An Economic Analysis of Financial Structure

Mishkin Ch.8

The Financial System

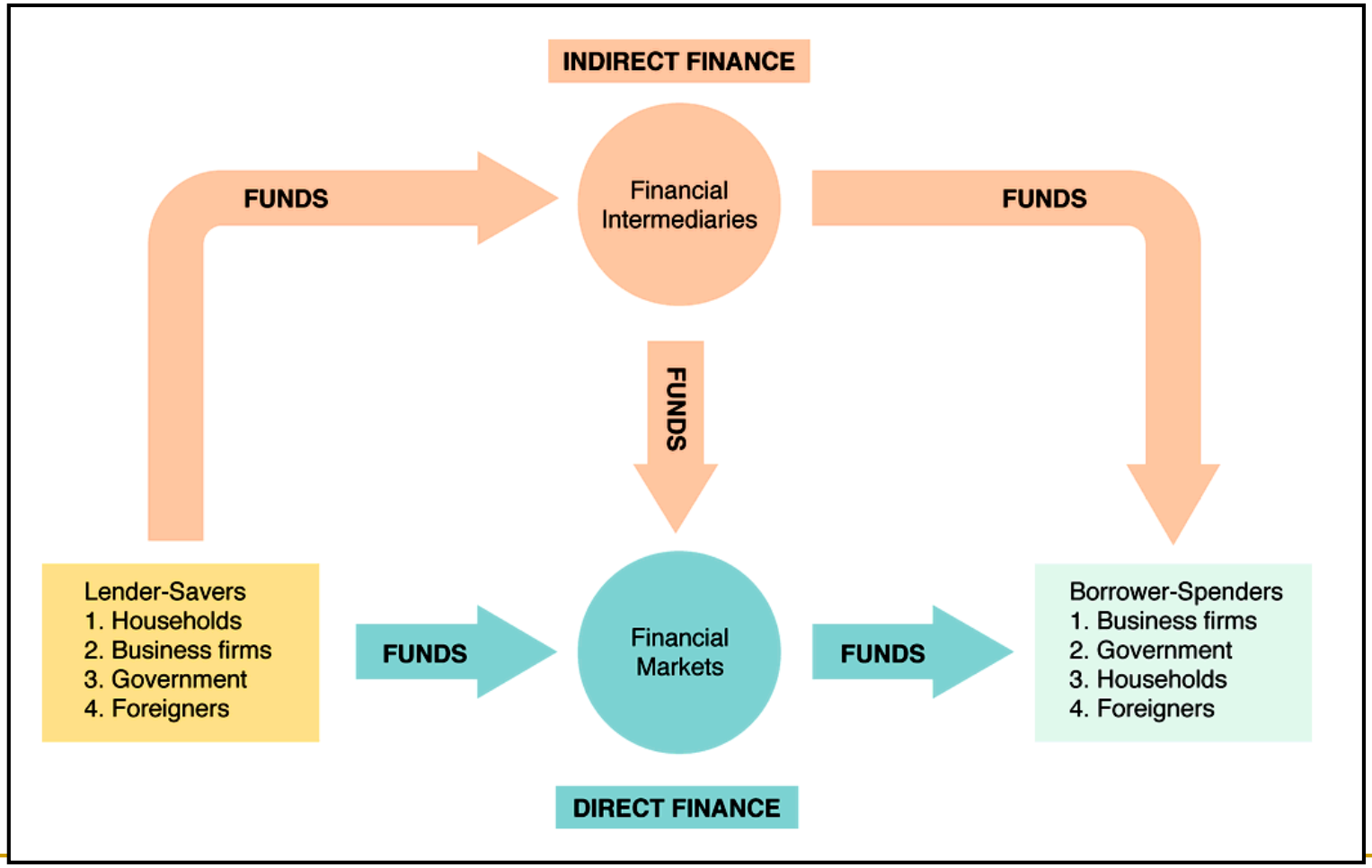
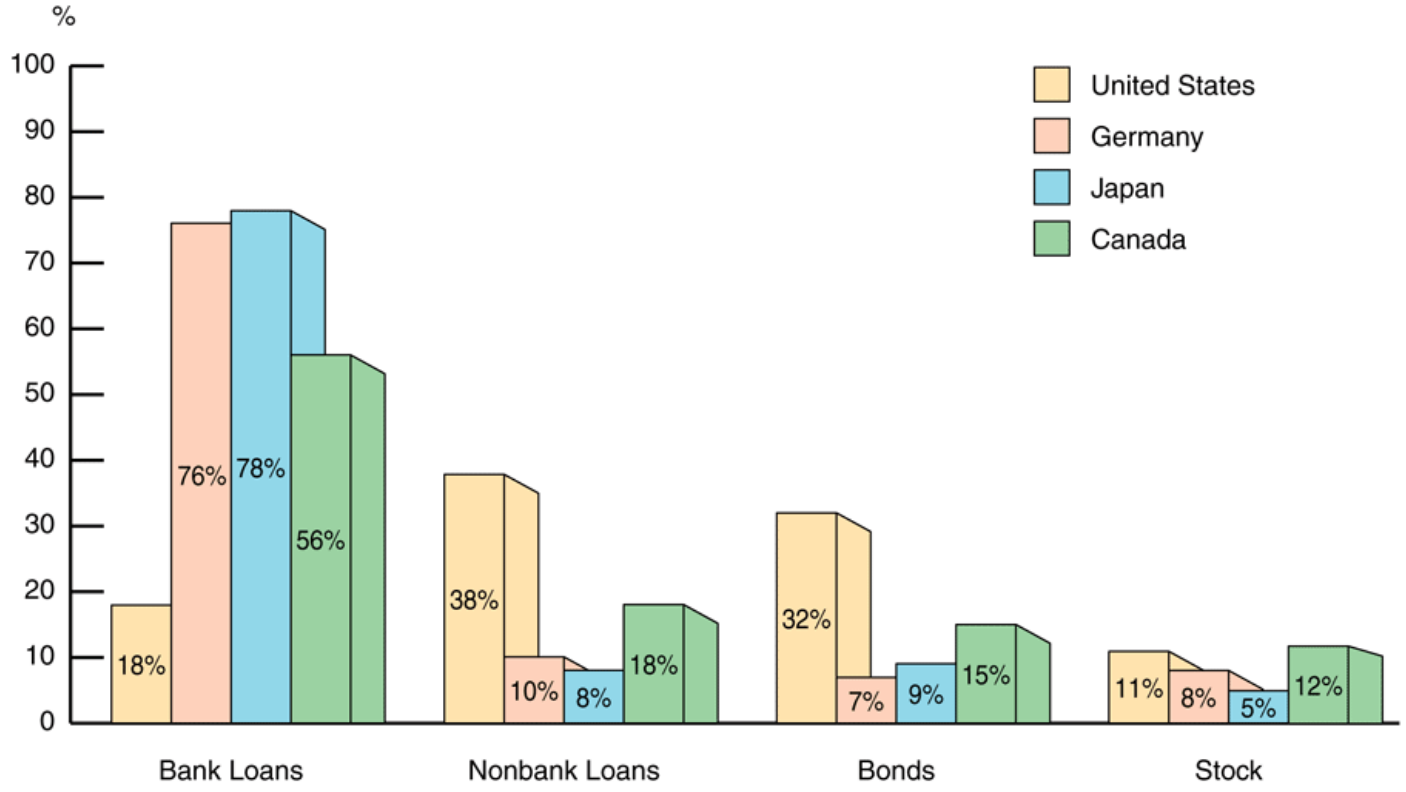


FIGURE 1 Sources of External Funds for Nonfinancial Businesses: A Comparison of the United States with Germany, Japan, and Canada



Source: Andreas Hackethal and Reinhard H. Schmidt, "Financing Patterns: Measurement Concepts and Empirical Results," Johann Wolfgang Goethe-Universitat Working Paper No. 125, January 2004. The data are from 1970–2000 and are gross flows as percentage of the total, not including trade and other credit data, which are not available.

Eight Basic Facts (1)

1. Stocks are not the most important sources of external financing for businesses
2. Issuing marketable debt and equity securities is not the primary way in which businesses finance their operations
3. Indirect finance is many times more important than direct finance
4. Financial intermediaries, particularly banks, are the most important source of external funds used to finance businesses.

Eight Basic Facts (2)

5. The financial system is among the most heavily regulated sectors of the economy
6. Only large, well-established corporations have easy access to securities markets to finance their activities
7. Collateral is a prevalent feature of debt contracts for both households and businesses.
8. Debt contracts are extremely complicated legal documents that place substantial restrictive covenants on borrowers

Transaction Costs

- Financial intermediaries have evolved to reduce transaction costs
  - **Economies of scale**: the reduction in transaction costs per dollar of investment as the size of transactions increases
  - **Expertise**

Asymmetric Information

- **Adverse selection** occurs before the transaction
- **Moral hazard** arises after the transaction
- Agency theory analyses how asymmetric information problems affect economic behavior

Adverse Selection: The Lemons Problem

- If quality cannot be assessed, the buyer is willing to pay at most a price that reflects the average quality
- Sellers of good quality items will not want to sell at the price for average quality
- The buyer will decide not to buy at all because all that is left in the market is poor quality items
- This problem explains fact 2 and partially explains fact 1

Adverse Selection: Solutions (1)

- Private production and sale of information
  - Free-rider problem
- Government regulation to increase information
  - Not always works to solve the adverse selection problem, explains Fact 5.
- Financial intermediation
  - Explains facts 3, 4, & 6.

Adverse Selection: Solutions (2)

- Collateral and net worth
  - Collateral: property promised to the lender if the borrower defaults
  - Net worth: the difference between a firm's assets and its liabilities
  - Explains fact 7.

Moral Hazard in Equity Contracts

- Called the Principal-Agent Problem
  - Principal: less information (stockholder)
  - Agent: more information (manager)
- Separation of ownership and control of the firm
  - Managers pursue personal benefits and power rather than the profitability of the firm

Principal-Agent Problem: Solutions

- Monitoring (Costly State Verification)
  - Free-rider problem
  - Fact 1
- Government regulation to increase information
  - Fact 5
- Financial Intermediation
  - Fact 3
- Debt Contracts
  - Fact 1

Moral Hazard in Debt Markets

- Borrowers have incentives to take on projects that are riskier than the lenders would like.
  - This prevents the borrower from paying back the loan.

Moral Hazard: Solutions

- Net worth and collateral
  - Incentive compatible
- Monitoring and Enforcement of Restrictive Covenants
  - Discourage undesirable behavior
  - Encourage desirable behavior
  - Keep collateral valuable
  - Provide information
  - Fact 8
- Financial Intermediation
  - Facts 3 & 4

Summary Table 1 Asymmetric Information Problems and Tools to Solve Them

Asymmetric Information Problem	Tools to Solve It	Explains Fact Number
Adverse selection	Private production and sale of information	1, 2
	Government regulation to increase information	5
	Financial intermediation	3, 4, 6
	Collateral and net worth	7
Moral hazard in equity contracts (principal–agent problem)	Production of information: monitoring	1
	Government regulation to increase information	5
	Financial intermediation	3
	Debt contracts	1
Moral hazard in debt contracts	Collateral and net worth	6, 7
	Monitoring and enforcement of restrictive covenants	8
	Financial intermediation	3, 4

Note: List of facts:
1. Stocks are not the most important source of external financing.
2. Marketable securities are not the primary source of finance.
3. Indirect finance is more important than direct finance.
4. Banks are the most important source of external funds.
5. The financial system is heavily regulated.
6. Only large, well-established firms have access to securities markets.
7. Collateral is prevalent in debt contracts.
8. Debt contracts have numerous restrictive covenants.

Banking and Management of Financial Institutions

Chapter 9 of Mishkin

The Bank Balance Sheet

- It must be the case that:
  - total assets = total liabilities + equities

- Banks makes profits by charging an interest rate on their holdings of securities and loans that is higher than the expenses on their liabilities.

Balance Sheet of All Commercial Banks in Thailand

(As of Jan 2016)

Assets	Value	Proportion	Liabilities	Value	Proportion
1. Cash	265,187	1.5%	14. Deposits	12,015,464	69.0%
2. Interbank and money market items, net	2,296,624	13.2%	15. Interbank and money market items, net	1,284,472	7.4%
3. Claims on securities	65,575	0.4%	16. Liabilities payable on demand	82,381	0.5%
4. Derivatives assets	493,024	2.8%	17. Liabilities to deliver securities	65,947	0.4%
5. Investments - net	2,361,711	13.6%	18. Financial liabilities designated at fair value through profit or loss	31,903	0.2%
6. Investments in subsidiaries and associates, net	167,952	1.0%	19. Derivatives liabilities	493,426	2.8%
7. Loans to customers, net	11,201,641	64.3%	20. Debt issued and Borrowings	810,043	4.6%
8. Customers' liabilities under acceptances	3,531	0.0%	21. Bank's liabilities under acceptances	3,531	0.0%
9. Properites foreclosed, net	77,602	0.4%	22. Provision	74,155	0.4%
10. Premises and equipment, net	200,458	1.2%	23. Deferred tax liabitities	10,883	0.1%
11. Goodwill and other intangible assets, net	51,996	0.3%	24. Other liabilities	300,274	1.7%
12. Deferred tax assets	17,719	0.1%	25. Shareholders' Equity	1,782,775	10.2%
13. Other assets, net	218,206	1.3%	26. Head office and other branches of the same Juristic person's Entity	465,972	2.7%
Total Assets	17,421,225	100.0%	Liabilities and Equities / Equity of Head Office	17,421,225	100.0%

Source: https://www.bot.or.th/English/Statistics/FinancialInstitutions/Pages/StatAssetsandLiabilities.aspx

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 (< $100,000) + savings deposits	42
State and local government and other securities	10	Large-denomination time deposits	14
Loans		Borrowings	28
Commercial and industrial	14	Bank capital	7
Real estate	29		
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/.

Bank Operation

- Banks make profits by selling liabilities (e.g. deposits) with one set of characteristics and using the proceeds to buy assets (e.g. loans) with a different set of characteristics. ➔ ***Asset transformation***.
- Normally, banks borrows from short-dated deposits and lends through long-term loans.

Bank Operation

T-account Analysis:

Deposit of $100 cash into First National Bank

Assets	**Liabilities**
Vault Cash + $100 (=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

Principles of Bank Management

- 1. Liquidity Management
- 2. Asset Management
  - Managing Credit Risk
  - Managing Interest-rate Risk
- 3. Liability Management
- 4. Capital Adequacy Management

1. Liquidity Management (1)

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		

Suppose there is a *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, bank still has excess reserves of $1 million: no changes needed in balance sheet

1. Liquidity Management (2)

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		

1. Liquidity Management (3)

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		

1. Liquidity Management (4)

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		

Conclusion: excess reserves are insurance against above 4 costs from deposit outflows

2. Asset Management

Asset Management

1. Get borrowers with low default risk, paying high interest rates
2. Buy securities with high return, low risk
3. Diversify
4. Manage liquidity

3. Liability Management

Liability Management

1. Nowaday, banks no longer need to depend on deposits, which they cannot manage
2. When see loan opportunities, they borrow, issue CDs, or issue bonds to acquire funds
3. They may even invent new products to the market

4. Capital Adequacy Management

1. Bank capital is a cushion that helps prevent bank failure
2. Higher is bank capital, lower is return on equity
   ROA = Net Profits/Assets
   ROE = Net Profits/Equity Capital
   EM = Assets/Equity Capital
   $ROE = ROA \times EM$
   Capital $\uparrow$, *EM* $\downarrow$, *ROE* $\downarrow$
3. Tradeoff between safety (high capital) and *ROE*
4. Banks also hold capital to meet capital requirements
5. Managing Capital:
   A. Sell or retire stock
   B. Change dividends to change retained earnings
   C. Change asset growth

Managing Credit Risk

Solving Asymmetric Information Problems

1. Screening (Vs Signaling)
2. Monitoring and Enforcement of Restrictive Covenants
3. Specialize in Lending
4. Establish Long-Term Customer Relationships
5. Loan Commitment Arrangements
6. Collateral and Compensating Balances
7. Credit Rationing

Managing Interest Rate Risk (1)

- 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

Managing Interest Rate Risk (2)

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	

Managing Interest-Rate Risk (3)

Gap Analysis

GAP = rate-sensitive assets – rate-sensitive liabilities

= \$20 – \$50 = –\$30 million

When $i \uparrow$ 5%:

1. Income on assets = + \$1 million

   (= 5% × \$20m)

2. Costs of liabilities = +\$2.5 million

   (= 5% × \$50m)

3. Δ Profits = \$1m – \$2.5m = –\$1.5m

   = 5% × (\$20m – \$50m) = 5% × (*GAP*)

   Δ Profits = $\Delta\, i \times GAP$

Managing Interest-Rate Risk (4)

Duration Analysis

$$\% \Delta \text{ value} \cong -(\% \text{ point } \Delta\, i) \times (DUR)$$

Example: $i \uparrow$ 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 total assets = \$100 million and total liabilities = \$90 million, then assets ↓ \$15 million, liabilities ↓ \$9 million, and bank's net worth ↓ by \$6 million

Strategies to Manage Interest-rate Risk

1. Rearrange balance-sheet
2. Interest-rate swap
3. Hedge with financial futures

Risk Management

Principal-Agent Problem

Traders have incentives to take big risks

Risk Management Controls

1. Separation of front and back rooms

2. Value-at-risk modeling: Calculate the maximum loss from its portfolio over a given time interval

3. Stress testing

Regulators encouraging banks to pay more attention to risk management

The Financial System