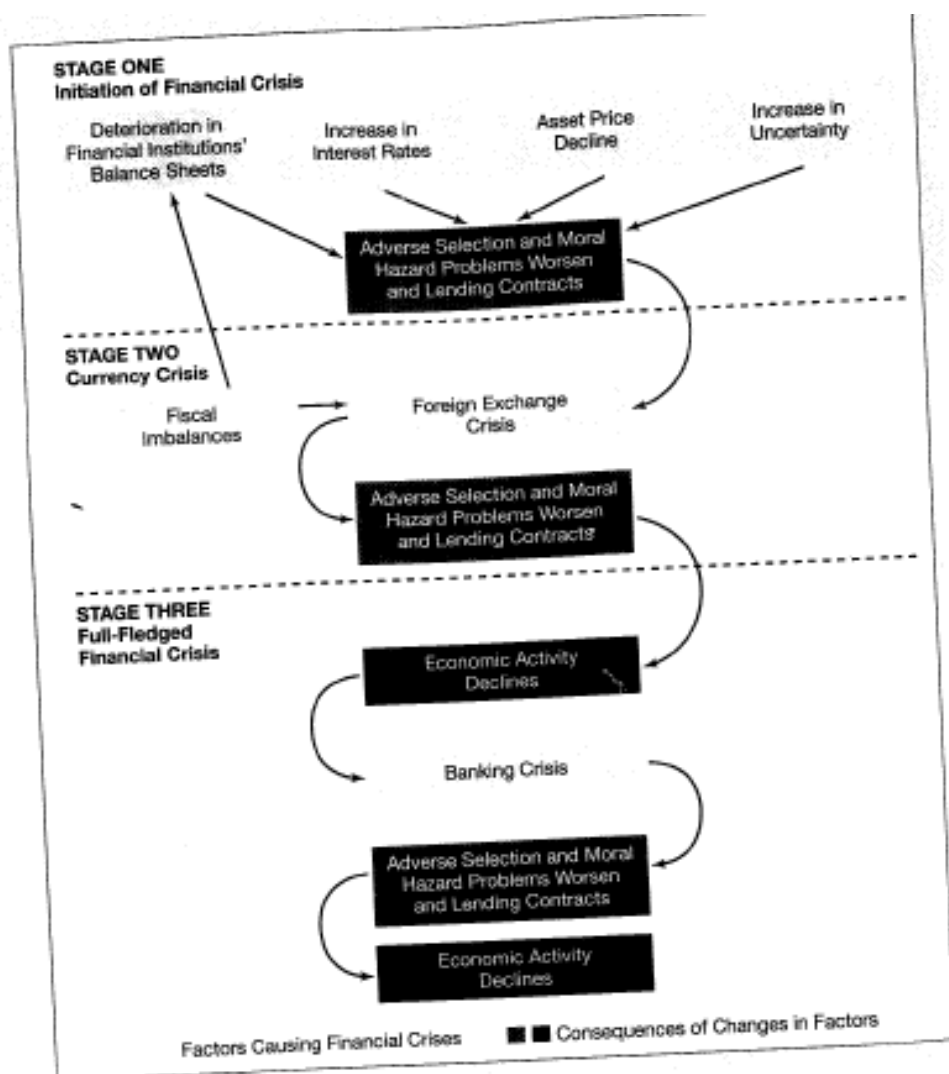
Typical exam question:
Explain the dynamics of a financial crisis in emerging market economies. (15)

CHAPTER 11: BANKING AND THE MANAGEMENT OF FINANCIAL INSTITUTIONS

The bank balance sheet

A bank's balance sheet is also a list of its **sources** of bank funds (liabilities) and **uses** to which these funds are put (assets). Banks obtain funds by borrowing and by issuing other liabilities. They then use these funds to acquire assets such as securities and loans. Banks make **profits** by charging a higher interest rate on their assets (e.g. loans) than they pay on their liabilities (deposits they hold).

Assets (uses)	Liabilities (sources)
Reserves	Checkable deposits
Deposits at other banks	Nontransaction deposits
Securities	Borrowings
loans	Bank capital

Basic banking

In general banks make profits by selling liabilities with one set of characteristics (a combination of liquidity, risk, size and return) and using the proceeds to buy assets with a different set of characteristics. Often referred to as **asset transformation**, e.g. savings deposit into a mortgage loan (borrowing short and lending long).

- **Deposits** form the largest part of banks' liabilities while loans form the bulk of banks' assets. In principle, the bank makes a profit because the revenue earned by interest on loans and the yield of securities, exceeds the interest paid on deposits.

- By far the greatest proportion of the new deposits that banks issue are to **borrowers**. For example, when you borrow money from a bank, the bank issues you with an increased deposit account balance.

- Most loan assets are banks' provision of finance to the private sector.

- Banks hold reserves (which are only 2.5% of their assets) amongst others in order to provide for the possibility of deposit withdrawals. Withdrawals are, however, typically offset by deposits – unless there is a run on the banks. Thus the main reason why reserves are held is that the central bank requires banks to hold a certain minimum of reserves as a percentage of their deposit liabilities.

- T-accounts provide a logically consistent framework to demonstrate the impact of typical transactions of banks.

General principles of bank management

Banks have four primary concerns:

- **Liquidity management**: to keep enough **cash** or liquid assets on hand. Note the role of **excess reserves** which is insurance against the costs associated with deposit outflows. The higher the costs associated with deposit outflows, the more excess reserves banks will want to hold.

- **Asset management**: to maximize profits banks must simultaneously seek the **highest returns** possible on assets, **reduce risk** and make adequate provisions for liquidity by **holding liquid assets**. They try and achieve this through:

  - finding borrowers who will pay high interest rates and are unlikely to default
  - purchase securities with high returns and low risk
  - attempt to lower risk through diversification
  - satisfy the reserve requirements without suffering high costs.

- **Liability management**: concept of acquiring funds at a low cost. How have banks become creative in their acquisition of funds?

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- **Capital adequacy management**: amount of capital required and strategy to acquire this capital. Importance of bank capital:
  - (i)   helps prevent bank failure
  - (ii)   it affects returns for the owners of the bank
  - (iii)   a minimum amount of bank capital is required by regulatory authorities.

  How the amount of bank capital affects returns to equity holders:
  - Bank owners care most about how much the bank is earning on their equity investment →ROE

- o The Equity multiplier (EM) is the relationship between the **return on assets** (how efficiently the bank is run) and the **return on equity** (how well the owners are doing on their investment).

$$EM = Assets/equity\ capital$$

- o Banks have to face a trade-off between safety and returns to equity holders. Bank capital has both **benefits** and **costs**. It makes investment safer (reduces likelihood of bankruptcy) but it is costly because the higher it is, the lower return on equity for a given return on assets.
- o *Given the return on assets, the lower the bank capital, the higher the return for the owners of the bank.*

Application: Strategies for Managing Bank Capital

- As a manager of FNB you have to decide on the correct amount of capital required. On analyzing the balance sheet of the bank you discover that the large amount of capital is **causing the return on equity to be too low.** You therefore conclude that the bank has a **surplus of capital**.
- In order to lower the amount of capital relative to assets and to raise the equity multiplier you can do any of three things: (1) reduce the amount of bank capital by buying back some of the banks stocks; (2) reduce the capital by paying higher dividends and thereby reducing retained earnings; (3) keep bank capital constant but increase the bank's assets by acquiring new funds, e.g. issuing CDs and then seeking out loan business or purchasing more securities with these funds.
- Because you think it would enhance your position with the stockholders, you decide on the 2nd option.
- Assume now, on the other hand that FNB has a **ratio of bank capital to assets of 4%.** Now you are concerned that the bank does not have enough capital to prevent a bank failure.
- To raise the amount of capital relative to assets, you have three choices: (1) raise capital for the bank by a stock (equity) issue; (2) raise capital by reducing dividend payments and increasing retained earnings; (3) keep capital at the same level but reduce the bank's assets by making fewer loans, and so shrink the size of the bank.
- ***Note:*** *a shortfall of bank capital is likely to lead to a bank reducing its assets and therefore a contraction in lending.*

Application: How the capital crunch caused a credit crunch during the Global Financial Crisis

- The slowdown in the growth of credit following the financial crisis, which started in 2007, meant that credit was hard to obtain, the so called **credit crunch**.   This was caused, at least partly, by a shortage of bank capital.
- The boom and bust in the housing market led to huge losses for banks and they were forced to take back onto the balance sheet many of the structured investment vehicles they had sponsored.
- Losses that had reduced capital together with the capital required to support the assets coming back onto balance sheets meant that banks were faced with shortages of capital
- As a consequence they were less inclined to lend and so credit was not easily available.

Managing credit risk

To be profitable, financial institutions must overcome the **adverse selection** and **moral hazard** problems that make loan default more likely. There are a number of ways they can do this:

- **Screening and monitoring**: adverse selection in loan markets requires that lenders screen out the bad credit risks from the goods ones so that loans are profitable. Lenders must, therefore, **collect reliable information** from prospective borrowers. Effective screening and information collection together form an important principle of **credit risk management**.
  Banks often specialize in lending to firms in a particular industry. This goes against the idea of diversification but at the same time makes some sense. By concentrating on leading firms in a specific industry the bank becomes knowledgeable about that specific industry and is better able to make informed decisions.
  Once a loan has been made there is still the risk of **moral hazard**. In order to reduce the likelihood of this occurring, financial institutions should adhere to the principle of managing credit risk and write provisions **(restrictive covenants)** into loan contracts that restrict borrowers from engaging in risky activities.

- **Long-term customer relationships**:   such relationships reduce the costs of collecting information and make it easier to screen out bad credit risks. This has the added advantage of the customer wishing to ensure that he/she can preserve a good relationship with the bank for future loan requirements and so reduces the chances of the customer doing anything to jeopardize the situation.

- **Loan commitments**: an agreement between the bank and a firm to grant loan requirements up to an agreed amount at an interest rate that is linked to a market rate. Majority of industrial and commercial loans are made under the **loan commitment arrangement**. The

advantage to the firm is a secure source of credit and to the bank a long-term relationships which facilitates the collection of information.

- **Collateral and compensating balance**: collateral requirements are important credit risk management tools. One particular form of collateral required by a bank when it makes a commercial loan, is called **compensating balances**: a firm receiving the loan must keep a **required minimum amount of funds** in a cheque account with the bank. This helps the bank to monitor the client and reduce the risk of moral hazard.

- **Credit rationing:** refusing to make loans even though customers are willing to pay the required interest rate. There are two forms: (i) refusal to make any loan and (ii) restricting the size of the loans made.

Managing interest rate risk

The increased volatility of interest rates has caused banks to become more concerned about their exposure to interest rate risk, i.e. the riskiness of earnings and returns associated with changes in interest rates. **If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce the bank's profits and a decline in interest rates will raise bank profits.**

Gap and Duration analysis: The sensitivity of a bank's profits to changes in interest rates can be measured using gap analysis. The amount of rate-sensitive liabilities is subtracted from the amount of rate-sensitive assets.

First National Bank			
Assets		**Liabilities**	
Rate-sensitive assets	$20 million	Rate-sensitive liabilities	$50 million
Variable-rate and		Variable-rate CDs	
short-term loans		Money market deposit	
Short-term securities		accounts	
Fixed-rate assets	$80 million	Fixed-rate liabilities	$50 million
Reserves		Checkable deposits	
Long-term loans		Savings deposits	
Long-term securities		Long-term CDs	
		Equity capital	

[Example: rate sensitive assets – rate sensitive liabilities = $20m - $50m = -$30m. This gap is multiplied by the change in interest rate, +5% and equals -$1,5m. This means that profits will decline by $1,5m if interest rates increase by 5%.]

An alternative method for measuring interest rate risk is called the **duration analysis** and examines the **sensitivity of the market value** of the bank's total assets and liabilities to changes in interest rates. This is based on Macaulay's concept of duration, which *measures the average lifetime of a security's stream of payments.*

Percent change in market value of security ≈ - percentage-point change in interest rate x duration in years

Duration analysis involves using the average duration of assets and liabilities to see how the net worth responds to a change in interest rates.

[Example: Suppose FNBs average duration of assets is 3 years and liabilities is 2 years. If FNB has $100 million in assets, $90 million in liabilities so bank capital is 10% of assets. With +5% in interest rates, the market value of the bank's assets fall by 15% (=-5% x 3 years) down to $85 million. However the market value of liabilities only fall by 10% (=-5% x 2 years) down to $81 million. The net result is that the net worth (assets minus liabilities) has declined by $6 million (from an original net worth value of $10 million down to only $4 million now) or 6% of the total original asset value.

Application: Strategies for managing interest rate risk: read through the application on page 287. The following is a summary:

Suppose that a duration and gap analysis for the bank has been done and decisions have to be made on alternative strategies. If you believe that **interest rates will fall in the future**, you may be willing to take no action because you know that the bank has more rate-sensitive liabilities than rate-sensitive assets and so will benefit from the expected interest rate decline.

[Explanation: the decrease in the amount banks have to pay on deposits (liabilities) will be greater than the decrease in the interest they will receive on their loans (assets)] What will happen though **if the interest rates increase**? It is possible you could shorten the duration of the bank's assets to increase their rate-sensitivity, alternatively you could lengthen the duration of the liabilities. New financial instruments such as derivatives (forwards, future, options and swaps) can help the bank reduce its interest-rate risk exposure and do not affect the balance sheet directly.

Off-balance sheet activities

The environment within which banks operate is becoming increasingly competitive and as a result banks have been aggressively seeking out profits by engaging in off-balance sheet activities. These involve **trading financial instruments** and **generating income from fees and loan sales**, activities that affect bank profits but <u>do not appear on bank balance sheets</u>.

- **Loan Sales**: a type of off-balance-sheet activity that has grown. Also called **Secondary loan participation** and involves a contract that sells all or part of the cash stream from a specific loan and thereby removes the loan from the bank's balance sheet. Banks earn profits by selling loans for an amount slightly greater than the amount of the

original loan. Because of the high interest rate on these loans it makes them attractive, institutions buy them.

- **Generation of Fee Income**: banks obtain income for providing specialized services to their customers, such as making foreign exchange trades on a customer's behalf, servicing a mortgage-backed security by collecting interest and principal payments and then paying them out, guaranteeing debt securities etc. Even though a guaranteed security doesn't appear on a bank's balance sheet, it still exposes it to default risk.

- **Trading activities and risk management techniques**: activities such as trading in financial futures, options for debt instruments and interest-rate swaps are off-balance-sheet activities. While these activities are often undertaken to reduce risks, banks also engage in **speculative activities** which can be very risky.
A particular problem for banks in the case of such trading activities is that the **principal-agent problem** can be severe. The Barings Bank failure is an example of how a trader was able to cause the collapse of an initially healthy bank (pg 289).

  To reduce the principal-agent problem, managers of financial institutions must set up **internal controls** to prevent such severe problems from arising. Such controls include the separation of the people in charge of trading operations from those in charge of the bookkeeping of such transactions. In addition, controls should be set on the limits of the total amount of traders' transactions and on the institution's exposure to risk.

Global Barings, Daiwa, Sumitomo, and Société Générale: Rogue Traders and the Principal–Agent Problem

The demise of Barings, a venerable British bank more than a century old, is a sad morality tale of how the principal–agent problem operating through a rogue trader can take a financial institution that has a healthy balance sheet one month and turn it into an insolvent tragedy the next.

In July 1992, Nick Leeson, Barings's new head clerk at its Singapore branch, began to speculate on the Nikkei, the Japanese version of the Dow Jones stock index. By late 1992, Leeson had suffered losses of $3 million, which he hid from his superiors by stashing the losses in a secret account. He even fooled his superiors into thinking he was generating large profits, thanks to a failure of internal controls at his firm, which allowed him to execute trades on the Singapore exchange *and* oversee the bookkeeping of those trades. (As anyone who runs a cash business, such as a bar, knows, there is always a lower likelihood of fraud if more than one person handles the cash. Similarly, for trading operations, you never mix management of the back room with management of the front room; this principle was grossly violated by Barings management.)

Things didn't get better for Leeson, who by late 1994 had losses exceeding $250 million. In January and February 1995, he bet the bank. On January 17, 1995, the day of the earthquake in Kobe, Japan, he lost $75 million, and by the end of the week had lost more than $150 million. When the stock market declined on February 23, leaving him with a further loss of $250 million, he called it quits and fled Singapore. Three days later, he turned himself in at the Frankfurt airport. By the end of his wild ride, Leeson's losses, $1.3 billion in all, ate up Barings's capital and caused the bank to fail. Leeson was subsequently convicted and sent to jail in Singapore for his activities. He was released in 1999 and apologized for his actions.

Our asymmetric information analysis of the principal–agent problem explains Leeson's behavior and the danger of Barings's management lapse. Letting Leeson control both his own trades and the back room increased asymmetric information, because it reduced the principal's (Barings's) knowledge about Leeson's trading activities. This lapse increased the moral hazard incentive for him to take risks at the bank's expense, as he was now less likely to be caught. Furthermore, once he had experienced large losses, he had even greater incentives to take on even higher risk because if his bets worked out, he could reverse his losses and keep in good standing with the company, whereas if his bets soured, he had little to lose because he was out of a job anyway. Indeed, the bigger his losses, the more he had to gain by bigger bets, which explains the escalation of the amount of his trades as his losses mounted. If Barings's managers had understood the principal–agent problem, they would have been more vigilant at finding out what Leeson was up to, and the bank might still be here today.

Unfortunately, Nick Leeson is no longer a rarity in the rogue traders' billionaire club, those who have lost more than $1 billion. Over eleven years, Toshihide Iguchi, an officer in the New York branch of Daiwa Bank, also had control of both the bond trading operation and the back room, and he racked up $1.1 billion in losses over the period. In July 1995, Iguchi disclosed his losses to his superiors, but the management of the bank did not disclose them to its regulators. The result was that Daiwa was slapped with a $340 million fine and the bank was thrown out of the country by U.S. bank regulators.

Yasuo Hamanaka is another member of the billionaire club. In July 1996, he topped Leeson's and Iguchi's record, losing $2.6 billion for his employer, the Sumitomo Corporation, one of Japan's top trading companies. Jerome Kerviel's loss for his bank, Société Générale, in January 2008 set the all-time record for a rogue trader: His unauthorized trades cost the French bank $7.2 billion.

The moral of these stories is that management of firms engaged in trading activities must reduce the principal–agent problem by closely monitoring their traders' activities, or the rogues' gallery will continue to grow.

Typical Exam questions

11.1 Present the major assets and liabilities of a commercial bank in balance sheet format. (6)

11.2 Demonstrate (make appropriate entries in this balance sheet, only changes are required) of the following transactions. (Hint: Each of the transactions requires two entries in the balance sheet.)

(a) New deposits of R10m arise. (2)
(b) The bank uses asset transformation (into loans) arising from (a). Explain why this gives rise to profits. Assume the required reserve ratio is 10% of deposits. (3)

(c) The bank borrows R2m from the central bank in order to increase its excess reserves. (2)
(d) The bank buys R1m of government stock. (2)
(e) The bank sells R3m of securities in order to finance a new loan of R3m. (2)
(f) The bank writes off R4m of bad loans. (2)
(g) The bank makes a profit of R6m. Thus the bank pays a dividend of R5m to its shareholders.(3)

11.3 Explain the primary concerns banks have in managing their assets and liabilities. (10)
11.4 Explain the meaning of credit risk and how banks can manage their credit risk. (7)
11.5 Explain briefly the meaning of interest rate risk and how banks may deal with this problem. (5)
11.6 Briefly explain the meaning of off-balance-sheet activities and the forms in which they occur. What type of risks do they hold for banks? (8)

True or false review questions

1. Bank A experiences a shortfall of capital. Because this increases the likelihood of a bank failure, bank A is likely to reduce its issue of new loans.
2. The purpose of screening and collecting information about a prospective lender is to gain relevant information to evaluate the risk of default of the loan. The process to gain this relevant information is called adverse selection.
3. A loan commitment arrangement reduces a bank's cost for screening and information collection.
4. Compensating balances function as a form of collateral for loans.
5. Loan sales occur when, say Bank A, sells a future income stream of certain categories of its loans, or part of its loans, to outside investors, at a price slightly above the original loan amount, which creates a profit in Bank A's income account. In terms of balance sheet entries, this reduces the amount of loans of bank A, while simultaneously increasing the amount of securities held by bank A.
6. Generation of fee income occurs when banks perform specialised services for clients, e.g. provision of foreign exchange, servicing of a security, providing a guarantee of debt securities (e.g. BAs), provision of backup lines of credit, etc. Some of this exposes the bank to risk. If the issuer of the security fails then the bank has to pay.

Part four: Central banking and the conduct of monetary policy
(Textbook: chapters 14, 15, 16 and 17)

CHAPTER 14: CENTRAL BANKS: A GLOBAL PERSPECTIVE

Central banks are important players in the financial markets around the world. They are the monetary authority and their actions affect interest rates, money supply and the supply of credit. All these factors have an effect on financial markets, aggregate demand and inflation.

The study guide highlights three questions relating the central bank:
- The goals of monetary policy
- The role of the central bank (SARB) in the South African banking system
- The case for central bank independence

Explaining central bank behavior

C3 Can monetary policy help to alleviate SA's unemployment problem?

In South Africa the goals of employment and economic growth are both equally important. SARB has been under pressure to lower interest rates particularly from trade unions.
Many believe that the advantages of a low interest rate (perceived as higher employment) far outweigh the problems of a low interest rate (a higher rate of inflation).

Refer to pages 50 - 52 in the study guide and complete this section. Note the conclusion.
  Can monetary policy in the form of low interest rates, help to alleviate South Africa's unemployment problem? The short answer to this question is no:

1. South Africa's high level of unemployment is mainly a structural problem. In a modern economy, business and industry demand skilled workers and it is typically also a skilled person who is in a better position to start a business. Raising the skill level of workers calls for structural solutions, such as a good school system and the development of worker skills and entrepreneurship through education and training. Structural problems of a long term nature are best solved by long term structural solutions. Short-term solutions like lowering interest rates to solve the structural unemployment problem are generally ineffective and often not sustainable.

2. The case for lower interest rates rests on the assumption that lower interest rates will lead to a higher level of economic activity and employment. Not always the case however! Lower interest rates may lead to price inflation, and the lack of price stability has negative effects on long term growth. Theoretically lower interest rates increase disposable income of households and increases borrowing. This increases aggregate demand. What happens to imports? Lastly,

monetary policy controls the repo rate which is a short-term interest rate, and there are significant lags before a lower interest rate impacts on the domestic economy.

3. Lower interest rates might lead to a depreciation of the value of the Rand and higher inflation. High inflation increases uncertainty which complicates planning, it corrupts information which disrupts markets, it leads to all sorts of unproductive activities trying to escape the adverse effects of inflation, it causes an unfavourable redistribution of income, it reduces social cohesion and leads to social unrest. Depreciation of the rand makes imports more expensive and adds fuel to the inflation process.

C4 The South African Reserve Bank (SARB)

Functions of the SARB

The SARB has six main functions, study these in study guide (page 52).

1. Sole right to issue cash or currency.
2. Provides facilities for clearing and the settlement of interbank obligations (cheques).
3. Acts as banker for and supervisor of other banks and as lender of last resort.
4. Formulation and implementation of monetary policy.
5. Banker for government
6. Custodian of the greater part of SA gold and other foreign exchange reserves.

Is the SARB independent? *(Possible exam essay question!!)*

Study in study guide. Pay particular attention to the following:
- South Africa uses an inflation targeting policy framework. The inflation target range is 3% to 6%.
- This target is set in consultation between the Governor of the SARB and the Minister of Finance.
- SARB has **operational independence** in monetary policy decisions aimed at achieving the target.
- SARB is accountable to Parliament via the Minister of Finance.
- The Governor of the SARB frequently explains the SARB's policy stance in the media.
- SARB is **financially independent** of government.
- The President appoints the governor and three deputy governors → implies SARB may not be completely isolated from political influences.

Should the Fed (SARB) be independent?

The following are points to consider **supporting the case for independence**:

- A strong argument that supports independence is that the subjecting of Fed to political pressures would cause an inflationary bias to monetary policy
- Because politicians tend to be motivated by self-interest (i.e. election) they are inclined to be short-sighted in regard to objectives. They are inclined to focus on finding short-term, popular solutions which may not have good long-term outcomes.
  - o An example: high money growth in the short run might lead to a drop in interest rates, but ultimately, as inflation heats up, will cause interest rates to rise.
- It is believed that a politically insulated (independent) Fed is more likely to be concerned with long-term objectives, such as a sound currency and stable price level.
- The political business cycle is also a reason for keeping the Fed independent. Expansionary policies are generally followed immediately prior to elections, and the bad consequences are only felt afterwards.
- If the Fed is put under the control of the president it would be subject to influence by the Treasury.
- The control of monetary policy is too important to leave to politicians. This can be stated in terms of the principal-agent problem: both the Federal Reserve and the politicians are agents of the public (the principals) and both have incentives to act in their own self-interests. It is argued though that the principal –agent problem is worse for politicians than for the Fed.
- An independent Fed can pursue policies that may not be popular, but are in the public interest.

The following are the points to consider when arguing **the case against independence**:

- Control of monetary policy by an elite group who is answerable to no-one is considered undemocratic
- The current lack of accountability is a problem.
- In arguing for the independence of the Fed, it is then possible to also argue for the independence of the Joint Chiefs and the IRS.
- The public holds the president and Congress responsible for the economic well-being of the country but lacks the control over a very important element in determining the health of the economy.
- In order to achieve economic stability, monetary policy must be coordinated with fiscal policy.

Recent research seems to support the idea that the **central bank should be independent**: when central banks are ranked from least independent to most independent, inflation performance is found to be the best for countries with the most independent central banks. In addition countries with independent

central banks are no more likely to have high unemployment or greater output fluctuations than those with less independent central banks.

Typical Exam questions

14.1 Should price stability be the primary goal of monetary policy? Also explain the meaning of hierarchical and dual mandates and how they can be used. (12)
14.2 Briefly explain the nature of the time-inconsistency problem and the role of the nominal anchor.(5)
14.3 Briefly explain why the price stability goal in SA is desirable in spite of other pressing economic problems. (15)
14.4 List and briefly explain the six main functions of the SARB. (6x3=18)
14.5 Explain
   (a) the advantages and disadvantages of the independence of a central bank (10)
   (b) and whether the SARB is in fact independent (9)

True or false review questions

1. A nominal anchor is a nominal variable that monetary policymakers use as an intermediate target to achieve an ultimate goal such as price stability. The nominal anchor affects people's price expectations.
2. Monetary policy is considered time-inconsistent because of the lags associated with the implementation of monetary policy and its effect on the economy.
3. If the central bank promotes price stability in the long term, then the other goals of monetary policy such as high employment, economic growth, stability of financial markets, interest rate stability and stability in foreign exchange markets are also achieved in the long term.
4. High employment and price level stability can, at times, conflict in the short run.
5. Either a dual or hierarchical mandate is acceptable as long as price stability is the primary goal in the long run.
6. A potential problem of a dual mandate (price stability and employment) is that the central bank emphasises inflation control rather than reducing business-cycle variations.
7. A potential problem of a hierarchical mandate is that the central bank may focus too much on short-term objectives.
8. Monetary policy in South Africa is an ineffective tool to achieve higher employment because monetary policy does not address the root of the unemployment problem and lower interest rates do not necessarily increase employment over the long term.
9. The Minister of Finance and parliament can, in principle, overrule the execution of monetary policy decisions of the SARB.
10. The ability of a central bank to set its monetary policy instruments is called goal independence.
11. The SARB is not goal independent.
12. The theory of bureaucratic behaviour suggests that the objective of a bureaucracy is to maximize the public's welfare.

13. Recent research indicates that low inflation has been found to be best in countries with the most independent central banks.
14. The case for central bank independence rests on the idea that monetary policy is performed better by professional experts such as the SARB.

CHAPTER 15:   THE MONEY SUPPLY PROCESS

Three players in the money supply process

The creation of money is explained by the interaction between the three main players in money supply process.

1.   The *central bank*: the government agency that oversees the banking system and is responsible for the conduct of monetary policy.

2.   *Banks* (depository institutions): accept deposits from individuals and institutions and make loans.

3.   *Depositors*: individuals and institutions that hold deposits in banks. [Referred to as the nonbank public (or nonbank private sector)]

The Fed's (SARB's) Balance Sheet

The operation of the Fed (SARB) and monetary policy involve actions that affect the holdings of assets and liabilities by these organizations.

Balance sheet of SARB (1st player)

Assets: changes lead to changes in reserves and monetary base → money supply. These assets also earn higher interest rates than the liabilities, so Fed makes billions every year.

> Securities: issued by the US Treasury or foreign currency
> Loans to banks: borrowings from Fed (SARB) at the repo rate.

Liabilities: Currency in circulation - held by nonbank public
Bank Reserves
Central government and other deposits
Other Liabilities e.g SARBDs

Balance sheet of South African commercial banks (2nd player)

Assets: Deposits with the SARB (R)
Bank notes & coins
Securities
Loans

Liabilities: Deposits (D)
Borrowings of banks
Capital

Control of the monetary base

It is necessary to understand how financial transactions between any of the four participants are recorded in the balance sheets of the banks. The way in which transactions affect banks reserves is a really important matter.

The following has been taken from the textbook to give you an idea of how a central bank influences the **monetary base** in an economy.

[The monetary base is also called **high-powered money**. It comprises the currency (C) in circulation as well as the total reserves (R) in the banking system.

$$MB = C + R$$

The Fed exercises control over the MB through the purchase of government securities in the open market. These are called open market operations.

- **Open Market Purchase from a Bank**: if Fed purchases $100 of bonds from a bank and pays for them with a $100 cheque: the end result is that reserves increase by $100, but there is no change in currency, so the MB has increased by $100.

- **Open Market Purchase from the Nonbank Public:**
  o If the person or corporation that sells the bonds to the Fed deposits the cheque in a local bank, then the outcome will be the same as the transaction with a bank (reserves increase but no change in currency).
  o If the proceeds from the sale are kept in currency then there is no effect on reserves, but does affect the level of currency. Therefore the MB still increases.

Mishkin (2007: 350) states that "the effect of open market operations on reserves is much more uncertain than the effect on the monetary base. Therefore, the Fed can control the monetary base with open market operations more effectively than it can control reserves. This is because it depends on whether the seller of the bonds keeps the proceeds from the sale in currency or in deposits."

As a main conclusion: however, note the following: "the effect of open market operations (OMOs) on reserves is not a great deal more uncertain – for two reasons: a significant proportion of OMOs are conducted directly with the banks, in which case the effect on bank reserves is direct and certain; only when OMOs are conducted with the nonbank public will their effect on reserves be uncertain ."

Shifts from deposits into currency

This shift will affect the reserves in the banking system but not the monetary base → another reason why the Fed has more control over the monetary base than over reserves.

e.g public wishes to hold more currency to buy gifts during Christmas, they withdraw $100 million in cash. Banking system loses $100 million in deposits and hence reserves. Monetary base is unaffected since $M = c(+) + R(-)$. These shifts cause random fluctuations in reserves making the monetary base a more stable variable.

Overview of the Fed's ability to control the monetary base

Whereas the amount of OMO's is completely controlled by the Fed, it cannot perfectly predict the amount of borrowings from the Fed by banks. So we can split the monetary base into that which is created by loans from Fed, **borrowed reserves** (less tightly controlled) and **nonborrowed monetary base** (tightly controlled as it results from OMOs).

> **$MB_n = MB - BR$**
>
> MB_n = nonborrowed monetary base
> MB = monetary base
> BR = borrowed reserves from Fed.

Multiple deposit creation: a simple model

When the Fed supplies the banking system with $1 of additional reserves, deposits increase by a multiple of this amount – **multiple deposit creation.**

- **Deposit creation: the single bank**. A single bank can make loans up to the amount of its excess reserves, thereby creating an equal amount of deposits. Assume that the new account holder (the individual with the loan) withdraws the amount he has been granted to make a payment from FNB. This amount is then deposited in another bank.

- **Deposit creation**: **the banking system.**   When another bank, say Bank A, receives the amount from FNB it will have an increase in its reserves. The balance of any excess reserves will be used to grant loans as a bank does not wish to hold idle excess reserves. Consequently the deposits in the banking system will increase again and again as each new bank receives deposits and grants loans.

  - A single bank can create deposits equal to the amount of its excess reserves, while the banking system as a whole can generate a **multiple expansion of deposits**, because when the reserves leave an individual bank

they are not leaving the banking system. *The initial increase in reserves results in a multiple increase in deposits.*

Example:

Philip Mohr, Louis Fourie and associates. 2007. Economics for South African Students. Fourth edition. Pretoria: Van chaik.

- Suppose Ms X receives R1000 as a gift and deposits it with Bank A. Bank A's cash reserves increase by R1000 and in exchange it creates a demand deposit of R1000 in favour of Ms X. Money supply is unaffected at this stage.
- If the cash reserve requirement is 20%, Bank A has to keep R200 of the R1000 deposited by Ms X as cash reserves.
- This leaves Bank A with R800 which it can lend to Mr Y in the form of an overdraft facility.
- Mr Y uses this facility to write a cheque to pat Mr Z, who deposits it into his bank, Bank B.
  - At this stage the total amount of demand deposits has increased from R1000 to R1800. The money creation process by the banks has thus begun.
  - Mr Z's deposit of R800 raises Bank B's cash reserves, again 20% of this (R160) has to be kept in the form of cash reserves. The other R640 can be lent out to another customer.

This process will continue until it works itself out. For every rand received by a bank in the form of a cash deposit, 20 cents have to be kept as a cash reserve with the central bank, but the remaining 80 cents can go out on loan.

Bank	New deposits	Additional cash reserves required	New loans granted
A	R1000	R200	R800
B	R800	R160	R640
C	R640	R128	R512
D	R512	R102,40	R409,60

- Note: the total increase in demand deposits will be equal to the original deposit multiplied by the credit multiplier.

- **Deriving the formula for multiple deposit creation.** The multiple increase in deposits caused by the increase in the banking system's reserves is called the **simple deposit multiplier:**

- Formula:

- Where ΔD = change in total cheque deposits in the banking system; rr = required reserve ratio; ΔR = change in reserves for the banking system.

For the banking system as a whole deposit creation will only stop when all excess reserves in the banking system are used up; **the banking system will be in equilibrium when the total amount of required reserves equals the total amount of reserves (RR = R)**. For this reason a given level of reserves in the banking system determines the level of deposits when the banking system is in equilibrium. Given level of reserves supports the given level of deposits.

- **Critique of the simple model**. This model seems to imply that the Fed has complete control over the level of deposits through the reserve ratio and the level of reserves. This does depend upon whether the proceeds from loans are deposited or kept as currency.
    o If the proceeds are used to raise the level of currency then D will not increase by as much as the "multiplier" might suggest.
    o If a single bank decides not to grant loans to the full extent of its excess reserves then the full expansion of the simple model of multiple deposit creation does not occur.
    o The Fed is not the only player whose behaviour influences the level of deposits. The decisions of banks, depositors and borrowers will all have an effect.

Factors that determine the money supply

The monetary base consists of reserves plus currency (MB = R + C = RR + ER +C). Reserves are either nonborrowed (MBn) or borrowed (BR) – discount loans.

- MBn is directly controlled by the central bank – money supply is **positively** related to the nonborrowed monetary base.
- BR depends on the banks' action - the money supply is **positively** related to the level of borrowed reserves from the central bank. BRs in South Africa are the amount of refinancing and depend on the repo rate. A high repo rate might discourage banks from borrowing from the SARB.
- If the required reserve ratio (rr) increases, there will be less multiple deposit expansion and money supply will fall
- As shown before, deposits undergo multiple expansions while currency doesn't. Therefore when deposits are converted into currency, there is a switch from a component of the money supply

that undergoes multiple expansion to one that doesn't. Money supply is **negatively** related to currency holdings.
- The money supply is negatively related to amount of excess reserves.

Overview of the money supply process

Refer to table 1 on page 395 in the prescribed textbook to see how the different factors affect the money supply.

SUMMARY TABLE 1

Money Supply Response

Player	Variable	Change in Variable	Money Supply Response	Reason
Federal Reserve System	Nonborrowed monetary base, MB_n	↑	↑	More MB for deposit creation
	Required reserve ratio, rr	↑	↓	Less multiple deposit expansion
Banks	Borrowed reserves, BR	↑	↑	More MB for deposit creation
	Excess reserves	↑	↓	Less loans and deposit creation
Depositors	Currency holdings	↑	↓	Less multiple deposit expansion

Note: Only increases (↑) in the variables are shown. The effects of decreases on the money supply would be the opposite of those indicated in the "Money Supply Response" column.

The money multiplier

The money multiplier is a ratio that relates the change in the money supply to a given change in the monetary base.

The money multiplier, m, tells us what multiple of the monetary base is transformed into money supply, M.

Derivation of the money multiplier equation:
- simple definition of money (M1 = C + D)
- Linking relationship: M = m x MB, where M = money supply and MB is the monetary base; m is the money multiplier
- Holdings of excess reserves are now included and it is assumed that the desired level of C and excess reserves (ER) grows proportionally with D:
  - c = C/D = currency ratio
  - e = ER/D = excess reserves ratio
- Total amount of reserves in the banking system R is the sum of required reserves RR and excess reserves ER So, the total

amount of required reserves equals the required reserve ratio, rr, times the amount of deposits D:
- o R = RR + ER and
- o RR = rr x D   [rr will be less than 1]
- **Now link the reserves in the banking system to the amount of deposits and excess reserves that they can support:**
  - o R = (rr x D) + ER
- Remember that MB = C + R, so now it is possible to derive an equation that links the amount of the monetary base to the levels of D and C:
  - o MB = C + R = C + (rr x D) + ER
- **An important feature of this equation is that an additional dollar of C does not support an increase in D. An increase in the monetary base that is only in currency is not multiplied, whereas an increase that goes into deposits is multiplied.**
- Now derive the money multiplier in terms of the currency and excess reserve ratios:
  - o MB = (rr x D) + (e x D) + (c x D) = (rr + e + c) x D
- Write down the expression that links demand deposits D to the monetary base MB (refer page 397 in textbook):

     D =   1/(rr + e + c) x MB   [Equation 3]

  - Finally, using M1 = D + C and specifying C as c x D, derive the money multiplier, m by referring to page 397 in the textbook:

  - o M = D + (c x D) = (1 + c) x D
- Substituting in for D from equation 3:

$$M = \frac{1 + c}{rr + e + c} \times MB$$

  - o m =

- It is a function of the currency ratio set by depositors c, the excess reserve ratio set by banks e, and the required reserve ratio set by the Fed rr.

Please work through Intuition behind money multiplier on pg 398 of textbook!!

Intuition Behind the Money Multiplier

To get a feel for what the money multiplier means, let's construct a numerical example with realistic numbers for the following variables:

$$rr = \text{required reserve ratio} = 0.10$$

$$C = \text{currency in circulation} = \$400 \text{ billion}$$

$$D = \text{checkable deposits} = \$800 \text{ billion}$$

$$ER = \text{excess reserves} = \$0.8 \text{ billion}$$

$$M = \text{money supply (M1)} = C + D = \$1,200 \text{ billion}$$

From these numbers we can calculate the values for the currency ratio c and the excess reserves ratio e:

$$c = \frac{\$400 \text{ billion}}{\$800 \text{ billion}} = 0.5$$

$$e = \frac{\$0.8 \text{ billion}}{\$800 \text{ billion}} = 0.001$$

The resulting value of the money multiplier is

$$m = \frac{1 + 0.5}{0.1 + 0.001 + 0.5} = \frac{1.5}{0.601} = 2.5$$

The money multiplier of 2.5 tells us that, given the required reserve ratio of 10% on checkable deposits and the behavior of depositors, as represented by $c = 0.5$, and banks, as represented by $e = 0.001$, a \$1 increase in the monetary base leads to a \$2.50 increase in the money supply (M1).

An important characteristic of the money multiplier is that it is less than the simple deposit multiplier of 10 found earlier in the chapter. The key to understanding this result is to realize that **although there is multiple expansion of deposits, there is no such expansion for currency**. Thus, if some portion of the increase in high-powered money finds its way into currency, this portion does not undergo multiple deposit expansion. In our simple model earlier in the chapter, we did not allow for this possibility, and so the increase in reserves led to the maximum amount of multiple deposit creation. However, in our current model of the money multiplier, the level of currency does rise when the monetary base MB and checkable deposits D increase because c is greater than zero. As previously stated, any increase in MB that goes into an increase in currency is not multiplied, so only part of the increase in MB is available to support checkable deposits that undergo multiple expansion. The overall level of multiple deposit expansion must be lower, meaning that the increase in M, given an increase in MB, is smaller than the simple model earlier in the chapter indicated.[9]

Factors that determine the money multiplier (m)

Changes in the required reserve ratio, rr:
- If rr increases while other variables stay the same, the same level of reserves cannot support as large an amount of cheque deposits and more reserves are needed.
- Deficiency in reserves means that banks must contract loans, causing a decline in deposits and in money supply
- When rr is higher less multiple expansion of D occurs and so the money multiplier decreases.
- Money multiplier and the money supply are negatively related to the required reserve ratio.

Change in the currency ratio, c:
- An increase in c means that people wish to convert some of D into C.
- Overall multiple expansion declines and so does the multiplier.
- The money multiplier and the money supply are negatively related to the currency ratio c.

Changes in excess reserves ratio, e:
- When banks increase e, they have less reserves to support D.
- This means that given the same level of MB, an increase in e will cause loans to contract and money supply will decrease.
- Because e is so small it does not have a large impact on m, but nevertheless, if e increases m will decrease.
- **Money multiplier and the money supply are negatively related to the excess reserves ratio**. There are two factors that affect the costs and benefits of excess reserves:
  o Market Interest rates (i): when i increases the opportunity cost of holding excess reserves increases and so e falls. So, **the banking system's excess reserves ratio is negatively related to the market interest rate.**
  o Expected deposit outflows: excess reserves provide insurance against deposit outflows. If expected deposit outflows rise then excess reserves will increase. So, the **excess reserve ratio is positively related to expected deposit outflows.**

Work through additional material in study guide C7, C8 and C9 on monetary policy in SA!!

Typical Exam questions

15.1 You must be able to record the (direct) changes arising from any of the transactions in section D question 2, in both the balance sheets of the SARB and that of banks.

15.2 Derive the simple multiple deposit creation model (formula: ΔD = (1/r)ΔR). Explain its meaning, the underlying behaviour of the three players of the money creation process, its simplifying assumptions and its critique. (20)

15.3 Explain how each of the following factors change money supply: changes in the nonborrowed monetary base; changes in the borrowed reserves; changes in the required reserve ratio; changes in the currency holdings; and changes in excess reserves. (Hint: Make use of appropriate formulas which you do not have to derive.) (9)

15.4 Derive the money multiplier equation mathematically:

$$M = \frac{1+c}{r+e+c} (MB).$$

Explain the meaning of the variables (M and MB; and r, e and c) and the effect on the multiplier of an increase in each of r, e and c. (12)

15.5 Briefly explain the arguments for a reversed causality in South Africa, that is, "deposit creation leads to reserve holding" (D → R) could be more realistic. (15)

## CHAPTER 16: TOOLS OF MONETARY POLICY

The market for reserves and the federal funds rate (interbank rate in the USA)

The market for reserves is where the federal funds rate is determined.

Demand for reserves:
- quantity of reserves demanded equals required reserves (required reserve ratio x amount of deposits on which reserves are required) plus the quantity of excess reserves demanded
- the interest rate or the federal fund rate indicates the opportunity cost of holding excess reserves
- after 2008, the Fed started paying interest on reserves, a fixed amount **below** the Federal Funds rate
- When the Federal Funds rate is **above** the rate paid on reserves i_{or}, the opportunity cost of holding reserves starts to fall. As the Federal Funds rate decreases, (Holding other variables constant ie: Required Reserves), the quantity of reserves demanded will increase.
- For this reason the demand curve for reserves slopes downwards. Refer Figure 1 on page 410 (374) in the textbook.
- If however the Fed funds rate begins to fall below the interest paid on excess reserves i_{or}, banks would not lend in the overnight market at a lower rate, instead they would just keep adding to their excess reserves.
- The result is that the demand curve becomes flat at i_{or} .

Figure 1: Equilibrium in the Market for reserves

With excess supply of reserves, the federal funds rate falls to i^*_n

With excess demand for reserves, the federal funds rate rises to i^*_{ff}
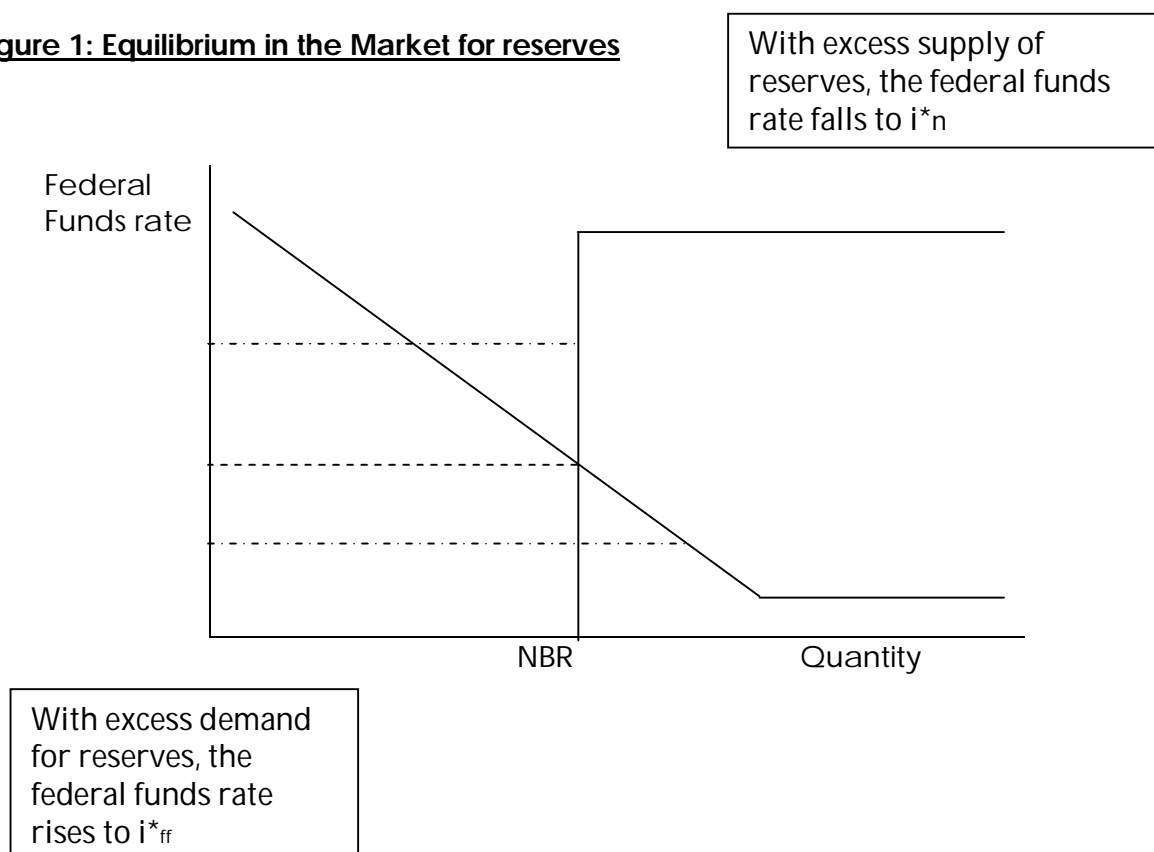
Supply of reserves:
- two components:
  - o NBR = non-borrowed reserves (supplied by Fed's OMO's)
  - o BR = borrowed reserves
- Primary cost of borrowing from the Fed is the interest rate the Fed charges on these loans, the discount rate (i_d).
- As long as the cost of borrowing from the other banks (called federal funds) is cheaper than the discount rate, banks would rather borrow from each other and **the borrowed reserves will be zero.** Therefore supply of reserves will be just equal to amount of non-borrowed reserves, so supply curve is vertical.
- If the federal fund rate rises above the discount rate, banks would want to keep borrowing more and more at the discount rate and then lend this money out at the higher federal fund rate. The supply curve then becomes horizontal (perfectly elastic). Refer figure 1 on page 410 (374).

Market Equilibrium:

- This occurs at the point where the quantity of reserves demanded equals the quantity supplied. $R^s = R^d$
- This will determine the federal funds rate.
- When the federal funds interest rate is above the equilibrium rate, there will be **more reserves supplied than are demanded (excess supply)** and so the federal fund rate will move downwards.
- When the federal funds interest rate is below the equilibrium rate, there will be **more reserves demanded than supplied (excess demand)** and the federal funds rate will move upwards.

## How changes in the tools of monetary policy affect the federal funds rate (in the USA)

Examining how changes in our 4 monetary policy tools affect the market for reserves and equilibrium federal funds rate.

1. **Open market operations (OMOs):**
   - The effect of an OMO depends on whether the supply curve initially intersects demand curve in its downward sloping or flat section.
   - OMOs lead to a greater quantity of reserves supplied and shifts the supply curve to the right (refer Figure 2 on page 413 (376).
   - The rightward shift of the supply curve causes the federal funds rate to decrease.
   - An open market purchases causes the federal funds rate to fall, whereas an open market sales causes the federal funds rate to rise.

Advantages of OMOs:
- Open market operations occur at the initiative of the Fed which has complete control over their volume.
- Open market operations are flexible and precise; they can be used to any extent no matter how small the change in reserves or monetary base required.
- Open market operations are easily reversed.
- Can be implemented quickly with no administrative delays. When the Fed decides it wants to change the monetary base or reserves it just places orders with securities dealers, and the trades are executed immediately.

Figure 2: response to an open market operation

Federal Funds rate

Federal Funds rate

Quantity

Quantity
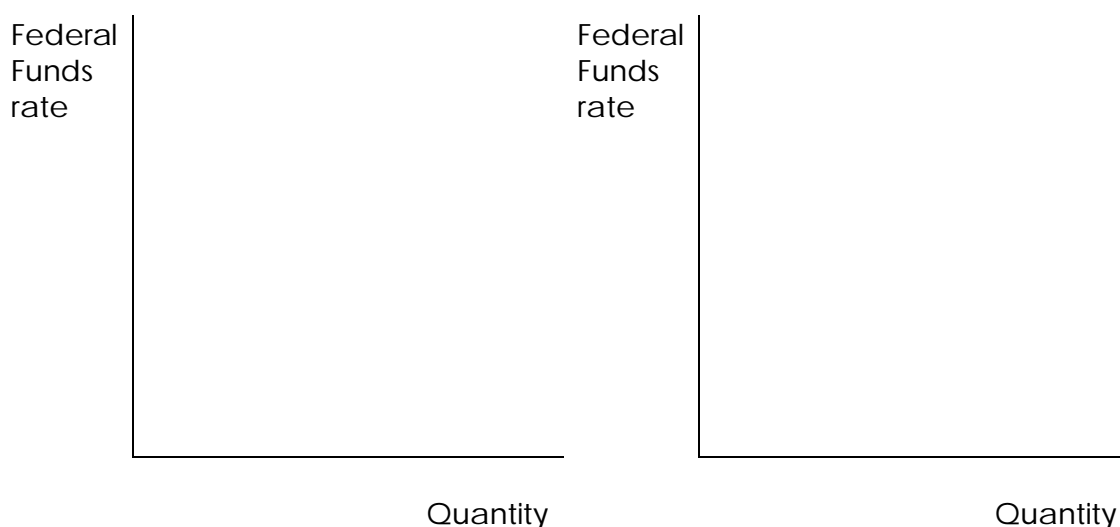
2. **Discount Lending (discount policy):**
- Effect of a discount rate change depends on whether the demand curve intersects the supply curve in its vertical section or its flat section.
- Refer to Figure 3. If the intersection occurs on the vertical section of supply curve, there is no discount lending and BR are zero. Here, when the discount rate is lowered, the horizontal section of supply curve falls. Thus there is no change in equilibrium federal funds rate.
- Since this is the typical situation, most changes in the discount rate have no effect on the federal funds rate.
- However if demand curve intersects supply on its flat section, there is some discount lending, and changes in discount rate do affect federal funds rate. So when discount rate is lowered, the horizontal section of the supply curve falls, and equilibrium federal funds rate falls.

Advantages and Disadvantages of Discount Policy:

- Most important advantage is that the Fed can use it to perform its function of lender as last resort.
- In the past discount policy was used as a tool of monetary policy with discount rate changed to affect money supply and interest rates.
- This is no longer the case because the discount loan decisions are made by the banks (not the Fed). Fed has more control through OMOs.
- Presently the discount facility is not used to set the federal funds rate but is only a backup facility to prevent the federal fund rate from rising too far above its target or is used to provide liquidity during financial crises.
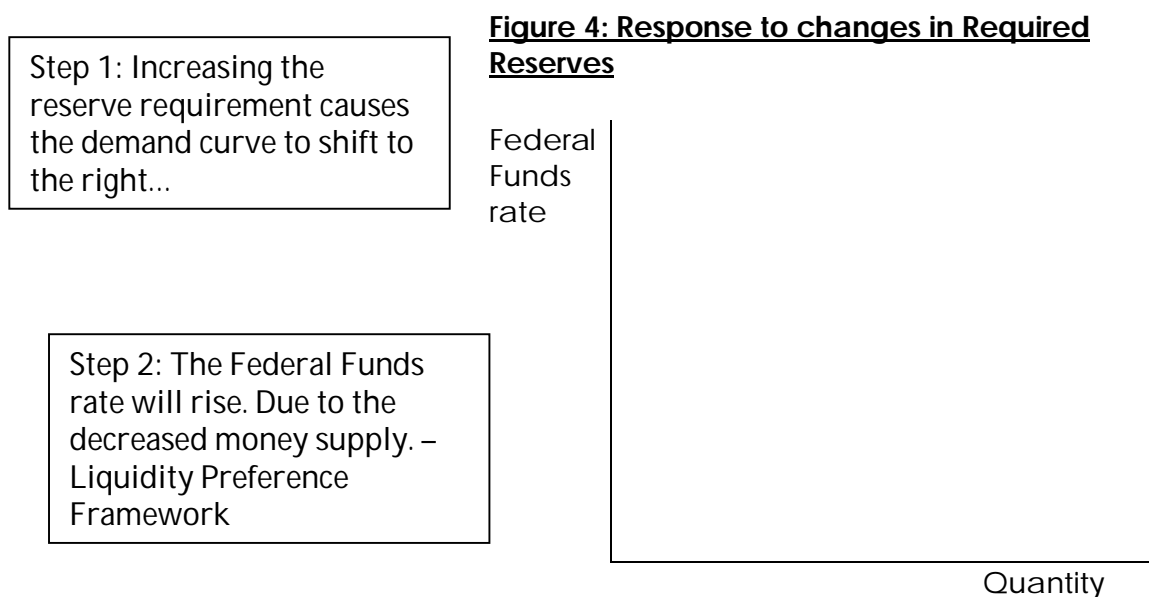
Figure 3: Response to a change in the discount rate

Federal Funds rate

Federal Funds rate
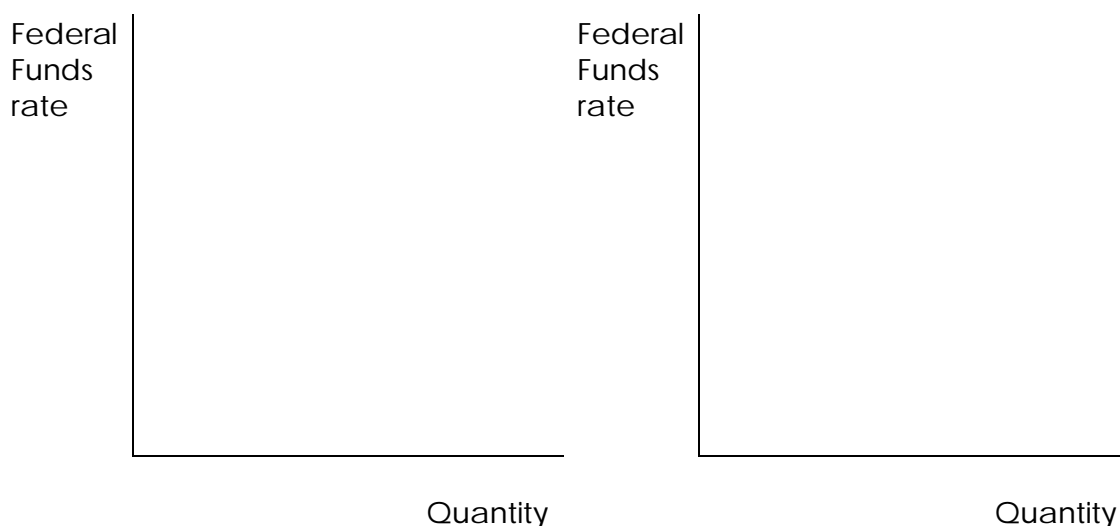
Quantity

Quantity

3. **Reserve Requirement:**
   - When the required reserve ratio increases then required reserves will also increase and hence the quantity of reserves demanded increases for any given interest rate.
   - An increase in the required reserve ratio will shift the demand curve to the right (refer Figure 4). This raises the federal funds rate.
   - A rise in reserve requirements reduces the amount of deposits that can be supported by a given monetary base and therefore reduces money supply.
   - A rise in reserves also **increases the demand for reserves** and **raises the federal fund rate.**

Step 1: Increasing the reserve requirement causes the demand curve to shift to the right...

Figure 4: Response to changes in Required Reserves

Federal Funds rate

Quantity

Step 2: The Federal Funds rate will rise. Due to the decreased money supply. – Liquidity Preference Framework

Disadvantages:

- This tool is much less effective than it once was because the reserve requirements are no longer binding for the banks.
- Another disadvantage of using reserve requirements to control money supply and interest rates is that **raising the requirements can cause immediate liquidity problems for banks** where reserve requirements are binding.
- Does not have much to recommend it so is no longer used. Some economists suggested it should be eliminated altogether.

4. **Interest on Reserves (Not Applicable in SA):**

An increase in the interest paid to banks on reserves will only have an impact if the supply curve intersects the demand curve at the downward sloping section ie: when the equilibrium federal funds rate is at the interest rate paid on reserves. At this point, a rise in the interest rate paid on reserves will cause the federal funds rate to rise.

Conventional monetary policy tools

Open market operations

These are the primary determinants of changes in interest rates and the monetary base, therefore main source of fluctuations in money supply. Purchases expand reserves and the monetary base, thereby increasing money supply and lowering short term interest rates. Sales shrink reserves and monetary base, decreasing the money supply and raising short-term interest rates.

Discount policy and lender of last resort

Operation of the discount window: healthy banks are allowed to borrow all they want at very short maturities from the primary credit facility. The interest rate on these loans is the discount rate, which is set higher than the federal funds rate target. This facility is intended to be a backup source of liquidity for sound banks.

Lender of last resort: to prevent bank failures from spinning out of control by providing reserves to banks when no one else will. This is very effective because reserves are immediately channeled to the banks that need them the most. This however also has a cost. If a bank expects that the Fed will provide it with discount loans when it gets into trouble, it will be willing o take on more risk. This creates a moral hazard problem that is most severe for large banks who may believe that the Fed view them as "too big to fail".

Reserve requirements

A rise in reserve requirements reduces the amount of deposits that can be supported by a given level of the monetary base and will lead to a contraction of the money supply. This also increases the demand for reserves and raises the federal funds rate. The newly instated **interest on reserves** is currently being used

<u>A framework for monetary policy in South Africa (C3)</u>

Study this section in the study guide together with these notes.

The instruments of monetary policy in South Africa:

a) OMO instruments are used to ensure that the supply of non-borrowed reserves always falls short of the total liquidity requirement.
b) Banks are thus required to borrow reserves from the SARB at the repo rate.
c) The SARB does not rely on changes in the required reserve ratio in its day-to-day management of the money market.

<u>How monetary policy is applied in South Africa (C4)</u>

Study this section in the study guide.

Open market operations:
- SARB actively maintains a **liquidity requirement** by means of OMOs which compel banks to borrow a substantial amount from the SARB at the repo rate. i.e SARB is constantly active in the money market to drain excess liquidity in order to force a liquidity shortage.
- SARB estimates the banks' overall liquidity requirements on a daily, weekly, monthly basis and takes account of all factors that may affect the liquidity shortage. SARB then offers a number of securities on

auction at varying interest rates. Banks estimate their liquidity shortage for the coming week and tender to the amounts and interest rates. The interest rates on bids are generally below that of the repo rate.

Accommodation Policy (Discount Lending):
- The purpose of accommodation policy in South Africa is that the SARB provides liquidity (borrowed cash reserves: BR) to banks. Because the SARB uses repurchase agreements (repo's) and the USA mainly uses discount instruments for this purpose, it is called discount policy in the USA and accommodation policy in SA.
- The SARB provides liquidity to the banks by means of repurchase agreements (repos) whereby the SARB "buys" government securities. When these repos mature (usually after a week), the banks repay the central bank the original amount provided a week ago plus interest at the repo rate.
- To ensure that the repo rate remains effective, the SARB compels the banks to borrow a substantial amount of the liquidity requirement from the SARB.
- If individual banks in South Africa or the banking sector as a whole face a severe cash reserve shortage that threatens to undermine the stability of the banking system, the central bank may have to act as lender of last resort. It will then provide emergency loans to banks at a rate higher than the repo rate.

Reserve requirements:
- Formally, banks are required to hold 2,5% of their total liabilities to the public as required reserves. In practice this is somewhat less because banks are allowed to exclude certain liabilities as required reserves.
- Banks are required to adhere to the reserve requirement on an average daily basis over a full month period. This implies that if a bank falls below its required reserves for a few days, it has to hold additional reserves during the remainder of the month.
- The bank's holdings of **vault cash** to service daily withdrawals of currency also **do not qualify as part of the required reserves**
- In principle, the SARB can change the required reserve ratio whenever the need arises. In practice it does not do so. The variation of the required reserve ratio is a slow, unwieldy and crude instrument. Changes in the reserve requirements have to be announced through a notice in the Government Gazette, which is a slow process. It is crude because small changes in the reserve requirement may lead to relatively large changes in required reserves.

Make sure you are able to use a graph to illustrate the South African market for reserves as well as the one applicable to the USA.

Refer to Graph 16.1 in the study guide and compare it to Figure 1 on page 410 (374) in the textbook. Note your findings below with particular reference to SA:

Figure 1, page 410 (374): Market for Reserves in the USA	Graph 16.1, page 71 in the study guide: Market for Reserves in SA

Typical Exam questions

16.1 Explain and graphically illustrate a model of the supply and demand in the market for reserves (as applicable to the US) which explains how the federal funds rate is determined. Also explain how changes in the tools of monetary policy (OMOs, changes in the discount lending rate, and changes in the reserve requirements) affect the federal funds rate. (15)

16.2 Explain and graphically illustrate how the market for reserves operates in SA. Also explain in principle how the tools of monetary policy (OMOs, BRs and the required reserve ratio) fit into this framework. (15)

16.3 Explain in more detail how monetary policy is conducted in South Africa. Explain the manner in which

(i) OMOs are used by the SARB as well as the operation of other tools used to supplement OMOs (10)

(ii) accommodation policy is applied (5)

(iii) the discount rate is used (5)

16.4 Comment on the following statement: "The formula M=(1+c)/(r+e+c).MB implies in the case of South Africa the central bank can accurately predict M given MB". Also comment on the question of causality between MB and M. (Hint: This matter is dealt with in the Activities section: D2-D6.)(10)

CHAPTER 17: THE CONDUCT OF MONETARY POLICY: STRATEGY AND TACTICS

The price stability goal and the nominal anchor

- **Price stability** = low and stable inflation. Viewed as one of the most important goals of monetary policy
- This is because rising price level (inflation) causes uncertainty. Such uncertainty is believed to hamper economic growth.
- **Nominal anchor** = a nominal variable such as the **inflation rate** or **money supply**, that limits the increases in price level to achieve price stability. Adherence to a nominal anchor that keeps the nominal variable within a narrow range promotes price stability by directly promoting low and stable inflation expectations.
  - Nominal anchor is also important because it can limit *time-inconsistency problem.*
- **Time-inconsistency problem**: monetary authorities are tempted to conduct monetary policy in a discretionary way (day-by-day basis) which produces poor long-run outcomes. For example they might pursue an expansionary monetary policy to boost economic growth in the short run, but the best policy might be not to pursue expansionary monetary policy so as to ensure inflationary conditions do not arise in the long run. (more on this topic in ch 25)

Other goals of monetary policy

1. High employment and output stability
Important since high unemployment causes much human misery and economy has both idle workers and resources (closed factories and unused equipment), resulting in a loss of output (lower GDP).
How high should employment be? What about structural and frictional employment?

2. Economic growth
Related to high employment goal because businesses are more likely to invest in capital equipment to increase productivity and economic growth when unemployment is low. Supply side economics discusses policies aimed at encouraging firms to invest or people to save, such as tax incentives. What is the role for monetary policy?

3. Stability of financial markets
Financial crises interfere with the ability of financial markets to channel funds between people.

4. Interest rate stability
Fluctuations in interest rates can create uncertainty and make it harder to plan for the future. E.g. affecting consumers' willingness to buy houses and for construction firm to plan how many houses to build. Upward movements in interest rates generate hostility toward central banks and lead to demands that their power be curtailed.

5. Stability in foreign exchange markets

With increased international trade, a country's exchange rate has become a major consideration of central banks. A rise in the Rand makes S. African exports less competitive with those abroad, and declines in the value of the Rand stimulate inflation in South Africa.

Should price stability be the primary goal of monetary policy?

Mishkin believes that **in the long run there is no trade-off between inflation and economic growth.** In the long run price stability promotes economic growth as well as financial and interest-rate stability. Although price stability is consistent with the other goals in the long run, in the short run price-stability often conflicts with the goals of high employment and interest-rate stability.

Hierarchical versus dual mandates

Mandates (objectives that are made primary) that put the goal of price stability first and believe that as long as this is achieved the other goals can be achieved more easily are called **hierarchical mandates**. It is this type of mandate that is followed by Bank of England, the Bank of Canada, the European Central Bank and the Reserve Bank of New Zealand.

The mandate faced by the Federal Reserve is stated as, "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long-run growth of the monetary and credit aggregates commensurate with the economy's long-run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates." This is a **dual mandate** to achieve two co-equal objectives: price stability and maximum employment.

Theoretically there is not much difference between the two mandates, however, in reality there may be. The public and politicians may believe that the hierarchical mandate puts too much emphasis on keeping inflation low and not enough on reducing business-cycle fluctuations. As long as price stability is a long-run goal, not short-run, central banks can focus on reducing output fluctuations by allowing inflation to deviate from the long-run goal for short periods of time and can therefore operate under a dual mandate.

Price stability as the primary, long run goal of monetary policy

Because low and stable inflation rates promote economic growth, central bankers have come to realize that price stability should only be the primary, long run goal of monetary policy. Attempts to keep inflation at the same level in the short run, no matter what, would likely lead to excessive output fluctuations. As long as price stability is a long run and not a short run goal, central bankers can focus on reducing output fluctuations by allowing inflation to deviate from the long run goal for short periods and, therefore, can operate under a dual mandate.

Inflation targeting

Inflation targeting involves several elements:
(1) public announcement of medium term numerical targets for inflation;
(2) an institutional commitment to price stability as the primary, long-run goal of monetary policy and a commitment to achieve the inflation goal;
(3) an information-inclusive approach in which many variables are used in making decisions about monetary policy;
(4) increased transparency of monetary policy strategy through communication with the public and the markets about the plans and objectives of monetary policymakers;
(5) increased accountability of the central bank for attaining its inflation objectives.

Advantages of inflation targeting:
- Allows the monetary authorities to use all available information, not just one variable, to determine the best settings for monetary policy.
- It is readily understood by the public and highly transparent.
- It has the likelihood of reducing the problem of time-inconsistency of central bank trying to increase output and employment in the short run.
- It helps focus the political debate on what a central bank can do in the long run (control inflation).
- Encourages frequent communication with the public.

Disadvantages of inflation targeting (pg 443)

- Delayed signals:
  _____

  _____

- Too much rigidity:
  _____

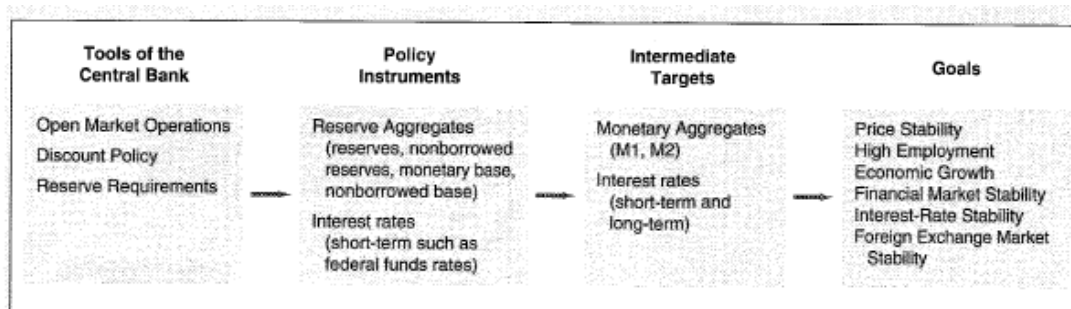 _____

- Potential for increased output fluctuations:
  _____

  _____

_____

- Low economic growth:

  _____

  _____

_____

Tactics: choosing the policy instrument

Tools of the Central Bank	Policy Instruments	Intermediate Targets	Goals
Open Market Operations Discount Policy Reserve Requirements	Reserve Aggregates (reserves, nonborrowed reserves, monetary base, nonborrowed base) Interest rates (short-term such as federal funds rates)	Monetary Aggregates (M1, M2) Interest rates (short-term and long-term)	Price Stability High Employment Economic Growth Financial Market Stability Interest-Rate Stability Foreign Exchange Market Stability

FIGURE 2   Linkages Between Central Bank Tools, Policy Instruments, Intermediate Targets, and Goals of Monetary Policy
The tools of the central bank are used to change the policy instruments to achieve the intermediate target and then the goals of monetary policy.

Refer to the section in the textbook (pg 454) and explain why the central bank cannot target both the interest and aggregate money supply simultaneously. The following is an example of such an explanation:

A central bank (e.g. US Fed) has at its disposal two basic types of policy instruments: (i) reserve aggregates (total reserves, non-borrowed reserve (NBR), MB and non-borrowed base) and (ii) interest rates.

By trying to achieve an **aggregate target**, the central bank is forced to let go of the interest rate. For example if the central bank has a specific target for NBR, the central bank will have a certain expectation of what the demand for reserves will be however, the final demand is dependent upon the individual banks and, with NBR given is likely to vary. Depending upon the variation in the levels of demand, the interest rate differs and must therefore be variable. (Refer figure 3 on page 410: Result of targeting on Non-borrowed reserves).

If the central bank decided to target the interest rate instead. In this case the central bank may expect the demand for reserves and the level of NBR to be at a specific level given the interest rate. However, due to unexpected changes in deposits or banks' desire to hold excess reserves the central bank will be forced to engage in open-market transactions to maintain the interest rate. This will lead to changes in the level of NBR. If the demand for reserves increases, the central bank will need to raise the supply of NBR until the interest rate is restored.

FIGURE 3

Result of Targeting on Nonborrowed Reserves

Targeting on nonborrowed reserves of NBR* will lead to fluctuations in the federal funds rate between i_{ff} and i_{ff} because of fluctuations in the demand for reserves between $R^{d'}$ and $R^{d''}$.
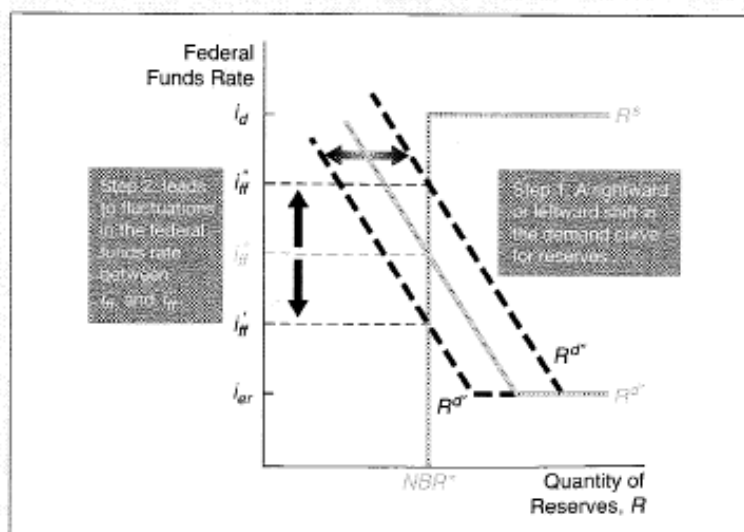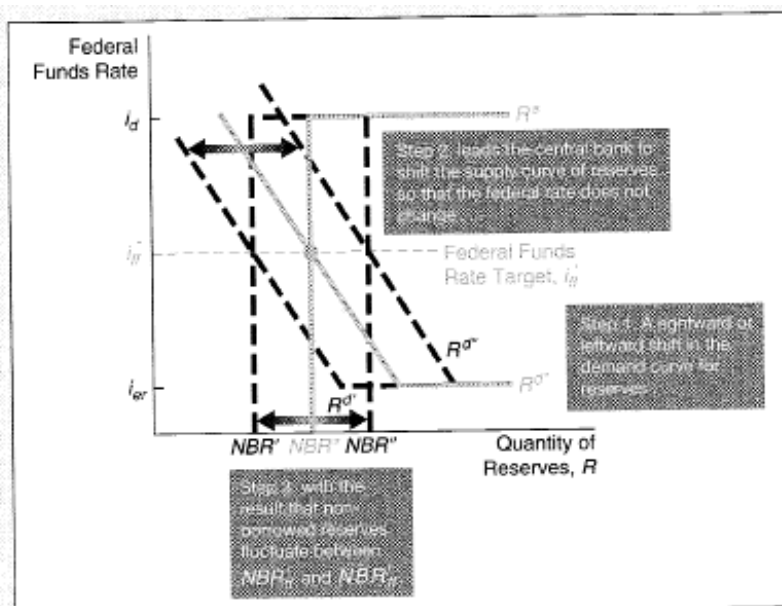

FIGURE 4

Result of Targeting on the Federal Funds Rate

Targeting on the interest rate i_{ff}^* will lead to fluctuations in nonborrowed reserves between NBR' and NBR'' because of fluctuations in the demand for reserves between $R^{d'}$ and $R^{d''}$.

Criteria for choosing the policy instrument

Three criteria apply when choosing an appropriate policy instrument:

- **Observability and measurability:** quick observability and accurate measurement of a policy instrument is necessary, because it will be useful only if it **signals the policy stance rapidly.** It seems that interest rates are more observable and measureable than are reserves and are therefore better policy instruments.

- **Controllability**: a central bank must be able to exercise effective control over a variable if it is to function as a useful policy instrument. Once again short-term interest rates are preferable to reserve aggregates as a policy instrument.

- **Predictable effect on goals**: this is the most important characteristic of a policy instrument. Central banks have concluded that the link between interest rate and other goals, such as controlling inflation, are tighter than the link between aggregates and inflation.

C2 Monetary targeting in South Africa (Study Guide, pg 78 -82)

In pursuing monetary targeting, the central bank announces that it will achieve a certain value (the target) of annual growth rate of a monetary aggregate. Usually refers to either M1 or M2.

Refer to study guide (page 78) and study the "additional explanations"

The **advantages** of monetary targeting:
- one advantage is that information on whether the central bank is achieving its target is known almost immediately – monetary figures are reported within a couple of weeks.
- Monetary targets can send immediate signals to the public and the market about the stance of monetary policy and the intention of policymakers to keep inflation in check.
- Allow for immediate accountability for monetary policy to keep inflation low and help to constrain monetary policymakers from falling into the time-inconsistency trap.

The **disadvantages** of monetary targeting:

- if the relationship between the monetary aggregate and the goal variable (inflation or nominal income) is weak, monetary aggregate targeting will not work.
- This seems to have been the problem in countries pursuing this type of policy and yet not achieving the desired outcomes.

*Students must be able to give a summarized version of the changes in monetary policy from the 1970s when it was based on a monetary targeting approach, through to the late 1990s when monetary targeting was **abandoned** and the move to a policy of inflation targeting began.*

Typical exam questions:

1. *Briefly explain the meaning of monetary targeting and its main advantages and disadvantages. Then briefly explain the major lessons that were learnt from the application of monetary targeting in the US, Japan and Germany as it was applied from the 1970s to the 1990s.* (15)
2. *Explain the five elements of inflation targeting. Also explain the advantages and disadvantages of inflation targeting* (15)
3. *Explain and illustrate graphically why the central bank (in the USA) cannot target both the NBR and the cash funds rate*

simultaneously. (Hint: Use a supply and demand for reserves framework.) *(10)*
4. *Explain which monetary policy instrument/s may be used by the central bank and which criteria apply when choosing a monetary policy instrument.* *(10)*

True or false review questions
1. Monetary targeting means that the central bank targets a growth rate of some monetary aggregate (for example M2) or interest rate to counter high inflation.
2. Monetary targeting can only work well when there is a reliable and stable relationship between the growth of the monetary aggregate and the inflation rate.
3. Monetary targeting worked quite well in South Africa when it was strictly applied and succeeded in reducing the inflation rate to a level below 10% per year for most of the 1990s.
4. The advantages of monetary targeting are that data on the instrument and the goal become available without a long delay, and that the central bank can be held accountable for executing monetary policy.
5. Monetary targeting was abandoned in South Africa after 1994 when the ANC came into power.
6. The advantages of inflation targeting are that is highly transparent and that inflation can be readily controlled by the central bank.
7. The central bank cannot simultaneously set both a monetary aggregate instrument and an interest rate instrument.
8. Endogenous money means that the level of the money stock changes mainly as a result of changes in the demand for bank loans.

PART SIX: MONETARY THEORY
(Textbook: Chapters 20, 21, 24, 25 and 26)

<u>CHAPTER 20:</u> **THE DEMAND FOR MONEY**

The study of the effect of money on the economy is called Monetary Theory. Having learnt about Money Supply, it is now necessary also to consider the demand for money.

1. <u>**Quantity theory of money**</u>

- this theory was developed by the classical economists of the 19th and early 20th centuries
- a theory of how nominal value of aggregate income is determined.
- Tells how much money is held for a given level of income.
- Most important point is that this theory suggests that interest rates have **no** effect on the demand for money

Velocity of Money and Equation of exchange:

- explained by Irving Fisher
- Fisher examined the links between the total quantity of money M (money supply) and the total amount of spending on final goods and services produced in the economy. Total spending (P x Y) is also thought of as aggregate nominal income for the economy (e.g. GDP).
- The link between M and P x Y is referred to as V (velocity of money).
- Definition: V = average number of times per year (turnover) that a dollar is spent in buying the total amount of goods and services produced in the economy.

- **Equation of exchange:**

- Equation of exchange is simply an identity. It does not tell us that when the money supply, M changes, nominal income (P x Y) changes in the same direction. In fact the identity leads to the argument that an increase in M would be offset by a decrease in V which leaves M x V and therefore P x Y unchanged.

- The identity has to be **converted into a theory** of how nominal income is determined.

Determinants of velocity
*According to Fisher, velocity is **determined by the institutions** in an economy. If people use credit cards to conduct transactions, therefore use money less often, then less money is required (M falls relative to PxY), and velocity (PxY)/M will increase. Conversely, if its more convenient to use cash, cheques and debit cards (all of which are money), more money is used to conduct the transactions generated by the same level of nominal income, and velocity will fall. Fisher took the view that velocity would be normally reasonably **constant in the short run.***

From the equation of exchange to the Quantity Theory of money

- Fisher's view that velocity is fairly constant in the short run, transforms the equation of exchange into the QUANTITY THEORY OF MONEY.
- This theory states **that nominal income is determined solely by movements in the quantity of money:** when M doubles, M x V doubles and so must P x Y.

Quantity theory and the <u>price level</u>

- Classical economists believed that wages and prices were completely flexible and that Y would remain at full-employment level.
- Conclusion of quantity theory is that if M doubles then P must double because Y and V are constant.
- They believed that any change in M would lead to a proportional change in the price level.
- *Movements in the price level resulted solely from changes in the quantity of money.*
- This theory implicitly assumed that the causal direction in the quantity equation runs from MV to PY.
- **BUT**: A case can also be made for the causal direction in the opposite way: PY to MV: price/wages increase and therefore the public's demand for credit increases and MV also increases.

Quantity theory and <u>inflation</u>

- Recall that the percentage change (%Δ) of a product of two variables is approximately equal to the sum of the percentage changes of each of these variables.
- %Δ in (x.y) = (%Δ in x) + (%Δ in y)
- Rewriting the equation of exchange, subtracting %ΔY from both sides and realizing that the inflation rate, π, is the growth rate of the price level, %ΔP:
- Π = %ΔP = %ΔM + %ΔV - %ΔY
- Since we assume velocity is constant, is growth rate is zero, so the <u>quantity theory of money is also a theory of inflation</u>:
- **Π = %ΔM - %ΔY**
- *The theory indicates that the inflation rate equals the growth rate of the money supply minus the growth rate of aggregate output*

Quantity Theory of Money Demand:

- Quantity theory of money tells us how much money is held for a given amount of aggregate income, it is, in fact, a theory of the demand for money.

- Fisher's quantity theory of money suggests that the demand for money is purely a function of income, and interest rates have no effect on the demand for money.

Is velocity really constant?

The classical view that velocity can be treated as a constant is **not supported by empirical data.** The fact that velocity is not always constant became particularly clear to economists during the years of the Great Depression, when the velocity of money dropped drastically.
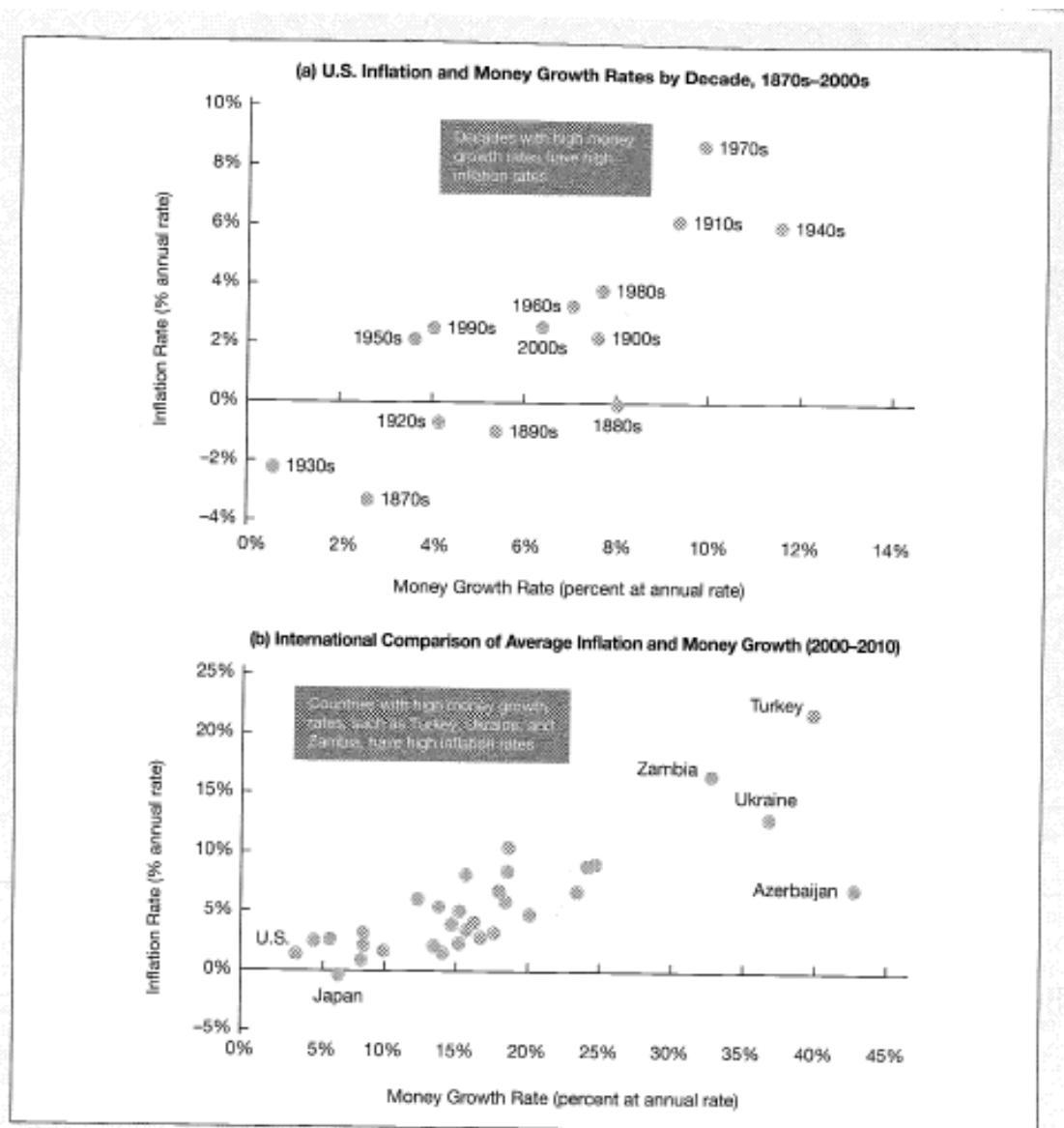
FIGURE 1   Relationship Between Inflation and Money Growth

In panel (a), decades with higher money growth rates (the 1910s, the 1940s, and the 1970s) typically have a higher average inflation rate. This relationship also holds in panel (b), where we examine the ten-year inflation and money growth rates from 2000–2010 for various countries.

Sources: For panel (a), Milton Friedman and Anna Schwartz, *Monetary trends in the United States and the United Kingdom: Their Relation to Income, Prices, and Interest Rates, 1867–1975,* Federal Reserve Economic Database (FRED), Federal Reserve Bank of St. Louis, http://research.stlouisfed.org/fred2/categories/25 and Bureau of Labor Statistics at http://data.bls.gov/cgi-bin/surveymost?cu, For panel (b), International Financial Statistics. International Monetary Fund, www.imfstatistics.org/imf/.

2. Keynes' Liquidity Preference Theory

Keynes developed a theory of money demand that took into account the importance of interest rates. This theory is called the **liquidity preference theory**. Why do individuals hold their wealth in money rather than investments? Keynes used three motives to explain this behaviour.

Transactions Motive: individuals are assumed to hold money because it is a medium of exchange that can be used to carry out everyday transactions. According to Keynes this is largely dependent upon

people's level of transactions which he believed were related to income.

Precautionary Motive: individuals will hold money "just in case". This motive for holding cash is determined mainly by the level of transactions individuals expect to make in the future. These balances are also related to income.

Speculative Motive: the final motive for holding wealth in the form of money, according to Keynes, was as a **store of wealth** and to be able to take advantage of wealth increasing opportunities. This was referred to as the speculative motive and is viewed as being **sensitive to interest rates** as well as expected future movements in interest rates. This part of the theory implies that the velocity of money is not constant. Note that when interest rates are high, individuals are more likely to hold their wealth in bonds and the demand for money will be low. When interest rates are low, individuals are more likely to hold their wealth in the form of cash (rather than bonds) and the demand for money will increase. **There is a negative relationship between the quantity of money demanded and the interest rate.**

When all three motives are considered together:
- by putting all three motives together Keynes was able to develop a demand for money equation.
- He distinguished between **nominal** and **real** quantities. Money is valued in terms of what it can buy.
- Keynes reasoned that people want to hold a certain amount of real money balances which would be related to income (Y) and interest rates (i).
- Write down the liquidity preference function (pg 543 in the textbook):

- The above function can be explained as follows: the demand for real money balances Md/P is a function of i and Y.
- Keynes' view was a major departure from Fisher's (interest has no effect on demand for money).
- Keynes' liquidity preference theory "postulated three motives for holding money, the transaction motive, the precautionary motive and the speculative motive. Although Keynes took the transactions and precautionary motives to be proportional to income, he reasoned that the speculative motive would be negatively related to the level of interest rates.
- Keynes' model has an important implication: **velocity is not constant and is in fact positively related to interest rates.** His liquidity preference theory casts doubt on the classical quantity theory that nominal income is determined primarily by movements in the quantity of money.

3. **Friedman's Portfolio Theory of Money Demand**

- Milton Friedman developed this theory in 1956. He questioned why people chose to hold money.
- Friedman stated that demand for money must be influenced by the same factors that influence the demand for any **asset** and so he applied the **theory of asset demand to money.**
- The theory of asset demand indicates that the demand for money should be a function of the resources available to individuals (their wealth), the expected returns on other assets relative to the expected return on money and relative liquidity. Whereas it is negatively related to risk.
- As had Keynes, Friedman also recognized that people wanted to hold a certain amount of real money balances, which was positively related to income and negatively related to interest rates.
- Demand for an asset is positively related to wealth.

Distinguish between Keynesian and Friedman theories

Friedman:
- By including more than one asset as substitutes for money, he recognized that more than one interest rate is important to the overall economy. However, he considered the effects in relation to the **return on investments** rather than the effect of interest on the demand for money.
- He viewed money and goods as substitutes and as a result changes in the quantity of money might have a direct effect on aggregate spending.
- He did not take expected return on money to be constant, as Keynes did.
- Suggests that changes in the interest rates have little effect on the demand for money.
- Believed that money is stable and insensitive to interest rates.
- Velocity is predictable and leads to the quantity theory *conclusion that money is the primary determinant of aggregate demand.*

Keynes:
- lumped all assets other than money in one group (bonds) and felt that the returns would move together.
- Considered the expected return on money to be constant
- Interest rates are important determinant of demand for money, through the speculative demand for money.
- This theory implies that velocity is unstable and cannot be treated as a constant.

Factors that determine the demand for money (table 1 pg 546)

Variable	Change in variable	Money demand response	Reason
Interest rates	⇧	⇩	Opportunity cost of money rises
Income	⇧	⇧	Higher transactions
Payment technology	⇧	⇩	Less need for money in transactions
Wealth	⇧	⇧	More resources to put into money
Risk of other assets	⇧	⇧	Money relatively **less** risky and so less desirable
Inflation risk	⇧	⇩	Money relatively **more** risky and so less desirable
Liquidity of other assets	⇧	⇩	Money relatively **less** liquid and so less desirable

Empirical evidence on the demand for money

Interest rates and money demand
The more sensitive the demand for money is to interest rates, the more unpredictable the velocity will be and the less clear the link between the money supply and aggregate spending will be.   According to the textbook, if interest rates do not affect the demand for money then velocity is more likely to be constant and the more likely it is that aggregate spending will be determined by the quantity of money. There is an extreme case of ultra-sensitivity of the demand for money to interest rates, called the **liquidity trap,** in which conventional monetary policy has no effect on aggregate spending, because a change in the money supply has no effect on interest rates.

Stability of money demand
If money demand function is unstable and undergoes substantial unpredictable shifts, then velocity is unpredictable and the quantity of money may not be tightly linked to aggregate spending.   The stability of money demand is important to the central bank in the decision as to whether to target interest rates or the money supply. After 1973 the rapid pace of financial innovation, which changed the items that could be used for money, resulted in the instability of the money demand function and velocity being hard to predict.

The overall conclusion is that the demand for money is unstable and that the setting of rigid money supply targets to control aggregate spending may thus be ineffective.

Study the additional explanations in the study guide.

Typical Exam questions

20.1 Briefly explain the quantity theory of money (QT), that is, its assumptions and predictions.
Demonstrate that the QT can be transformed into the quantity theory of money demand. Does the assumption regarding V agree with the empirical findings? (10)
20.2 Explain why Keynes's liquidity preference theory predicts that both nominal income and interest rates affect the demand for money. (10)
20.3 Explain the major findings of empirical evidence on the demand for money function and its implication for monetary policy. (5)

CHAPTER 21: THE IS CURVE

This chapter is a revision of what students learnt in ECS202 (Macroeconomics, 2nd year). Student should study the content in the study guide and use both the study guide and the textbook to answer the questions below. Once a student has completed the questions and graphs, he or she should have a good understanding of the IS-LM model and the use of this model for analyzing fiscal and monetary policy.

Note: There is only one possible exam question on this chapter which refers to the realism of the ISLM model. But in order to evaluate the realism of the ISLM model, you must understand what ISLM is all about.

1.   Who developed the IS-LM model?

       _____

       _____

2.   Why is it considered useful?

       _____

       _____

       _____

Determination of aggregate output:

3.   Total quantity demanded of an economy's output is the sum of what?

       _____

       _____

Consumer expenditure and the Consumption function:

4.   Draw the Consumption function and give the expression used to
       represent the Consumption function.

5.   List the main elements of C.

_____

_____

Investment Spending:

6.   Name the two type of investment that make up I._____

_____

_____

7.   What comprises planned investment spending? _____

_____

8.   Write down the equation for the aggregate demand function (in a simple, closed economy).

_____

Expenditure Multiplier:

10.   Explain the implications and derivation of the expenditure multiplier.

_____

_____

_____

_____

_____

Government's Role:

11.   Use a graph to illustrate the role of government and its effect on aggregate spending and output.

12.   Briefly explain the effects of changes in the variables of aggregate output in an open economy with a government sector.

_____

_____

_____

13.   Differentiate between exogenous and endogenous variables.

_____

_____

_____

The IS Curve:

14.   What does the IS curve tell us?   _____

_____

15.   What causes the IS curve to shift? _____

_____

The LM Curve:

16.   What does the LM curve tell us? _____

        _____

17.   Use a graph to explain the effects on the money market of an autonomous rise in money demand. What could cause this rise in M^d?

Is the IS-LM model realistic?

Study this section in the study guide and note the following:
*   Many economists argue that the IS-LM is unrealistic
*   Remember any model is a simplification of reality
*   The purpose of the ISLM model is to show the links between the major macroeconomic variables – this it does well.
*   Is the model close to reality?   To answer this it is necessary to consider which variables are exogenous and which are endogenous.
*   A major assumption of the ISLM model is the M is an exogenous variable. This is not the case in modern economies and this does limit the use of the ISLM model.
*   The model also takes prices as given and so is unable to tell us anything about inflation. Consequently it is good for the short run when inflation is low.
*   This model is still considered a "first approximation" for understanding the real world.

Exam question

21.1 Briefly explain why the assumptions/predictions of the ISLM model are unrealistic in the case of South Africa. Explain the meaning of endogenous and exogenous variables and explain why the money supply is endogenous/exogenous in South Africa. Which additional assumption can be made to make ISLM more realistic? (12)

Chapter 24: Monetary Policy Theory

Fluctuating levels of **inflation** have been a "headache" to policymakers, politicians, consumers and producers for decades. Keeping inflation under control is a key element of monetary policy in the USA and SA. Milton Friedman proposed that "inflation is always and everywhere a monetary phenomenon". He believed that because **inflation was caused by high growth rates of the money supply, the reverse was the solution; keep the growth rate of money supply low and inflation will be prevented.**

Response of monetary policy to shocks

The main goal of central banks is price stability: try to maintain inflation, Π, close to the target level Π^T, slightly above zero and usually between 1 – 3 %.

1) Response to an aggregate demand shock
The economy is initially at point 1, where output is at Y^P and inflation is at Π^T. the negative demand shock decreases aggregate demand, shifting AD_1 to the left. Policymakers can respond to this in two ways:

a) **No policy response.** The AD curve remains at AD_2, here aggregate output falls to Y_2 below potential output Y_p and inflation falls to Π_2, below the target. With output below potential, slack begins to develop in the labour and product markets, lowering inflation. The SRAS curve will shift down to AS_3, and economy will move to point 3. Output will again be at its potential level while inflation will fall to a lower level of Π_3.

Figure 1
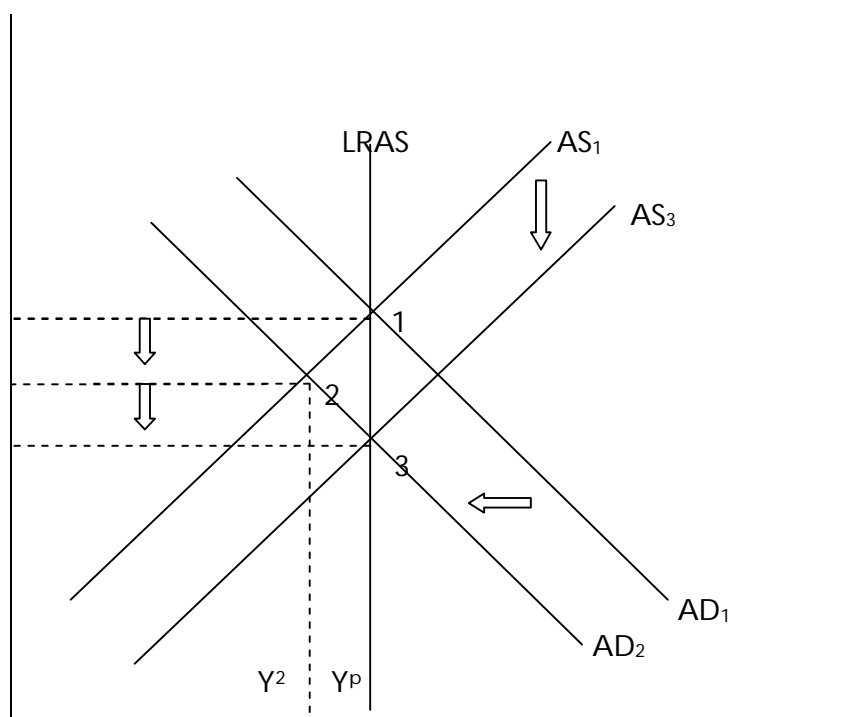
Policy stabilizes economic activity and inflation in the short run.
Policymakers can eliminate both the output and inflation gap in the
short run by pursuing policies to increase demand to its initial level and
return economy to its pre-shock state. CB does this by easing monetary
policy (cutting interest rates). This stimulates investment spending and
increases quantity of aggregate output demanded, thereby shifting
AD curve right.

Figure 2
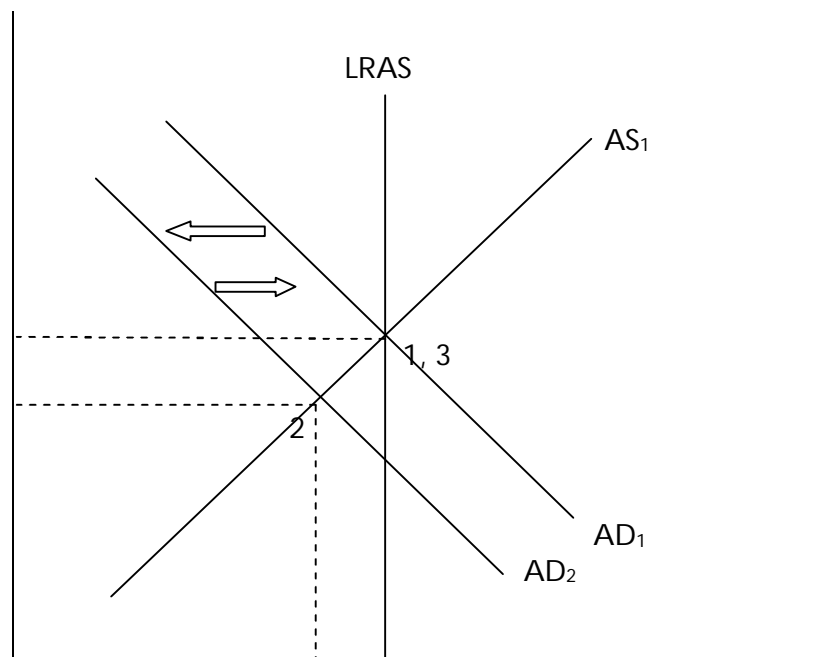
Application: Quantitative (credit) easing in response to the global financial crisis

If the negative demand shock is so large that CB can't lower interest rate
further because it hits a floor of zero, bank needs to turn to nonconventional
monetary policy. This involves liquidity provision and asset purchases, which
result in an expansion of the CB balance sheet and so are referred to
quantitative easing or more accurately **credit easing.**

How did QE stabilize output and inflation during the GFC? – see figure 2 above
After the Lehman Brothers collapse, the real cost of borrowing to households
and businesses shot up due to increased financial frictions. This led to a
decline in consumption and investment expenditure, causing a contraction in
AD and a leftward shift to AD_2.
By engaging asset purchases and liquidity provision, the Fed was able to
reduce financial friction and lower the real cost of borrowing. AD curve
shifted to right, thereby avoiding deflation and boosting economic activity so
the economy did not enter a depression as in the 1930s. However the Fed
was unable to shift the aggregate demand curve all the way back to AD_1.

2) Response to a permanent supply shock

Suppose an increase in regulations **permanently reduces** the potential level of output. Potential output falls from Y^p_1 to Y^p_3, and LRAS shifts left to $LRAS_3$. This triggers a price shock that shifts SRAS upward to AS_2. Two possible policy responses to this permanent supply shock are possible:

a) No policy response. (see figure 3) if monetary policy is unchanged, the economy will move to point 2, with inflation rising to Π_2 and output falling to Y_2. Since this level of output is still higher than potential, the SRAS keeps shifting up until it reaches AS_3, where it intersects AD_1. The economy moves to point 3, eliminating the output gap but leaving inflation higher at Π_3 and output lower at Y^p_3.

Figure 3
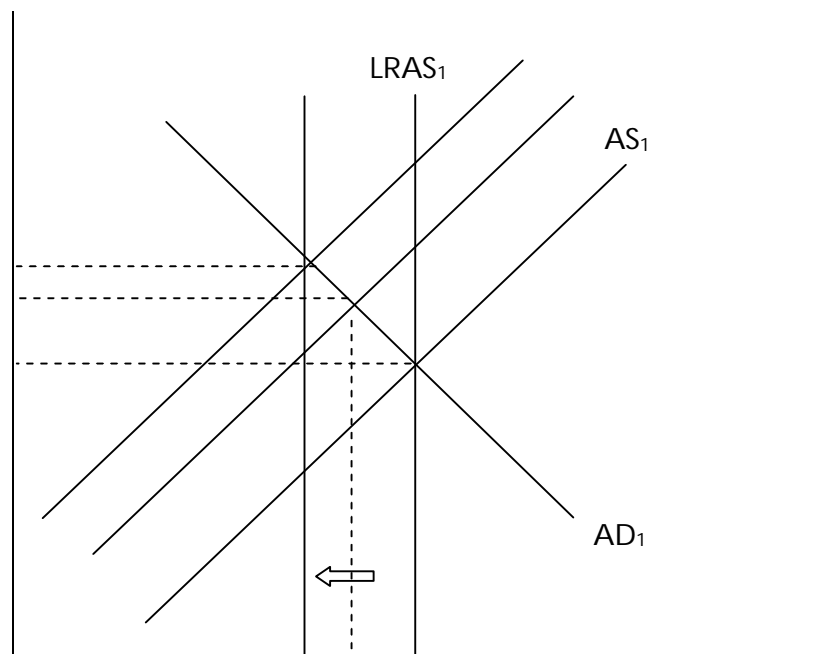
b) Policy stabilizes inflation. (see figure 4) monetary authorities can keep inflation at the target rate and stabilize inflation by decreasing AD to AD_3 where it intersects $LRAS_3$. To do this they need to tighten monetary policy by **increasing the real interest rate** causing investment spending to fall and lowering aggregate demand. The economy goes to point 3, where the output gap is zero and inflation is at the target.

Figure 4
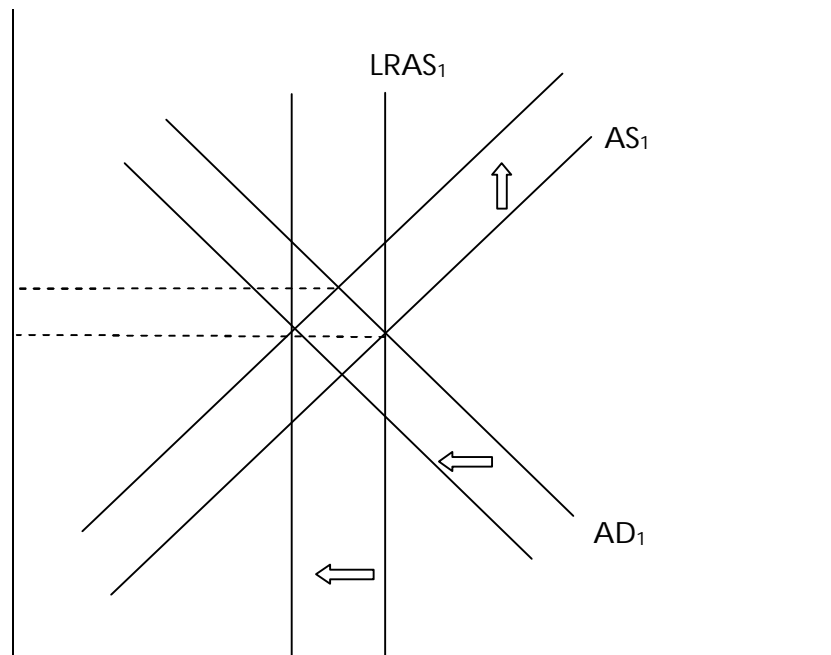
The divine coincidence still remains true when a permanent supply shock occurs: there is no trade-off between the dual objective of stabilizing inflation and economic activity.

3) Response to a temporary supply shock

With a temporary shock such as an **oil price surge**, the divine coincidence does not always hold. Policymakers face a short-run tradeoff between stabilizing inflation and economic activity. The shock shifts the SRAS left to AS_2 but leaves the LRAS unchanged because the shock is temporary. The economy moves to point 2, with inflation rising to Π_2 and output falling to Y_2. Policymakers can respond in two ways:

a) **No policy response.** (see figure 5)here the AD curve does not shift. Since aggregate output is less than potential, eventually the SRAS will shift right to AS_1. Economy will return to point 1 and close both the output and inflation gap. Both inflation and economic activity will stabilize over time. *__In the long run there is no tradeoff between the two objectives, and the divine coincidence holds.__*

While we wait in the long run however, the economy will undergo a painful period of reduced output and higher inflation rates. This opens the door for stabilization of inflation or economic activity in the short run.
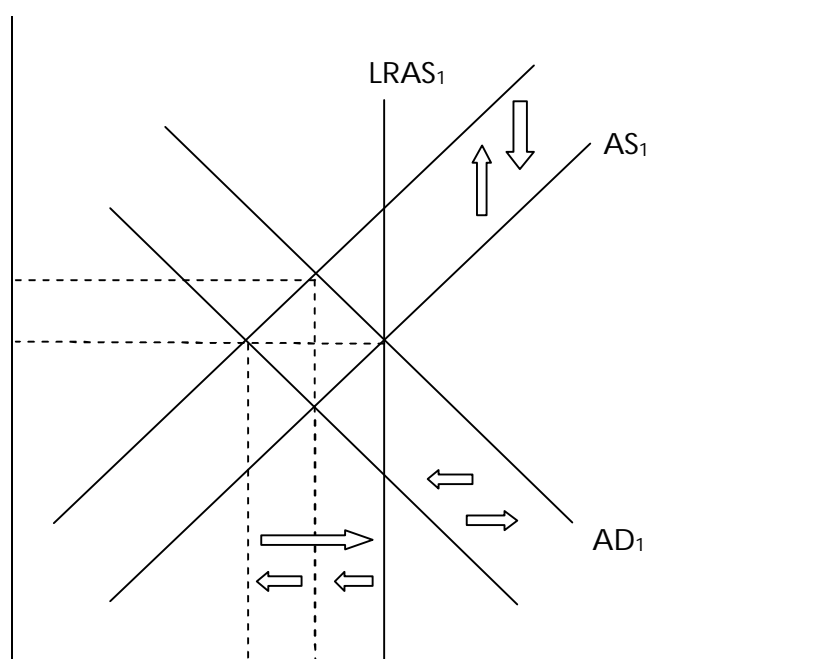
<u>Figure 5</u>
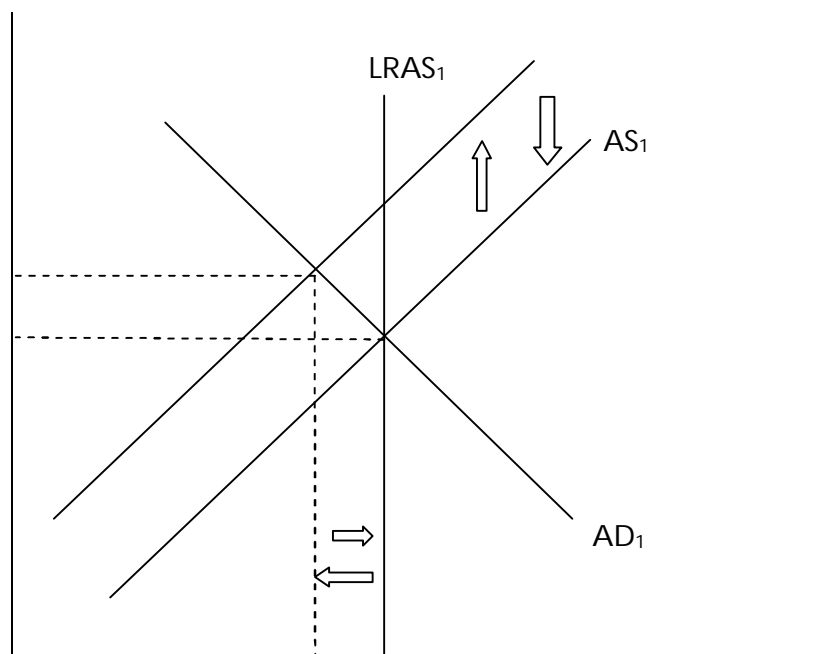
b) Policy stabilizes inflation in short run. (see figure 6) By raising interest rates, investment and aggregate demand will fall, shifting the AD left to AD_3. Economy moves to point 3, where output is below potential, the slack in the economy shifts the SRAS back down to AS_1. To keep the inflation rate at Π^T, monetary authorities will need to move the SRAD back to AD_1 by reversing the tightening and eventually the economy will return to point 1. Stabilizing inflation reduces aggregate output in the short run and only over time will output recover back to potential levels.

Stabilizing inflation in response to a temporary supply shock has led to a larger deviation of aggregate output from potential, so this action has not stabilized economic activity.

Figure 6

c) **Policy stabilizes economic activity in the short run.** (see figure 7) To increase AD to AD_3, they would have to ease monetary policy by lowering real interest rates. At point 3, the output gap is zero so monetary policy has stabilized economic activity, however inflation has risen to Π_3 which is greater than the target, so inflation has not been stabilized.
Stabilizing economic activity in response to a temporary supply shock results in a rise in inflation.

Figure 7
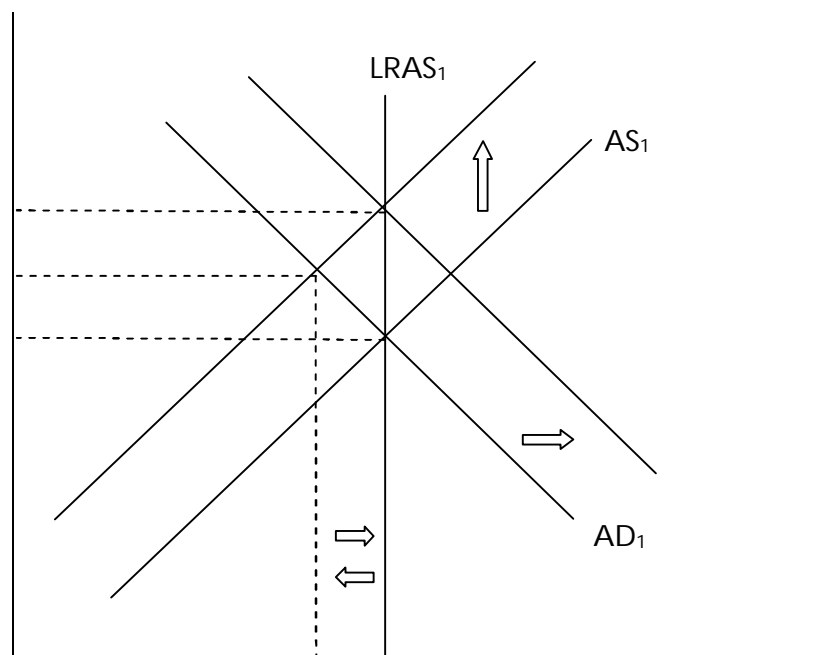
The bottom line: The relationship between stabilizing inflation and stabilizing economic activity.

We can draw the following conclusions from the above analysis:
1. If most shocks to the economy are **aggregate demand shocks** or **permanent aggregate supply shocks**, then policy that stabilizes inflation will also stabilize economic activity, even in the short run.
2. If temporary supply shocks are more common, then a central bank must choose between the two stabilization objectives in the short run.
3. In the long run there is no conflict between stabilizing inflation and economic activity in response to shocks.

How actively should policymakers try to stabilize economic activity?

All economists have similar policy goals however they disagree on the best approach to achieve them. Suppose we are faced with an economy with high unemployment resulting from a negative demand or supply shock. **Non-activists** believe wages and prices are very flexible, so the self-correcting mechanism is very rapid. They believe government action is unnecessary to eliminate unemployment. **Activists** (Keynesians) regard the self-correcting mechanism as very slow because wages and prices are sticky. They therefore see the need for the government to pursue active policy to eliminate high unemployment when it develops.

Lags and policy implementation

If policymakers could shift the aggregate demand curve instantaneously, activist policies could be used to immediately move the economy to the full-employment level. However several types of lags prevent this immediate shift from occurring:
   1. **Data** lag is time it takes for policymakers to obtain data indicating what is happening in the economy.
   2. **Recognition** lag is time it takes for policymakers to be sure of what the data are signaling.
   3. **Legislative** lag is time it takes to pass legislation to implement a particular policy. This does not exist for monetary policy actions.
   4. **Implementation** lag is time it takes to change policy instruments once a new policy is decided on. Again, less important for monetary policy than fiscal.
   5. **Effectiveness** lag is time it takes for policy to actually have an impact on the economy. This lag is both long (often a year or longer) and variable (a lot of uncertainty about how long it is).

Inflation: Always and everywhere a monetary phenomenon.

We see that policymakers can target any inflation rate in the long run by shifting the aggregate demand curve with monetary policy. Suppose the central bank believes the inflation target is too low, it will ease monetary policy by lowering the real interest rate at any inflation rate, thereby increasing investment spending and aggregate demand, the AD curve shifts to AD_3. Because output is above potential output, the SRAS will shift up, stopping at AS_3, where inflation is at a higher target level of Π_3^T and the output gap is back to zero. The analysis in figure 8 demonstrates the following points:

   1. Monetary authorities can target any inflation rate in the long run with monetary policy instruments.
   2. Potential output – and therefore the quantity of aggregate output produced in the long run – is **independent of monetary policy.**

Figure 8: A rise in the inflation target
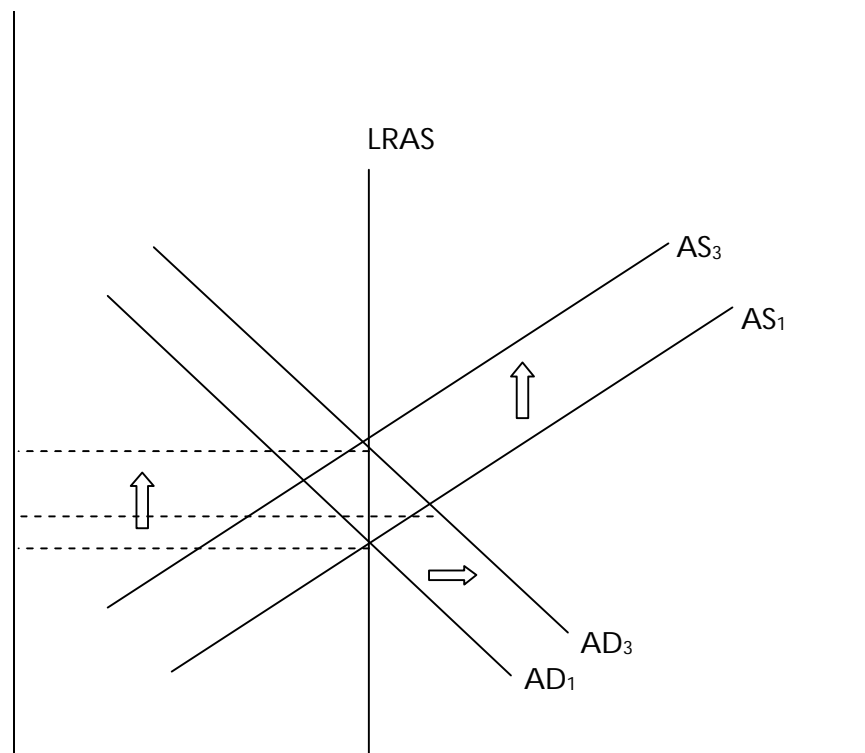
Causes of inflationary monetary policy

If everyone agrees that high inflation is so bad, why do we see so much of it? Monetary authorities can set the inflation rate in the long run, so it must be that in trying to achieve other goals, governments end up with overly expansionary monetary policy and high inflation.

Two types of inflation can result from activist stabilization policy to promote high employment:
  1. **Cost-push inflation** results either from a temporary negative supply shock or a push by workers for wage hikes beyond what productivity gains can justify
  2. **Demand-pull inflation** results from policymakers pursuing policies that increase aggregate demand

Cost-push versus demand-pull inflation

How do we know whether it is demand-pull or cost-push inflation? We would normally expect to see demand-pull when unemployment is below the natural level, and cost-push when unemployment is above the natural level. However we still struggle measuring the natural level of unemployment. A further complication, cost-push can be initiated by demand-pull. When demand-pull inflation produces higher inflation rates, expected inflation will eventually rise and cause workers to demand higher wages (cost-push inflation).

Application: The Great Inflation

We can now investigate the causes of the rise in U.S. inflation from 1965 to 1982, a period dubbed the "Great Inflation". *See figure 11 on pg 639.* The CPI rate was below 2% in the early 1960s, but by the late 1970s, it was averaging 8% and peaked at over 14% in 1980 after the oil price shock in 1979. The economy experienced unemployment below the natural rate in all but one year between 1960 and 1973, suggesting a demand-pull inflation. Policymakers pursued monetary policy easing that shifted the aggregate demand curve right trying to achieve an output target that was too high, thus increasing inflation.
 In hindsight, most economists today agree that the natural rate of unemployment was substantially higher than first thought in the 1960s and 1970s, between 5-6%. After 1975, the unemployment rate was regularly above the natural rate yet inflation continued, suggesting a cost-push inflation. Only when the Fed committed to an anti-inflationary monetary policy, which involved hiking the federal funds rate to the 20% level, did inflation come down, ending the Great Inflation.

Please see Additional material for South Africa in study guide.
C3: Inflation: an overview of the main issues
C3.1. Definition and measurement of inflation
C3.2. Impulses versus spirals
C3.3. Money and inflation
C3.4. Social conflict and inflation proneness
C3.5. Combating inflation
C3.6. The cost of inflation

Typical Exam questions

24.1 Provide a perspective on Friedman's proposition that inflation is always and everywhere a monetary phenomenon. Firstly evaluate the empirical evidence in this regard (you may refer to the experience of any country), then explain whether inflation is always and everywhere a demand-pull phenomenon. Lastly explain why money plays a vital role in sustaining the inflationary process. (15)
24.2 Define inflation and explain how inflation is measured in South Africa. Refer to the CPI, PPI and core inflation. (10)
24.3 Provide a definition of inflation. Specifically refer to the difference between an inflationary impulse and an inflationary spiral initiated by an initial increase in the price of a good. (8)
24.4 Comment on the statement: "Inflation is essentially a symptom of conflict over income distribution, which cannot be settled by relative price/wage movements". Then discuss three factors which make an economy more inflation prone. (18)
24.5
(a) Explain the importance of the foreign sector in the SA economy and explain the effect which changes in the R/$ exchange rate have on the

revenue earned by SA and the foreign sector and the speed at which R-prices change in SA. (12)

(b) Also explain the effects of the increase in dollar parity pricing in SA and the real income gains and sacrifices to be made in SA due to changes in the R/$ exchange rate. (8)

24.6 Briefly discuss solutions to inflation problem in South Africa.

(a) Explain the essence of any anti-inflationary policy and briefly discuss a structural solution to inflation. (9)

(b) Explain the effect of a stronger and weaker exchange rate (R/$) on the domestic inflation rate. (6)

24.7 Briefly discuss the following counter-inflationary policy measures:

> *(a) Price controls (6)*
> *(b) A voluntary social contract between business, labour and government (4)*
> *(c) Tight monetary policy (8)*

In each case, explain its meaning, whether it is likely to be successful, and if applicable, its advantages and disadvantages.

24.8 Briefly explain how inflation was contained in SA during the 2004-2007 period, how this situation was reversed in August 2008 and the implications of this for the SA economy. (7)

24.9 Explain the self-reinforcing nature of lower inflation, that is, the role of inflationary expectations (6)

24.10 Explain the costs of inflation, that is, on productivity, income distribution and foreign investment. (18)

Chapter 25: The role of expectations in monetary policy

Purpose of study unit
To explain the role of monetary policy in time-inconsistency situations and benefits of a credible nominal anchor.

Policy conduct: rules or discretion?

Policymakers operate with discretion when they make no commitment to future actions, instead make what they believe in that moment to be the right choice. Time inconsistency problem introduces limitations of discretionary policy. Time Inconsistency is the tendency to deviate from good long run plans when making short run decisions.

Policymakers are always tempted to pursue more expansionary policy than firms expect because it would boost economic output in short run. But the best policy is *not* to, because decisions about wages and prices reflect workers expectations about policy. And when they see a CB pursuing discretionary expansionary policy, they know this will lead to inflation and will therefore raise expectations about inflation and drive up wages and prices. This leads to higher inflation.

Policymakers will have better inflation performance in the long run if they do not try to surprise people with unexpectedly expansionary policy, but instead keep inflation under control → abandon discretion and adopt rules to govern policy making

Role of credibility and a nominal anchor

An important way to constrain discretion is by committing to a *nominal anchor* such as the inflation rate. If this commitment has credibility – believed by the public – it has important benefits:

1. It has elements of a behavior rule which can help overcome the time inconsistency problem by providing an expected constraint. CB will be subject to public scrutiny and criticism if they miss the objective.
2. It helps to anchor inflation expectations, which leads to smaller fluctuations in inflation, thus contributes to price stability, but also helps stabilize aggregate output. It makes monetary policy more efficient.

CHAPTER 26: Transmission Mechanisms of Monetary Policy

The transmission mechanism of monetary policy explains how monetary policy works – which variables respond to interest rate changes, when, why, how, how much and how predictably.

Traditional interest rate channels

The traditional view of monetary transmission mechanism:

An important feature of the interest rate transmission mechanism is its emphasis on the **real rather than nominal interest rate** that affects consumer and business decisions. Also, it is often the real long term interest rate that has the major effect on spending. The phenomenon of *sticky prices*, the fact that the aggregate price level adjusts slowly over time, so that expansionary monetary policy, which lowers short term nominal rate, also lowers short term real interest rate.

The expectations hypothesis of term structure (ch 6) says that long term interest rate is an average of expected future short term rates, also suggests that a lower short term rate, as long as it persists, leads to a fall in the long term rate. This leads to rise in business investment, residential housing investment, inventory investment and consumer durable expenditure, all of which produce a rise in aggregate demand.

That the real interest rate rather than the nominal rate affects spending provides an important mechanism for how monetary policy can stimulate the economy. If nominal interest rates are at a floor of zero, with a commitment to future expansionary monetary policy expected inflation can raise, thereby lowering the real interest rate and stimulating spending through the interest rate channel:

Due to the empirical failure of traditional interest rate monetary transmission mechanisms, the search for other transmission mechanisms came about.

Other asset price channels

Exchange rate effects on exports
When domestic real interest rates fall, domestic dollar assets become less attractive relative to other assets denominated in foreign currencies. As a result, the value of dollar assets relative to other currency assets, dollar depreciates. This makes domestic goods cheaper than foreign goods causing a rise in exports and hence aggregate demand.

Tobin's q theory
This explains how monetary policy can affect the economy through its effect on the valuation of equities (stock). q is the market value of firms divided by the replacement cost of capital. If q is high, market price of firms is high

relative to replacement cost of capital, and new plant and equipment capital is cheap relative to the market value of firms. Companies can then issue stock and get a high price for it relative to the cost of the facilities and equipment they are buying. Investment spending will therefore rise.

But how might monetary policy affect stock prices? Lower real interest rates on bonds mean that expected return on this alternative to stocks will fall. This makes stocks more attractive relative to bonds so demand for them increases and raises their price.

Wealth effects
The basic premise of the life cycle hypothesis of consumption is that consumers smooth out their consumption over time. Therefore what determines consumption spending s the lifetime resources of consumers, not just today's income. Important component of resources is consumer's financial wealth → common stock. When stock prices rise, financial wealth increases and consumption should rise. Now monetary easing can lead to a rise in stock prices.

Credit view
Based on the problem of asymmetric information in financial markets that leads to financial frictions. Two types of monetary transmission channels arise as a result:

1. **Bank lending channel**
   Because of banks' special role, certain borrowers will not have access to credit markets unless they borrow from banks. Therefore the channel operates as follows: expansionary monetary, which increase bank reserves and bank deposits, raises the quantity of bank loans available. This causes investment and possibly consumer spending to rise.

2. **Balance sheet channel**
   Arises from financial frictions in credit markets. In chap 8 we saw the lower the net worth of businesses, the more severe the adverse selection and moral hazard problems in lending to these firms. Lower net worth means that lenders in effect have less collateral for their loans, so their potential losses from adverse selection are higher. This leads to decreased lending to finance investment spending. Monetary policy can affect firms balance sheets in several ways. Easing of monetary policy, which causes a rise in stock prices, which rises their net worth and leads to higher investment spending and aggregate demand because of the decrease in adverse selection

and moral hazard problems. This leads to the following schematic for one balance sheet channel of monetary transmission:

Why are credit channels likely to be important?
There are three reasons to believe that credit channels are important monetary transmission mechanisms:
1. A large body of evidence on the behavior of individual firms supports the view that **credit market imperfections** of the type crucial to the operation of credit channels do affect firms' employment and spending decisions.
2. There is evidence that **small firms are hurt more** by tight monetary policy than large firms.
3. The **asymmetric information** view of credit market imperfections at the core of the credit channel analysis is a theoretical construct that has proved useful in explaining many other important phenomena, such as why financial institutions exist, why our financial system has the structure that it has and why financial crises are so damaging.

Typical Exam questions

26.1 Explain the meaning of the transmission mechanism of monetary policy in South Africa in general, describe its main links, explain how it influences domestic inflation and why monetary policy is subject to lags. (12)
26.2 Explain how the interest rate channel of monetary policy operates. (6)
26.3 Explain how the other financial asset prices channel of monetary policy operates. (9)
26.4 Explain how the credit channel of monetary policy operates. (9)

GOOD LUCK AND MAY YOUR EFFORTS BE JUSTLY REWARDED!!

ECS3701
SUGGESTED SOLUTIONS TO SELECTED TUTORIAL QUESTIONS

1.2   **Explain briefly what a common stock is, what purpose it serves, and how it affects business investment decisions. (3)**

A common stock refers to a share of ownership in a company (corporation). The owner of the stock has a claim on the earnings of the company (corporation). The stock is an important factor in business investment decisions, because the price of shares affects the amount of funds that can be raised by selling newly issued stock to finance investment spending.

1.3   **List two ways in which the quantity of money may affect the economy. (2)**

There is evidence to support the fact that money plays an important role in generating business cycles and evidence exists that the rate of money growth has declined before every recession.
 Empirical data indicates that an increase in the supply of money (quantity of money) is linked to increases in prices (inflation).

1.5   **List and define three (3) commonly used measures of the aggregate price level.**

The three measures of aggregate price level are:
- GDP deflator is defined as nominal GDP divided by real GDP.
- PCE deflator is the nominal personal consumption expenditures divided b real PCE.
- CPI is the consumer price index and is expressed as a price index with the base year equal to 100.

2.1   **Explain briefly the function of financial markets, the meaning of direct**
and   indirect financing, and the meaning of a financial intermediary. (5)

Financial markets allow funds to flow from people who lack productive investment opportunities but have surplus funds to people who have opportunities but do not have the necessary funds.

Direct financing: borrowers borrow funds directly from lenders in the financial   markets.

Indirect financing: this refers to the activities of financial intermediaries such as   commercial banks in facilitating and reconciling the different requirements of borrowers and lenders via the process of financial asset transformation.

Financial intermediary refers to an institution that acts as a link between surplus   units and deficit units in an economy.

2.5 Explain the functions performed by financial intermediaries and how they can promote economic efficiency in financial markets. (8)

The basic function of financial markets is to channel funds from savers who have an excess of funds to borrowers (spenders) who have a shortage of funds. Financial markets can do this either through direct finance, or through indirect finance which involves a financial intermediary. The intermediary acts by channeling funds from the surplus unit to the deficit unit and helps to overcome some of the problems that exist such as transactions costs and asymmetric information.

This channeling of funds helps improve the economic welfare of everyone in society because it allows funds to move from people who have no productive investment opportunities to those who have such opportunities. In this way financial markets contribute to economic efficiency. In addition the channeling of funds can directly benefit consumers by allowing them to make purchases when they need them most.

3.1 Provide a formal definition of money. Then explain in principle how money stock is measured (5)

Money is defined as anything that is generally accepted as payment for goods and services or in repayment of debt. In a modern economy it consists of two major components: currency (C) and deposits (D). Money stock in SA is measured based on the types of deposits included in D:

M1A consists of cash plus cheque and transmission deposits.

M1 consists of M1A plus "other demand deposits".

M2 consists of M1 plus deposits and includes short-term and medium-term deposits.

M3 is the most comprehensive measure of money.

3.4 **Explain the meaning of the following terms as well as its advantages/disadvantages in facilitating payments: (15)**

Description	Advantages	Disadvantages
Commodity Money: money made up of precious metals or other valuable commodities.	An early medium of exchange that was universally acceptable.	This form of money is very heavy and is hard to transport from place to place.
Fiat Money: paper currency decreed by government as legal tender. It is largely dependent upon trust of the value of the currency.	Much lighter than precious metals or even coins.	Easily stolen. Can be expensive to transport in large quantitites.
Cheques: an instruction from you to your bank to transfer money from your account to someone else's account.	Allow transactions to take place without carrying around large sums of money. Improved the efficiency of the payment system. Loss from theft is greatly reduced.	Takes time to get cheques from place to place. The administration required to support the use of cheques is expensive.
Electronic payments: transmit payments via the internet. "Money" moves directly from one persons account to that of another.	It is quick and efficient. It is a cheap means of payment.	Problems of making errors in transmission do exist and are really difficult to reverse. While security is good, there is a risk of "hackers" being able to intervene in transactions.
E-Money: substitute for cash and exists only in electronic form. The debit card is a form of e-money.	Efficient and convenient.	Expensive to set up. Electronic means of payment raise security and privacy concerns. Leaves an electronic trail which contains personal data.

4.1   **In principle, explain the rationale of discounting future cash flows.
Then   explain the meaning of the formula: PV = CF/(1 + i) ^{n} (5)**

The process of calculating today's value of rands received in the future is called   discounting the future.   This concept allows one to work out today's value (price) of a credit (debt) market instrument at a given simple interest rate by adding up the individual present values of all the future payments received.   Furthermore this allows one to compare the values of two or more instruments with different   timing of their payments.

PV = present value

CF = cash flow

i = annual interest rate

n = number of years

4.3   **Explain the meaning of thefollowing concepts in the context of a coupon bond: coupon rate, yield to maturity of a bond and the return on a bond. Please provide the relevant formula/s. (7)**

Coupon rate: the rand amount of the yearly coupon payment expressed as a percentage of the face value of a coupon bond.

Yield to Maturity: of the several common ways to calculate interest rates, the most important is the yield to maturity.   The key to calculating the yield to maturity for any credit market instrument, is to equate today's value of the credit instrument with the PV of all of its future cash flow payments. The bond price and the yield to maturity are negatively related.

The formula used to calculate the yield to maturity depends upon the specific credit instrument being considered. In this case the yield to maturity on a bond could be represented as: Refer to TB page 75/76.

P =

The return on a security shows how well you have done by holding this security   over a stated period of time and it can differ substantially from the interest rate   measured by the yield to maturity. The rate of return is defined as the payments to the owner plus the change in its value expressed as a fraction of its purchase price. Because of fluctuating interest rates, the capital gains and losses on   long-term bonds can be large.

Formula for the return on a bond: Refer to page 81

R   =

4.4   Distinguish between nominal and real interest rate (4)

The real interest rate is defined as the nominal interest minus the expected rate of   inflation. The real interest rate reflects the real cost of borrowing and is likely to   be a better indicator of the incentives to borrow and lend.

The nominal interest rate ignores the effects of inflation and is frequently the interest rate which is generally referred to in an economy.

5.3   Derive a bond demand curve (price of a bond versus its quantity demanded) and a bond supply curve and explain how the equilibrium P and Q for the bond is determined. (8)

For the sake of simplicity consider a bond that has no coupon payments but pays a fixed amount at the maturity date.
Demand Curve (lenders)
- Assume a discount bond worth R10000.
- Bond is sold at R9000, discount rate is 10%.
- The formula to calculate the interest rate: $i = Re = (F - P)/ P$
- i = interest rate; Re = expected return; F = face value of the discount bond; P = initial purchase price of the discount bond.
- Formula shows that a particular value of the interest rate corresponds to each bond price. The lower the price of a bond the higher the interest.
- Ceteris paribus all other factors, the lower the price (higher the interest) the greater will be the demand for that bond. This is as per the theory of asset demand.
- This implies a downward sloping demand curve for bonds.

Supply Curve (borrowers):
- Assume all other variables except the price of the bond remain constant.
- Assuming the same amounts as in the example above, if the price of the bond was, say R7000, the return on this bond would be higher than 10%.
- This higher return implies that this bond is relatively expensive to firms who wish to borrow by issuing bonds. Thus a firm is more likely to supply more bonds to the market when price is higher and interest rate is correspondingly lower.
- This implies a positive relationship between price and quantity supplied for bonds.

Market Equilibrium:
- This occurs when the amount that people are wiling to buy (quantity demanded) equals the amount that people are willing to sell (quantity supplied) at a given price. The point where the market will settle.

- In the bond market this is achieved when the quantity of bonds demanded is equal to the quantity of bonds supplied: Bd = Bs.
- The concepts of excess demand and excess supply can be used to explain the establishment of the equilibrium price and quantity in the bond market.
- Excess demand means that more people want to buy bonds than others are willing to sell, this will drive the prices of bonds upwards.
- Excess supply means that more people wish to sell bonds than wish to buy bonds. This will drive the price of bonds downwards.

5.6 **Explain how Keynes' liquidity preference framework can be used to explain the effects of an increase in income, a rise in the price level and an increase in the money supply (assume that all other economic variables remain constant). Then explain why an increase in money supply does not necessarily lead to a decrease in interest rates over the longer term. (12)**

The liquidity preference framework is based on the assumption that there are two main categories of assets that people use to store wealth: money and bonds. The total wealth in the economy is therefore equal to the sum of money and bonds. The liquidity preference framework uses the demand and supply of money to determine interest rates.

In Keynes's liquidity preference framework two factors cause the demand curve for money to shift: income and the price level.

Increase in income: referred to as the income effect. Any increase in income leads to an increase in the demand for money for the following reasons:

- As an economy expands and income rises, wealth increases and people want to hold more money as a store of value.
- As an economy expands, people will want to transact more and this will also cause the demand for money to increase.

The conclusion is there reached that a higher level of income causes the demand for money at each interest rate to increase and the demand curve to shift to the right. (Refer to the graphs in Summary table 4 on page 115).

Price-level effect: A rise in price levels means that people will have to hold more money in order to transact. That is they will increase the nominal amount of money they hold. The conclusion, therefore is that a rise in the price level causes the demand for money at each interest rate to increase and the demand curve to shift to the right.

Increase in the money supply: assume that the money supply is completely controlled by the central bank. An increase in money

supply implies that the money supply curve shifts to the right. The interest established at the new equilibrium point will be at a lower rate of interest, ceteris paribus, in the short-term. This is referred to as the liquidity effect.

Increase in money supply does not necessarily lead to a lower interest rate in the longer term:

- An increasing money supply has an expansionary influence on the economy. National income and wealth will increase and the income effect of an increase in the money supply leads to an increase in the interest rate.
- An increase in the money supply can also cause the overall price level in an economy to increase. An increase in the price level will also result in an increase in the interest rate.
- The higher inflation rate (i.e. increasing prices) that results will also lead to an increase in interest rates.

The conclusion that may be reached from the above is that there are four possible effects on interest rates when money supply increases: the liquidity effect, the income effect, the price-level effect and the expected inflation effect. The liquidity effect indicates that an increase in money supply will lead to a decrease in the interest rate. The other effects work in the opposite direction and are likely to dominate. Therefore, an increase in the money supply leads to higher, rather than lower interest rates.

[Note the difference between the price-level effect and expected inflation effect:
price-level effect remains even after prices have stopped rising, whereas the expected inflation effect disappears]

6.1   Explain the meaning of the risk structure of interest rates (3). List and explain 3 factors which affect the risk structure of interest rates using a supply of /demand for bonds –framework. (18)

Risk structure of interest rates refers to the relationship between interest rates on bonds with the same maturity. Interest rates on bonds with the same maturity differ on different categories of bonds in any given period and the spread between interest rates varies over time.

The three factors that affect the risk structure of interest rates are:
Risk of defaulting: bonds that have no default risk are referred to as default-free bonds. The spread between default-free bonds and bonds with default risk is referred to as the risk premium. This refers to how much additional interest a bond must earn in order to make a person willing to hold it. A bond with default risk will always have a positive risk premium, and an increase in its default risk will raise the risk premium.

[Use of demand/supply framework: Refer to FIGURE 2 (page 125) and complete the diagram below. Also make sure you can explain the process as an example of the effects of default risk on demand and supply of bonds and the conclusion drawn from this.]
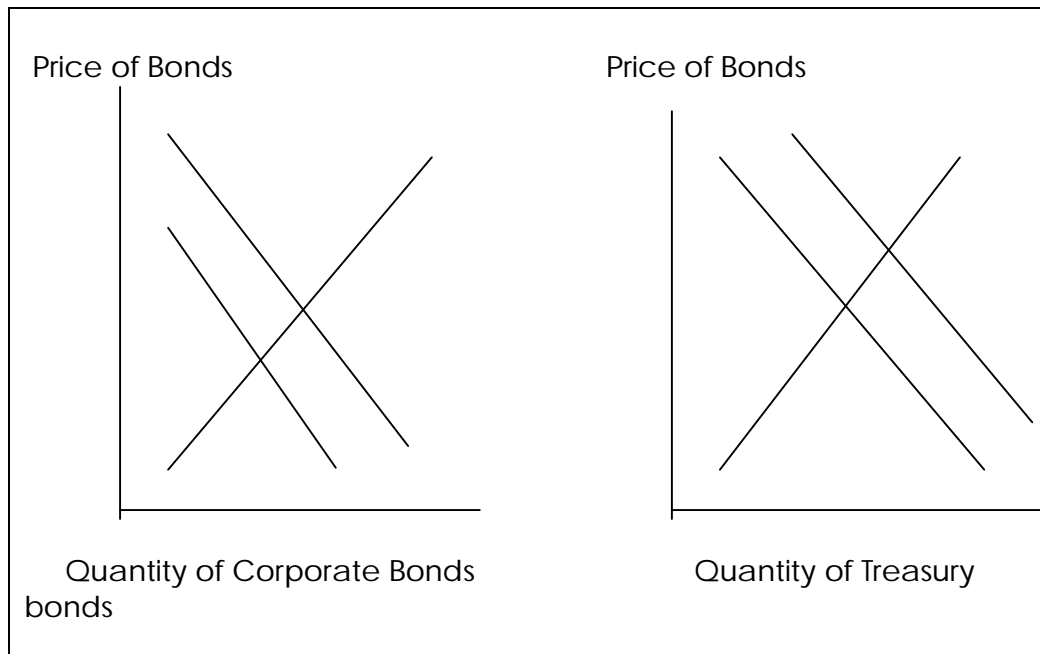
Price of Bonds   Price of Bonds

Quantity of Corporate Bonds   Quantity of Treasury
bonds

Liquidity of bonds: the more liquid an asset is the more people will wish to hold it. The greater the liquidity of a bond, the lower the interest rate required. The spread between a bond with high liquidity and one with low liquidity is also referred to as a risk premium.

Tax treatment: the fact that interest payments on municipal bonds in the USA are tax free has the same effect on the demand for these bonds as an increase in their expected returns. The demand for municipal bonds tends to be higher, therefore prices are higher and interest rates have been lower (implying lower risk) than the Treasury bonds. Refer to figure 3 on page 129.

6.2   Explain the meaning of the "term structure of interest rates" and the yield curve. Draw a normal yield curve and explain why its shape applies. List three (3) empirical facts generally observed about the yield curve. (10)

Term structure of interest rates refers to the behavior of bonds with identical risk, liquidity and tax characteristics which may have different interest rates because of different times remaining to maturity.

When the yields on bonds with differing terms to maturity but the same risk, liquidity and tax considerations are plotted on a graph, this is called a yield curve. Normal yield curves are upward-sloping and this means that the long-term interest rates are above the short-term interest rates.

A normal yield curve:
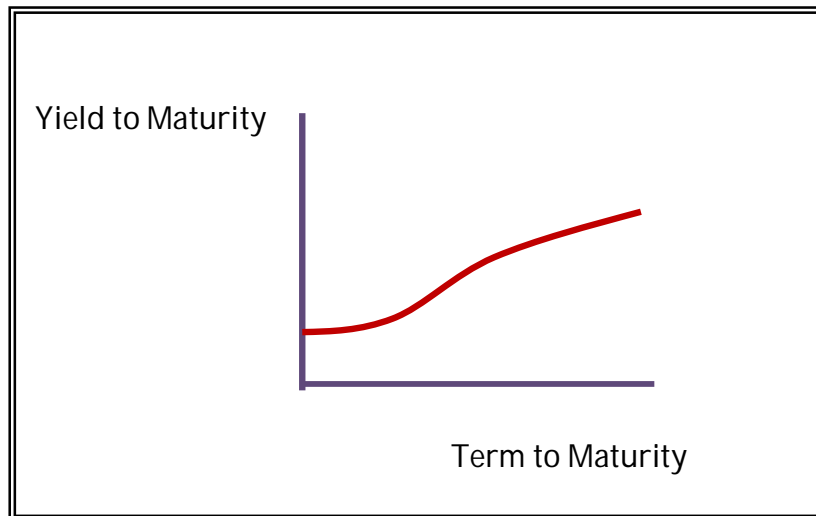
The following empirical facts relating to yield curves are also important:
(1)   interest rates on bonds of differing maturities move together over time.
(2)   When short-term interest rates are low, yield curves are more likely to have an upward slope; when short-term rate are high, yield curves are more likely to slope downwards and be inverted.
(3)   Yield curves almost always slope upward.

8.4   **Explain in general why indirect financing is more important than direct financing and in particular, why banks are the most important source of external finance for financing businesses. Then comment on the two statements: "The role of banks in lending will probably decline in future" and "The more established a firm is, the more likely it will issue securities to raise funds". (10)**

According to the statistics from the USA, direct financing (since 1970s) is used in less than 10% of the external funding of American business. This position is changing in the USA. In most other countries the amount of financing raised through direct financing is even less. This is an indication that direct financing is much less important than indirect financing in most economies. For this reason the role of financial intermediaries if very important.

Financial intermediaries, particularly banks, are the most important source of all external funds used to finance business. They help to overcome the problems of adverse selection which prevents the securities market from being effective in channeling funds from savers to borrowers. However, banks' share of external funds for businesses in industrialized countries have been declining in recent years.

"The role of banks in lending will probably decline in future": due to improvements in information technology in the USA, the lending role of financial institutions such as banks has declined. The simultaneous

decline of costs and income advantages of banks has resulted in reduced profitability of traditional banking and an effort by banks to leave this business and engage in new and more profitable activities.

"The more established a firm is, the more likely it will issue securities to raise funds":   It is a fact that well-known corporations find it much easier to raise finance in the securities market than do the smaller businesses. People and markets are better informed on these companies and it will therefore be easier for such companies to find funds directly when required.

8.9   **Explain why the underdeveloped financial systems in developing and transitional economies face several difficulties that restrict their efficiency, and how certain practices in developing and transitional countries reduce economic efficiency. (6)**

In general underdeveloped financial system leads to a low state of economic development and economic growth. The main difficulties faced are:
- in many countries the system of property rights (rule of law, constraints on government expropriation, etc.) functions poorly, making it difficult to use these tools to help solve the adverse selection and moral hazard problems.
- A poorly developed or corrupt legal system may make it extremely difficult for lenders to enforce restrictive covenants. Lenders are therefore less likely to lend and this will decrease the opportunity for investment.
- Governments often use the financial systems to direct credit to themselves or to favoured sectors of the economy by, for example, setting artificially low interest rates on certain types of loans.
- Banks in many transition and developing countries are owned by their governments and because of the absence of the profit motive, these state-owned banks have little incentive to allocate their capital to the most productive uses. Often the primary loan customer is the government.
- Many developing countries have an underdeveloped regulatory apparatus that prevents the provision of adequate information to the marketplace, e.g. weak accounting standards.

10.4   **Explain briefly the meaning of credit risk and how banks can manage it. (7)**

Credit risk is the risk that arises because borrowers might default. To be profitable, financial institutions must overcome the adverse selection and moral   hazard problems that make loan defaults more likely. In order to manage credit   risk the following process are followed:

- Screening and monitoring: whereby the institution collects information about the potential client and the credit risk involved and then monitor the borrowers to see that they are complying with the restrictive covenants.
- Long-term customer relationships: long-term relationships mean that financial institutions are able to collect reliable information on clients.
- Loan Commitments: this is a commitment by a bank to provide loans to a client, e.g. a firm. This encourages a long-term relationship and allows banks to request necessary information from the parties concerned.
- Collateral and compensating balances. Collateral lessens the consequences of adverse selection and reduces moral hazard because the borrower has more to lose from defaulting.
- Credit rationing. This may take place in two ways: (i) when the financial institution refuses to make a loan of any amount to a borrower, even if the borrower is willing to pay a higher interest rate; (ii) when a lender is willing to make a loan but restricts the size of the loan to less than the borrower would like.

13.4   **List and briefly explain the six (6) main functions of the South African Reserve Bank (SARB). (6 x 3 = 18).**

In relation to the payment system, the SARB performs the following functions:

1.   Sole issuer of cash or currency. The SARB controls the SA Mint Company and the SA Bank Note Company.
2.   The SARB provides facilities for clearing and the settlement of interbank   obligations. The SARB also oversees the safety and soundness of the payment system through the introduction of settlement risk reduction measures.

In relation to the supervision of the commercial banks, the SARB performs the following:

3.   Acts as banker for and supervisor of other banks and the lender of last resort to all banks. The purpose of this function is to maintain sound and effective banking practices in the interest of depositors and ultimately the economy as a whole.

In relation to the conduct of monetary policy, the central bank performs the following critical function:

4.   The primary function of the SARB, but also politically, the most sensitive one, is the formulation and implementation of monetary policy. Monetary policy works through several levels (channels).

5.   The SARB acts as banker for government. The main services provided are administering the auctions of government bonds and treasury bills, participating in the National Treasury's debt management meetings and managing the flow of government funds in the money market.

6.	The SARB is the custodian of the greater part of South Africa's gold and	other foreign exchange reserves.

**14.2	Derive the simple multiple deposit creation model (formula: ΔD = 1/rΔR). Explain its meaning, the underlying logic of the process, its simplifying assumptions and its critique**. (20)

In the case of the USA, when the Federal Reserve supplies the banking system with additional reserves, the deposits increase by a multiple of this amount, this process is called multiple deposit creation.

Assumptions of the model (process):
*	In the case of the single bank: a single bank will not make loans that exceed the value of the excess reserves it has before making the loan.
*	In the case of many banks, or the banking system: whether a bank chooses to use its excess reserves to make loans or to purchase securities, the effect on deposit expansion is the same.

The workings of the model:
*	In the case of the single bank: a single bank cannot by itself generate a multiple expansion of deposits. It cannot make loans greater in amount than its excess reserves because the bank will lose these reserves as the deposits (money made available) created by the loan find their way to other banks and the bank will then lose its reserves.
*	In the case of the banking system: although one bank may lose excess reserves to another bank, these reserves do not leave the banking system. As a result the process of money creation continues as reserves move from bank to bank. This multiple increase in deposits is called the simple deposit multiplier. It is the dependent upon the required reserve ratio and the formula for the multiple expansion of deposits can be written as follows:

$$\Delta D = 1/r \ \times \ \Delta R$$

Where: **ΔD**	=	change in total cheque deposits in the banking system

r	=	required reserve ratio

ΔR	=	change in reserves for the banking system

Critique of the model:
*	The simple model of multiple deposit creation has serious deficiencies. Decisions by depositors to increase their holdings of currency or of banks to hold excess reserves will result in a smaller expansion of deposits than the simple model predicts. All four players – the central bank, banks, depositors and borrowers – are important in the determination of the money supply. This leads to the derivation of a more complex money multipliers.

- The simple model seems to imply that the central bank (the Fed) has complete control over the level of deposits through (r) and the level of reserves (R). This depends, however, whether the proceeds from loans are deposited or kept as currency.
- If the proceeds are used to raise the level of currency then demand deposits (D) will not increase by as much as the "multiplier" might suggests.
- If a single bank decides not to grant loans to the full extent of its excess reserves then the full expansion does not occur.

14.5 **Briefly explain the arguments for a reversed causality, that is, "deposit creation leads to reserve holding" (D → R) could be more realistic. (15)**

Mishkin's analysis assumes that the reserve holdings of banks leads to deposit creation. Many other economists argue that in fact "deposit creation leads to reserve holding" and that this better describes what really happens. This is referred to as reverse causality.

- In a modern money system, cash reserves consist of money issued by the central bank which is mainly in the form of deposits which are kept with the SARB. Commercial banks are dependent upon the central bank for their cash.
- The central bank provides the banking system with its normal cash needs.
- The central bank can choose between two strategies: control the amount of cash it provides and allow the cash fund rate (repo rate) to find its own level; alternatively it can fix the cash funds rate and allow the amount of cash reserves it makes to find its own level. The second strategy is the one used: central banks seek to set the cash fund rate at a certain target level.
- For this reason there is a price constraint, but no quantity constraint on the amount of cash the central bank offers to the banking system.
- An individual bank that is prudent is most likely assured of the required cash reserves at the prevailing cash fund rate. For this reason it can grant all the credit and issue all the deposits required and then seek to obtain cash reserves. This means that D leads to R (reverse causality).
- This implies that changes in r, c and e do not cause a change in the impact of R on D but rather a change in the impact of D on R.
  - If r increases banks would need more reserves for deposits created and since the central bank will provide these reserves.
  - If the currency ratio (c) increases, the central bank will have to provide more cash (MB) into the system

o If the value of excess reserves (e) increases the central bank will also have to provide more cash (MB).

- Banks hold few excess reserves (ER). This seems to confirm the reversed causal direction view. In South Africa, particularly, banks do not have to comply with the cash reserve requirements on a day-to-day basis but only over a month period. This further removes the rationale for holding excess reserves.

16.1 Briefly explain the meaning of monetary targeting and the lessons learnt form the application of monetary targeting the US, Japan and Germany as it was applied from 1970s – 1990s. What are the main advantages and disadvantages of monetary targeting? (15)

In following a monetary targeting strategy, the central bank announces that it will achieve a certain value of the annual growth rate of a monetary aggregate.

Although policies of monetary targeting was followed in the USA, Germany, Japan and others in the 1970s it was quite different from the type of monetary targeting recommended by Milton Friedman. The central banks did not adhere to strict rules for monetary growth.

USA: In 1979 the Fed switched to an operating procedure that focused on nonborrowed reserves and control of the monetary aggregates and less on the federal funds rate. However, it had little success in achieving the monetary targets. In 1982 the Fed decreased its emphasis on monetary targets and in 1993 it abandoned this approach.

Japan: In 1974 Japan experience a large increase in the inflation rate (it increased to greater than 20%). It was believed that this was accommodated by the growth in money supply (also in excess of 20%). As a result in 1978, the central bank of Japan began to announce "forecasts" at the beginning of each quarter for M2 and CDs. The Bank of Japan's monetary policy performance during the 1978 – 1987 period was much better than the Fed's. Money growth in Japan slowed and was much less variable than in the USA. The result was a more rapid stop to inflation being achieved with less variability in real output than in the USA. During the period 1987 to 1989 there were concerns about the appreciation of the Yen and so the Bank of Japan increased the rate of money growth. Many blame the speculation in Japanese land and stock prices on this increase in money growth. To reduce speculation, the Bank of Japan switched to a tighter monetary policy aimed at slower money growth. The aftermath was a substantial decline in land and stock prices. The resulting weakness of the economy lead to deflation which promoted further financial instability. Critics have argued that Japan's monetary policy has been

overly restrictive and this has contributed to the stagnation of the economy over the past few years.

Germany: Germany's central bank (Bundesbank) chose to focus on a narrow monetary aggregate called central bank money. In 1988 this was switched back to M3. The key fact about the monetary targeting regime in Germany is that it was not a Friedman type monetary targeting rule. The Bundesbank allowed growth outside of its target ranges for periods of two to three years. The monetary targeting regime in Germany demonstrated a strong commitment to clear communication of the strategy to the general public. Monetary targeting was primarily a method for communicating strategy of monetary policy focused on long-run considerations and the control of inflation.

Advantages of monetary targeting:
- information on whether the central bank is achieving its target is know almost immediately.
- Can send almost immediate signals to the public and markets about the stance of monetary policy.
- These signals help fix inflation expectations and produce less inflation.
- Help to constrain monetary policyholders from falling into the time-inconsistency trap, by calling for almost instant accountability for monetary policy to keep inflation low.

Disadvantages of monetary policy:
- The above only occurs if the following exist:
  - Strong and reliable relationship between goal variable and the targeted monetary aggregate. If this relationship is weak monetary targeting will not work.

19.1 **Briefly explain the Quantity theory of money (QT), that is, its assumptions and predictions. Demonstrate that the QT can be transformed into the Quantity theory of money demand. Does the assumption regarding V agree with the empirical findings? (10).**

The quantity theory of money is derived from the equation of exchange. It states that the nominal income is determined solely by movements in the quantity of money. When the quantity of money (M) doubles, M x V doubles and so does P x Y, the value of nominal income.

The classical economists believed that wages and prices were completely flexible (assumption) and so the level of aggregate output (Y) in an economy during normal times would remain at full-employment level and was therefore fairly constant. The QT implies that if M increases then there will be an increase in P, because V and Y are assumed to be constant.

The quantity theory of money provided an explanation of movements in the price level: movements in the price level result solely from changes in the quantity of money.

Because the QT tells how much money is held for a given amount of aggregate income, it is considered to be a theory of the demand for money. Fisher's QT suggests that the demand for money is purely a function of income, and interest rates have no effect on the demand for money.

Empirical data has shown that velocity of money is not constant. V may be defined in two ways:
- V = PY/M [MV = PY] and this is referred to as "income velocity of circulation".
- V = PT/M [MV = PT] and is referred to as "transaction velocity of circulation".
- The transaction velocity measures the average number of times a given amount of money is spent over a given period. It reflect the number of transactions that need to take place for a given amount of finished output (Y) to be produced.

19.3   Explain Friedman's approach of his modern quantity theory of money and which factors determine the demand for M/P. Then explain why changes in interest rates, according to Friedman, have little effect on the demand for money and why the money demand function is stable. (15)

Milton Friedman developed his quantity theory of money in 1956. Friedman believed that the demand for money should be influenced by the same factors that influenced the demand for any other assets. He then applied the theory of asset demand to the demand for money.

The theory of asset demand indicates that the demand for money should be a function of the resources available to individuals and the expected returns on other assets relative to the expected return on money. Like Keynes, Friedman recognised that people want to hold a certain amount of real money balances .

The factors that Friedman argued would affect the demand for money were:
- Permanent wealth (Friedman's measure of wealth)
- Expected return on money
- Expected return on bonds
- Expected return on equity
- Expected inflation rate

Friedman did not take the expected return on money to be a constant. He argued that changes in interest rate would result in the difference between the return on bonds and the return on money

remaining relatively constant (incentive terms for holding money remain fairly constant). As a result the demand for money would not be influenced by interest rates. So Friedman's demand for money function is one in which permanent income is the primary determinant of money demand.

Friedman also suggested that the random fluctuations in the demand for money are small and that the demand for money can be predicted accurately by the money demand function. When combined with his view that the demand for money is insensitive to changes in interest rates, this means that velocity is highly predictable.

In conclusion, Friedman's theory of demand is based on the theory of asset demand and he argues that the demand for money will be a function of permanent income and the expected returns on alternative assets relative to the expected return on money. The final outcome of Friedman's theory is that velocity is highly predictable and therefore money is the primary determinant of aggregate spending.

20.1 **Briefly explain why the ISLM model is unrealistic. Focus on the meaning of endogenous and exogenous variables and how the ISLM models deals with it. Which additional assumption can be made to make the ISLM more realistic?   (10)**

Some academics and economists argue that the ISLM model should no longer be used in economic theory because it is unrealistic.   A number of factors need to be considered in this regard:

(i) Any economic model is a simplification of reality and so all economic models can be called unrealistic.

(ii) The intended purpose of the ISLM model is to show the links between the major macroeconomic variables and it shows how the real components of Y are related to each other. [Y = C + I + G + NX]. It provides an "elegant framework" to determine how changes in one variable (exogenous variables) impact on other (endogenous) variables.

(iii) Exogenous variables in the case of the ISLM model refer to those that affect certain variables in the model but are not, in turn, affected by any of the variables in the model.   Endogenous variables are those which are affected by other variables in a model. An important assumption is made that money supply (M) is exogenous, while income (Y) and interest rate (i) are endogenous.   In SA at present the SARB controls the interest rate making it exogenous and not the money supply, therefore, the assumption that money supply is exogenous it not applicable at all, money supply is, in fact, endogenous.

(iv) The ISLM model assumes that the aggregate price level is constant because there is no variable within the model that represents the aggregate price level.   Despite this assumption

being unrealistic, it does not impact on the use of the ISLM model as long as it is used for short-periods with low inflation.

(v) The main problem stems from the assumption that the interest rate is endogenous to the money market, and money supply is exogenous.

(vi) If the model was adapted to account for this reality, the LM curve would be reflected as a straight line (horizontal, elastic) at the interest rate fixed by the central bank. When this is done the model does loses some of its "neatness and elegance".

In conclusion, the ISLM model no longer provides a good representation of reality but nevertheless remains the main paradigm in undergraduate macroeconomic theory.

23.3 **Explain the meaning of the transmission mechanism of monetary policy in South Africa in general, describe its main links, explain how it influences domestic inflation and why monetary policy is subject to lags. (12)**

The transmission mechanism of monetary policy refers to the role that interest rates play in linking the financial sector with the real sector of the economy. This is seen in the processes that are set in motion when the SARB changes the repo rate.

The main links are:
• the operational instrument of monetary policy which is the repo rate. This has a direct effect on other variables in the economy (other interest rates, exchange rate, money and credit and other asset prices).
• Pressure of demand relative to the supply capacity of the economy is a key factor influencing domestic inflationary pressures.
• If market interest rates, the exchange rate, credit or other asset prices do not respond meaningfully to changes in the repo rate then monetary policy will have little effect.

In South Africa the repo rate affects the economy through a number of channels:
• Interest rate channel. Any change initially influences the interest on retail financial products. Almost immediately after the repo is changed, domestic banks adjust their lending rates. Firms and individual respond to the changes in interest rates by altering their investment and spending patterns.
• Other financial asset prices: prices of foreign exchange act as achannel for the transmission of monetary effects. When the SA interest rate falls, deposits denominated in rand become less attractive than deposits in foreign currencies and the rand depreciates. The lower rand makes domestic goods cheaper causing a rise in net exports and hence aggregate output. The depreciation of the rand will also cause the price of imports to

increase and becomes inflationary. Monetary policy can also affect the economy through its effects on the valuation of equities. When monetary policy is relaxed, the public finds that it has more money to spend, and one place this can be spent is the stock market. A higher demand for shares leads to an increase in prices. The combination of higher prices with higher fixed capital formation leads to an increase in output (Y). Household wealth can be affected by the repo rate and is also a powerful channel.

- Credit: this operates through bank lending. Expansionary monetary policy increases bank reserves and bank deposits, thus increasing the amount of loans available. This increase in loans will cause fixed capital formation and consumer spending to rise. Credit also affects the balance sheets of households and firms and arises from asymmetric information in credit markets.

24.1 Provide a perspective on Friedman's proposition that inflation is always and everywhere a monetary phenomenon. Firstly evaluate the empirical evidence in this regard (you may refer to the experience of any country), then explain whether inflation is always and everywhere a demand-pull phenomenon. Lastly explain why money plays a vital role in sustaining the inflationary process.   (15)

Milton Friedman believed that because inflation was caused by high growth rate of money supply, the reverse was the solution: keep the growth rate of money supply low and inflation would be prevented.

Reduced-form evidence shows a high correlation between the inflation rate and the growth rate of the money supply. In the case of German hyperinflation (1921 – 1923) the German government printed large amounts of money in order to make available the cash required to reconstruct Germany after World War I. Evidence shows that as the money supply increased so did prices.   Zimbabwe's hyperinflation is the same as Germany's: extremely high money growth because the weak government of Robert Mugabe was unwilling to finance government expenditures by raising taxes, which led to a very high budget deficit financed by money creation.

Strong empirical evidence indicates that rapid inflation in many countries seem to have links with increases in money supply. This is has also been seen in the case in the Latin American countries that had highest growth rates in money supply and the highest inflation rates.

Mishkin indicates that if inflation is viewed as a continuing and rapid increase in the price level, almost all economists agree with Friedman. The issue to be considered is why and how does inflationary monetary policy come about. The intention is not to create inflation but rather to achieve some significant macroeconomic objective, e.g. economic growth. Friedman argues that upward movements in the price level are a monetary phenomenon only if this is a sustained process.

Demand-pull inflation is caused by large increases in aggregate demand which are not counteracted by increases in aggregate supply. This increase in AD leads to an increase in the price level. If such an increase in AD is driven by an increase in money supply it is likely to lead to serious inflation. However, if the increase in AD is caused through some other factor, such as an increase in government spending it will not necessarily result in high inflation unless it is accompanied by an increase in the money supply.

For this reason it may be concluded that Milton Friedman was correct with regards to his statement that "inflation is always and everywhere a monetary phenomenon".