



Homework Exercises – 9 Answers

Money and Banking (Trường Đại học Ngoại thương)

Homework Exercises – 9

Chapter 17 – Homework Questions

1. Rank the following bank assets from most liquid to least liquid:
 - a. Commercial Loans **3**
 - b. Securities **2**
 - c. Reserves **1**
 - d. Physical Capital **4**
2. If the president of a bank told you that the bank was so well run that it never had to call in loans, sell securities or borrow as a result of a deposit outflow, would you be willing to buy stock in that bank? Why or why not?

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. If the bank you own has no excess reserves and a sound customer comes in asking for a loan, should you automatically turn the customer down, explaining that you don't have any excess reserves to loan out? Why or why not? What options are available for you to provide the funds your customer needs?

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. Why has the development of overnight loan markets made it more likely that banks will hold fewer reserves?

Because when a deposit outflow occurs, a bank is able to borrow reserves in these overnight loan markets quickly; thus, it does not need to acquire reserves at a high cost by calling in or selling off loans. The presence of overnight loan markets thus reduces the costs associated with deposit outflows, so banks will hold fewer excess reserves.
5. If you are a banker and expect interest rates to rise in the future, would you want to make short-term or long-term loans?

You should want to make short-term loans. Then, when these loans mature, you will be able to make loans at higher interest rates, which will generate more income for the bank.
6. "Bank managers should always seek the highest return possible on their assets." Is this statement true, false or uncertain? Explain your answer.

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. "Banking has become a more dynamic industry because of more active liability management." Is this statement true, false or uncertain?

True. Banks can now pursue new loan business much more aggressively than in the past because when they see profitable loan opportunities, they can use liability management to acquire new funds and expand the bank's business.

8. Why has noninterest income been growing as a source of bank operating income?

Because the off-balance sheet activities mentioned in this chapter that generate fees have become a more important part of a bank's business.

9. Which components of operating expenses experience the greatest fluctuations? Why?

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. Why do equity holders care more about ROE than ROA?

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. What does the net interest margin measure and why is it important to bank managers?

The net interest margin measures the difference between interest income and expenses. 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. If a bank doubles the amount of its capital and ROA stays constant, what will happen to ROE?

ROE will fall in half.

13. If a bank finds its ROE is too low because it has too much bank capital, what can it do to raise its ROE?

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. What are the benefits and costs for a bank when it decides to increase the amount of its bank capital?

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. If a bank is falling short of meeting its capital requirements by \$1m, what three things can it do to rectify the situation?

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.

Chapter 17 – Quantitative Questions

1. The balance sheet of TriBank starts with an allowance for loan losses of \$1.33m. During the year, TriBank charges off worthless loans of \$0.84m, recovers \$0.22m on loans previously charged off, and charges current income for a \$1.48m provision for loan losses. Calculate the end-of-year allowance for loan losses.
$$\text{\$1.33m} - \text{\$0.84m} + \text{\$0.22m} + \text{\$1.48m} = \text{\$2.19m}$$
2. X-Bank reported an ROE of 15% and an ROA of 1%. What is the equity multiplier?
$$\text{ROE} = \text{ROA} \times \text{EM}$$
$$0.15 = 0.01 \times \text{EM}$$
$$\text{EM} = 15 = \text{assets/equity}$$

So equity/assets = 6.66%. This is a well-capitalized bank.
3. Wiggley S&L issues a standard 30-year fixed rate mortgage at 7.8% for \$150,000. Thirty-six months later mortgage rates jump to 13%. If the S&L sells the mortgage at this point how much of a loss is incurred?
When issued, the required payment is:
$$\text{PV} = \$150,000, I = 7.8/12, N = 360, FV = 0$$
Compute PMT.
$$\text{PMT} = \$1,079.81$$

After 36 months, the mortgage balance is:
$$\text{PMT} = \$1,079.81, I = 7.8/12, N = 324, FV = 0$$
Compute PV. PV = \\$145,764.43
However, at current rates, the remaining cash flows are worth:
$$\text{PMT} = \$1,079.81, I = 13/12, N = 324, FV = 0$$
Compute PV. PV = \\$96,637.64
Wiggley S&L expects to take a loss of \$49,126 if it sells the mortgage.
4. Refer to the previous question. In 1981 Congress allowed S&Ls to sell mortgages at a loss and 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?

The sale would be recorded as:

Debit		Credit	
Cash	\$96,638	Mortgage	\$145,764
Capitalized Loss	\$49,126		

Then, each year for the next 27 years the loss would be written off:

Debit		Credit	
Loss Expense	\$1,819.48	Capitalized Loss	\$1,819.48

5. For the upcoming week, Nobel National Bank plans to issue \$25m in mortgages and purchase \$100m in T-bills. New deposits of \$35m are expected and other sources will generate \$15m in cash. What is Nobel's estimate of funds needed?
 $\$25m + \$100m - \$35m - \$15m = \$75m$
6. A bank estimates that demand deposits are, on average, \$100m with a standard deviation of \$5m. 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.
The highest that demand deposits will reach, with 99% confidence, is \$100 M + 3 × \$5 million, or \$115 million. To maintain 8% as reserves against this possibility, they must maintain \$115 M × 0.08 = \$9.2 million.
A different 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.

The remaining questions relate to the first month's operation of NewBank.

7. NewBank started its first day of operations with \$6m in capital. \$100m in checkable deposits is received. The bank issues a \$25m commercial loan and another \$25m in mortgages, with the following terms.
 - Mortgages: 100 standard 30-year fixed-rate mortgages with a nominal annual rate of 5.25% each for \$250,000.
 - Commercial loan: 3-year loan, simple interest paid monthly at 0.75% per month.

If required reserves are 8%, what does the bank's balance sheet 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 \$45m in 30-day T-bills. The T-bills are currently trading at \$4986.70 (including commissions) for a \$5,000 face value instrument. How many do they purchase? What does the balance sheet look like?

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 third day of operations, deposits fall by \$5m. What does the balance sheet look like? Are there any problems?

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 in reserves.

10. To meet any shortfall in the previous question, NewBank will borrow the cash in the federal 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?

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 of the required payments from its mortgages, commercial loans and T-bills. How much cash is received? How are these transactions recorded?

The required monthly mortgage payments are:

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

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

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

These are recorded as:

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

The T-bills paid: $9,024 \times \$5,000 \bullet \$45,120,000$. 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 federal funds borrowed. How much cash is owed?

How is this recorded?

Recall that the formula for discount interest is

$$PV = FV \times \left(1 - r \frac{\text{days}}{360} \right)$$

which means that

$$FV = \frac{PV}{\left(1 - r \frac{\text{days}}{360} \right)}$$

or

$$FV = \frac{1,600,000}{\left(1 - 2.9\% \frac{29}{360} \right)}$$

so $FV = \$1,603,746.53$.

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.

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.

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

ROA ● $272,677 / 101.41 \text{ M}$ ● 0.2689% (monthly)

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

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

ROE ● $272,677 / 6,272,677$ ● 4.35% (monthly)

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

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

ROE ● $231,427 / 6,228,280$ ● 3.71% (monthly)

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

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.

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 – 36, FV ● 0

Compute PV. PV ● \$238,845.64

The transaction is recorded as:

Debit		Credit	
<i>Cash</i>	<i>150,000.00</i>	<i>Loan</i>	<i>\$238,845.64</i>
<i>Loan Loss Expense</i>	<i>\$88,845.64</i>		