Banking and the Management of Financial Institutions

The balance sheets of commercial banks demonstrate the role of asset transformation: holding short-term liabilities (deposits and other short-term liabilities) and using the proceeds to buy assets (making loans and other long-term securities). That is, the bank borrows short and lends long.

We first examine the balance sheet of commercial banks, and then study how banks manage liquidity and capital. Finally, we analyze how banks manage credit risk, interest rate risk, and the risk of off-balance sheet activities.

1 Bank Management

1.1 Asset and Liability Management

Asset Side

(1) Lend to customers: higher interest rate vs. lower risk of defaulting.

(2) Diversification in asset holding.

(3) Purchase securities with low returns and low risk vs. high returns and high risk.

Liability Side

(1) Checkable deposits have decreased in importance as source of bank funds.

(2) Expansion of overnight interbank loan markets (federal funds rate, LIBOR) and new financial instruments (such as Repos and negotiable CDs) have allowed more flexibility in banks' liability management.

1.2 Liquidity Management

In case of unusually large quantity of deposit outflows (bank run), banks with insufficient liquidity must borrow or even fire sell its assets to meet the demand for withdrawals. The loss from fire sale may force an otherwise financially sound bank into insolvency. Therefore, banks must maintain sufficient liquid assets in its portfolio to contain liquidity risk.

Required reserves are a legal requirement by the central bank requiring banks to maintain a certain **reserve requirement ratio**. The shortfall of required reserves must be covered by changing other parts of its balance sheet. Banks hold excess reserves in order to avoid the following potential costs:

(1) Higher interest rate paid on the borrowed funds, including interbank loan market

and repos.

(2) Fire-sale of its securities held may incur transaction costs and capital loss.

(3) Borrowing from the central bank through discount window (discounting , paying discount rate and subsequent difficulties dealing with the central bank.

(4) Call in loans (without rolling over loans) disrupts long-term relationship with its customers and sell off loans (Other banks may only agree to purchase loans at a substantial discount) are the most costly way of acquiring reserves.
Note: Do not confuse sell off loans with loan-sale. The latter is an off-balance sheet activity.

Besides reserve requirement, monetary authority also requires banks to maintain a *required liquidity ratio*. See handout.

1.3 Capital Management

(1) Bank capital helps alleviating moral hazard and adverse selection problems, and thus helps preventing bank failure.

(2) The amount of capital affects return for the owners (equity holders) of the bank: the

higher the bank capital relative to bank asset, the lower the return on equity (ROE). The return on asset (ROA) measures the efficiency of utilizing assets, $ROA = \frac{\text{Net profit after taxes}}{\text{Assets}}$, and return on equity (ROE) measures the efficiency of utilizing bank capital, $ROE = \frac{\text{Net profit after taxes}}{\text{Bank capital}}$.

The relationship between ROA and ROE can be expressed by EM (equity multiplier)

$$EM = \frac{\text{Assets}}{\text{Bank capital}} = \frac{\text{Assets}}{\text{Net profit after taxes}} \times \frac{\text{Net profit after taxes}}{\text{Bank capital}} = \frac{ROE}{ROA}.$$

Since shareholders of the bank are concerned with their own rate of return , i.e., ROE, which can be expressed as

$$ROE = ROA \times EM.$$

Given ROE and an amount of bank assets, the higher level of bank capital it holds, the lower the EM is, and also the lower the ROE is.

Thus, the adequacy of bank capital generates a trade-off between the soundness of the bank and ROE. The bank has to weigh over the trade-off to choose an optimal level of capital.

(3) Capital Adequacy Requirement (Basel Accord) – See Chapter 11.

2 Credit Risk

To manage credit risk, banks have to lower the severity of information asymmetry and the potential losses from default.

(1) Screening and information collection: Evaluate a borrower's character, capacity, capital, collateral, and condition of business (5C).

(2) Monitoring and enforcement of restrictive covenants

(3) Specialization in lending: sometimes banks may focus on certain industries due to their expertise in information production for these industries

(4) Maintain long-term customer relationships: gather private information of the firm, reducing costs of monitoring.

(5) Loan commitments (line of credit): Loan commitment is a promise to lend to a prespecified amount to a customer on prespecified terms for a prespecified time period. It promote long-term relationship with its clients, and a firms is able to secure credit whenever it needs.

(6) Collateral and compensating balances

(7) Credit rationing
—— (a) Refuse to lend even if the borrower is willing to pay a higher interest rate: to alleviate adverse selection problem.
—— (b) Limit the amount of loans to a borrower: to alleviate moral hazard problem (This is equivalent to ask for the borrower to contribute enough their own capital to the investment so that the borrower will not invest in highly risky project).

3 Interest-Rate Risk

If a bank has more rate-sensitive liabilities than rate-sensitive assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits.

3.1 Gap Analysis

Gap analysis calculates the difference between the interest earnings of rate-sensitive assets and interest payments of rate-sensitive liabilities in a certain period of time.

First, we calculate the amount of GAP:
GAP = the amount of rate-sensitive assets - the amount of rate-sensitive liabilities.

This is equivalent to
GAP = the amount of fixed-rate liabilities - the amount of fixed-rate assets.

If GAP$<$0, a rise in interest rates will reduce bank profits, and a decline in interest rates will raise bank profits.

The effect of a change in interest rate on the profit will be

$$\triangle \pi \backsimeq GAP \times \triangle i.$$

To control for the interest rate risk, one way is to adjust items in assets and liabilities to reduce the absolute value of GAP. For example, if Bank A has

$GAP =$ rate-sensitive assets - rate-sensitive liabilities = 12-17 = -5 (billion),

thus, when the interest rate rises by 0.5%, it profit is reduced by

$$\triangle \pi \backsimeq GAP \times \triangle i = (-5) \times 0.5\% = 0.025(billion).$$

Thus, Bank A will want to increase the amount of rate-sensitive assets or decrease the amount of rate-sensitive liabilities.

But usually an adjustment of GAP by changing the composition of assets and liabilities is costly. The other way is to use interest rate related derivatives (e.g., interest rate swap). For example, Bank B is in the opposite situation, i.e., its GAP is 5 billion, so it wants to decrease the amount of rate-sensitive assets or increase the amount of rate-sensitive liabilities.

An arrangement of swap is:
Bank B gives interest incomes from 5 billion of rate-sensitive assets to Bank A, and
Bank A gives interest incomes from 5 billion of fixed-rate assets to Bank B.

4 Off-Balance-Sheet (OBS) Activities

Non-interest incomes (fee incomes) are increasingly important for banks. Banks generate fee incomes from off-balance sheet activities, including trading foreign exchanges for their customers, servicing mortgage-backed security by collecting interest and principal payments, guaranteeing debt securities, providing backup line of credit (loan commitments for firms, credit lines for consumers).

OBS activities represent **contingent assets or liabilities**, which mean that these items of assets or liabilities will become items in the balance sheet contingent on certain

events.

4.1 Loan Sales (Loan Brokerage)

Loans are sold off to other financial institutions when originated, and are removed from the bank's balance sheet. This greatly increases liquidity of banks. This is usually the first step of securitization.

Also, by selling off these loans (sold without recourse), banks no longer have to hold capital against those loans (Loans sold *with recourse* are still guaranteed by the bank in case of default). This allows banks to expand more loans.

The bank may continue to be responsible for servicing the loan, enforcing loan covenants, monitoring, and handling problems in case of default. The bank makes profit from collecting origination and service fees.

4.2 Letters of Credit (L/C)

A letter of credit is a document issued by a bank on behalf of its customer guaranteeing a third party that it will pay up to a specified amount and with specified terms in case its customer default.

For example, a **commercial letter of credit** is issued specifically to facilitate trade or commerce. Consider a Taiwan's importer purchases goods from an Japan's exporter in Tokyo. Suppose Bank of Taiwan issues a commercial L/C on behalf of the Taiwan's importer. Such a letter would be addressed to some bank in Tokyo requesting it to "accept" the drafts of the Japan's importer up to a specified amount and under certain conditions. The Taiwan banker sends the L/C to the exporter in Japan. The Japan exporter presents to the Tokyo correspondent of Bank of Taiwan the L/C together with evidence that he has shipped the goods according to contract and then draws a draft on Bank of Taiwan. He takes the draft to his own local bank (Mizuho Bank) and receives his payment for the goods. Bank of Taiwan receives a commission for issuing the L/C and Mizuho Bank on whom the credit is issued gets a commission for accepting the drafts.

The other example is standby letters of credit, which are issued for a variety of purposes, such as to improve the credit ratings for issuers of bonds and commercial paper (so that the issuing bank assumes the liabilities in case the debt issuer defaults); to provide back-up facilities for loans granted by third parties; or to assure performance under construction and employment contracts. It obligates the bank to guarantee or stand as surety for the benefit of a third party.

4.3 Loan Commitment

Loan commitment may create risk for the bank. For example, when interest rate is increasing, a bank can only charge a pre-determined lower interest rate when the borrower draws down the line of credit.

Furthermore, during the period when monetary policy tightens or the credit market liquidity is lower, borrowers tend to draws down the line of credit. In this case, banks tend to be short on liquidity and thus may not be able to honor its commitment.

4.4 Trading activities and risk management techniques

To reduce interest rate risk or credit risk, banks trade in futures, options, interest-rate swaps, and foreign exchanges (such as interest rate swap, credit default swap (CDS), etc.). All these transactions are off-balance sheet activities.

But financial institutions participate in these markets not only for hedging risk, but also for engaging in speculation. These speculation activities can be extremely risky (e.g., The derivative broker Nick Leeson was responsible for the collapse of Barings bank, the oldest investment bank in UK, in 1995) and the traders have an incentive to take on excess risk by betting on others' money. To reduce this Principal-Agent problem,

corporate governance is primarily important (Internal Controls, Separation of trading activities and bookkeeping, Limits on exposure, Value-at-risk, Stress testing).