

SUMMARY

1. The concepts of adverse selection and moral hazard explain the origin of many credit risk management principles involving loan activities, including screening and monitoring, development of long-term customer relationships, loan commitments, collateral, compensating balances, and credit rationing.
2. With the increased volatility of interest rates that occurred in recent years, financial institutions became more concerned about their exposure to

interest-rate risk. Income gap and duration gap analyses tell a financial institution if it has fewer rate-sensitive assets than liabilities (in which case a rise in interest rates will reduce income and a fall in interest rates will raise it) or more rate-sensitive assets than liabilities (in which case a rise in interest rates will raise income and a fall in interest rates will reduce it). Financial institutions can manage interest-rate risk by modifying their balance sheets and by making use of new financial instruments.

KEY TERMS

compensating balances, p. 566
credit rationing, p. 566

duration gap analysis, p. 570
gap analysis (income gap analysis),
p. 568

loan commitment, p. 565
secured loans, p. 565

QUESTIONS

1. Can a financial institution keep borrowers from engaging in risky activities if there are no restrictive covenants written into the loan agreement?
2. Why are secured loans an important method of lending for financial institutions?
3. "If more customers want to borrow funds at the prevailing interest rate, a financial institution can increase its profits by raising interest rates on its loans." Is this statement true, false, or uncertain? Explain your answer.
4. Why is being nosy a desirable trait for a banker?
5. A bank almost always insists that the firms it lends to keep compensating balances at the bank. Why?
6. "Because diversification is a desirable strategy for avoiding risk, it never makes sense for a financial institution to specialize in making specific types of loans." Is this statement true, false, or uncertain? Explain your answer.

QUANTITATIVE PROBLEMS

1. A bank issues a \$100,000 variable-rate 30-year mortgage with a nominal annual rate of 4.5%. If the required rate drops to 4.0% after the first six months, what is the impact on the interest income for the first 12 months?
2. A bank issues a \$100,000 fixed-rate 30-year mortgage with a nominal annual rate of 4.5%. If the required rate drops to 4.0% immediately after the mortgage is issued, what is the impact on the value of the mortgage?
3. Calculate the duration of a \$100,000 fixed-rate 30-year mortgage with a nominal annual rate of 7.0%. What is the expected percentage change in value if the required rate drops to 6.5% immediately after the mortgage is issued?
4. The value of a \$100,000 fixed-rate 30-year mortgage falls to \$89,537 when interest rates move from 5% to 6%. What is the approximate duration of the mortgage?
5. Calculate the duration of a commercial loan. The face value of the loan is \$2,000,000. It requires simple interest yearly, with an APR of 8%. The loan is due in four years. The current market rate for such loans is 8%.
6. A bank's balance sheet contains interest-sensitive assets of \$280 million and interest-sensitive liabilities of \$465 million. Calculate the income gap.
7. Calculate the income gap for a financial institution with rate-sensitive assets of \$20 million and rate-sensitive liabilities of \$48 million. If interest rates rise from 4% to 4.8%, what is the expected change in income?

8. Calculate the income gap given the following items:

- \$8 million in reserves
- \$25 million in variable-rate mortgages
- \$4 million in checkable deposits
- \$2 million in savings deposits
- \$6 million of two-year CDs

9. The following financial statement is for the current year. From the past, you know that 10% of fixed-rate mortgages prepay each year. You also estimate that 10% of checkable deposits and 20% of savings accounts are rate-sensitive.

What is the current income gap for Second National Bank? What will happen to the bank's current net interest income if rates fall by 75 basis points?

Second National Bank			
Assets		Liabilities	
Reserves	\$1,500,000	Checkable deposits	\$15,000,000
Securities		Money market deposits	\$5,500,000
< 1 year	\$6,000,000	Savings accounts	\$8,000,000
1 to 2 years	\$8,000,000	CDs	
> 2 years	\$12,000,000	Variable rate	\$15,000,000
Residential mortgages		< 1 year	\$22,000,000
Variable rate	\$7,000,000	1 to 2 years	\$5,000,000
Fixed rate	\$13,000,000	> 2 years	\$2,500,000
Commercial loans		Federal funds	\$5,000,000
< 1 year	\$1,500,000	Borrowings	
1 to 2 years	\$18,500,000	< 1 year	\$12,000,000
> 2 years	\$30,000,000	1 to 2 years	\$3,000,000
Buildings, etc.	\$2,500,000	> 2 years	\$2,000,000
Total	\$100,000,000	Bank capital	\$5,000,000
		Total	\$100,000,000

10. Chicago Avenue Bank has the following assets:

Asset	Value	Duration (in years)
T-bills	\$100,000,000	0.55
Consumer loans	\$40,000,000	2.35
Commercial loans	\$15,000,000	5.90

What is Chicago Avenue Bank's asset portfolio duration?

11. A bank added a bond to its portfolio. The bond has a duration of 12.3 years and cost \$1,109. Just after buying the bond, the bank discovered that market interest rates are expected to rise from 8% to 8.75%. What is the expected change in the bond's value?
12. Calculate the change in the market value of assets and liabilities when the average duration of assets is 3.60, the average duration of liabilities 0.88, and interest rates increase from 5% to 5.5%.

13. Springer County Bank has assets totaling \$180 million with a duration of five years, and liabilities totaling \$160 million with a duration of two years. If interest rates drop from 9% by 75 basis points, what is the change in the bank's capitalization ratio?

14. The manager for Tyler Bank and Trust has the following assets and liabilities to manage:

Asset	Value	Duration (years)
Bonds	\$75,000,000	9.00
Consumer loans	\$875,000,000	2.00
Commercial loans	\$700,000,000	5.00

Liability	Value	Duration (years)
Demand deposits	\$300,000,000	1.00
Saving accounts	??	0.50

If the manager wants a duration gap of 3.00, what level of saving accounts should the bank raise? Assume that any difference between assets and liabilities is held as cash (duration = 0).

15. The following financial statement is for the current year. After you review the data, calculate the duration gap for the bank.

Second National Bank					
Assets			Liabilities		
		Duration (in years)			Duration (in years)
Reserves	\$5,000,000	0.00	Checkable deposits	\$15,000,000	2.00
Securities			Money market deposits	5,000,000	0.10
< 1 year	5,000,000	0.40	Savings accounts	15,000,000	1.00
1 to 2 years	5,000,000	1.60	CDs		
> 2 years	10,000,000	7.00	Variable rate	10,000,000	0.50
Residential mortgages			< 1 year	15,000,000	0.20
Variable rate	10,000,000	0.50	1 to 2 years	5,000,000	1.20
Fixed rate	10,000,000	6.00	> 2 years	5,000,000	2.70
Commercial loans			Interbank loans	5,000,000	0.00
< 1 year	15,000,000	0.70	Borrowings		
1 to 2 years	10,000,000	1.40	< 1 year	10,000,000	0.30
> 2 years	25,000,000	4.00	1 to 2 years	5,000,000	1.30
Buildings, etc.	5,000,000	0.00	> 2 years	5,000,000	3.10
			Bank capital	5,000,000	
Total	\$100,000,000		Total	\$100,000,000	

For Problems 16–23, assume that the First National Bank initially has the balance sheet shown on page 567 and that interest rates are initially at 10%.

16. If the First National Bank sells \$10 million of its securities with maturities greater than two years and replaces them with securities maturing in less than one year, what is the income gap for the bank? What will happen to profits next year if interest rates fall by 3 percentage points?
17. If the First National Bank decides to convert \$5 million of its fixed-rate mortgages into variable-rate mortgages, what happens to its interest-rate risk? Explain with income gap and duration gap analyses.
18. If the manager of the First National Bank revises the estimate of the percentage of fixed-rate mortgages that are repaid within a year from 20% to 10%, what will be the revised estimate of the interest-rate risk the bank faces? What will happen to profits next year if interest rates fall by 2 percentage points?
19. If the manager of the First National Bank revises the estimate of the percentage of checkable deposits that are rate-sensitive from 10% to 25%, what will be the revised estimate of the interest-rate risk the bank faces? What will happen to profits next year if interest rates rise by 5 percentage points?
20. Given the estimates of duration in Table 23.1, what will happen to the bank's net worth if interest rates rise by 10 percentage points? Will the bank stay in business? Why or why not?
21. If the manager of the First National Bank revises the estimates of the duration of the bank's assets to four years and liabilities to two years, what is the effect on net worth if interest rates rise by 2 percentage points?
22. Given the estimates of duration in Problem 21, how should the bank alter the duration of its assets to immunize its net worth from interest-rate risk?
23. Given the estimates of duration in Problem 21, how should the bank alter the duration of its liabilities to immunize its net worth from interest-rate risk?

For Problems 24–29, assume that the Friendly Finance Company initially has the balance sheet shown on page 575 and that interest rates are initially at 8%.

24. If the manager of the Friendly Finance Company decides to sell off \$10 million of the company's consumer loans, half maturing within one year and half maturing in greater than two years, and uses the resulting funds to buy \$10 million of Treasury bills, what is the income gap for the company? What will happen to profits next year if interest rates fall by 5 percentage points? How could the Friendly Finance Company alter its balance sheet to immunize its income from this change in interest rates?
25. If the Friendly Finance Company raises an additional \$20 million with commercial paper and uses the funds to make \$20 million of consumer loans that mature in less than one year, what happens to its interest-rate risk? In this situation, what additional changes could it make in its balance sheet to eliminate the income gap?
26. Given the estimates of duration in Table 23.2, what will happen to the Friendly Finance Company's net worth if interest rates rise by 3 percentage points? Will the company stay in business? Why or why not?
27. If the manager of the Friendly Finance Company revises the estimates of the duration of the company's assets to two years and liabilities to four years, what is the effect on net worth if interest rates rise by 3 percentage points?
28. Given the estimates of duration found in Problem 27, how should the Friendly Finance Company alter the duration of its assets to immunize its net worth from interest-rate risk?
29. Given the estimates of duration in Problem 27, how should the Friendly Finance Company alter the duration of its liabilities to immunize its net worth from interest-rate risk?

WEB EXERCISES

Risk Management in Financial Institutions

1. This chapter discussed the need financial institutions have to control credit risk by lending to creditworthy borrowers. If you allow your credit to deteriorate, you may find yourself unable to borrow when you need to. Go to <http://quicken.intuit.com/support/help/managing-your-credit/winning-back-your-finances-how-to-increase-your-credit-score-in-6-months-INF24303.html>. What factors affect your creditworthiness? What can you do to improve your appeal to lenders?
2. The FDIC is extremely concerned with risk management in banks. High-risk banks are more likely to fail and cost the FDIC money. The FDIC regularly examines banks and rates them using a system called CAMELS. Go to <http://www.frbsf.org/econsrch/wklyltr/wklyltr99/el99-19.html>. What does the acronym CAMELS stand for? Discuss how CAMELS ratings are used in the supervisory process.