Economic Analysis of Financial Regulation

Chapter 10

Econ 351 – Monetary Economics

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Exercise: Interest-Rate Gap Analysis

Suppose you are the manager of a bank with the following balance-sheet items:

- \$15 million in fixed-rate assets
- \$30 million in rate-sensitive assets
- \$25 million in fixed-rate liabilities
- \$20 million in rate-sensitive liabilities

1. Use gap analysis to determine how the bank's profit will change if interest rates rise by 5%.
2. What actions can the bank take to reduce its interest-rate risk?

Solution: Interest-Rate Gap Analysis

Step 1: Calculate the Interest-Rate Gap

$$RSA = 30, \qquad RSL = 20, \qquad \text{Gap} = RSA - RSL = 30 - 20 = 10$$

Step 2: Effect on Net Interest Income

$$\Delta NII \approx \text{Gap} \times \Delta i = 10 \times 0.05 = 0.5$$

Net interest income increases by \$0.5 million.

Reducing Interest-Rate Risk

- Adjust the balance sheet so that $RSA \approx RSL$
- Use interest-rate derivatives (swaps, futures, options)

Exercise: Duration Calculation

Suppose a financial instrument generates the following cash flows:

- \$70 at the end of year 1
- \$80 at the end of year 2
- \$90 at the end of year 3

Assume the discount rate is 10%. Compute the **duration** of this financial instrument.

Reminder. Duration is the present-value-weighted average time to receive the cash flows:

$$D = \frac{\sum_t t \times PV(CF_t)}{\sum_t PV(CF_t)}$$

Solution: Duration Calculation

$$PV_1 = \frac{70}{1.1} = 63.64$$

$$PV_2 = \frac{80}{1.1^2} = 66.12$$

$$PV_3 = \frac{90}{1.1^3} = 67.58$$

Total price:

$$P = 63.64 + 66.12 + 67.58 = 197.34$$

$$D = \frac{\sum t \times PV(CF_t)}{P} = \frac{1(63.64) + 2(66.12) + 3(67.58)}{197.34} \approx 2.02 \text{ years}$$

Preview

This chapter develops an economic analysis of financial regulation.

The chapter in two steps

- **Why regulate?** Asymmetric information between banks and depositors makes bank runs possible, so governments build a safety net (deposit insurance); the safety net in turn creates moral hazard and adverse selection.
- **How to regulate?** Restrictions on asset holdings, capital requirements, licensing and examination, risk-management assessment, and restrictions on competition.

Outline

The Government Safety Net

Types of Financial Regulation

Asymmetric Information as a Rationale for Regulation

Financial intermediaries help reduce information problems, but they also create new risks.

Source of Asymmetric Information

- Depositors cannot easily observe the quality of bank loans.
- Banks know more about their assets than depositors.

Government regulation and safety nets become necessary.

Problems Caused by Asymmetric Information: Bank Runs

Bank Runs

- Depositors do not know the **quality of loans**
- Depositors do not know whether the **bank is financially sound**
- The best strategy is to **withdraw deposits quickly**
- **Financial panic** may occur



A crowd gathers outside the American Union Bank, New York City, during a bank run early in the Great Depression (1931).

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Deposit Insurance

FDIC (Federal Deposit Insurance Corporation)

- Established in 1934.
- Insures deposits up to $250,000.
- Protects depositors, maintains confidence in the banking system, and reduces the likelihood of bank runs.

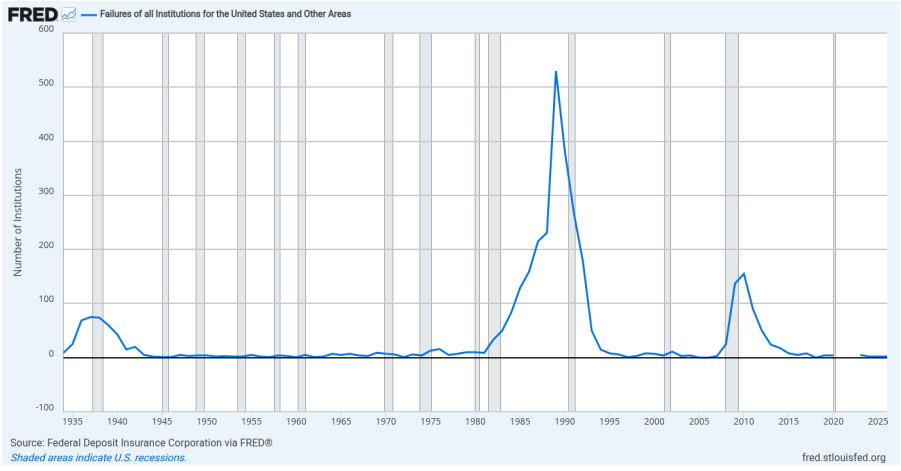
Handling Bank Failures

- **Payoff method:** FDIC reimburses insured depositors.
- **Purchase & assumption:** FDIC arranges mergers.

Impact

Bank failures dropped sharply after FDIC creation.

Bank Failures in the United States Since 1934



Number of failed FDIC-insured institutions per year, 1934–2025. Failures stayed low after the FDIC was created, with spikes in the late 1980s and after 2008.

Source: FRED, Federal Reserve Bank of St. Louis (series BKFTTLA641N)

Deposit Insurance in Developing Countries

Potential Problems

- Deposit insurance may create **greater problems** in emerging market countries.
- The introduction of an **explicit government deposit insurance system** is often associated with:
  - lower banking system stability
  - higher probability of banking crises
- **Reason: Moral hazard**
  - Banks may take excessive risks when deposits are insured
  - Weak legal systems and ineffective regulation make monitoring difficult
  - Corruption may further worsen the problem

Disadvantages of the Government Safety Net

Moral Hazard Problem

- Depositors and creditors have **less incentive to monitor banks**
- Banks may engage in **riskier activities**
  - If investments succeed $\rightarrow$ banks earn high profits
  - If investments fail $\rightarrow$ losses are partly absorbed by the safety net
- Similar incentive problems arise in:
  - Limited liability corporations
  - Bank managers and executives

Disadvantages of the Government Safety Net

Adverse Selection

- Individuals most likely to create problems for the insurance system are often the ones most eager to use it
- Risk-loving investors are more likely to enter the banking industry
  - Especially when supervision is weak

Two sides of the safety net. Deposit insurance stops bank runs, but it also weakens the incentives of depositors to monitor (**moral hazard**) and attracts exactly the risk-takers the insurance system can least afford (**adverse selection**).

Disadvantages of the Government Safety Net: Too Big to Fail

What Is "Too Big to Fail"?

- Large institutions expect government rescue.
- Encourages additional risk-taking.

Examples

- 1984 Continental Illinois rescue
- 2008 crisis: Bear Stearns, Lehman Brothers, AIG

Lesson

Expected bailouts can increase systemic risk.



The Continental Illinois Bank Building in Chicago; the bank's 1984 rescue is the classic "too big to fail" case.

Wikimedia Commons, Ken Lund, CC BY-SA 2.0

Disadvantages of the Government Safety Net

Challenges from Financial Consolidation

- Important U.S. banking laws in **1994 and 1999**
  - Allowed interstate banking and financial conglomerates
  - Generated economies of scale and scope
- **Expansion in bank size**
  - Increased the problem of **"Too Big to Fail"**
  - Greater systemic risk
- **Cross-industry mergers**
  - Government safety net may extend to other financial institutions

Outline

The Government Safety Net

Types of Financial Regulation

Types of Financial Regulation

Restrictions on Asset Holdings

- It is difficult to monitor how banks manage their assets
  - Due to **asymmetric information**
- Regulators limit the **types of assets** banks can hold
  - To reduce excessive risk-taking
- Example: classification of bonds
  - **Investment-grade vs. speculative (junk) bonds**
  - Credit rating agencies define the boundary (typically **BBB**)

Financial Regulation: Capital Requirements

Leverage Ratio

- **Leverage ratio** = Capital / Total Assets; one of the earliest regulatory methods
- Banks must keep the ratio above a minimum level (e.g., 5%)
- However, banks hold assets with very different levels of risk, and off-balance-sheet activities can also affect risk

Example: Comparing Two Banks

Two banks each have assets of $10 billion.

- Bank A: mainly holds government bonds, equity $0.5 billion
- Bank B: mainly makes corporate loans, equity $1 billion
- Bank B also provides $5 billion in loan guarantees

Question: Which bank is riskier?

Financial Regulation: Capital Requirements

Risk-Based Capital Requirements

- Capital requirements can be based on the **riskiness of assets**
- Assets are adjusted according to their risk level
  - This leads to the concept of **risk-weighted assets**
- Potential risks must also be included
  - **Off-balance-sheet activities** are converted into on-balance-sheet equivalents
- More detailed regulation of capital
  - Different components of bank capital are defined and regulated

Why Do We Need Risk-Weighted Assets?

Different types of assets carry different levels of risk, so their sizes cannot be compared directly.

Suppose **John** has \$1 million and three investment options:

- Government bonds: expected return = 2%
- Bank investment product: expected return = 8%
- Lending to a friend's startup: expected return = 15%

To protect against possible losses, John must hold some capital. **Which investment requires the most capital?**

Capital Requirement Example

Bank A plans to lend \$100 million to Company X for 6 months. The risk weight is 20%.
Bank B plans to lend \$100 million to Company Y. The risk weight is 100%.
Bank C wants to lend to Company Z. The risk weight is 20%.

- Bank C's maximum risk-weighted assets: \$25 million
- Bank C has already issued \$50 million of loans (risk weight = 20%)

Assume the minimum capital adequacy ratio is 8%.

1. How much capital is required for Bank A and Bank B?
2. What is the maximum loan Bank C can extend?

Capital Requirement Example: Solution

Bank A

$$RWA = 100M \times 20\% = 20M \qquad Capital = 0.08 \times 20M = 1.6M$$

Bank B

$$RWA = 100M \times 100\% = 100M \qquad Capital = 0.08 \times 100M = 8M$$

Bank C

$$Current\ RWA = 50M \times 20\% = 10M$$

$$Remaining\ RWA = 25M - 10M = 15M$$

$$Max\ Loan = \frac{15M}{0.20} = 75M$$

Financial Regulation: Licensing and Examination

Licensing and Examination

- **Licensing of financial institutions**
  - Helps prevent **adverse selection**
- **Regular examinations** of financial institutions
  - Helps reduce **moral hazard**
- Supervisors evaluate banks through regulatory ratings

CAMELS Rating System

- **C** –Capital adequacy
- **A** –Asset quality
- **M** –Management
- **E** –Earnings
- **L** –Liquidity
- **S** –Sensitivity to market risk

Financial Regulation: Risk Management Assessment

Evolution of Risk Management in Financial Regulation

- **Change in regulatory philosophy**
  - **Past:** focus on bank failures and **ex post intervention**
  - **Now:** focus on banks' **risk management systems** and **ex ante supervision**
- **Monitoring potential future risks**
  - Value at Risk (VaR)
  - Stress testing
- **Regulation of systemically important financial institutions (SIFIs)**
  - Past: government bailouts ("too big to fail")
  - Now: stricter supervision and higher capital requirements

Financial Regulation: Restrictions on Competition

Two Types of Restrictions

- **Branching restrictions**
  - Limits on establishing bank branches
  - Restrictions on bank mergers and acquisitions
  - Related to **economies of scale**
- **Activity restrictions**
  - Separation of banking and other financial services
  - Related to **economies of scope**

Both kinds of restriction limit risk-taking by limiting what banks can do and where, but they also give up the economies of scale (branching, mergers) and economies of scope (combining financial services) that the restrictions prevent.

Chapter Summary

- Asymmetric information is the rationale for regulation: depositors cannot judge loan quality, so a rumour can trigger a bank run and a financial panic.
- Deposit insurance (FDIC, 1934) sharply reduced bank failures, but the safety net creates moral hazard (riskier banks, less monitoring) and adverse selection (risk-lovers enter banking).
- "Too big to fail" and financial consolidation extend the safety net and raise systemic risk.
- Regulation responds with restrictions on asset holdings, capital requirements (leverage ratio and risk-weighted assets), licensing and examination (CAMELS), risk-management assessment, and restrictions on competition.