

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

1. How do monetary policy actions made by the Federal Reserve impact interest rates?

Through its daily open market operations, such as buying and selling Treasury bonds and Treasury bills, the Fed seeks to influence the money supply, inflation, and the level of interest rates. When the Fed finds it necessary to slow down the economy, it tightens monetary policy by raising interest rates. The normal result is a decrease in business and household spending (especially that financed by credit or borrowing). Conversely, if business and household spending decline to the extent that the Fed finds it necessary to stimulate the economy it allows interest rates to fall (an expansionary monetary policy). The drop in rates promotes borrowing and spending.

3. 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.

The repricing gap is a measure of the difference between the dollar value of assets that will reprice and the dollar value of liabilities that will reprice within a specific time period, where repricing can be the result of a roll over of an asset or liability (e.g., a loan is paid off at or prior to maturity and the funds are used to issue a new loan at current market rates) or because the asset or liability is a variable rate instrument (e.g., a variable rate mortgage whose interest rate is reset every quarter based on movements in a prime rate). Rate sensitivity represents the time interval where repricing can occur. The model focuses on the potential changes in the net interest income variable. In effect, if interest rates change, interest income and interest expense will change as the various assets and liabilities are repriced, that is, receive new interest rates.

5. 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?

The CGAP effect describes the relation between changes in interest rates and changes in net interest income. According to the CGAP effect, when CGAP is positive the change in NII is positively related to the change in interest rates. Thus, an FI would want its CGAP to be positive when interest rates are expected to rise. According to the CGAP effect, when CGAP is negative the change in NII is negatively related to the change in interest rates. Thus, an FI would want its CGAP to be negative when interest rates are expected to fall.

7. If a bank manager was quite certain that interest rates were going to rise within the next six months, how should the bank manager adjust the bank's six-month repricing gap to take advantage of this anticipated rise? What if the manager believed rates would fall in the next six months.

When interest rates are expected to rise, a bank should set its repricing gap to a positive position. In this case, as rates rise, interest income will rise by more than interest expense. The result is an increase in net interest income. When interest rates are expected to fall, a bank should set its repricing gap to a negative position. In this case, as rates fall, interest income will fall by less than interest expense. The result is an increase in net interest income.

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

Assets		Liabilities/Equity	
1. Cash and due from	\$ 6.25	1. Equity capital (fixed)	\$25.00
2. Short-term consumer loans (one-year maturity)	62.50	2. Demand deposits	50.00
3. Long-term consumer loans (two-year maturity)	31.25	3. One-month CDs	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 bankers' 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	<u>50.00</u>
9. Premises	<u>6.25</u>		
	\$337.50		\$337.50

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

Looking down the asset side of the balance sheet, we see the following one-year rate-sensitive assets (RSA):

1. Short-term consumer loans: \$62.50 million, which are repriced at the end of the year and just make the one-year cutoff.
2. Three-month T-bills: \$37.50 million, which are repriced on maturity (rollover) every three months.
3. Six-month T-notes: \$43.75 million, which are repriced on maturity (rollover) every six months.
4. 30-year floating-rate mortgages: \$50.00 million, which are repriced (i.e., the mortgage rate is reset) every nine months. Thus, these long-term assets are RSA in the context of the repricing model with a one-year repricing horizon.

Summing these four items produces one-year RSA of \$193.75 million. The remaining \$143.75 million is not rate sensitive over the one-year repricing horizon. A change in the level of interest rates will not affect the interest revenue generated by these assets over the next year. The \$6.25 million in the cash and due from category and the \$6.25 million in premises are nonearning assets. Although the \$131.25 million in long-term consumer loans, three-year Treasury bonds,

and 10-year, fixed-rate mortgages generate interest revenue, the level of revenue generated will not change over the next year since the interest rates on these assets are not expected to change (i.e., they are fixed over the next year).

Looking down the liability side of the balance sheet, we see that the following liability items clearly fit the one-year rate or repricing sensitivity test:

1. One-month CDs: \$37.50 million, which mature in one months and are repriced on rollover.
2. Three-month CDs: \$50 million, which mature in three months and are repriced on rollover.
3. Three-month bankers' acceptances: \$25 million, which mature in three months and are repriced on rollover.
4. Six-month commercial paper: \$75 million, which mature and are repriced every six months.
5. One-year time deposits: \$25 million, which are repriced at the end of the one-year gap horizon.

Summing these five items produces one-year rate-sensitive liabilities (RSL) of \$212.5 million. The remaining \$125 million is not rate sensitive over the one-year period. The \$25 million in equity capital and \$50 million in demand deposits do not pay interest and are therefore classified as nonpaying. The \$50 million in two-year time deposits generate interest expense over the next year, but the level of the interest generated will not change if the general level of interest rates change. Thus, we classify these items as *fixed-rate liabilities*.

The five repriced liabilities (\$37.50 + \$50 + \$25 + \$75 + \$25) sum to \$212.5 million, and the four repriced assets of \$62.50 + \$37.50 + \$43.75 + \$50 sum to \$193.75 million. Given this, the cumulative one-year repricing gap (CGAP) for the bank is:

$$\text{CGAP} = (\text{One-year RSA}) - (\text{One-year RSL}) = \text{RSA} - \text{RSL} = \$193.75 \text{ million} - \$212.5 \text{ million} = -\$18.80 \text{ million}$$

- 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.

The CGAP would project the expected annual change in net interest income (ΔNII) of the bank is:

$$\begin{aligned}\Delta \text{NII} &= \text{CGAP} \times \Delta R \\ &= (-\$18.80 \text{ million}) \times 0.01 \\ &= -\$188,000\end{aligned}$$

Similarly, if interest rates fall equally for RSAs and RSLs, NII will fall by:

$$\begin{aligned}&= (-\$18.80 \text{ million}) \times (-0.01) \\ &= \$188,000\end{aligned}$$

- 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.

The resulting change in NII is calculated as:

$$\begin{aligned}\Delta \text{NII} &= [\text{RSA} \times \Delta R_{\text{RSA}}] - [\text{RSL} \times \Delta R_{\text{RSL}}] \\ &= [\$193.75 \text{ million} \times 1.2\%] - [\$212.5 \text{ million} \times 1.0\%] \\ &= \$2.325 \text{ million} - \$2.125 \text{ million} \\ &= \$200,000\end{aligned}$$

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

The gap to total assets ratio is the ratio of the cumulative gap position to the total assets of the FI. The cumulative gap position is the sum of the individual gaps over several time buckets. The value of this ratio is that it tells the direction of the interest rate exposure and the scale of that exposure relative to the size of the FI.

13. What is the spread effect?

The spread effect is the effect that a change in the spread between rates on RSAs and RSLs has on net interest income as interest rates change. The spread effect is such that, regardless of the direction of the change in interest rates, a positive relation exists between changes in the spread and changes in NII. Whenever the spread increases (decreases), NII increases (decreases).

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

<u>Assets</u>		<u>Liabilities and Equity</u>	
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)	<u>\$50</u>	(currently 7% annually)	\$20
		Equity	<u>\$10</u>
Total assets	<u>\$100</u>	Total liabilities & equity	<u>\$100</u>

- a. What is WatchoverU's expected net interest income (for year 2) at year-end?

Current expected interest income: $\$50\text{m}(0.10) + \$50\text{m}(0.07) = \$8.5\text{m}.$

Expected interest expense: $\$70\text{m}(0.06) + \$20\text{m}(0.07) = \underline{\$5.6\text{m}}.$

Expected net interest income : $\$8.5\text{m} - \$5.6\text{m} = \$2.9\text{m}.$

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

After the 2 percent interest rate increase, net interest income is:

$$50(0.12) + 50(0.07) - 70(0.08) - 20(.07) = \$9.5\text{m} - \$7.0\text{m} = \$2.5\text{m}, \text{ a decline of } \$0.4\text{m}.$$

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

WatchoverU's repricing or funding gap is $\$50\text{m} - \$70\text{m} = -\$20\text{m}$. The change in net interest income using the funding gap model is $(-\$20\text{m})(0.02) = -\0.4m .

- d. What will expected net interest income (for year 2) 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?

After the unequal rate increases, net interest income will be $50(0.12) + 50(0.07) - 70(0.07) - 20(0.07) = \$9.5\text{m} - \$6.3\text{m} = \3.2m , an increase of $\$0.3\text{m}$. It is not uncommon for interest rates to adjust in an unequal manner on RSAs versus RSLs. Interest rates often do not adjust solely because of market pressures. In many cases, the changes are affected by decisions of management. Thus, you can see the difference between this answer and the answer for part a.

17. A bank has the following balance sheet:

<u>Assets</u>			<u>Avg. Rate</u>	<u>Liabilities/Equity</u>			<u>Avg. Rate</u>
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	<u>265,000</u>			Nonpaying	<u>390,000</u>		
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 CGAP and gap ratio.

$$\text{Repricing GAP} = \$550,000 - \$375,000 = \$175,000$$

$$\text{Gap ratio} = \$175,000 / \$1,570,000 = 11.15\%$$

- 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.

$$\Delta \text{II} = \$550,000(0.0045) = \$2,475$$

$$\Delta \text{IE} = \$375,000(0.0035) = \$1,312.50$$

$$\Delta \text{NII} = \$2,475 - \$1,312.50 = \$1,162.50$$

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

The CGAP affect worked to increase net interest income. That is, the CGAP was positive while interest rates increased. Thus, interest income increased by more than interest expense. The result

is an increase in NII. The spread effect also worked to increase net interest income. The spread increased by 10 basis points. According to the spread affect, as spread increases, so does net interest income.

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

<u>Assets</u>		<u>Liabilities and Equity</u>	
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)	<u>50</u>	Equity	<u>30</u>
Total assets	<u>\$670</u>	Total liabilities and equity	<u>\$670</u>

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

Repricing gap using a 30-day planning period = \$150m - \$340m = -\$190 million.

Repricing gap using a 3-month planning period = (\$150m + \$150m) - \$340m = -\$40 million.

Repricing gap using a 2-year planning period = (\$150m + \$150m + \$100m + \$50m) - \$340m = \$110 million.

- 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?

$$\Delta II = (\$150m. + \$150m.)(0.005) = \$1.5m.$$

$$\Delta IE = \$340m.(0.006) = \$2.04m.$$

$$\Delta NII = \$1.5m. - (\$2.04m.) = -\$0.54m.$$

- 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?

$$\Delta II = (\$150m. + \$150m. + \$100m. + \$50m.)(0.005) = \$2.25m.$$

$$\Delta IE = \$340m.(0.0075) = \$2.04m.$$

$$\Delta NII = \$2.25m. - (\$2.04m.) = \$0.21m.$$

- 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?

For the 3-month analysis, the CGAP affect worked to decrease net interest income. That is, the CGAP was negative while interest rates increased. Thus, interest income increased by less than interest expense. The result is a decrease in NII. For the 3-year analysis, the CGAP affect worked

to increase net interest income. That is, the CGAP was positive while interest rates increased. Thus, interest income increased by more than interest expense. The result is an increase in NII.

21. What are some of the weakness of the repricing model? How have large banks solved the problem of choosing the optimal time period for repricing? What is runoff cash flow, and how does this amount affect the repricing model's analysis?

The repricing model has four general weaknesses:

- (1) It ignores market value effects.
- (2) It does not take into account the fact that the dollar value of rate-sensitive assets and liabilities within a bucket are not similar. Thus, if assets, on average, are repriced earlier in the bucket than liabilities, and if interest rates fall, FIs are subject to reinvestment risks.
- (3) It ignores the problem of runoffs. That is, that some assets are prepaid and some liabilities are withdrawn before the maturity date.
- (4) It ignores income generated from off-balance-sheet activities.

Large banks are able to reprice securities every day using their own internal models so reinvestment and repricing risks can be estimated for each day of the year.

Runoff cash flow reflects the assets that are repaid before maturity and the liabilities that are withdrawn unexpectedly. To the extent that either of these amounts is significantly greater than expected, the estimated interest rate sensitivity of the FI will be in error.

The following questions and problems are based on material in Appendix 8A, located on the website (www.mhhe.com/saunders9e).

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

<u>Assets</u>		<u>Liabilities and Equity</u>	
Cash	\$60	Demand deposits	\$140
5-year Treasury notes	60	1-year certificates of deposit	160
30-year mortgages	<u>200</u>	Equity	<u>20</u>
Total assets	<u>\$320</u>	Total liabilities and equity	<u>\$320</u>

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

$M_A = [0 \times \$60m + 5 \times \$60m + 30 \times \$200m] / \$320m = 19.6875$ years, and $M_L = [0 \times \$140m + 1 \times \$160m] / \$300m = 0.5333$ years. Therefore, the maturity gap = $MGAP = 19.6875 - 0.5333 = 19.1542$ years. Nearby Bank is exposed to an increase in interest rates. If rates rise, the value of assets will decrease by more than the value of liabilities.

25. If a bank manager is certain that interest rates were going to increase within the next six months, how should the bank manager adjust the bank's maturity gap to take advantage of this anticipated increase? What if the manager believes rates will fall? Would your suggested adjustments be difficult or easy to achieve?

When rates rise, the value of the longer-lived assets will fall by more than the shorter-lived liabilities. If the maturity gap is positive, the bank manager will want to shorten the maturity gap or make it negative. If the maturity gap is negative, the manager might do nothing. If rates are expected to decrease, the manager should reverse these strategies. Changing the maturity on the balance sheet often involves changing the mix of assets and liabilities. Attempts to make these changes may involve changes in financial strategy for the bank which may not be easy to accomplish. Later in the text, methods of achieving the same results using derivatives will be explored.

27. The following is a simplified FI balance sheet:

<u>Assets</u>		<u>Liabilities and Equity</u>	
Loans	\$1,000	Deposits	\$850
		Equity	<u>\$150</u>
Total assets	<u>\$1,000</u>	Total liabilities & equity	<u>\$1,000</u>

The average maturity of loans is four years and the average maturity of deposits is two years. Assume loan and deposit balances are reported as book value, zero-coupon items.

- a. Assume that interest rate on both loans and deposits is 9 percent. What is the market value of equity?

The market value of loans = $\$1,000/(1.09)^4 = \708.4252 , and the market value of deposits = $\$850/(1.09)^2 = \715.4280 . The net worth = $\$708.4252 - \$715.4280 = -\$7.0028$. (That is, net worth is negative.)

- b. What must be the interest rate on deposits to force the market value of equity to be zero? What economic market conditions must exist to make this situation possible?

In this case the deposit value should equal the loan value. Thus, $\$850/(1 + x)^2 = \708.4252 . Solving for x , we get 9.5374%. That is, deposit rates will have to increase more because they have a shorter maturity. Further, this result suggests that deposit rates would have to be higher than loan rates.

- c. Assume that interest rate on both loans and deposits is 9 percent. What must be the average maturity of deposits for the market value of equity to be zero?

In this case, we need to solve the equation in part (b) for N, i.e., $\$850/(1 + 0.09)^N = \708.4252 . The result is $N = 2.1141$ years. If interest rates remain at 9 percent, then the average maturity of deposits has to be higher in order to match the value of a 4-year loan.

29. Scandia Bank has issued a one-year, \$1million CD paying 5.75 percent to fund a one-year loan paying an interest rate of 6 percent. The principal of the loan will be paid in two installments: \$500,000 in six months and the balance at the end of the year.

- a. What is the maturity gap of Scandia Bank? According to the maturity model, what does this maturity gap imply about the interest rate risk exposure faced by Scandia Bank?

The maturity gap is 1 year – 1 year = 0. The maturity gap model would state that the bank is immunized against changes in interest rates because assets and liabilities are of equal maturity.

- b. Assuming no change in interest rates over the year, what is the expected net interest income at the end of the year?

Principal received in six months	\$500,000	
Interest received in six months (0.03 x \$1,000,000)		<u>30,000</u>
Total		\$530,000

Principal received at the end of the year	\$500,000	
Interest received at the end of the year (0.03 x \$500,000)		15,000
Future value of interest received in six months (\$530,000 x 1.03)		<u>545,900</u>
Total principal and interest received		\$1,060,900

Principal and interest paid on deposits (\$1,000,000 x 0.0575)	<u>\$1,057,500</u>	
Net interest income received		\$3,400

- c. What would be the effect on annual net interest income of a 2 percent interest rate increase that occurred immediately after the loan was made? What would be the effect of a 2 percent decrease in rates?

If interest rates increase 2 percent, then the reinvestment benefits of cash flows in six months will be higher:

Principal received in six months	\$500,000	
Interest received in six months (0.03 x \$1,000,000)		<u>30,000</u>
Total		\$530,000

Principal received at the end of the year	\$500,000	
Interest received at the end of the year (0.03 x \$500,000)		15,000
Future value of interest received in six months (\$530,000 x 1.04)		<u>551,200</u>
Total principal and interest received		\$1,066,200

Principal and interest paid on deposits (\$1,000,000 x 0.0575)	<u>\$1,057,500</u>	
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Net interest income received	\$8,700
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If interest rates decrease by 2 percent, then reinvestment income is reduced.

Principal received in six months	\$500,000
Interest received in six months (0.03 x \$1,000,000)	<u>30,000</u>
Total	\$530,000

Principal received at the end of the year	\$500,000
Interest received at the end of the year (0.03 x \$500,000)	15,000
Future value of interest received in six months (\$530,000 x 1.02)	<u>540,600</u>
Total principal and interest received	\$1,055,600

Principal and interest paid on deposits (\$1,000,000 x 0.0575)	<u>\$1,057,500</u>
Net income received	-\$1,900

- d. What do these results indicate about the ability of the maturity model to immunize portfolios against interest rate exposure?

The results indicate that just matching assets and liabilities by maturity is not sufficient to immunize a portfolio against interest rate risk. If the timing of the cash flows within a period is different for assets and liabilities, the effects of interest rate changes are different. For a truly effective immunization strategy, one also needs to account for the timing of cash flows.

31. What are the weaknesses of the maturity gap model?

First, the maturity gap model does not consider the degree of leverage on the balance sheet. For example, if assets are not financed entirely with deposits, a change in interest rates may cause the assets to change in value by a different amount than the liabilities. Second, the maturity model does not take into account the timing of the cash flows of either the assets or the liabilities, and thus reinvestment and/or refinancing risk may become important factors in profitability and valuation as interest rates change.

The following questions and problems are based on material in Appendix 8B to the chapter.

33. The current one-year Treasury bill rate is 5.2 percent, and the expected one-year rate 12 months from now is 5.8 percent. According to the unbiased expectations theory, what should be the current rate for a two-year Treasury security?

$$(1.052)(1.058) = (1 + {}_1R_2)^2 = 1.113016; (1 + {}_1R_2) = 1.054996 \Rightarrow {}_1R_2 = 0.0550 \text{ or } 5.50 \text{ percent}$$

35. *The Wall Street Journal* reports that the rate on three-year Treasury securities is 5.60 percent and the rate on four-year Treasury securities is 5.65 percent. According to the

unbiased expectations hypothesis, what does the market expect the one-year Treasury rate to be in year 4, $E({}_4r_1)$?

$${}_1R_4 = [(1+{}_1R_1)(1+E({}_2r_1))(1+E({}_3r_1))(1+E({}_4r_1))]^{1/4} - 1$$

Thus, $0.0565 = [(1+0.056)^3(1+E({}_4r_1))]^{1/4} - 1$

and $E({}_4r_1) = [(1+0.0565)^4/(1+0.056)^3] - 1 = 5.80\%$

37. Based on economists' forecasts and analysis, one-year Treasury bill rates and liquidity premiums for the next four years are expected to be as follows:

$${}_1R_1 = 5.65\%$$

$$E({}_2r_1) = 6.75\%$$

$$L_2 = 0.05\%$$

$$E({}_3r_1) = 6.85\%$$

$$L_3 = 0.10\%$$

$$E({}_4r_1) = 7.15\%$$

$$L_4 = 0.12\%$$

Using the liquidity premium hypothesis, plot the current yield curve. Make sure you label the axes on the graph and identify the four annual rates on the curve both on the axes and on the yield curve itself.

$${}_1R_1 = 5.65\%$$

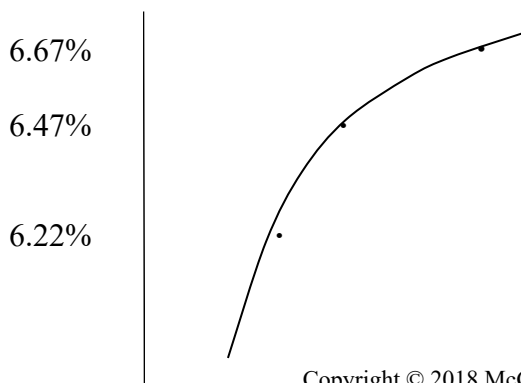
$${}_1R_2 = [(1 + 0.0565)(1 + 0.0675 + 0.0005)]^{1/2} - 1 = 6.22\%$$

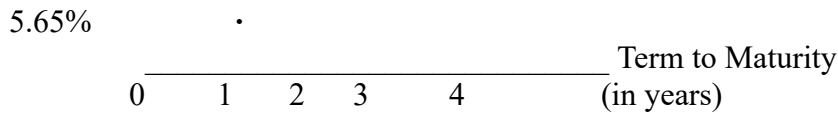
$${}_1R_3 = [(1 + 0.0565)(1 + 0.0675 + 0.0005)(1 + 0.0685 + 0.001)]^{1/3} - 1 = 6.47\%$$

$${}_1R_4 = [(1 + 0.0565)(1 + 0.0675 + 0.0005)(1 + 0.0685 + 0.001)(1 + 0.0715 + 0.0012)]^{1/4} - 1 = 6.67\%$$

and the current yield curve will be upward sloping as shown:

Yield to Maturity





39. You note the following yield curve in *The Wall Street Journal*. According to the unbiased expectations hypothesis, what is the one-year forward rate for the period beginning two years from today, ${}_2f_1$?

Maturity	Yield
One day	2.00%
One year	5.50
Two years	6.50
Three years	9.00

$${}_2f_1 = [(1 + {}_1R_2)^2 / (1 + {}_1R_1)] - 1$$

$${}_2f_1 = [(1.065)^2 / (1.055)] - 1 = 7.51\%$$

Integrated Mini Case: Calculating and Using the Repricing GAP

State Bank's balance sheet is listed below. Market yields are in parenthesis, and amounts are in millions.

<u>Assets</u>		<u>Liabilities and Equity</u>	
Cash	\$20	Demand deposits	\$250
Fed funds (1.05%)	150	Savings accounts (1.5%)	20
3-month T-bills (5.25%)	150	MMDAs (2.5%)	
2-year T-notes (6.50%)	100	(no minimum balance requirement)	340
8-year T-bonds (7.50%)	200	3-month CDs (4.2%)	120
5-year munis (floating rate)		6-month CDs (4.3%)	220
(8.20%, repriced @ 6 months)	50	1-year CDs (4.5%)	375
6-month consumer loans (6%)	250	2-year CDs (5%)	425
1-year consumer loans (5.8%)	300	4-year CDs (5.5%)	330
5-year car loans (7%)	350	5-year CDs (6%)	350
7-month C&I loans (5.8%)	200	Fed funds (1%)	225
2-year C&I loans (floating rate)		Overnight repos (1.25%)	290
(5.15%, repriced @ 6-months)	275	6-month commercial paper (3%)	300
15-year variable rate mortgages		Subordinate notes:	
(5.8%, repriced @ 6-months)	200	3-year fixed rate (6.55%)	200
15-year variable rate mortgages		Subordinated debt:	
(6.1%, repriced @ year)	400	7-year fixed rate (7.25%)	100
15-year fixed-rate mortgages (7.85%)	300	Total liabilities	\$3,545
30-year variable rate mortgages			

(6.3%, repriced @ quarter)	225		
30-year variable rate mortgages			
(6.4%, repriced @ month)	355		
30-year fixed-rate mortgages (8.2%)	400		
Premises and equipment	<u>20</u>	Equity	<u>400</u>
Total assets	<u>\$3,945</u>	Total liabilities and equity	<u>\$3,945</u>

a. What is the repricing gap if the planning period is 30 days? 6 months? 1 year? 2 years? 5 years?

<u>Assets</u>		<u>Repricing period</u>
Cash	\$20	Not rate sensitive
Fed funds (1.05%)	150	30-days
3-month T-bills (5.25%)	150	6-months
2-year T-notes (6.50%)	100	2-years
8-year T-bonds (7.50%)	200	Not rate sensitive
5-year munis (floating rate)		
(8.20%, repriced @ 6 months)	50	6-months
6-month consumer loans (6%)	250	6-months
1-year consumer loans (5.8%)	300	1-year
5-year car loans (7%)	350	5-years
7-month C&I loans (5.8%)	200	1-year
2-year C&I loans (floating rate)		
(5.15%, repriced @ 6-months)	275	6-months
15-year variable rate mortgages		
(5.8%, repriced @ 6-months)	200	6-months
15-year variable rate mortgages		
(6.1%, repriced @ year)	400	1-year
15-year fixed-rate mortgages (7.85%)	300	Not rate sensitive
30-year variable rate mortgages		
(6.3%, repriced @ quarter)	225	6-months
30-year variable rate mortgages		
(6.4%, repriced @ month)	355	30-days
30-year fixed-rate mortgages (8.2%)	400	Not rate sensitive
Premises and equipment	<u>20</u>	Not rate sensitive

<u>Liabilities and Equity</u>		<u>Repricing Period</u>
Demand deposits	\$250	Not rate sensitive
Savings accounts (1.5%)	20	30-days
MMDAs (4.5%)		
(no minimum balance requirement)	340	30-days
3-month CDs (4.2%)	120	6-months
6-month CDs (4.3%)	220	6-months
1-year CDs (4.5%)	375	1-year
2-year CDs (5%)	425	2-years
4-year CDs (5.5%)	330	5-years
5-year CDs (6%)	350	5-years

Fed funds (1%)	225	30-days
Overnight repos (1.25%)	290	30-days
6-month commercial paper (3%)	300	6-months
Subordinate notes		
3-year fixed rate (6.55%)	200	5-years
Subordinated debt		
7-year fixed rate (7.25%)	100	Not rate sensitive
Equity	400	Not rate sensitive

30-day repricing gap: RSAs = \$150m. + \$355m. = \$505m.
RSLs = \$20m. + \$340m. + \$225m. + \$290m. = \$875m.
CGAP = \$505m. - \$875m. = -\$370m.

6-month repricing gap: RSAs = \$505m. + \$150m. + \$50m. + \$250m. + \$275m. + \$200m.
+ \$225m. = \$1655m.
RSLs = \$875m. + \$120m. + \$220m. + \$300m. = \$1515m.
CGAP = \$1655m. - \$1515m. = \$140m.

1-year repricing gap: RSAs = \$1655m. + \$300m. + \$200m. + \$400m. = \$2555m.
RSLs = \$1515m. + \$375m. = \$1890m.
CGAP = \$2555m. - \$1890m. = \$665m.

2-year repricing gap: RSAs = \$2555m. + \$100m. = \$2655m.
RSLs = \$1890m. + \$425m. = \$2315m.
CGAP = \$2655m. - \$2315m. = \$340m.

5-year repricing gap: RSAs = \$2655m. + \$350m. = \$3005m.
RSLs = \$2315m. + \$330m. + \$350m. + \$200m. = \$3195m.
CGAP = \$3005m. - \$3195m. = -\$190m.

b. What is the impact over the next six months on net interest income if interest rates on RSAs increase 60 basis points and on RSLs increase 40 basis points?

$$\Delta \text{NII (6-months)} = \Delta \text{II (6-months)} - \Delta \text{IE (6-months)}$$

$$= \$1655\text{m.}(0.0060) - \$1515\text{m.}(0.0040) = \$3.87\text{m.}$$

c. What is the impact over the next year on net interest income if interest rates on RSAs increase 60 basis points and on RSLs increase 40 basis points?

$$\Delta \text{NII (1-year)} = \Delta \text{II (1-year)} - \Delta \text{IE (1-year)}$$

$$= \$2555\text{m.}(0.0060) - \$1890\text{m.}(0.0040) = \$7.77\text{m.}$$