

# Chapter 9

## Banking and the Management of Financial Institutions

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## The Bank Balance Sheet

Table 1 Balance Sheet of All Commercial Banks (Items as a percentage of the total, January 2003)

| Assets (Uses of Funds)*                         |     | Liabilities (Sources of Funds)   |     |
|---|-----|----------------------------------|-----|
| Reserves and cash items                         | 5   | Checkable deposits               | 9   |
| Securities                                      |     | Nontransaction deposits          |     |
| U.S. government and agency                      | 15  | Small-denomination time deposits |     |
| State and local government and other securities | 10  | (< \$100,000) + savings deposits | 42  |
| Loans   |     | Large-denomination time deposits | 14  |
| Commercial and industrial                       | 14  | Borrowings                       | 28  |
| Real estate                                     | 29  | Bank capital                     | 7   |
| Consumer  | 9   |                                  |     |
| Interbank                                       | 4   |                                  |     |
| Other   | 8   |                                  |     |
| Other assets (for example, physical capital)    | 6   |                                  |     |
| Total   | 100 | Total                            | 100 |

\*In order of decreasing liquidity.  
Source: www.federalreserve.gov/releases/h8/current/

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## The Bank Balance Sheet: Select Items

- Borrowings
  - from the Fed (discount loans) or from other banks (overnight loans)
  - taken to fulfill reserve requirements with the Fed
- Reserves:
  - consist of vault cash and deposits with the Fed (reserves):
    - required reserves with the Fed (a certain percent of checkable deposits, given by the *required reserve rate*)
    - excess reserves, because they are the most liquid bank assets

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## The Bank Balance Sheet: Select Items (cont.)

- Cash items:
  - cash items in process of collecting
  - deposits at other banks (correspondent banking)
- Short-term U.S. government securities are also called *secondary reserves*

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## Bank Operation

### T-account Analysis:

*Deposit of \$100 cash into First National Bank*

| Assets                            | Liabilities                |
|-----------------------------------|----------------------------|
| Vault Cash + \$100<br>(=Reserves) | Checkable Deposits + \$100 |

*Deposit of \$100 check into First National Bank*

| Assets                                      | Liabilities                |
|---|----------------------------|
| Cash items in process of collection + \$100 | Checkable Deposits + \$100 |

### First National Bank

| Assets           | Liabilities                |
|------------------|----------------------------|
| Reserves + \$100 | Checkable Deposits + \$100 |

### Second National Bank

| Assets           | Liabilities                |
|------------------|----------------------------|
| Reserves - \$100 | Checkable Deposits - \$100 |

*Conclusion:* When bank receives deposits, reserves ↑ by equal amount; when bank loses deposits, reserves ↓ by equal amount

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## Principles of Bank Management

1. Liquidity Management
  - have enough liquid assets to meet bank's obligation to depositors
2. Asset Management
  - keep an acceptable level of risk
  - two aspects:
    - managing credit risk (the risk that borrowers may default)
    - managing interest-rate risk (changes in earnings and returns on bank assets because of changes in interest rates)

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## Principles of Bank Management (cont.)

3. Liability management
  - acquire funds at low cost
  
4. Capital adequacy management
  - decide the amount of capital the bank should maintain
  - acquire the necessary capital

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## Liquidity Management Example

**Reserve requirement = 10%, Excess reserves = \$10 million**

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$20 million | Deposits     | \$100 million |
| Loans      | \$80 million | Bank Capital | \$ 10 million |
| Securities | \$10 million |              |               |

**Deposit outflow of \$10 million**

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$10 million | Deposits     | \$ 90 million |
| Loans      | \$80 million | Bank Capital | \$ 10 million |
| Securities | \$10 million |              |               |

With 10% reserve requirement, the bank still has excess reserves of \$1 million: no changes needed in balance sheet

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## Liquidity Management Example (cont.)

**No excess reserves**

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$10 million | Deposits     | \$100 million |
| Loans      | \$90 million | Bank Capital | \$ 10 million |
| Securities | \$10 million |              |               |

**Deposit outflow of \$10 million**

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$ 0 million | Deposits     | \$ 90 million |
| Loans      | \$90 million | Bank Capital | \$ 10 million |
| Securities | \$10 million |              |               |

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## Liquidity Management Example – Solutions to Liquidity Problem

### 1. Borrow from other banks or corporations

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$ 9 million | Deposits     | \$ 90 million |
| Loans      | \$90 million | Borrowings   | \$ 9 million  |
| Securities | \$10 million | Bank Capital | \$ 10 million |

### 2. Sell Securities

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$ 9 million | Deposits     | \$ 90 million |
| Loans      | \$90 million | Bank Capital | \$ 10 million |
| Securities | \$ 1 million |              |               |

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## Liquidity Management Example – Solutions to Liquidity Problem (cont.)

### 3. Borrow from Fed

| Assets     |              | Liabilities    |               |
|------------|--------------|----------------|---------------|
| Securities | \$10 million | Bank Capital   | \$ 10 million |
| Reserves   | \$ 9 million | Deposits       | \$ 90 million |
| Loans      | \$90 million | Discount Loans | \$ 9 million  |

### 4. Call in or sell off loans

| Assets     |              | Liabilities  |               |
|------------|--------------|--------------|---------------|
| Reserves   | \$ 9 million | Deposits     | \$ 90 million |
| Loans      | \$81 million | Bank Capital | \$ 10 million |
| Securities | \$10 million |              |               |

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## Liquidity Management – Conclusions

- Cover deposit outflows (liquidity needs):
  - excess reserves
  - loans from other banks or corporations
  - sale of securities
  - loans from the Fed
  - call-in or sale of loans
- Conclusion:
  - excess reserves are insurance against above 4 costs from deposit outflows (higher costs imply more excess reserves desired)

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## Asset Management

- Goals
  - seek highest returns possible on loans and securities
  - reduce risk
  - hold liquid assets

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## Asset Management Techniques

- get borrowers with low default risk, paying high interest rates (typically, banks are conservative – default rate is less than 1%)
- buy securities with high return, low risk
- diversify (many types of securities and many types of loans)
- manage liquidity (satisfy reserve requirements without large costs)

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## Liability Management

- not important before the 1960s because:
  - checking accounts were not paying interest, hence no competition for attracting deposits
  - inter-bank overnight loans were not well developed
- became important when large banks (*money center banks*) developed new financial instruments (e.g., negotiable CDs) and inter-bank overnight loans
- banks no longer primarily depend on deposits - when they see loan opportunities, they borrow or issue CDs to acquire the funds
- most banks manage both sides of the balance sheet together – *asset-liability management*

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## Capital Adequacy Management: Measures of Bank Profitability

- *Return on assets* (ROA) = net profits/assets
  - shows how efficiently the bank is run
- *Return on equity* (ROE) = net profits/equity capital
  - shows how well bank owners do
- *Equity multiplier* (EM) = assets/equity capital
  - is related to the other two measures:  
ROE = ROA × EM

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## Capital Adequacy Management

- Bank capital
  - is a cushion that helps prevent bank failure
  - if capital ↑, EM ↓, ROE ↓, hence there is a tradeoff between safety (high capital) and high ROE (satisfy shareholders)
  - the higher is bank capital, the lower is return on equity
  - banks also hold capital to meet capital requirements (set to avoid bankruptcies)

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## Capital Adequacy Management (cont.)

- Strategies for managing capital:
  - sell or retire stock
  - change dividends to change retained earnings (pay higher or lower dividends)
  - change asset growth (issue CDs, or conversely, call-in loans or sell securities)

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## Managing Credit Risk

Solving asymmetric-information problems:

- screening
- monitoring and enforcement of restrictive covenants
- specialize in lending
- establish long-term customer relationships
- loan commitment arrangements
- collateral and *compensating balances* (minimum amount of funds required in the checking account)
- credit rationing (no loans or smaller amounts)

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## Managing Interest-Rate Risk

### First National Bank

| Assets                |        | Liabilities                |        |
|-----------------------|--------|----------------------------|--------|
| Rate-sensitive assets | \$20 m | Rate-sensitive liabilities | \$50 m |
| Variable-rate loans   |        | Variable-rate CDs          |        |
| Short-term securities |        | MMDAs                      |        |
| Fixed-rate assets     | \$80 m | Fixed-rate liabilities     | \$50 m |
| Reserves              |        | Checkable deposits         |        |
| Long-term bonds       |        | Savings deposits           |        |
| Long-term securities  |        | Long-term CDs              |        |
|                       |        | Equity capital             |        |

More rate-sensitive liabilities than assets: interest rates ↑, profit ↓

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## Gap Analysis

- *gap* (GAP) = the difference between rate-sensitive assets and rate-sensitive liabilities  
 $GAP = \$20 - \$50 = -\$30$  million
- when interest rates rise by 5%:  
 income on assets =  $5\% \times \$20m = +\$1$  million  
 costs of liabilities =  $5\% \times \$50m = +\$2.5$  million  
 $\Delta\text{Profits} = \$1m - \$2.5m = -\$1.5$  million  
 $= 5\% \times (\$20m - \$50m) = 5\% \times (GAP)$
- hence,  
 $\Delta\text{Profits} = \Delta i \times GAP$

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## Duration Analysis

- *duration* (DUR) = a measure of the average lifetime of a stream of payments
- the value of balance sheet items changes when interest rates change:  
 $\% \Delta \text{ value} \approx -(\Delta i) \times (\text{DUR})$
- example: interest rates rise by 5%, duration of bank assets = 3 years, duration of liabilities = 2 years  
 $\% \Delta \text{ assets} = -5\% \times 3 = -15\%$   
 $\% \Delta \text{ liabilities} = -5\% \times 2 = -10\%$
- if assets = \$100m and liabilities = \$90m, then assets fall by \$15m, liabilities fall by \$9m, and bank's net worth falls by \$6m

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## Strategies to Manage Interest-Rate Risk

- rearrange the balance-sheet:
  - shorten duration of assets
  - lengthen duration of liabilities
- use financial instruments (interest-rate swaps, futures)
  - less costly than altering the balance sheet
  - possibly the only feasible alternative

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## Off-Balance-Sheet Activities

- Loan sales
- Fee income from
  - foreign exchange trades for customers
  - servicing mortgage-backed securities
  - guarantees of debt
  - backup lines of credit
- Trading activities
  - financial futures
  - financial options
  - foreign exchange
  - swaps

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## Risk Management

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- Principal-agent problem
  - traders have incentives to take big risks
- Risk management controls
  - separation of front and back rooms
  - modeling *value-at-risk* (the maximum loss the bank portfolio is likely to sustain over a given period of time)
  - stress testing (doomsday scenario)
  - regulators encourage banks to pay more attention to risk management

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