

# EE432 Monetary Theory and Policy



## Lecture 6 The Economics of Financial Intermediation and Depository Institutions (Part 2)

Dr. Chamadanai Marknual

Faculty of Economics, Thammasat University

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# 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

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

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

$$\begin{aligned} ROA \times \frac{\text{Bank Assets}}{\text{Bank Capital}} &= \frac{\text{Net profit after taxes}}{\text{Total bank assets}} \times \frac{\text{Bank Assets}}{\text{Bank Capital}} \\ &= \frac{\text{Net profit after taxes}}{\text{Bank capital}} = ROE \end{aligned}$$

# 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 rate *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 wish to borrow 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