EE432 Monetary Theory and Policy

Lecture 5 Depository Institutions: Banks and Bank Management

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Semester 1/2021

Outline

- The Balance Sheet of Commercial Banks
- Bank Risk

Chapter 12

Depository Institutions: Banks and Bank Management

The Balance Sheet of Commercial Banks

The Balance Sheet of Commercial Banks

- **Commercials banks** are institutions established to ***provide banking services to businesses***, allowing them to ***deposit funds safely*** and to ***borrow them when necessary***.
- Total **bank assets** equal total **bank liabilities** plus **bank capital**.
- Banks **obtain funds** from ***individual depositors and businesses***, as well as by ***borrowing from other financial institutions*** in financial markets.

The Balance Sheet of Commercial Banks

- The ***difference*** *between a bank's* ***assets*** and ***liabilities*** is the bank's capital, or **net worth**.
  - **Net worth** is the *value of the bank* to *its owners*.
- A **bank's profits** come from *both* ***service fees*** and from the ***difference*** *between* ***what it pays for its liabilities*** and the ***return it receives on its assets***.

Assets: Uses of Funds

- The **asset** side of the balance sheet shows *what banks do with the funds they raise*.
- **Assets** are divided into four broad categories:
  - ***Cash***
  - ***Securities***
  - ***Loans***
  - ***All other assets***

Cash Items

Cash asset are of three types:

1. **Reserves** - the most important.
   - ***Regulations require a certain percent of cash held in reserves.***
   - Include the ***cash in the bank's vault***, **vault cash**, and *bank's deposits at the Federal Reserve System*.
   - **Cash** is the *most liquid of the bank's assets*.
2. **Cash items in process of collection**.
   - *The uncollected funds from checks.*
3. **Balances of the accounts** that banks **hold at other banks.**
   - Small banks have accounts at large banks - *correspondent bank* deposits.

Securities

- **Securities** are the *second largest component of bank assets.*
- Banks *cannot hold stocks*, so these are **only bonds.**
- About half of all securities are **mortgage-backed.**
- A sizeable portion ***are very liquid*** - can be *sold quickly if the bank needs cash.*

Loans

- Loans are the **primary assets of modern commercial banks**, accounting for well over one-half of assets.
- Loans can be divided into **five categories**:
  1. **Business loans** called ***commercial and industrial (C&I) loans;***
  2. **Real estate loans**, including both *home and commercial mortgages* and *home equity loans;*
  3. **Consumer loans**, like *auto and credit card loans*;
  4. **Interbank loans**; and
  5. **Other types**, including *loans for the purchase of other securities.*

Loans

- The *different loan types* **differ in their liquidity**.
- The primary difference in *various kinds of depository institutions* is their **composition of loan portfolios.**
  - **Commercial banks** make loans primarily to ***businesses***.
  - **Savings** provide ***mortgages to individuals***.
  - **Credit unions** specialize in ***consumer loans***.

Loans

- *Prior to the financial crisis*, commercial banks became *more involved in the real estate*.
  - The rise of the ***commercial paper market*** made ***securities debt finance*** more convenient for large firms.
  - The creation of **mortgage-backed securities (MBS)** meant that *banks could sell the mortgage loans they made,* which *reduced the risk of illiquid assets.*

Liabilities: Sources of Funds

- **Banks** get ***funds*** *from* ***savers*** *and from* ***borrowing*** *in the financial markets*.
- There are two types of deposit accounts:
  - **Transaction accounts** (checkable deposits)
  - **Nontransaction accounts** (savings deposits and time deposits)

Checkable Deposits

- **Demand deposits** make up the *largest component of checkable deposits.*
- *Financial innovation* has *reduced the importance of checkable deposits* in the day-to-day business of banking.
  - They have a **low return for consumers**
  - Traditional checking accounts are **no longer the principal source of bank funds**

Nontransaction Deposits

- **Savings deposits** were popular for may decades, but *less so today.*
- **Time deposits** are **certificates of deposit (CDs) with a fixed maturity.**

Borrowings

- **Borrowing** is the second most important source of bank funds.
- ***Banks can borrow*** by:
  - Borrowing *from the central bank*, which is rare
  - Borrowing *from other banks*

Borrowings

- Banks with **excess reserves** will *lend their surplus funds to banks that need them* though an **interbank market** called the **federal funds market**.
  - The *lending bank* must ***trust*** ***the borrowing bank*** as these *loans are unsecured*.
- Commercial banks **also borrow from foreign banks**.

Borrowings

- Banks finally can *borrow using an instrument called* a **repurchase agreement, or repo**.
  - A **short-term collateralized loan** in which a ***security*** *is exchanged for cash*.
  - The *parties agree* to **reverse the transaction** *on a specific future date, typicaly the next day*.

Bank Capital and Profitability

- **Net worth** is referred to as **bank capital, or *equity capital*.**
- Capital is the **cushion** banks have ***against a sudden drop*** in the **value of their assets** or an **unexpected withdrawal of liabilities**.
  - It *provides some insurance against insolvency*.

Bank Capital and Profitability

- An important component of bank capital is **loan loss reserves**:
  - **Loan loss reserves** are an ***amount the bank sets aside*** to **cover potential losses** from ***defaulted loans***.
- At some point the *bank gives up hope a loan will be repaid* and it is ***written off***, or erased from the bank's balance sheet.
- At this point, the ***loan loss reserve*** is ***reduced*** by the ***amount of*** *the loan that has* ***defaulted***.

Bank Capital and Profitability

There are several measures of **bank profitability**.

1. **Return on assets (ROA)**
   - **ROA** is the ***bank's net profit left after taxes*** divided by *the* ***bank's total assets***.

$$ROA = \frac{\text{Net profit after taxes}}{\text{Total bank assets}}$$

   - It is a measure of ***how efficiently*** **a particular banks** ***uses its assets***.

Bank Capital and Profitability

2. The **bank's *return to its owners*** is measured by the **return on equity (ROE).**
   - This is the ***bank's net profit after taxes*** divided by ***the bank's capital***.

$$ROE = \frac{\text{Net profit after taxes}}{\text{Capital}}$$

Bank Capital and Profitability

- **ROA and ROE** are *related to leverage.*

$$\text{Leverage} = \frac{\text{Bank Assets}}{\text{Bank Capital}}$$

- One measure of **leverage** is the *ratio of banks **assets** to bank **capital**.*
- Multiplying **ROA** *by asset to capital ratio* gives **ROE**.

$$ROE = \frac{\text{Net profit after taxes}}{\text{Bank Capital}}$$

$$ROA \times \frac{\text{Bank Assets}}{\text{Bank Capital}} = \frac{\text{Net profit after taxes}}{\text{Total bank assets}} \times \frac{\text{Bank Assets}}{\text{Bank Capital}}$$

$$= \frac{\text{Net profit after taxes}}{\text{Bank capital}} = ROE$$

Bank Capital and Profitability

3. The final measure of bank profitability is ***net interest income*.**
   - This is related to the fact that ***banks pay interest on their liabilities*** and ***receive interest on their assets.***
   - *Net interest income* is the **difference** between
     - **Securities and loans generate *interest income***
     - **Deposits and bank borrowing generate *interest expenses***

Bank Capital and Profitability

- **Net interest income** can also be expressed as
  - the ***difference*** between the ***interest income*** *generated by banks or other financial institutions* and the *amount of* ***interest paid out*** *to their lenders, relative to the amount of their interest-earning assets:* **net interest margin**.
  - This is the bank's **interest rate spread** - the *weighted average* ***difference*** between the ***interest rate received on assets*** and the ***interest rate paid for liabilities.***

Off-Balance-Sheet Activities

To generate **fees**, banks engage in numerous **off-balance-sheet activities.**

1. **Lines of credit** - *similar to maximum credit limits allowed on credit cards.*
   - The firm **pays a bank a fee** *in return for the* ***ability to borrow whenever necessary.***
   - The **payment is made** when *the agreement is signed* and *firm receives* a ***loan commitment.***

Off-Balance-Sheet Activities

2. Letters of credit

- These **guarantee** that a *customer of the bank will be* ***able to make a promised payment***.
- Customer might **request** that the **bank send a *commercial letter of credit*** *to an exporter in another country* ***guaranteeing*** *payment for the goods on receipt.*
- In return for taking this risk, the **bank receives a fee.**

Off-Balance-Sheet Activities

3. Standby letter of credit

- Standby letters of credit are ***letters issued to firms and governments that <u>wish to borrow</u> in the financial markets***
- They act as a form of insurance.

Bank Risk

Bank Risk: Where It Comes from and What to Do about It

- The **bank's goal** is to ***make a profit*** *in each of its lines of business.*
- They want to **pay less** *for the deposits* they receive ***than*** **for the loans they make** and the **securities they buy**.

Bank Risk: Where It Comes from and What to Do about It

- Thus, the bank is ***exposed*** to *a host of risks*:
  - **Liquidity risk**
  - **Credit risk**
  - **Interest-rate risk**
  - **Trading risk**

Liquidity Risk

- **Liquidity risk** is the *risk of a **sudden** demand for **liquid funds***.
- Banks face liquidity risk on **both sides of their balance sheets**.
  - **Deposit withdrawal** is a liability-side risk.
  - **Lines of credit** are an asset-side risk.
- *Even if* a bank has a *positive net worth*, ***illiquidity** can still drive it out of business*.

Liquidity Risk

- *In the past*, the common way to *manage liquidity risk* was to **hold excess reserves**.
  - This is a **passive way** to manage liquidity risk.
  - Holding excess reserves is **expensive**, because it means *forgoing higher rates of interest* than can be *earned with loans or securities*.
- There are two other ways to manage liquidity risk.
  - The bank can **adjust** its ***assets*** or its ***liabilities***.

Liquidity Risk

On the **asset side** a bank has several options.

1. The easiest option is to ***sell a portion of its securities portfolio***.
   - Most **treasuries** can be ***sold quickly*** at relatively low cost.
   - Banks that are particularly concerned about liquidity risk ***can structure their securities holdings*** to *facilitate such sales.*

Liquidity Risk

2. A second possibility is for the bank to **sell some of its loans** to another banks.
   - Banks generally make sure that a *portion of the loans they hold* are ***marketable*** for this purpose.
3. Another way is to **refuse to renew a customer loan** that has come due.
   - However this is bad for business.
     - The bank can **lose a good customer.**
     - Reducing assets **lowers profitability**.

Liquidity Risk

Bankers prefer to ***use*** **liability management** to address liquidity risk.

1. Banks can **borrow to meet any shortfall** either *from the central bank* or *from another bank*.
2. The bank can **attract additional deposits**.

Credit Risk

- **Credit risk** is the ***risk*** *that a* ***bank's loans*** *will* ***not*** *be* ***repaid****.*
- Banks use a variety of tools *to manage credit risk:*
  1. **Diversification**, where banks ***make a variety of different loans to spread the risk***.
  2. **Credit risk analysis,** where the bank ***examines the borrower's credit history*** to determine the *appropriate interest rate to charge*.

Credit Risk

- **Diversification** can be *difficult* for banks, especially *if they focus on a certain type of lending.*
  - If a bank lends in only **one geographic area** or **one industry,** it is *exposed to economic downturns* that are ***local or industry-specific***.
- **Credit risk analysis** uses a *combination* of *statistical models* and *information* that is ***specific to the loan applicant***
  - The result is an **assessment of the likelihood** that a **particular borrower will default**.

Interest-Rate Risk

- A ***bank's liabilities*** *tend to be* ***short-term***, while ***assets tend to be long term***.
  - The **mismatch** between the two sides of the balance sheet create **interest-rate risk**.
- When **interest rates rise**, banks face the risk that the ***value of their assets*** will *fall more than the value of their liabilities*, **reducing the bank's capital.**
- **Rising interest rates *reduce revenues relative to expenses,*** directly *lowering a bank's profits*.

Interest-Rate Risk

- The term ***interest-rate sensitive*** means that a *change in interest rates* will *change the revenue produced by an asset.*
- For a bank **to make a profit**, the ***interest rate on its liabilities*** must be **lower** than the ***interest rate on its assets***.
  - The difference in the two rates is the bank's **net interest margin.**
- *When a* ***bank's liabilities*** *are* ***more interest-rate sensitive*** *than its assets*, an **increase in interest rates** will **cut into the bank's profits**.

Interest-Rate Risk

- To manage interest-rate risk is to *determine how sensitive the bank's balance sheet is to a change in interest rates.*
- **Managers** *must compute* an **estimate of the *change in the bank's profit* for each one-percentage-point change in the interest rate**.
- This procedure is called ***gap analysis***.

Interest-Rate Risk

Bank managers can *use a number of tools to manage interest-rate risk.*

1. They can **match the interest-rate sensitivity of assets *with*** that of **liabilities**.
2. Alternatives include the **use of derivatives**, *specifically interest-rate swaps*.

Trading Risk

- **Risk** that the ***value of instrument may go down rather than up is called*** **trading risk**, or *market risk*.
- Today **banks hire traders** to *actively buy and sell securities, loans, and derivatives* using a portion of the bank's capital.
- **Traders** normally ***share in the profits from good investments***, but the *bank pays for the losses*.
- This creates **moral hazard** - ***traders take more risk*** than the banks would like.

Trading Risk

- The solution to the moral hazard problem is to *compute the risk the traders generate*.
  - *Use standard deviation and value at risk*.
- The **bank's risk manager *limits the amount of risk any individual trader is allowed to assume*** and *monitors closely*.
- The ***higher the inherent risk in the bank's portfolio***, the ***more capital the bank will need to hold.***

Other Risks

- ***Foreign exchange risk*** comes from *holding* ***assets denominated in one currency*** and *liabilities denominated in another.*
- Banks manage this in two ways:
  - They work to **attract deposits** that are *denominated in the* ***same currency as their loans***, matching assets to liabilities.
  - They ***use foreign exchange futures and swaps*** to hedge the risk.

Other Risks

- ***Sovereign risk*** arises from the fact that ***some foreign borrowers may not repay*** *their loans* because their **government prohibits them from doing so.**
  - If a foreign country is experiencing a *financial crisis*, the **government may decide to restrict dollar-denominated payments.**
- Banks have three options:
  - **Diversification,**
  - **Refuse loans to certain countries**, or
  - **Use derivatives to hedge the risk**.

Other Risks

- **Operational risk** is when ***computer systems fail or buildings burn down***.
  - This was an issue for some banks when the *World Trade Center was destroyed*.
- The banks must **make sure their computer systems and buildings are sufficiently robust** to withstand potential disasters.

End of lecture