

EE432 Monetary Theory and Policy



Lecture 5 Depository Institutions: Banks and Bank Management

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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

- **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 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*.

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

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

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

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

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 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 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 spread**.
- *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