**Solutions for End-of-Chapter Questions and Problems: Chapter Eight**

2.1 What is the repricing gap? In using this model to evaluate interest rate risk, what is meant by rate sensitivity? On what financial performance variable does the repricing model focus? Explain.

2.2 What is a maturity bucket in the repricing model? Why is the length of time selected for repricing assets and liabilities important when using the repricing model?

2.3 What is the CGAP effect? According to the CGAP effect, what is the relation between changes in interest rates and changes in net interest income when CGAP is positive? When CGAP is negative?

2.4 Which of the following is an appropriate change to make on a bank’s balance sheet when GAP is negative, spread is expected to remain unchanged and interest rates are

expected to rise?

According to the CGAP effect, when GAP, or CGAP, is positive the change in NII is positively related to the change in interest rates. Thus, an FI would want its GAP to be positive when interest rates are expected to rise.

a. Replace fixed-rate loans with rate-sensitive loans

b. Replace marketable securities with fixed-rate loans

c. Replace fixed-rate CDs with rate-sensitive CDs

d. Replace equity with demand deposits

e. Replace vault cash with marketable securities

2.5 Consider the following balance sheet positions for a financial institution:

* Rate-sensitive assets = $200 million. Rate-sensitive liabilities = $100 million
* Rate-sensitive assets = $100 million. Rate-sensitive liabilities = $150 million
* Rate-sensitive assets = $150 million. Rate-sensitive liabilities = $140 million

a. Calculate the repricing gap and the impact on net interest income of a 1 percent increase in interest rates for each position.

b. Calculate the impact on net interest income on each of the above situations assuming a 1 percent decrease in interest rates.

c. What conclusion can you draw about the repricing model from these results?

2.6 Consider the following balance sheet for MMC Bancorp (in millions of dollars):

Assets Liabilities

1. Cash and due from $ 6.25 1. Equity capital (fixed) $25.00

2. Short-term consumer loans 62.50

(one-year maturity) 2. Demand deposits 50.00

3. Long-term consumer loans 31.25

(two-year maturity) 3. Passbook savings 37.50

4. Three-month T-bills 37.50 4. Three-month CDs 50.00

5. Six-month T-notes 43.75 5. Three-month banker’s

acceptances 25.00

6. Three-year T-bonds 75.00 6. Six-month commercial paper 75.00

7. 10-year, fixed-rate mortgages 25.00 7. One-year time deposits 25.00

8. 30-year, floating-rate

mortgages 50.00 8. Two-year time deposits 50.00

9. Premises 6.25

$337.50 $337.50

a. Calculate the value of MMC’s rate-sensitive assets, rate sensitive liabilities, and repricing gap over the next year.

b. Calculate the expected change in the net interest income for the bank if interest rates rise by 1 percent on both RSAs and RSLs. If interest rates fall by 1 percent on both RSAs and RSLs.

c. Calculate the expected change in the net interest income for the bank if interest rates rise by 1.2 percent on RSAs and by 1 percent on RSLs. If interest rates fall by 1.2 percent on RSAs and by 1 percent on RSLs.

2.7 What is the gap to total assets ratio? What is the value of this ratio to interest rate risk managers and regulators?

2.8 Consider the following balance sheet for WatchoverU Savings, Inc. (in millions):

Assets Liabilities and Equity

Floating-rate mortgages 1-year time deposits

(currently 10% annually) $50 (currently 6% annually) $70

30-year fixed-rate loans 3-year time deposits

(currently 7% annually) $50 (currently 7% annually) $20

Equity $10

Total assets $100 Total liabilities & equity $100

a. What is WatchoverU’s expected net interest income at year-end?

b. What will net interest income be at year-end if interest rates rise by 2 percent?

c. Using the cumulative repricing gap model, what is the expected net interest income for a 2 percent increase in interest rates?

1. What will net interest income be at year-end if interest rates on RSAs increase by 2 percent but interest rates on RSLs increase by 1 percent? Is it reasonable for changes in interest rates on RSAs and RSLs to differ? Why?

2.9 Use the following information about a hypothetical government security dealer named M. P. Jorgan. Market yields are in parenthesis, and amounts are in millions.

Assets Liabilities and Equity

Cash $10 Overnight repos $170

1-month T-bills (7.05%) 75 Subordinated debt

3-month T-bills (7.25%) 75 7-year fixed rate (8.55%) 150

2-year T-notes (7.50%) 50

8-year T-notes (8.96%) 100

5-year munis (floating rate)

(8.20% reset every 6 months) 25 Equity 15

Total assets $335 Total liabilities & equity $335

a. What is the repricing gap if the planning period is 30 days? 3 months? 2 years? Recall that cash is a non-interest-earning asset.

b. What is the impact over the next 30 days on net interest income if interest rates increase 50 basis points? Decrease 75 basis points?

1. The following one-year runoffs are expected: $10 million for two-year T-notes and $20 million for eight-year T-notes. What is the one-year repricing gap?

d. If runoffs are considered, what is the effect on net interest income at year-end if interest rates increase 50 basis points? Decrease 75 basis points?

2.10. A bank has the following balance sheet:

Assets Avg. Rate Liabilities/Equity Avg. Rate

Rate sensitive $550,000 7.75% Rate sensitive $375,000 6.25%

Fixed rate 755,000 8.75 Fixed rate 805,000 7.50

Nonearning 265,000 Nonpaying 390,000

Total $1,570,000 Total $1,570,000

Suppose interest rates rise such that the average yield on rate-sensitive assets increases by 45 basis points and the average yield on rate-sensitive liabilities increases by 35 basis points.

a. Calculate the bank’s repricing GAP, gap to total assets ratio, and gap ratio.

b. Assuming the bank does not change the composition of its balance sheet, calculate the resulting change in the bank’s interest income, interest expense, and net interest income.

c. Explain how the CGAP and spread effects influenced the change in net interest income.

2.11- A bank has the following balance sheet:

Assets Avg. Rate Liabilities/Equity Avg. Rate

Rate sensitive $550,000 7.75% Rate sensitive $575,000 6.25%

Fixed rate 755,000 8.75 Fixed rate 605,000 7.50

Nonearning 265,000 Nonpaying 390,000

Total $1,570,000 Total $1,570,000

Suppose interest rates fall such that the average yield on rate-sensitive assets decreases by 15 basis points and the average yield on rate-sensitive liabilities decreases by 5 basis points.

a. Calculate the bank’s CGAP, gap to total asset ratio, and gap ratio.

b. Assuming the bank does not change the composition of its balance sheet, calculate the resulting change in the bank’s interest income, interest expense, and net interest income.

c. The bank’s CGAP is negative and interest rates decreased, yet net interest income decreased. Explain how the CGAP and spread effects influenced this decrease in net interest income.

2.12. The balance sheet of A. G. Fredwards, a government security dealer, is listed below. Market yields are in parentheses, and amounts are in millions.

Assets Liabilities and Equity

Cash $20 Overnight repos $340

1-month T-bills (7.05%) 150 Subordinated debt

3-month T-bills (7.25%) 150 7-year fixed rate (8.55%) 300

2-year T-notes (7.50%) 100

8-year T-notes (8.96%) 200

5-year munis (floating rate)

(8.20% reset every 6 months) 50 Equity 30

Total assets $670 Total liabilities and equity $670

a. What is the repricing gap if the planning period is 30 days? 3 month days? 2 years?

b. What is the impact over the next three months on net interest income if interest rates on RSAs increase 50 basis points and on RSLs increase 60 basis points?

c. What is the impact over the next two years on net interest income if interest rates on RSAs increase 50 basis points and on RSLs increase 75 basis points?

d. Explain the difference in your answers to parts (b) and (c). Why is one answer a negative change in NII, while the other is positive?

2.13. A bank has the following balance sheet:

Assets Avg. Rate Liabilities/Equity Avg. Rate

Rate sensitive $225,000 6.35% Rate sensitive $300,000 4.25%

Fixed rate 550,000 7.55 Fixed rate 505,000 6.15

Nonearning 120,000 Nonpaying 90,000

Total $895,000 Total $895,000

Suppose interest rates rise such that the average yield on rate-sensitive assets increases by 45 basis points and the average yield on rate-sensitive liabilities increases by 35 basis points.

a. Calculate the bank’s repricing GAP.

b. Assuming the bank does not change the composition of its balance sheet, calculate the net interest income for the bank before and after the interest rate changes. What is the resulting change in net interest income?

c. Explain how the CGAP and spread effects influenced this increase in net interest income.

2.14. Nearby Bank has the following balance sheet (in millions):

Assets Liabilities and Equity

Cash $60 Demand deposits $140

5-year Treasury notes 60 1-year certificates of deposit 160

30-year mortgages 200 Equity 20

Total assets $320 Total liabilities and equity $320

What is the maturity gap for Nearby Bank? Is Nearby Bank more exposed to an increase or decrease in interest rates? Explain why?

2.15. County Bank has the following market value balance sheet (in millions, all interest at annual rates). All securities are selling at par equal to book value.

Assets Liabilities and Equity

Cash $20 Demand deposits $100

15-year commercial loan at 10% 5-year CDs at 6% interest,

interest, balloon payment 160 balloon payment 210

30-year mortgages at 8% interest, 20-year debentures at 7% interest, 120

balloon payment 300 balloon payment

Equity 50

Total assets $480 Total liabilities & equity $480

a. What is the maturity gap for County Bank?

b. What will be the maturity gap if the interest rates on all assets and liabilities increase by 1 percent?

c. What will happen to the market value of the equity?