

Chapter 17

Banking and the Management of Financial Institutions

■ Answers to End-of-Chapter Questions

1. The rank from most to least liquid is (c), (b), (a), (d).
2. No, because the bank president is not managing the bank well. The fact that the bank has never incurred costs as a result of a deposit outflow means that the bank is holding a lot of reserves that do not earn any interest. Thus the bank's profits are low, and stock in the bank is not a good investment.
3. No. When you turn a customer down, you may lose that customer's business forever, which is extremely costly. Instead, you might go out and borrow from other banks, corporations, or the Fed to obtain funds so that you can make the customer's loan. Alternatively, you might sell negotiable CDs or some of your securities to acquire the necessary funds.
4. Overnight loan market is a component of money market where funds are borrowed or lent out "overnight", i.e. for one business day, making it the shortest term loan. Such loans are attractive to businesses as they offer the lowest interest rate over the shortest loan period. When a deposit outflow occurs, a bank (or an entity) is able to borrow reserves in these overnight loan markets quickly; thus, it does not need to acquire reserves at a high cost. So, if a bank is short of cash at the end of the day and cannot meet its reserve balance requirement, it can borrow from a bank with extra cash. By controlling the funds rate, a country is able to maintain healthy economic growth – increasing the rate during inflation and decreasing it during deflation.
5. Interest rates can affect investment decisions when companies have to make purchases using loans taken from banks. For example, if the interest rates are high, then this might affect a company's decision to buy new machinery and it might just end up renting the machinery at a small fee in which quality of the machinery might be compromised, and affect the quality of the end product. Consequently, it may also lead to reduced demand due to product quality, and so on.
6. False. If an asset has a lot of risk, a bank manager might not want to hold it even if it has a higher return than other assets. Thus a bank manager has to consider risk as well as the expected return when deciding to hold an asset.
7. Retail banks face liabilities on handling customer deposits, lending money to customers, borrowing and lending from other financial institutions where they have to maintain their utmost integrity, and control damage in the day-to-day transactions be it local or international.

8. A bank's operating income consists of interest income mainly, but over the years, banks have managed to diversify toward non-interest income. The components of non-interest income are deposit and transaction fee, insufficient funds fee, annual fee, monthly account service charge fee, and dormant account fee. This non-interest income fee is important to sustain the banks and reap higher margins. Recent regulations have been put in place to limit trading and proprietary activities of banks with the assumption that non-traditional activities always increase the systemic risk of banks. This view is still subject to open debate.
9. Interest expenses have large fluctuations because interest rates fluctuate so much; provisions for loan losses fluctuate a lot because when the economy turns down or a particular sector of the economy deteriorates, the potential for loan losses rises dramatically.
10. Because ROE, the return on equity, tells stock holders how much they are earning on their equity investment, while ROA, the return on assets, only provides an indication how well the bank's assets are being managed.
11. Net interest margin is the difference between the interest income generated by banks and the amount of interest expenses paid out to their lenders, and is expressed as a percentage earned on total assets. It is an important measure of assessing bank performance. It is important because it indicates whether asset and liability management is being done properly so that the bank earns substantial income on its assets and has low costs on its liabilities.
12. ROE will fall in half.
13. To lower capital and raise ROE, holding its assets constant, it can pay out more dividends or buy back some of its shares. Alternatively, it can keep its capital constant but increase the amount of its assets by acquiring new funds and then seeking out new loan business or purchasing more securities with these new funds.
14. The benefit is that the bank now has a larger cushion of bank capital and so is less likely to go broke if there are losses on its loans or other assets. The cost is that for the same ROA, it will have a lower ROE, return on equity.
15. It can raise \$1 million of capital by issuing new stock. It can cut its dividend payments by \$1 million, thereby increasing its retained earnings by \$1 million. It can decrease the amount of its assets so that the amount of its capital relative to its assets increases, thereby meeting the capital requirements.

■ Quantitative Problems

1. The balance sheet of KriBank starts with an allowance for loan losses of \$2.66 million. During the year, KriBank charges off worthless loans of \$1.68 million, recovers \$0.44 million on loans previously charged off, and charges current income for \$2.96 million provisions for loan losses. Calculate the end of year allowance for loan losses.

Solution:

$$2.66 \text{ M} - 1.68 \text{ M} + 0.44 \text{ M} + 2.96 \text{ M} = \$4.38 \text{ M}$$

2. X-Bank reported an ROE of 15% and an ROA of 1%. How well capitalized in this bank?

Solution: $ROE = ROA \times EM$

$$0.15 = 0.01 \times EM$$

$$EM = 15 = \text{assets/equity}$$

So equity/assets = 6.66%. This is a well-capitalized bank.

3. In mid-1980, Willem G&H issued a standard 35-year fixed rate mortgage at 8.6% for \$170,000. Forty-eight months later, mortgage rates jumped to 15%. If the G&H sells the mortgage, how much of a loss is incurred?

Solution:

When issued, the required payment is:

$$PV = \$170,000, I = 8.6/12 = 0.7167, N = 420, FV = 0$$

Compute PMT .

$$PMT = \$1,282.22$$

After 48 months, the mortgage balance is:

$$PMT = \$1,282.22, I = 8.6/12, N = 372, FV = 0$$

Compute PV . $PV = \$166,355.70$

However, at current rates, the remaining cash flows are worth:

$$PMT = \$1,282.22, I = 15/12, N = 372, FV = 0$$

Compute PV . $PV = \$101,568.11$

Willem G&H expects to take a loss of \$64,787.59 if it sells the mortgage.

4. Refer to the previous question. In 1984 Congress allowed G&Hs to sell mortgages at a loss and to amortize the loss over the remaining life of the mortgage. If this were used for the previous question, how would the transaction have been recorded? What would be the annual adjustment? When would that end?

Solution:

The sale would be recorded as:

Debit

Credit

Cash	\$101,568.11	Mortgage	\$166,355.70
Capitalized Loss	\$64,787.59		

Then, each year for the next 31 years (ending in 2015!), the loss would be written off:

Debit		Credit	
Loss Expense	\$2,089.92	Capitalized Loss	\$2,089.92

5. For the upcoming week, Nobel National Bank plans to issue \$50 million in mortgages and purchase \$200 million 31-day T-bills. New deposits of \$70 million are expected, and other sources will generate \$30 million in cash. What is Nobel's estimate of funds needed?

Solution:

$$\$50 \text{ M} + \$200 \text{ M} - \$70 \text{ M} - \$30 \text{ M} = \$150 \text{ M}$$

6. A bank with \$100 million in demand deposits estimates that net daily deposits are, on average, \$100 million with a standard deviation of \$5 million. The bank wants to maintain a minimum of 8% of deposits in reserves at all times. What is the highest expected level of deposits during the month? What reserves do they need to maintain? Use a 99% confidence level.

Solution: The highest that demand deposits will reach, with 99% confidence, is $\$100 \text{ M} + 3 \times \5 million , or \$115 million. To maintain 8% as reserves against this possibility, they must maintain $\$115 \text{ M} \times 0.08 = \9.2 million .

A better approach would be to increase/decrease reserves as deposits are received/withdrawn, rather than maintain \$9.2 million against the possibility of \$115 M in deposits.

7. NewBank started its first day of operations with \$6 million in capital. \$100 million in checkable deposits is received. The bank issues a \$25 million commercial loan and another \$25 million in mortgages, with the following terms:
- mortgages: 100 standard 30-year, fixed-rate with a nominal annual rate of 5.25% each for \$250,000.

- commercial loan: 3-year loan, simple interest paid monthly at 0.75%/month.
If required reserves are 8%, what does the bank balance sheets look like? Ignore any loan loss reserves.

Assets		Liabilities	
Required Reserves	\$ 8 million	Checkable Deposits	\$100 million
Excess Reserves	\$48 million	Bank Capital	\$ 6 million
Loans	\$50 million		

8. NewBank decides to invest \$45 million in 30-day T-bills. The T-bills are currently trading at \$4,986.70 (including commissions) for a \$5,000 face value instrument. How many do they purchase? What does the balance sheet look like?

Solution: The bank can purchase \$45 M/\$4,986.70, which is about 9,024 T-bills. The actual cost is \$44,999,980.80.

After the transaction, the balance sheet is:

Assets		Liabilities	
Required Reserves	\$ 8 million	Checkable Deposits	\$100 million
Excess Reserves	\$ 3 million	Bank Capital	\$ 6 million
T-bills	\$45 million		
Loans	\$50 million		

9. On the 3rd day of operations, deposits fall by \$5 million. What does the balance sheet look like? Are there any problems?

Solution: The cash leaving the bank comes from reserves, first excess and then required. Following the outflow, the balance sheet is:

Assets		Liabilities	
Required Reserves	\$ 6 million	Checkable Deposits	\$95 million
T-bills	\$45 million	Bank Capital	\$ 6 million
Loans	\$50 million		

With \$95 million in deposits, the $0.08 \times \$95 \text{ M}$ is required in reserves, or \$7.6 million. The bank is short \$1.6 million.

10. To meet any shortfall in the previous question, NewBank will borrow the cash in the fed funds market. Management decides to borrow the needed funds for the remainder of the month (now 29 days). The required yield on a discount basis is 2.9%. What does the balance sheet look like after this transaction?

Solution:

Assets		Liabilities	
Required Reserves	\$7.6 million	Checkable Deposits	\$ 95 million
T-bills	\$ 45 million	Fed Funds Borrowed	\$1.6 million
Loans	\$ 50 million	Bank Capital	\$ 6 million

11. The end of the month finally arrives for NewBank, and it receives all the required payments from its mortgages, commercial loan, and T-bills. How much cash was received? How are these recorded?

Solution: The required monthly mortgage payments are:

$$PV = 25 \text{ M}, I = 5.25/12, N = 360, FV = 0$$

Compute PMT . $PMT = \$138,050.93$

The loan payment is: $\$23 \text{ M} \times 0.0075 = \$187,500$.

These are recorded as:

Debit		Credit	
Cash	\$325,551	Interest Income	\$296,875
		Loans	\$ 28,676

The T-bills paid: $9,024 \times \$5,000 = \$45,120,000$. This is recorded as:

Debit		Credit	
Cash	\$45,120,000	T-bills	\$44,999,980.80
		Interest Income	\$ 120,019.20

12. NewBank also pays off its fed funds borrowed. How much cash is owed? How is this recorded?

Solution:

$$\frac{\$F - \$1.6 \text{ M}}{F} \times \frac{360}{29} = 0.029$$

$$F = \$1,603,746.53$$

This is recorded as:

Debit		Credit	
Fed Funds	\$1,600,000	Cash	\$1,603,746.53
Interest Expense	\$ 3,746.53		

13. What does the month-end balance sheet for NewBank look like? Calculate this before any income tax consideration.

Solution:

Assets		Liabilities	
Required Reserves	\$ 7.6 million	Checkable Deposits	\$ 95 million
Excess Reserves	\$43.84 million	Bank Capital	\$6.41 million
Loans	\$49.97 million		

14. Calculate NewBank's ROA and NIM for its first month. Assume that net interest equals EBT, and that NewBank is in the 34% tax bracket.

Solution:

Interest income	\$416,894
Interest expense	\$ 3,747
NIM	\$413,147
Income tax	\$140,470
Net income	\$272,677

$$\text{ROA} = 272,677 / 101.41 \text{ M} = 0.2688\% \text{ (monthly)}$$

15. Calculate NewBank's ROE and final balance sheet including its tax liabilities.

Solution:

Assets		Liabilities	
Required Reserves	\$ 7.6 million	Checkable Deposits	\$ 95 million
Excess Reserves	\$43.84 million	Taxes Payable	\$140,470
Loans	\$49.97 million	Bank Capital	\$ 6.27 million

$$\text{ROA} = 272,677 / 6,269,530 = 4.35\% \text{ (monthly)}$$

16. If NewBank was required to establish a loan loss reserve at 0.25% of the loan value for commercial loans, how is this recorded? Recalculate NewBank's ROE and final balance sheet including its tax liabilities.

Solution: The establishment of the loan loss reserve is:

Debit		Credit	
Loan Loss Expense	\$62,500	Loan Loss Reserve	\$62,500

The new income is:

Interest income	\$416,894
Interest expense	\$ 3,747
NIM	\$413,147
Loan loss expense	\$ 62,500
Taxable income	\$350,647
Income tax	\$119,220
Net Income	\$231,427

The new balance sheet is:

Assets		Liabilities	
Required Reserves	\$ 7.6 million	Checkable Deposits	\$ 95 million
Excess Reserves	\$43.84 million	Taxes Payable	\$119,220
Loans	\$49.97 million	Loan Loss Reserve	\$ 62,500
		Bank Capital	\$ 6.23 million

$$\text{ROE} = 231,427 / 6,228,280 = 3.71\% \text{ (monthly)}$$

17. If NewBank's target ROE is 4.5%, how much net fee income must it generate to meet this target?

Solution: The required net income = $0.045 \times \$6 \text{ M} = \$270,000$.

Working backwards, we get:

Taxable income	\$409,091
Income tax	\$139,091
Net Income	\$270,000

Since the taxable income was previously \$350,647, this means that \$58,444 in net fee income (fees generated less expenses) is needed to meet the target.

18. After making payments for three years, one of the mortgage borrowers defaults on the mortgage. NewBank immediately takes possession of the house and sells it at auction for \$175,000. Legal fees amount to \$25,000. If no loan loss reserve was established for the mortgage loans, how is this event recorded?

Solution: The required monthly mortgage payments are:

$$PV = 250,000, I = 5.25/12, N = 360, FV = 0$$

Compute PMT . $PMT = \$1,380.51$

The remaining balance on the mortgage after 36 payments is:

$$PMT = \$1,380.51, I = 5.25/12, N = 360 - 6, FV = 0$$

Compute PV . $PV = \$238,845.64$

The transaction is recorded as:

Debit		Credit	
Cash	150,000.00	Loan	\$238,845.64
Loan Loss Expense	\$88,845.64		