Monetary Theory and Policy

Chapter 10： Banking and the Management of Financial Institutions

The Bank Balance Sheet

- Liabilities
  - Checkable deposits
  - Nontransaction deposits
  - Borrowings
  - Bank capital

The Bank Balance Sheet

- Assets
  - Reserves
  - Cash items in process of collection
  - Deposits at other banks
  - Securities
  - Loans
  - Other assets

Table 1 Balance Sheet of All Commercial Banks (items as a percentage of the total, June 2014)

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Assets (Uses of Funds)*		**Liabilities (Sources of Funds)**	
Reserves and cash items	19%	Checkable deposits	11%
Securities		Nontransaction deposits	
U.S. government and agency	13	Small-denomination time deposits (<$100,000) + savings deposits	47
State and local government and other securities	6	Large-denomination time deposits	11
Loans		Borrowings	20
Commercial and industrial	12	Bank capital	11
Real estate	25		
Consumer	8		
Interbank	1		
Other	7		
Other assets (for example, physical capital)	9		
Total	100	Total	100

*In order of decreasing liquidity.

Source: http://www.federalreserve.gov/releases/h8/current/.

Basic Banking: Cash Deposit

First National Bank		First National Bank	
Assets	Liabilities	Assets	Liabilities
Vault Cash +$100	Checkable deposits +$100	Reserves +$100	Checkable deposits +$100

- Opening of a checking account leads to an increase in the bank's reserves equal to the increase in checkable deposits

Basic Banking: Check Deposit

First National Bank	
Assets	Liabilities
Cash items in process of collection +$100	Checkable deposits +$100

When a bank receives additional deposits, it gains an equal amount of reserves; when it loses deposits, it loses an equal amount of reserves

First National Bank		Second National Bank	
Assets	Liabilities	Assets	Liabilities
Reserves +$100	Checkable deposits +$100	Reserves -$100	Checkable deposits -$100

Basic Banking: Making a Profit

First National Bank	
Assets	Liabilities
Required reserves +$100	Checkable deposits +$100
Excess reserves +$90	

First National Bank	
Assets	Liabilities
Required reserves +$100	Checkable deposits +$100
Loans +$90	

- Asset transformation: selling liabilities with one set of characteristics and using the proceeds to buy assets with a different set of characteristics
- The bank borrows short and lends long

Bank Management

- Liquidity Management
- Asset Management
- Liability Management
- Capital Adequacy Management
- Credit Risk
- Interest-rate Risk

Liquidity Management: Ample Excess Reserves

Assets		Liabilities	
Reserves	$20M	Deposits	$100M
Loans	$80M	Bank Capital	$10M
Securities	$10M		

Assets		Liabilities	
Reserves	$10M	Deposits	$90M
Loans	$80M	Bank Capital	$10M
Securities	$10M		

- Suppose bank's required reserves are 10%
- If a bank has ample excess reserves, a deposit outflow does not necessitate changes in other parts of its balance sheet

Liquidity Management: Shortfall in Reserves

Assets		Liabilities	
Reserves	$10M	Deposits	$100M
Loans	$90M	Bank Capital	$10M
Securities	$10M		

Assets		Liabilities	
Reserves	$0	Deposits	$90M
Loans	$90M	Bank Capital	$10M
Securities	$10M		

- Reserves are a legal requirement and the shortfall must be eliminated
- Excess reserves are insurance against the costs associated with deposit outflows

Liquidity Management: Borrowing

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Borrowing	$9M
Securities	$10M	Bank Capital	$10M

- Cost incurred is the interest rate paid on the borrowed funds

Liquidity Management: Securities Sale

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Bank Capital	$10M
Securities	$1M		

- The cost of selling securities is the brokerage and other transaction costs

Liquidity Management: Federal Reserve

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Borrow from Fed	$9M
Securities	$10M	Bank Capital	$10M

- Borrowing from the Fed also incurs interest payments based on the discount rate

Liquidity Management: Reduce Loans

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$81M	Bank Capital	$10M
Securities	$10M		

- Reduction of loans is the most costly way of acquiring reserves
- Calling in loans antagonizes customers
- Other banks may only agree to purchase loans at a substantial discount

Asset Management: Three Goals

- Seek the highest possible returns on loans and securities
- Reduce risk
- Have adequate liquidity

Asset Management: Four Tools

- Find borrowers who will pay high interest rates and have low possibility of defaulting
- Purchase securities with high returns and low risk
- Lower risk by diversifying
- Balance need for liquidity against increased returns from less liquid assets

Liability Management

- Recent phenomenon due to rise of money center banks
- Expansion of overnight loan markets and new financial instruments (such as negotiable CDs)
- Checkable deposits have decreased in importance as source of bank funds

Capital Adequacy Management

- Bank capital helps prevent bank failure
- The amount of capital affects return for the owners (equity holders) of the bank
- Regulatory requirement

Capital Adequacy Management: Preventing Bank Failure

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	$10M	Deposits	$90M	Reserves	$10M	Deposits	$96M
Loans	$90M	Bank Capital	$10M	Loans	$90M	Bank Capital	$4M

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	$10M	Deposits	$90M	Reserves	$10M	Deposits	$96M
Loans	$85M	Bank Capital	$5M	Loans	$85M	Bank Capital	-$1M

Capital Adequacy Management: Returns to Equity Holders

- Return on assets : net profit after taxes per dollar of assets

$$\text{ROA} = \frac{\text{net profit after taxes}}{\text{assets}}$$

- Return on equity : net profit after taxes per dollar of capital

$$\text{ROE} = \frac{\text{net profit after taxes}}{\text{equity capital}}$$

- Relationship between ROA and ROE is expressed by the Equity Multiplier: the amount of assets per dollar of equity capital

$$\text{EM} = \frac{\text{Assets}}{\text{Equity Capital}}$$

$$\frac{\text{net profit after taxes}}{\text{equity capital}} = \frac{\text{net profit after taxes}}{\text{assets}} \times \frac{\text{assets}}{\text{equity capital}}$$

$$\text{ROE} = \text{ROA} \times \text{EM}$$

Capital Adequacy Management: Safety

- Benefits the owners of a bank by making their investment safe
- Costly to owners of a bank because the higher the bank capital, the lower the return on equity
- Choice depends on the state of the economy and levels of confidence

Application: How a Capital Crunch Caused a Credit Crunch in 2008

- Shortfalls of bank capital led to slower credit growth
  - Huge losses for banks from their holdings of securities backed by residential mortgages.
  - Losses reduced bank capital
- Banks could not raise much capital on a weak economy, and had to tighten their lending standards and reduce lending.

Credit Risk: Overcoming Adverse Selection and Moral Hazard

- Screening and Monitoring
  - Screening
  - Specialization in lending
  - Monitoring and enforcement of restrictive covenants

Credit Risk: Overcoming Adverse Selection and Moral Hazard

- Long-term customer relationships
- Loan commitments
- Collateral and compensating balances
- Credit rationing

Interest-Rate Risk

First National Bank			
Assets		Liabilities	
Rate-sensitive assets	$20M	Rate-sensitive liabilities	$50M
Variable-rate and short-term loans		Variable-rate CDs	
Short-term securities		Money market deposit accounts	
Fixed-rate assets	$80M	Fixed-rate liabilities	$50M
Reserves		Checkable deposits	
Long-term loans		Savings deposits	
Long-term securities		Long-term CDs	
		Equity capital	

- If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits

Interest Rate Risk: Gap Analysis

- Basic gap analysis:

$$\left(\text{rate sensitive assets - rate sensitive liabilities}\right)\times$$

$$\Delta \text{ interest rates} = \Delta \text{ in bank profit}$$

- Maturity bucked approach
  - Measures the gap for several maturity subintervals.
- Standardized gap analysis
  - Accounts for different degrees of rate sensitivity.

Interest Rate Risk: Duration Analysis

$$\%\Delta \text{in market value of security H} - \%\Delta \text{in interest rate} \times \text{duration in years}$$

- Uses the weighted average duration of a financial institution's assets and of its liabilities to see how net worth responds to a change in interest rates.

Off-Balance-Sheet Activities

- Loan sales (secondary loan participation)
- Generation of fee income. Examples:
  - Servicing mortgage-backed securities.
  - Creating SIVs (structured investment vehicles) which can potentially expose banks to risk, as it happened in the subprime financial crisis of 2007-2008.

Off-Balance-Sheet Activities

- Trading activities and risk management techniques
  - Financial futures, options for debt instruments, interest rate swaps, transactions in the foreign exchange market and speculation.
  - Principal-agent problem arises

Off-Balance-Sheet Activities

- Internal controls to reduce the principal-agent problem
  - Separation of trading activities and bookkeeping
  - Limits on exposure
  - Value-at-risk
  - Stress testing