Money and Banking
Lecture 7: Basics of Banking II

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Outline

INTRODUCTION

- In last lecture, we know how banks make profit and manage risk based on balance sheet perspective.
- Sources of funding for banks are deposits (checking deposits and time deposits) and borrowed funds (interbank borrowing).
- Use of funds contains bank loans.
- In this lecture, we are going to explore the following questions:
  1. Summarize the functions of banks
  2. Why banks liabilities are considered as money *in metallic money system*?
  3. Fragility of banks

FUNCTIONS OF COMMERCIAL BANK

- Based on what we have learned, commercial banks play at least three important functions
  1. maturity transformation: borrow short to lend long
  2. liquidity transformation: liquidity liabilities but illiquid assets
  3. risk transformation: par at liabilities but premium on assets
- *Maturity transformation* or *maturity mismatch* is fundamental for investment.
- Investors prefer short term to long term, while borrowers (e.g., households, corporations, governments) prefer long term (less uncertainty).

Functions of Commercial Bank

- Without such transformation role by banks, investment would never happen.
- By transferring short-term (callable) liabilities into long-term assets, banks need *liquidity transformation*.
- In this sense, banks carry out *liquidity risk* or sells *liquidity insurance* to depositors by completing this function.
- Depositors transfer liquidity risk to banks, or pay liquidity premium to banks, to have the right to withdraw deposits at demand.
- To carry out liquidity risk or liquidity insurance, banks charges low interest rates on depositors (higher risk, higher return).

Functions of Commercial Bank

- *Risk transformation* can be associated with *liquidity transformation*, because banks carry credit risk/default risk and liquidity risk on balance sheet.
- From last lecture, it is costly for banks to complete those transformation.
- Screening, long-term relationship, covenants, compensating balances, and line of credit and so forth to prevent adverse selection and moral hazard.
- Weighting out costs of required reserves, excess reserves, Treasury securities, loans, interbank borrowing and other funding to prevent liquidity risk.
- By taking those transformation and risks, banks are able to allocate funds to the needy.

Contribution to Money Creation

- On asset side, banks supply credit to the economy, while on liability side, banks generate "money".
- Why is bank's liability, i.e., deposits, money?
- The story goes back to *metallic money* (e.g., gold or silver) system. Ancient form of banking originated from goldsmith.
- Banks with precious metals as reserve, yet a fraction of it to back up random and small amount of withdrawal, can operate lending business.
- Banknotes, in this case, are backed up with the value of precious metals, the public's trust on the issuer.
- *Bank only works when withdrawal is random and small amount*.

Contribution to Money Creation

- Bank, issuing banknotes, is fundamental for *payment system*.
- Banknotes can be used to do transaction, i.e., function as *medium of exchange* and *store of value*.
- Western banks also invent checkbook to draw money against depositors' accounts. With checks in payment system, transactions are more convenient.
- The holders are not required to redeem checks first and then deposit proceeds in banks. Instead, checks can be directly deposited, and corresponding banks wire funds on notice.
- *Based on that, we can conclude that bank's liability, banknotes, or deposits, is money*.

Contribution to Money Creation

- Banks are able to create credit (lending to business or households, for example) and create money (by issuing deposits or banknotes), i.e., private credit and money supply.
- Banks are corporate, shareholders owned.
- Conflict happens: money is considered as a public good whereas its supplier, bank, is a private entity. How to align the public interests with the private's?
- The marginal cost of banknote issuance is zero. However, increasing money supply entails *inflation*.
- The public are willing to hold private supplied money as long as those money are backed up by solid bank's assets, e.g., gold, or government bonds.

FRAGILITY OF BANKS: ASYMMETRIC INFORMATION

- The existence of banks provides a solution to reduce *asymmetric information* between *end investors* and *end borrowers* by functioning as an intermediary.
- Commercial banks employ various tools (e.g., screening) to reduce asymmetric information, and hold those assets on balance sheet to get profit.
- *Banks possess private information* related to lending, while depositors (end investors) still are kept in dark. In this sense, the asymmetric information exits between banks and end borrowers, and between banks and depositors.
- This asymmetric information problem can be exacerbated when the economy is hit by negative shocks.

Fragility of Banks: Asymmetric Information

- Suppose a bank lent much money to an oil company. The company was hit by falling oil price, and unable to payback its loan.
- As a result, the bank has to write off the loan to oil company. News spread out and nerves depositors, who worry about the safety of deposits.
- The optimal strategy for depositors is to withdraw deposits. The bank offers "first-come-first-serve" principle, because there is no difference between deposits.
- However, this bank only has a fraction of reserves in gold in its vault. It cannot meed all withdrawal at once.
- Interbank borrowing is one way to get out of this. Yet, the counterparty may concern the default risk of this bank at this moment.

Fragility of Banks: Asymmetric Information

- Selling loans to other banks will not work, either.
- The reason is the originator holds *private information* about loans, and it takes time for outsiders to process those information.
- Calling in loans (i.e., request early payoff) does not work.
- Under a metallic money system, a bank in trouble is more likely to go under in a bank run.
- This is the fragility of banks when depositors, i.e., end investors, have no idea about intermediaries and end borrowers.

FRAGILITY OF BANKS: ASYMMETRIC INFORMATION

- The second case can make bank fragile is depositors have no idea (asymmetric information) about the business model of banking.
- Banks are *highly leveraged* corporate. It means banks rely on borrowed funds (e.g., deposits) to finance its assets (e.g., loans).
- Leverage increases equity return on shareholders, but also increases risk for debtors (e.g., depositors) when assets lose value.
- If the losses are large enough, the bank can face *insolvency*: its total assets fall below its liabilities, and its net worth becomes negative.
- Insolvency hurts a bank's shareholder, managers, and employees.

FRAGILITY OF BANKS: ASYMMETRIC INFORMATION

- To reduce insolvency risk, banks are supposed to hold more capital.
- Bank's safety depends on its level of capital relative to its assets, i.e., **equity ratio**.

$$\text{equity ratio} = \frac{\text{capital}}{\text{assets}},$$

- Holding capital constant, a higher level of assets reduces the equity ratio.

Fragility of Banks: Asymmetric Information

- The greater a bank's assets, the more it has to lose if things go wrong. $\rightarrow$ greater insolvency risk.
- The big disadvantage of raising equity ratio is that it makes a bank less profitable.
- The profitability is measured by the return on equity (ROE).
- $$ROE = \frac{\text{profit}}{\text{capital}} = \frac{\frac{\text{profit}}{\text{assets}}}{\frac{capital}{assets}},$$
- $$ROE = \frac{ROA}{ER},$$
- The return on equity depends on the return on assets and the equity ratio. Given ROA, higher equity ratio, lower ROE.

FRAGILITY OF BANKS: ASYMMETRIC INFORMATION

- To summarize, a bank faces a trade-off when it chooses its equity ratio.
- A higher ratio reduces insolvency risk but also reduces return on equity (i.e., profitability).
- A bank would like a ratio that is high enough to make insolvency unlikely but low enough to maximize returns for its shareholders.
- A bank manager supervised by shareholders is more likely to maximize shareholders' interests instead of debt holders.

Fragility of Banks: Asymmetric Information

- Moreover, without closer monitoring, banks are prone to take risky investments.
- It is very costly for either individual shareholder or debt holder to monitor daily management, or for individual shareholder to monitor investment decisions.
- free-rider problem: other shareholders or debt holders can take a free-ride on some shareholders or debt holders who do due diligence.
- For the latter, increased investment returns is offset by increased monitoring cost; while free-riders obtain increased return without cost.
- In the end, no one prefers to paying monitoring risk.

FRAGILITY OF BANKS: ASYMMETRIC INFORMATION

- For shareholders, ways to address this problem contain (1) attractive salary payment, (2) bonuses, and (3) stock options. More readings about *principal -agent problem* in *Corporate Finance*.
- Fore debt holders, ways to address this problem contain (1) negative covenants, (2) higher interest rate, and (3) derivatives (e.g., *credit default swap*).
- However, for depositors in particular, higher interest rate on deposits seems only option.
- No further constraints on banking activities can be imposed by depositors.
- If significant loss happened, debt holders suffer more than shareholders, because the latter enjoy higher return when bearing higher risk.

Fragility of Banks: Asymmetric Information

- Loss either caused by asymmetric information between end investors and end borrower, or by asymmetric information between depositors and bank would wipe out investors' wealth, and more importantly, disturbs general economic activities.
- Collapse of one bank is contagious, i.e., easily spreading from one bank to another, and to the whole banking system.
- Since liabilities of banks are *money*, it would have negative spill-over effect (externality) in banking crisis.

BANKING REGULATION: STABLE BANKING SYSTEM

- Besides improvement in governance at corporate level (e.g., principal-agent problem), regulations on banking activities are necessary.
- **Deposit Insurance**. In Great Depression, 11,000 of U.S. 25,000 banks bankrupt. Deposit insurance was initiated by *Federal Deposit Insurance Corporation* (FDIC) under the Banking Act of 1933 (also known as Glass-Steagall Act).
- Deposit insurance prevents depositors from running on a bank. FDIC now stand between banks and depositors. When banks get into trouble, depositors could get protection from FDIC, e.g., receiving maximum protected account.
- FDIC then would be the debt holders of troubled banks, and cover the loss by liquidating troubled banks' assets.

BANKING REGULATION: STABLE BANKING SYSTEM

- In reality, FDIC takes much active role, rather than "sit-and-wait".
- FDIC could assist mergers and acquisitions in banking industry, that is, splitting possible trouble bank into a "good" bank and a "bad" bank, far before it really gets into trouble.
- However, deposit insurance protects depositors but create *moral hazard problem*.
- **Separation between commercial banking and investment banking** in Glass-Steagall Act. Commercial banks prone to take securities trading business for greater profit. Higher risk-taking investment hurts debt holders more.
- *JP Morgan Chase & Co v.s. Morgan Stanley*: in 1935, the heads of JP Morgan decided to spin off its investment banking operations. Henry Morgan and Harold Stanley founded Morgan Stanley on September 16, 1935.

BANKING REGULATION: STABLE BANKING SYSTEM

- By the 1950s, JP Morgan was only a mid-sized bank. In 1959, it merged with the Guaranty Trust Company of New York to become the Morgan Guaranty Trust Company. The latter was nearly four times the size of JP Morgan at that time.
- Ten years after the merger, Morgan Guaranty established a bank holding company (a company owns one or more banks, but does not necessarily engage in banking itself) called *JP Morgan & Co*.
- In the 1990s, JP Morgan moved quickly to rebuild its investment banking operations and by the late 1990s emerged as a top-five player in securities underwriting.

BANKING REGULATION: STABLE BANKING SYSTEM

- Chase Manhattan had emerged as one of the largest and fastest growing commercial banks in the U.S. In 2000, Chase, looking for another transformational merger to improve its position in investment banking, merged with JP Morgan to form *JP Morgan Chase& Co*.
- JP Morgan Chase & Co offers *investment banking, commercial banking, retail banking, asset management, private banking and private equity business*.
- Morgan Stanley was one of the five investment banks on Wall Street, together with Bear Sterns, Lethman Brothers, Merrill Lynch, and Goldman Sachs.
- Yet, after the financial crisis of 2007, Morgan Stanley has been converted to a bank holding company.

BANKING REGULATION: STABLE BANKING SYSTEM

- **Restrictions on Competition** for example, in U.S. state banks once were not allowed to open branches across state borders.
- Restrictions on competition in banking industry, argued by its proponents, make bank profit stable and less like to take risky investments.
- *Financial innovation* dilute such restrictions, e.g. ATM.
- Banking regulation cannot stop banks from innovation to seek profit maximization, and most importantly, regulations cannot help banks in crisis, because regulations do not provide "money".

Birth of Central Bank and Money Supply in Fiat Money System

- Central bank, a government agency, is assigned to the role to bail out healthy banks from crisis.
- Yet, central bank only takes *passive role* in financial crisis under *metallic money system*, why?
- Central bank, under *fiat money system*, is more powerful to backstop financial crisis in some cases.
- We will try to explore this from money supply process under fiat money system.