

GENERAL REVISION FOR TREASURY MANAGEMENT

(Please see that you can answer the following 32 questions and the MCQs)

1. What do the following terms mean: Asset management? Liability management? Funds management?

Answer:

Asset management refers to a banking strategy where management has control over the allocation of bank assets but believes the bank's sources of funds (principally deposits) are outside its control. The key decision area for management is not deposits and other borrowings but assets. The financial manager exercises control over the allocation of incoming funds by deciding who is granted loans and what the terms on those loans will be.

Liability management is a strategy wherein greater control towards bank liabilities is exercised. This is done mainly by opening up new sources of funding and monitoring the volume, mix and cost of their deposits and non-deposit items.

Funds management combines both asset and liability management approaches into a balanced liquidity management strategy. Effective coordination in managing assets and liabilities will help to maximize the spread between revenues and costs and control risk exposure.

2. What factors have motivated financial institutions to develop funds management techniques in recent years?

Answer:

The necessity to find new sources of funds in the 1970s and the risk management problems encountered with troubled loans and volatile interest rates in the 1970s and 1980s led to the concept of planning and control over both sides of a bank's balance sheet—the essence of funds management.

The maturing of liability management techniques, coupled with more volatile interest rates and greater risk, eventually gave birth to the funds management approach,

3. What forces cause interest rates to change?

Answer:

Interest rates are determined, not by individual banks, but by the collective borrowing and lending decisions of thousands of participants in the money and capital markets. They are also impacted by changing perceptions of risk by participants in the money and capital markets, especially the risk of borrower default, liquidity risk, price risk, reinvestment risk, inflation risk, term or maturity risk, marketability risk, and call risk.

4. What kinds of risk do financial firms face when interest rates change?

Answer:

Financial institutions can lose income or value no matter which way interest rates go. As market interest rates move, financial firms typically face at least two major kinds of interest rate risk—price risk and reinvestment risk. Price risk arises when market interest rates rise. Rising interest rates can lead to losses on security instruments and on fixed-rate loans as the market values of these instruments fall. Rising interest rates will also cause a loss to income if an institution has more rate-sensitive liabilities than rate-sensitive assets. Reinvestment risk rears its head when market interest rates fall. Falling interest rates will usually result in capital gains on fixed-rate securities and loans but an institution will lose income if it has more rate-sensitive assets than liabilities. Also, financial firms will be forced to invest incoming funds in lower-yielding earning assets, lowering their expected future income. A big part of managing assets and liabilities consists of finding ways to deal effectively with these two forms of risk.

5. What makes it so difficult to correctly forecast interest rate changes?

Answer:

Interest rates cannot be set by an individual bank or even by a group of banks. They are determined by thousands of investors trading in the credit markets. Moreover, each market rate of interest has multiple components—the risk-free real interest rate plus various risk premiums. A change in any of these rate components can cause interest rates to change. This makes it virtually impossible to accurately forecast interest rate changes.

To consistently forecast market interest rates correctly would require bankers to correctly anticipate changes in the risk-free real interest rate and in all rate components. Another important factor is the timing of the changes. To be able to take full advantage of their predictions, they also need to know when the changes will take place.

6. What is the yield curve, and why is it important to know about its shape or slope?

Answer:

The yield curve is the graphic picture of how interest rates vary with different maturities of loans viewed at a single point in time (and assuming that all other factors, such as credit risk, are held constant).

The slope of the yield curve determines the spread between long-term and short-term interest rates. In banking most of the long-term rates apply to loans and securities (i.e., bank assets) and most of the short-term interest rates are attached to bank deposits and money market borrowings (i.e., bank liabilities).

If the yield curve is upward sloping, then revenues from longer-term assets will outstrip expenses from shorter term liabilities. The result will normally be a positive net interest margin (interest revenues greater than interest expenses), which tends to generate higher earnings. In contrast, a relatively flat (horizontal) or negatively sloped yield curve often generates a small or even negative net interest margin, putting downward pressure on the earnings of financial firms that borrow short and lend long.

Thus, the shape or slope of the yield curve has a profound influence on a bank's net interest margin or spread between asset revenues and liability costs.

7. What is it that a lending institution wishes to protect from adverse movements in interest rates?

Answer:

Changes in market interest rates can damage a financial firm's profitability by increasing its cost of funds, by lowering its returns from earning assets and by reducing the value of the owners' investment. Therefore, a financial institution wishes to protect both the value of assets and liabilities, and the revenues and costs generated by both assets and liabilities from adverse movements in interest rates.

8. What is the goal of *hedging*?

Answer:

The goal of hedging in banking is to freeze the spread between asset returns and liability costs and to offset declining values on certain assets by profitable transactions so that a target rate of return is assured.

9. First National Bank of Bannerville has posted interest revenues of R63 million and interest costs from all of its borrowings of R42 million. If this bank possesses R700 million in total earning assets, what is First National's net interest margin? Suppose the bank's interest revenues and interest costs double, while its earning assets increase by 50 per cent. What will happen to its net interest margin?

Answer:

The bank's net interest margin is 3 per cent computed as follows:

$$\text{Net Interest Margin} = \frac{\$63 \text{ million} - \$42 \text{ million}}{\$700 \text{ million}} = 0.03 \text{ or } 3 \text{ percent}$$

If interest revenues and interest costs double while earning assets grow by 50 percent, the net interest margin will change as follows:

$$\text{Net Interest Margin} = \frac{(\$63 \text{ million} - \$42 \text{ million}) \times 2}{\$700 \text{ million} \times (1.50)} = 0.04 \text{ or } 4 \text{ percent}$$

Clearly the net interest margin increases—in this case by one third.

10. Explain the concept of gap management.

Answer:

Gap management requires the management to perform analysis of the maturities and repricing opportunities associated with interest-bearing assets and with interest-bearing liabilities. When more assets are subject to repricing or will reach maturity in a given period than liabilities or vice versa, the bank has a gap between assets and liabilities and is exposed to loss from adverse interest-rate movements based on the gap's size and direction. If an organization is over exposed to interest rate fluctuation, the management will try and match the volume of assets that can be repriced, with the volume of liabilities.

11. Explain when is a financial firm asset sensitive and when is it liability sensitive.

Answer:

A financial firm is asset sensitive when it has more interest-rate sensitive assets maturing or subject to repricing during a specific time period than rate-sensitive liabilities. A liability sensitive position, in contrast, would find the financial institution having more interest-rate sensitive deposits and other liabilities than rate-sensitive assets for a particular planning period.

12. Commerce National Bank reports interest-sensitive assets of R870 million and interest-sensitive liabilities of R625 million during the coming month. Is the bank asset sensitive or liability sensitive? What is likely to happen to the bank's net interest margin if interest rates rise? If they fall?

Answer:

Because interest-sensitive assets are larger than liabilities by R245 million, the bank is asset sensitive.

If interest rates rise, the bank's net interest margin should rise as asset revenues increase more than the resulting increase in liability costs. On the other hand, if interest rates fall, the bank's net interest margin will fall as asset revenues decline faster than liability costs.

13. Peoples' Bank has a cumulative gap for the coming year of + R135 million, and interest rates are expected to fall by two and a half percentage points. Calculate the expected change in net interest income that this financial institution may experience. Determine the change that will occur in net interest income if interest rates rise by one and a quarter percentage points?

Answer:

For the decrease in interest rates:

Expected Change in Net Interest Income = R135 million \times (- 0.025) = - R3.38 million

The net interest income will decrease by R3.38 million.

For the increase in interest rates:

Expected Change in Net Interest Income = \$135 million \times (+ 0.0125) = + R1.69 million the net interest income will increase by \$1.69 million.

14. Explain how you measure:

- (1) The Rand interest-sensitive gap.
- (2) The relative interest-sensitive gap.
- (3) The interest sensitivity ratio?

Answer:

The Rand interest-sensitive gap is measured by taking the repriceable (interest-sensitive) assets minus the repriceable (interest-sensitive) liabilities over some set planning period. Common planning periods include 3 months, 6 months and 1 year.

The relative interest-sensitive gap is the Rand interest-sensitive gap divided by the size of a financial institution (often total assets).

The interest-sensitivity ratio (ISR) is the ratio of interest-sensitive assets to interest sensitive liabilities.

Regardless of which measure you use, the results should be consistent. If you find a positive (negative) gap for Rand interest-sensitive gap, you should also find a positive (negative) relative interest-sensitive gap and an interest sensitivity ratio greater (less) than one.

15. Suppose Carroll Bank and Trust reports interest-sensitive assets of R570 million and interest-sensitive liabilities of R685 million. Calculate the bank's (1) Rand interest-sensitive gap; (2) its relative interest-sensitive gap and (3) the interest-sensitivity ratio?

Answer:

(1) Rand Interest-Sensitive Gap = Interest-Sensitive Assets – Interest Sensitive Liabilities
= R570 mill. – R685 mill. = – **R115 mill.**

(2) Relative Gap = $\frac{\text{IS Gap}}{\text{Bank Size (i.e. total assets)}}$ = $\frac{-R115}{R570}$ = – **0.2018**

Interest-Sensitivity Ratio = $\frac{\text{Interest-Sensitive Assets}}{\text{Interest-Sensitive Liabilities}}$ = $\frac{\$570}{\$685}$ = **0.8321**

16. Define the concept *duration*?

Answer:

Duration is a value- and time-weighted measure of maturity that considers the timing of all cash inflows from earning assets and all cash outflows associated with liabilities. It measures the average maturity of a promised stream of future cash payments. It is a direct measure of price risk.

17. Determine how a financial institution's *duration gap* is determined.

Answer:

A bank's duration gap is determined by taking the difference between the Rand-weighted duration of a bank's assets portfolio and the Rand-weighted duration of its liabilities. The duration of the bank's assets can be determined by taking a weighted average of the duration of all of the assets in the bank's portfolio. The weight is the Rand amount of a particular type of asset out of the total Rand amount of the assets of the bank. The duration of the liabilities can be determined in a similar manner.

18. What are the advantages of using duration as an asset-liability management tool as opposed to interest-sensitive gap analysis?

Answer:

Interest-sensitive gap only looks at the impact of changes in interest rates on the bank's net income. It does not take into account the effect of interest rate changes on the market value of the bank's equity capital position. Whereas, duration provides a single number which tells the bank their overall exposure to interest rate risk. Duration can be used for hedging against the interest rate risk, and it can also measure the sensitivity of the market value of financial instruments to changes in interest rates.

19. How can you tell if you are fully hedged using duration gap analysis?

Answer:

You are fully hedged when the dollar weighted duration of the assets portfolio of the bank equals the dollar weighted duration of the liability portfolio. This means that the bank has a zero duration gap position when it is fully hedged. Of course, because the bank usually has more assets than liabilities the duration of the liabilities needs to be adjusted by the ratio of total liabilities to total assets to be entirely correct.

20. What are the principal limitations of duration gap analysis? Indicate the way of reducing the impact of these limitations.

Answer:

There are several limitations with duration gap analysis. It is often difficult to find assets and liabilities of the same duration to fit into the financial-service institution's portfolio. In addition,

some accounts such as deposits and others don't have well defined patterns of cash flows which make it difficult to calculate duration for these accounts. Duration is also affected by prepayments by customers as well as defaults. Duration gap models assume that a linear relationship exists between the market values (prices) of assets and liabilities and interest rates, which is not strictly true. Finally, duration analysis works best when interest rate changes are small and short and long term interest rates change by the same amount. If this is not true, duration analysis is not as accurate.

Recent research suggests that duration balancing can still be effective, even with moderate violations of the technique's underlying assumptions. In this age of mergers and continuing financial-services industry consolidation, the duration gap concept remains a valuable managerial tool despite its limitations.

21. Suppose that a savings institution has an average asset duration of 2.5 years and an average liability duration of 3.0 years. If the savings institution holds total assets of R560 million and total liabilities of R467 million, does it have a significant leverage-adjusted duration gap? If interest rates rise, what will happen to the value of its net worth?

Answer:

$$\begin{aligned} \text{Duration Gap} &= D_A - D_L \times \frac{\text{Liabilities}}{\text{Assets}} = 2.5 \text{ years} - \left(3.0 \text{ years} \times \frac{\$467 \text{ million}}{\$560 \text{ million}} \right) \\ &= 2.5 \text{ years} - 2.5018 \text{ years} \\ &= -0.0018 \text{ years} \end{aligned}$$

This bank has a very slight negative duration gap; so small in fact that we could consider it insignificant. If interest rates rise, the bank's liabilities will fall slightly more in value than its assets, resulting in a small increase in net worth.

22. Stilwater Bank and Trust Company has an average asset duration of 3.25 years and an average liability duration of 1.75 years. Its liabilities amount to R485 million, while its assets total R512 million. Suppose that interest rates were 7 per cent and then rise to 8 per cent. What will happen to the value of the Stilwater bank's net worth as a result of a decline in interest rates?

Answer:

First, we need an estimate of Stilwater's duration gap. This is:

$$\text{Duration Gap} = 3.25 \text{ years} - 1.75 \text{ years} \times \frac{\$485 \text{ mill.}}{\$512 \text{ mill.}} = +1.5923 \text{ years}$$

Then, the change in net worth if interest rates rise from 7 percent to 8 percent will be:

$$\text{Change in NW} = \left[-3.25 \text{ years} \times \frac{+.01}{(1+.07)} \times \$512 \text{ mill} \right] - \left[-1.75 \text{ years} \times \frac{+.01}{(1+.07)} \times \$485 \text{ mill.} \right]$$

$$= - R7.62 \text{ million.}$$

The value of Stilwater bank's net worth would rise by about R7.62 million if the interest rate rises by 1 percentage points.

23. A government bond is currently selling for R1,195 and pays R75 per year in interest for 14 years when it matures. If the redemption value of this bond is R1,000, what is its yield to maturity if purchased today for R1,195?

Answer:

The yield to maturity (x) equation for this bond would be:

$$\$1,195 = \frac{\$75}{(1+YTM)^1} + \frac{\$75}{(1+YTM)^2} + \frac{\$75}{(1+YTM)^3} + \frac{\$75}{(1+YTM)^4} + \dots + \frac{\$75}{(1+YTM)^{13}} + \frac{\$1,075}{(1+YTM)^{14}}$$

Using a financial calculator the YTM = 5.4703 percent.

24. Treasury bills are available for purchase this week at the following prices (based upon R100 par value) and with the indicated maturities:
- R97.25, 182 days.
 - R95.75, 270 days.
 - R98.75, 91 days.

Calculate the bank discount rate (DR) on each bill if it is held to maturity. What is the equivalent yield to maturity (sometimes called the bond-equivalent or coupon-equivalent yield) on each of these Treasury Bills?

Answer:

The discount rates and equivalent yields to maturity (bond-equivalent or coupon-equivalent yields) on each of these Treasury bills are:

	<u>Discount Rates</u>		<u>Equivalent Yields to Maturity</u>
a.	$\frac{100 - 97.25}{100} \times \frac{360}{182} = 5.44\%$		$\frac{100 - 97.25}{97.25} \times \frac{365}{182} \approx \underline{5.67\%}$
b.	$\frac{100 - 95.75}{100} \times \frac{360}{270} = 5.67\%$		$\frac{100 - 95.75}{95.75} \times \frac{365}{270} \approx \underline{6.00\%}$
c.	$\frac{100 - 98.75}{100} \times \frac{360}{91} = 4.95\%$		$\frac{100 - 98.75}{98.75} \times \frac{365}{91} \approx \underline{5.08\%}$

25. New Comers State Bank has recorded the following financial data for the past three years (dollars in millions):

	Current Year	Previous Year	Two Years Ago
Interest revenues	R82	R80	R78
Interest expenses	64	66	68
Loans (excluding nonperforming)	450	425	400
Investments	200	195	200
Total deposits	450	425	400
Money market borrowings	150	125	100

- (a) What has been happening to the bank's net interest margin? What do you think caused the changes you have observed? Do you have any recommendations for New Comers' management team?

Answer:

Net interest margin (NIM) = Net interest income/Total earning assets

Where,

Net interest income = Net interest revenues - Net interest expenses

Total earning assets = Loans + Investments

$$\text{NIM (Current)} = (R82-64)/(450 + 200) = 18/650 = 0.028 \text{ or } 2.77\%$$

$$\text{NIM (Previous)} = (R80-66)/(425 + 195) = 14/620 = 0.0226 \text{ or } 2.26\%$$

$$\text{NIM (Two years ago)} = (R78-68)/(400 + 200) = 10/600 = 0.0167 \text{ or } 1.67\%$$

The net interest margin has been increasing over the years. As interest revenues and expenses as well as the bank's assets have increased consistently over the years, there has been a constant increase in the net interest margin. If the bank can further cut down on its interest expenses and increase its assets in the next years, the net interest margin will increase at a higher rate.

26. Conway Bank reported an average asset duration of 7 years and an average liability duration of 4 years. In its latest financial report, the bank recorded total assets of R1.8 billion and total liabilities of R1.5 billion. If interest rates began at 5 per cent and then suddenly climbed to 6 percent, what change will occur in the value of Conway's net worth? By how much would Conway's net worth change if, instead of rising, interest rates fell from 5 percent to 4.5 percent?

The key formula is:

$$\text{Change in net worth} = \left[-D_A \times \frac{\Delta r}{(1+r)} \times A \right] - \left[-D_L \times \frac{\Delta r}{(1+r)} \times L \right]$$

For the change in interest rates from 5 to 6 percent, change in net worth will be:

$$\begin{aligned}
&= \left[-7 \times \frac{0.01}{(1+0.05)} \times 1.8 \right] - \left[-1.4657 \times \frac{0.01}{(1+0.05)} \times 1.5 \right] \\
&= -R0.12 \text{ billion} - (-R0.05714 \text{ billion}) \\
&= -R0.06286 \text{ billion}
\end{aligned}$$

On the other hand, if interest rates decline from 5 to 4.5 percent, change in net worth will be:

$$\begin{aligned}
&= \left[-7 \times \frac{-0.005}{(1+0.05)} \times 1.8 \right] - \left[-1.4657 \times \frac{-0.005}{(1+0.05)} \times 1.5 \right] \\
&= +R0.06 \text{ billion} - R0.02857 \text{ billion} \\
&= +R0.03143 \text{ billion}
\end{aligned}$$

27. A financial firm holds a bond in its investment portfolio whose duration is 15 years. Its current market price is R975. While market interest rates are currently at 6 percent for comparable quality securities, a decrease in interest rates to 5.75 percent is expected in the coming weeks. What change (in percentage terms) will this bond's price experience if market interest rates change as anticipated?

Change in price is computed as follows:

$$\begin{aligned}
\frac{\Delta P}{P} &\approx -D * \frac{\Delta r}{(1+r)} \\
&= -15 \times \frac{-0.0025}{(1+0.06)} = \underline{3.54 \text{ percent}}
\end{aligned}$$

This bond's price will approximately increase by 3.54 per cent or to R1,009.515.

28. Carter National Bank holds R15 million in government bonds having a duration of 12 years. If interest rates suddenly rise from 6 per cent to 7 per cent, what percentage change should occur in the bonds' market price?

Answer:

The percentage change in market price is computed as follows:

$$\begin{aligned}
\frac{\Delta P}{P} &\approx -D * \frac{\Delta r}{(1+r)} \\
-12 * \frac{.01}{(1+.06)} &= -0.1132 \text{ or } 11.32 \text{ percent}
\end{aligned}$$

Therefore, the market price will change approximately by 11.32 percent.

29. What are off-balance-sheet items and why are they important to some financial firms?

Answer

Off-balance-sheet items are usually transactions that generate fee income for a bank (such as standby credit guarantees) or help hedge against risk, (such as financial futures contracts) but do not show up on the balance sheet. They are important as a supplement to income from loans and to help a bank reduce its exposure to interest-rate and other types of risk.

30. What accounts make up the Report of Income (income statement of a bank)?

Answer:

The Report of Income includes all sources of bank revenue (loan income, investment security income, revenue from deposit service fees, trust fees, and miscellaneous service income) and all bank expenses (including interest on all borrowed funds, salaries, wages, and employee benefits, overhead costs, loan loss expense, taxes, and miscellaneous operating costs.) The difference between operating revenues and expenses (including tax obligations) is referred to as net income.

31. Explain the following statement: “The financial statements of financial-service institutions exhibit three main characteristics that have important consequences for managers of these institutions and the public.

Answer:

The first characteristic of these institutions is that they have lower operating leverage. They have small amounts of buildings, equipment and other fixed assets.

However, financial service institutions have large amounts of financial leverage. Financial leverage comes from how the bank finances its assets. If a institutions borrows a lot, it faces a larger financial leverage and has a larger amount of risk as a result. Financial service institutions finance approximately 90 per cent of their assets with debt, and therefore face significant financial leverage.

Small changes in revenues can lead to large changes in net income and earnings per share as a result. In addition, changes in interest rates can have significant effects on the net income and capital position of financial institutions.

Thirdly, most of the liabilities of financial institutions are short term. This means that financial institutions can face significant liquidity problems. A sudden demand by depositors for funds can lead to large problems for financial firms.

32. How are the balance sheets and income statements of finance companies, insurers, and securities companies similar to those of banks, and in what ways are they different? What might explain the differences you observe?

Answer:

The main similarities between the nonbank competitors of banks can be found on the asset side of their balance sheets. All of the above rely on loans and securities, although they normally label them differently. The main difference is the source of funds. None of the aforementioned competitors can draw upon deposits and have to rely on money market, other borrowings and equity. These differences are rooted in the nature of their line of business and underlying regulations.

MCQs

1. Which of the following is a key objective of the funds management strategy for banks?

A) Bank need to coordinate control of assets and liabilities

B) Banks only need to worry about control of assets

C) Banks only need to worry about control of liabilities

D) Banks do not need to worry about control of either assets or liabilities

2. A bond has a coupon rate of 8,75 per cent and has 12 years to maturity. This bond has a face value of R1 000 and is selling in the market for R1 231.

What is this bond's yield to maturity?

A) 8.75 per cent

B) 6.00 per cent

C) 9.84 per cent

D) 12.00 per cent

3. Suppose a Treasury Bill has a face value of R10,000 and has 35 days to maturity. This Treasury Bill has a discount rate of 5.25 per cent. What price is this Treasury Bill selling for?
- A) R10 000.00
 - B) R5 400.00
 - C) R9 948.96**
 - D) R9 475.00
4. An announcement that the prices of goods and services in the market are rising would cause an increase in which of the following?
- A) The risk free rate
 - B) The default risk premium
 - C) The liquidity risk premium
 - D) The inflation risk premium**
5. The Brits Stars Bank has Rand interest sensitive assets of R475 million and Rand interest sensitive liabilities of R200 million. If interest rates rise what is likely to happen to the net interest margin of this bank?
- A) Net interest margin is likely to rise**
 - B) Net interest margin is likely to fall
 - C) Net interest margin is likely to stay the same
 - D) The impact on net interest margin cannot be determined from this information
6. Suppose a bond has a duration of 8 years and is selling in the market for R1 085. Currently market interest rates are 6 per cent and are expected to rise by 1.5 percent. What should happen to the price of this bond?
- A) The price of this bond should rise by 11.32 percent
 - B) The price of this bond should rise by 8.00 percent
 - C) The price of this bond should fall by 11.32 percent**
 - D) The price of this bond should fall by 8.00 percent
7. Suppose the Augustina National Bank has assets with a duration of 6.5 years and liabilities with a duration of 3.0 years. This bank has R200 million in assets and R180 million in liabilities. What should happen to this bank's net worth if interest rates go from 7 per cent to 8 per cent?
- A) Net worth should fall by 6.26 million**
 - B) Net worth should rise by 6.26 million
 - C) Net worth should fall by 5.61 million
 - D) Net worth should fall by 3.50 million

8. The risk that has to do with the breadth and depth of the secondary market is:
- A) Interest rate risk
 - B) Business risk
 - C) Liquidity risk**
 - D) Call risk
9. The risk that has to do with the falling sales and rising unemployment in the local area is:
- A) Interest rate risk
 - B) Business risk**
 - C) Liquidity risk
 - D) Call risk
10. The risk that loans will be terminated or paid off ahead of schedule because they will be refinanced or because of turnover of assets used to back the loans is:
- A) Interest rate risk
 - B) Business risk
 - C) Call risk
 - D) Prepayment risk**

END