MONEY AND BANKING
LECTURE 6: BASICS OF BANKING I

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Outline

INTRODUCTION

- In last lecture, we discuss the existence of financial institutions is to address *asymmetric information*, i.e., why we need financial institutions.
- We take (commercial) banks as an example to illustrate how to prevent possible *adverse selection* and *moral hazard*.
- In the next two lectures, we are going to explore *banking* in two ways
  1. what business are banks engaged?
  2. what is *banking* in general?

BANKS' BALANCE SHEET

1. The balance sheet lists what the business owns (assets), what the firm owes to others (liabilities), and what the owners have invested (capital) as of a given time.

$$\text{Assets} = \text{liabilities} + \text{capital}\,, \tag{1}$$

2. The right side of the identity can be viewed as the sources of funds for a bank. Either creditors or owners.
3. The left side is the use of funds.

Transaction Accounts

1. **Checking accounts** serve as the basic medium of exchange in the economy, accounting for about half of the total money supply (M1). Transaction accounts account for about 13% of all deposits.
2. A **demand deposit** is a checking account in which the owner is entitled to receive his or her funds on demand and to write checks on the account, which transfers legal ownership of funds to other.
3. **NOW accounts** (a.k.a negotiable order of withdrawal) accounts are just demand deposits that pay interest. The Depository Institutions Deregulation and Monetary Control Act (1980).

Savings Deposits

1. **Saving accounts** usually have records of fund transfers in passbooks. When funds were deposited or withdrawn from a saving account, the passbook had to be presented. Still play a vital role in China.
2. **Money Market Deposit Accounts** started in December 1982. MMDAs are federally insured and pay an interest rate that is set at the discretion of the issuing bank. By law depositors are limited to six third-party transfers each month. MMMDAs account for about 45% of bank deposits, making them the largest source of funds for banks.

TIME DEPOSITS

1. Time deposits account for 26% of bank deposits, second largest sources of funds. Unlike demand deposits, time deposits are not available until their maturity date, and the funds cannot be transferred to another party by a written check.
2. **Certificates of Deposit**. CDs are bank liabilities issued in a designated amount, specifying a fixed rate of interest and maturity date. The interest rate is generally higher than on saving accounts.
3. **Negotiable Certificates of Deposits**. NCDs are very large, unsecured liabilities of commercial banks issued in denominations of $100,000 or more to business firms and individuals.

Borrowed Funds

1. **Borrowed funds** are typically short-term borrowings by commercial banks from the wholesale money markets or a Federal Reserve bank.
2. They are economically similar to deposits but are not insured by the FDIC.
3. **Federal Funds**. Reserve requirement by central bank.
4. **Repurchase agreements (RPs)**. More details in *Shadow Banking I*.
5. **Banker's Acceptances**. Use a lot in *international trade* between exporters and importers.

Capital Accounts

1. *Bank capital* represents the equity or ownership funds of a bank, and it is account against which bank loan and security losses are charged.
2. *Capital stock* represents the direct investments into the bank in the form of common or preferred stock;
3. *Undivided profits* (retained earnings) compose that accumulated portion of the bank's profit that has not been paid out to shareholders as dividends;
4. *Special reserve accounts* are set up to cover anticipated losses on loans and investments.

Assets

1. Cash items. This category includes **vault cash**, the currency sitting in banks' branches and ATMs. Another is deposits in banks' accounts at the Federal Reserve. The sum os these two components is called **reserves**.
2. Reserves are most liquid asset. Provide money when depositors want it. Reserves produce little income. In Oct 2008, banks started receiving interest on their deposits, but the interest rate is low.
3. A final component of cash asset is **cash items in process of collection**. These are checks that have been deposited in a bank but have not yet cleared. The bank is waiting for the funds promised by the check.

SECURITIES

1. **Securities** are 19 percent of bank assets. By law, banks are restricted to securities with low risk. These include Treasury bonds, municipal bonds, and corporate bonds, or mortgage-backed securities. Banks are not allowed to hold stocks or junk bonds.
2. Securities pay interest, lower than bank loans, but more than reserves, while providing liquidity. For this reason, securities held by banks are often called **secondary reserves**.

LOANS

1. **Loans** are banks' most important asset class, accounting for 56 percent of total assets. Banks make loans to several types of borrowers: consumers, businesses, governments, and other banks.
2. Loans are less liquid than securities: it is hard to turn them into cash quickly. In addition, borrowers sometimes default on loans.
3. Nevertheless, high risk associates with high return. Bank loans pay higher interest rates.

HOW BANKS MAKE PROFITS

- Suppose a depositor Richard opens a bank in China, and names it Bank of Richard in China. Richard starts his bank with $20, which is the bank's initial capital, or net worth.
- By law, the bank has to deposit in an account of central bank as required reserve.

Assets		Liabilities and Net Worth	
Reserves	20	Net worth	20

How Banks Make Profits

- To raise more funds. Richard seeks deposits.
- He asks his friend to deposit \$50, and trades CD with another bank \$50

Assets		Liabilities and Net Worth	
Reserves	120	Checking Deposits	50
		Nontransaction Deposits	50
		Net Worth	20
TOTALS	120		120

How Banks Make Profits

Suppose Richard does not want to put $120 as reserve anymore. But it makes the business lose money.

Assets		Liabilities and Net Worth	
Reserves	10	Checking Deposits	50
Securities	30	Nontransaction Deposits	50
Loans	80	Net Worth	20
TOTALS	120		120

HOW BANKS MAKE PROFITS

1. Assume that interest rate on loans is 8%, and rates on securities and deposits are 4%. No interest earned on reserves.
2. **Interest Income** is \$7.60, which is (\$30 $\times$ 4%+\$80 $\times$ 8%). Let us assume we have extra \$5.00 income from issuing letter of credit. So we have \$12.60.
3. **Interest Expense** is \$2, which is (\$50 $\times$ 4%) Also I have to pay myself salary, say \$6.00.
4. So the profit by the end of 2014 is \$4.60.
5. **ROA** $\frac{\text{profit}}{\text{assets}} = \frac{\$4.60}{\$120} = 3.8\%$
6. **ROE**=$\frac{\text{profits}}{\text{capital}} = \frac{\$4.60}{\$20} = 23\%$

OFF-BALANCE-SHEET ACTIVITIES

- Banks also receive income from off-balance-sheet (OBS) activities.
- Those activities are not revealed on bank balance sheets, because they don't affect the current levels of the assets and liabilities.
- We will know several forms of OBS activities in this section.

LINES OF CREDIT

- A line of credit (also known as *loan commitment*) gives an individual or firm the right to borrow a certain amount of money at any time.
- It allows borrower to have immediate access to the funds as long as the determined ceiling in the loan balance is not exceeded.
- It is a way for banks to keep long-term relationship with (good) borrowers.
- Lines of credit also produce income for banks, because firms pay fees to keep them open.

LETTERS OF CREDIT

- When a bank issues a letter of credit, it guarantees some payment promised by a firm.
- Two types of letters of credit:
  1. a *commercial letter of credit* guarantees a payment for goods or services. e.g. exporter shipping goods when payment is guaranteed by a letter of credit.
  2. a *standby letter of credit* guarantees on a security. e.g. a commercial paper standby letter of credit.

Asset Management

- Banks also mange assets for other, e.g., a small pension fund.
- Corporations lack of experience to choose the right mix of securities to invest, they would entrust the money to a bank that purchases securities on their behalf and pay fees to the bank for this service.
- Wealthy individuals also hire banks to manage assets, called *private banking*.

DERIVATIVES

- Large banks trade derivatives such as futures and options on stocks, bonds, and currencies.
- Banks use derivatives to hedge against risks they face, such as changes in interest rates.
- A *loophole* in bank regulation: banks are forbidden to own stocks but they *can* trade derivatives related to stocks, either case is risky.
- The Dodd-Frank Act of 2010 requires regulators to develop rules limiting banks' derivative trading.

INVESTMENT BANKING

- Some banks provide investment-banking services, such as underwriting securities and advising on mergers and acquisitions.
- Banks were allowed to enter these business in 1999, when the Glass-Steagall Act was repealed.
- Investment-banking activities are important sources of income for the largest banks.

LIQUIDITY RISK

- Banks hold reserves and liquid securities to be ready for withdrawals.
- However, if depositors want to withdraw large amounts (in most cases, suddenly), the bank may not have enough reserves and securities to meet this demand. $\Rightarrow$ liquidity risk.
- Confronting liquidity risk, banks are forced to sell illiquid assets (e.g., loans). Yet, it is hard to sell illiquid assets quickly, unless banks accept low prices - less than the loans are really worth.
- Those loans are sold at *fire-sale prices*.

Liquidity Risk

- Illiquid loans reflects the basic problem of asymmetric information.
- A bank gathers information about its borrowers, that is, having a good idea of the default risk for its loans.
- Other banks without screening the borrowers may be uncertain of this risk.
- Due to this uncertainty, the seller must accept fire-sale prices.

Liquidity-Profit Trade-Off

- A simple way to reduce liquidity risk is to hold more liquid assets.
- The disadvantage of holding liquid assets is that they pay less interests than illiquid assets (e.g., loans).
- If high liquidity is not needed, it reduces profits.
- Banks try to ease the trade-off by short-term borrowing, including borrowing from the central bank.

Credit Risk

- Credit risk is another name for *default risk*, the risk that borrowers won't repay their loans.
- When a loan defaults, the bank must *write off* the loan: it removes the loan from its balance sheet.
- *Write-off* $\rightarrow$ banks' assets $\downarrow$ & net worth $\downarrow$.
- One way to reduce credit risk is *syndication*, i.e., a bank agrees to sell parts of the loan to a group of other financial institutions (e.g., pension funds and investment banks), also called *syndicate*.

Interest Rate Risk

- Banks' profits are affected by short-term interests (e.g. that of Treasury bill rate).
- Interest rates $\uparrow \rightarrow$ profits $\uparrow$, and vice versa.
- The resulting instability in profit is called interest rate risk.
- Interest rate risk stems from **maturity mismatch** in banks' balance sheets.

INTEREST RATE RISK

- Most liabilities of banks have short maturities. For example, checking and saving deposits have zero maturities - can be withdrawn at any moment.
- time deposits - one- to two-year maturity
- Because of short-term maturities, interest rates on bank liabilities must be compete with rates on securities. - banks' liabilities are *rate sensitive*.

INTEREST RATE RISK

- Bank assets, in contrast, typically have long maturities.
- business loans 10-year terms, mortgages 30-year terms.
- When T-bill rates arise, banks are able to raise rates on future loans. But the loans they hold currently have lower rates locked in for long periods.
- Bank assets, in this sense, are rate insensitive.

Interest Rate Risk

- Interest rate risk can be measured by rate-sensitivity gap.

  $$\text{rate-sensitivity gap} = \text{rate-sensitive assets} - \text{rate-sensitive liabilities},$$

- The effect of interest rate risk on banks' profit is described as follows.

  $$\text{change in profits} = (\text{change in short-term interest rate}) \times (\text{rate-sensitivity gap}),$$

Interest Rate Risk

- Suppose rate-sensitive assets (T-bills) are 30 RMB and rate-sensitive liabilities (saving deposists are 50 RMB. The rate-sensitivity gap is -20 RMB.
- When interest rate rises from 4% to 7%, changes in profits?
- $(7\% - 4\%) \times (-20) = -0.60$ RMB
- Ways of reducing risk:
  1. loan sales
  2. floating rate
  3. derivatives, e.g., an interest rate swap