Financial Institutions and System

Week 6: An Economic Analysis of Financial Structure, and Banking and the Management of Financial Institutions

Iegor Vyshnevskyi, Ph.D.

Sogang University

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Agenda

1. An Economic Analysis of Financial Structure
2. Banking and the Management of Financial Institutions
3. Class Activity

1. An Economic Analysis of Financial Structure

Basic Facts About Financial Structure Throughout the World

This chapter provides an economic analysis of how our financial structure is designed to promote economic efficiency.

Figure 1 compares how businesses in the U.S., Germany, Japan, and Canada used external funding from 1970–2000.

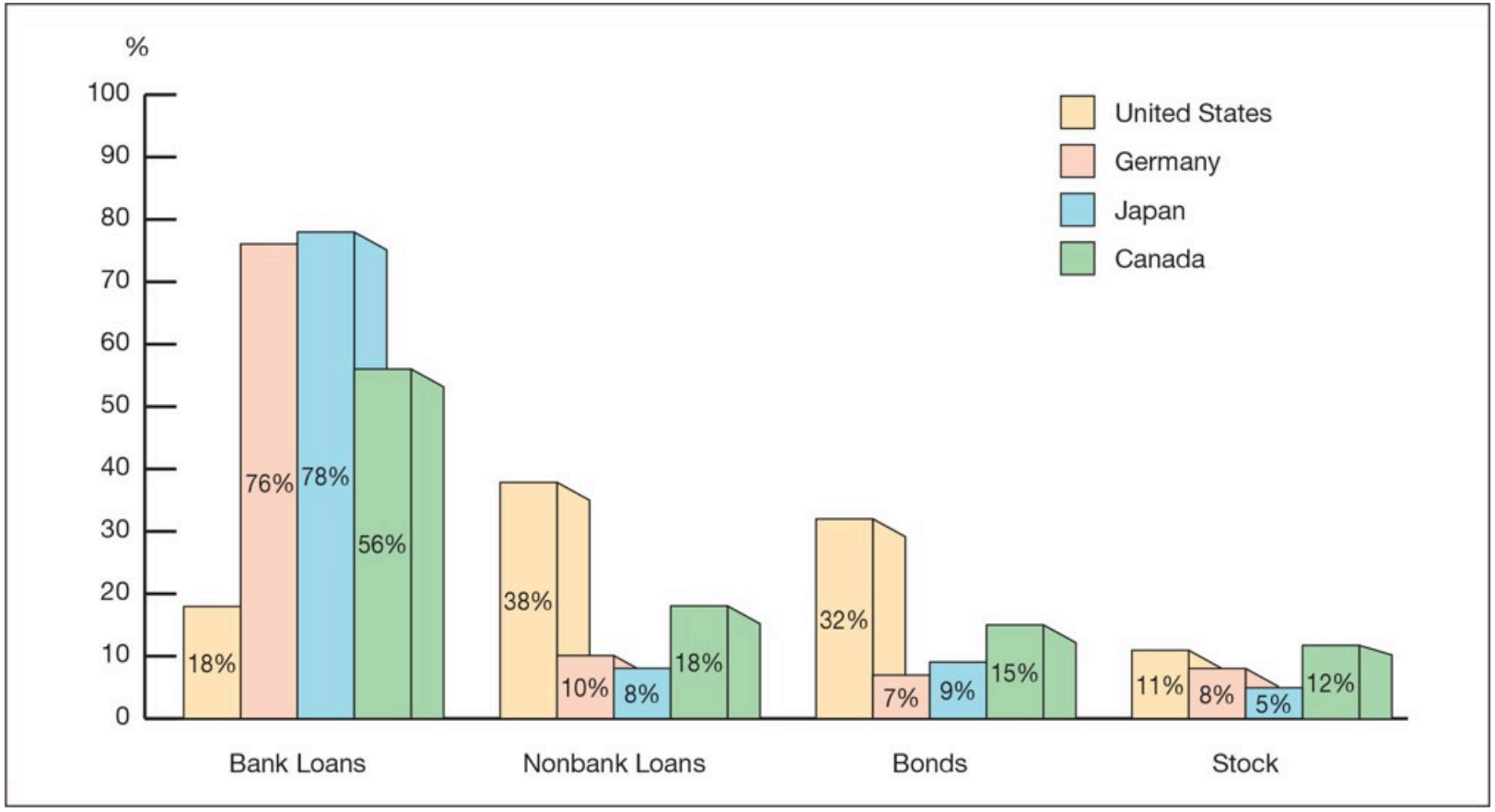

Figure 1: Sources of External Funds for Nonfinancial Businesses: A Comparison of the United States with Germany, Japan, and Canada

8 Basic Facts About Financial Structure Worldwide

1. Stocks are **not** the most important source of external financing for businesses.
2. Marketable securities are **not** the primary funding method.
3. **Indirect finance** is far more important than direct finance.
4. Financial **intermediaries** (especially banks) are key sources of business financing.
5. The financial system is heavily **regulated**.
6. Only **large firms** access securities markets easily.
7. **Collateral** is widely used in debt contracts.
8. Debt contracts contain **restrictive covenants** to reduce risk.

Transaction Costs

- Examples: Brokerage fees, search costs, lack of diversification.

Solutions by Financial Intermediaries:

- **Economies of scale** – pool funds, reduce costs per investor, enable diversification.
- **Expertise** – better able to screen and manage investments.

Asymmetric Information: Adverse Selection & Moral Hazard

- **Adverse selection**: Hidden information **before** transaction.
- **Moral hazard**: Hidden actions **after** transaction.

Agency theory explains how this affects financial decision-making.

The Lemons Problem

If buyers can't distinguish good vs bad quality:

- They only pay average price.
- Good sellers exit.
- Only lemons remain.

Explains why firms don’t rely much on public equity/debt markets.

Solving Adverse Selection

Private Info Sales:

- But... free-rider problem.

Government Regulation:

- Requires disclosures & audits (Fact 5).
- But not always reliable (e.g., Enron).

Role of Financial Intermediaries

- Specialize in credit analysis.
- Make **private loans** (no free-rider issue).
- Earn higher returns, minimize risks.

Explains Facts 3, 4, and 6.

Collateral & Net Worth

- **Collateral** reduces loss in case of default → more likely to get loan.
- **Net worth** plays similar role: "Only those who don't need loans can get them."

Explains Fact 7.

Enron Implosion (2001)

- Hid debt off balance sheet.
- Regulation failed to catch deception.
- Massive employee pension losses.

Illustrates limits of disclosure-based regulation.

Moral Hazard in Equity: Principal-Agent Problem

- **Separation of ownership & control** → managers may act in self-interest.
- Stockholders = Principals; Managers = Agents.

Tools to Solve Principal-Agent Problem

- **Monitoring**: Costly ("costly state verification") → discourages equity.
- **Regulation**: Improves transparency (Fact 5).
- **Venture capital/private equity**: Avoid free-rider by controlling board (Fact 3).

Debt vs Equity

- **Debt**: Requires fixed repayments; less monitoring needed.
- Moral hazard only matters if borrower defaults.

Explains Fact 1.

Moral Hazard in Debt

- Borrowers may take on riskier projects than lender prefers.

Solutions:

- Net worth & collateral → align incentives.
- Restrictive covenants → monitor behavior, ensure proper use of funds (Fact 8).

Role of Financial Intermediation

- Hard to write covenants for every scenario.
- Intermediaries make private loans → avoid free-riders.

Explains Facts 3 & 4.

The Tyranny of Collateral

- In many developing countries, poor individuals **cannot legally claim** property.
- No collateral → few loans → persistent poverty.

Takeaway: Strong legal infrastructure is crucial for financial access.

2. Banking and the Management of Financial Institutions

The Bank Balance Sheet

To understand how banking works, start by looking at the bank balance sheet, a list of the bank's assets and liabilities.

$$\text{Total Assets} = \text{Total Liabilities} + \text{Capital}$$

A balance sheet shows the sources (liabilities and capital) and uses (assets) of funds.

Banks make profits by borrowing funds (via deposits, borrowing) and using them to purchase income-earning assets (loans and securities).

Bank Liabilities: Checkable and Nontransaction Deposits

- **Checkable deposits**: allow account holders to write checks.
  - 14% of bank liabilities (June 2020)
  - Declined from 60% in the 1960s
  - Lowest-cost source of bank funds
- **Nontransaction deposits**:
  - No check-writing privileges
  - Include savings and time deposits
  - 63% of liabilities (June 2020)

Bank Liabilities: Borrowings and Capital

- **Borrowings**:
  - From the Fed (discount loans), other banks (federal funds market), or corporations (Eurodollars)
  - Grew from 2% (1960s) to 10% (2020)
- **Bank Capital**:
  - 13% of assets (2020)
  - Raised via new equity or retained earnings
  - Cushion against asset value declines

Bank Assets: Reserves and Interbank Deposits

- **Reserves**: deposits at the Fed + vault cash
  - Required reserves (based on reserve ratio)
  - Excess reserves (insurance against outflows)
- **Deposits at other banks**:
  - Small banks hold funds at larger banks for services
  - Reserves + deposits = ~15% of assets

Bank Assets: Securities and Loans

- **Securities**:
  - All debt instruments; banks can't hold stock
  - ~20% of bank assets, provide ~10% of income
  - US gov't, agency, state/local bonds
- **Loans**:
  - Primary source of revenue: >50% of assets
  - Most profitable and riskiest asset
- **Other assets**: physical capital (buildings, equipment)

Table: Commercial Bank Balance Sheet (June 2020)

Assets (Uses of Funds)*		**Liabilities (Sources of Funds)**	
Reserves and cash items	15%	Checkable deposits	14%
Securities		Nontransaction deposits	
U.S. government and agency	16	Savings deposits	52
State and local government and other securities	4	Small-denomination time deposits	2
		Large-denomination time deposits	9
		Borrowings	10
		Bank capital	13

Assets (Uses of Funds)*		**Liabilities (Sources of Funds)**	
Loans			
Commercial and industrial	14		
Real estate	23		
Consumer	7		
Other	8		
Other assets (for example, physical capital)	13		
Total	100	Total	100

*In order of decreasing liquidity.

Source: Federal Reserve Bank of St. Louis, FRED database:

Basic Banking: Deposit Effects

First National Bank			
Assets		Liabilities	
Vault cash	+$100	Checkable deposits	+$100

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

- A cash deposit increases checkable deposits and reserves equally.

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

Second National Bank			
Assets		Liabilities	
Reserves	–$100	Checkable deposits	–$100

- A check deposit from another bank increases reserves.
- A check withdrawal causes a reserve loss.

Making a Profit: Asset Transformation

First National Bank			
Assets		Liabilities	
Required reserves	+$10	Checkable deposits	+$100
Excess reserves	+$90		

First National Bank			
Assets		Liabilities	
Required reserves	+$10	Checkable deposits	+$100
Loans	+$90		

- Borrow short (deposits), lend long (loans).
- Banks transform liabilities into assets with different risk, liquidity, and maturity.

Principles of Bank Management

1. **Liquidity Management**: ensure enough reserves for withdrawals
2. **Asset Management**: earn high return, reduce risk, maintain liquidity
3. **Liability Management**: acquire funds at low cost
4. **Capital Adequacy Management**: maintain sufficient capital to prevent insolvency

Liquidity Management Example

If a bank's required reserve ratio is 10%:

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		

- With ample excess reserves, the bank can handle withdrawals without asset sales.

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		

- Without reserves, the bank must borrow or sell assets.

Ways to Cover Reserve Shortfall

- **Borrow** from other banks or Fed (discount loan)
  -

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

- **Sell Securities**:
  -

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

- **Borrow from Fed**:
  -

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

- **Call in or sell loans**:
  -

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

    - Most costly, harms customer relationships

Asset Management: Goals & Tools

Three Goals:

1. Maximize returns
2. Minimize risk
3. Maintain liquidity

Four Tools:

1. Lend to creditworthy borrowers
2. Purchase low-risk securities
3. Diversify asset portfolio
4. Balance returns vs. liquidity

Liability & Capital Management

- **Liability Management**:
  - Shift from relying on checkable deposits
  - Use CDs, repurchase agreements, and federal funds
- **Capital Adequacy**:
  - Capital prevents bank failure
  - Affects return to shareholders (ROE)
  - Required by regulators

Capital & Insolvency Example

High Capital Bank				Low Capital Bank			
Assets		**Liabilities**		**Assets**		**Liabilities**	
Reserves	$10 million	Deposits	$90 million	Reserves	$10 million	Deposits	$96 million
Loans	$90 million	Bank capital	$10 million	Loans	$90 million	Bank capital	$ 4 million

High Capital Bank				Low Capital Bank			
Assets		**Liabilities**		**Assets**		**Liabilities**	
Reserves	$10 million	Deposits	$90 million	Reserves	$10 million	Deposits	$96 million
Loans	$85 million	Bank capital	$ 5 million	Loans	$85 million	Bank capital	–$1 million

Low capital means bad loans can wipe out equity → insolvency

ROA, ROE, and Equity Multiplier

$$\text{ROA} = \frac{\text{Net Profit}}{\text{Assets}}$$

$$\text{ROE} = \frac{\text{Net Profit}}{\text{Equity}}$$

$$\text{EM} = \frac{\text{Assets}}{\text{Equity}} \quad \Rightarrow \text{ROE} = \text{EM} \times \text{ROA}$$

Lower capital = higher ROE, but higher risk

Capital Strategy

- **Surplus capital**: buy back stock, pay dividends, expand assets
- **Capital shortage**: issue equity, reduce dividends, shrink assets

> Lending contraction often follows a capital crunch

Capital Crunch → Credit Crunch (GFC Example)

- Mortgage-backed losses reduced bank capital
- Banks tightened lending standards
- Lending and credit availability declined

Managing Credit Risk: Adverse Selection & Moral Hazard

- **Adverse selection**: risky borrowers seek loans
- **Moral hazard**: borrowers take risky actions post-loan

> Solution: screen, monitor, require collateral, and limit exposure

Credit Risk Management Tools

- **Screening & Monitoring** (e.g. credit scores, loan covenants)
- **Specialization in lending** (local knowledge)
- **Restrictive covenants** (e.g. no asset sales, reporting)
- **Loan commitments** (pre-agreed funding)
- **Collateral & compensating balances**
- **Credit rationing** (limit or refuse risky loans)

Interest-Rate Risk Example

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

- $20M rate-sensitive assets vs. $50M rate-sensitive liabilities
- 5% rate ↑ → $1.5M profit ↓
- 5% rate ↓ → $1.5M profit ↑

Gap Analysis

$$\text{Gap} = \text{Rate-Sensitive Assets} - \text{Rate-Sensitive Liabilities} = -\$30M$$

$$\Delta\text{Profits} = \text{Gap} \times \Delta\text{Interest Rate}$$

Managing Interest-Rate Risk

- **Shorten duration of assets**, **lengthen liabilities**
- **Use interest-rate derivatives** (e.g., swaps, futures)
- Accept some risk if expecting favorable rate movement

Conclusion: Key Takeaways

- **Banking is a balancing act**: Profitability vs. risk, liquidity vs. return, capital vs. leverage.
- **The balance sheet tells a story**: How banks acquire funds (liabilities) and allocate them (assets) reflects their strategic priorities.
- **Risk management is central**:
  - Credit risk (default)
  - Interest-rate risk (gap analysis & duration)
  - Liquidity risk (reserve management)
- **Capital matters**:
  - Protects against insolvency
  - Influences return on equity (ROE)
  - Regulated for systemic stability
- **Tools banks use**:
  - Asset/liability management
  - Covenants, collateral, monitoring
  - Specialization & long-term relationships
  - Derivatives for hedging

3. Class Activity

Any QUESTIONS?

Thank You!

Next Class

- (Apr 18)
  - **Chap 14.** Central Banks
  - **Chap 15.** The Money Supply Process