

Econ 330: Money and Banking

Spring 2015, Handout 5

Chapter 10 : Bank Management

Recall: Bank managements.

1. **Liquidity Management:** The acquisition of sufficiently liquid assets to meet the bank's obligations to depositors. Excess reserves are insurance against the costs associated with deposit outflows (Liquidity risk).
2. **Asset Management:** The bank manager must pursue an acceptably low lever of risk by acquiring assets that have low rate of default and by diversifying asset holdings. Maximize profit while managing **Credit risk** and **Interest rate risk**.
3. **Liability Management:** Acquiring funds at low cost. Search for other sources of funds.
4. **Capital Adequacy Management:** The manager must decide the amount of capital the bank should maintain and then acquire the needed capital. Tradeoff between safety and returns on equity

Today: Focus on **Credit risk** and **Interest rate risk**.

1. Managing Credit Risk

(a) Asymmetric Information Problems

- i. **Adverse Selection:** those who are more likely to produce an adverse outcome are the most likely to be selected. Adverse selection in loan markets occurs because bad credit risks (those most likely to default on their loans) are the ones who actively seek for loans.
- ii. **Moral Hazard:** a tendency to take undue risks because the costs are not borne by the party taking the risk. Moral hazard in loan markets occurs when borrowers have incentives to engage in activities that are undesirable from the lender's point of view

Example (from **2012**)¹:

When the Baltimore Ravens were one step away from getting to the Super Bowl, Joe Flacco told the NFL Network, a rather interesting story about him a riding skateboard during a bye week and a noisy neighbor who decided to tell on him:

"I'd never been on a skateboard in my life, so I was literally riding it about 10 feet down my driveway just to see if I could stand on it and stay upright," Flacco said Wednesday on "NFL Total Access." "One of my neighbors must have called in looking for (Ravens general manager) Ozzie Newsome and left a voicemail on his secretary's phone saying, 'Hey, man, you got to let Joe Flacco know we're trying to win the Super Bowl around here! He's at home riding a skateboard. Somebody's got to let him know what the deal is.'

(He won the Super Bowl in 2013, signed a new \$120.6 million contract and celebrated with a 10-piece McNugget meal, fries and an unsweetened tea at McDonald's²)

¹<http://offthebench.nbcsports.com/2012/01/21/baltimore-ravens-qb-joe-flacco-rides-skateboard-neighbor-tells-on-him/>

²<http://sports.yahoo.com/blogs/nfl-shutdown-corner/joe-flacco-celebrates-largest-contract-nfl-history-mcdonald-150916001-nfl.html>

(b) Solutions

i. Screening and Monitoring

- Collect reliable information from borrowers
- Write provisions into loan contracts that restrict borrowers from engaging in risky activities
- Specialize in lending to firms in particular industries

ii. Long Term Customer Relationships

- Less costs of information collection from long-term customers
- More incentive to be good borrowers

iii. Loan Commitments

- A bank's commitment to provide a firm with loans up to a given amount at a given interest rate

iv. Collateral and Compensating Balances

- Internalize default risks to borrowers

v. Credit Rationing

- A lender refuses to make a loan of any amount to a borrower
- A lender is willing to make a loan but restricts the size of the loan to less than the borrower would like

2. Managing Interest Rate Risk

(a) Volatility in market interest rate can cause deterioration in profit or net-worth of financial institutions. (Recall the UW Credit Union case study) There are **two** ways to measure interest rate risk: gap analysis and duration analysis.

i. **Gap Analysis**

$$\Delta \text{Profit} = \text{Gap} \times \Delta i$$

- Gap = Interest Rate Sensitive Assets – Interest Rate Sensitive Liabilities
 - If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits.

ii. **Duration Analysis**

- Duration measures the average life of a security's stream of payments.³
- Percent change in market value of security
 $\approx - (\text{Percentage Point change in interest rate}) \times (\text{duration in years})$

$$\% \Delta \text{Value} \approx -DUR \times \Delta i$$

where $\% \Delta \text{Value} = (\text{Value}_{t+1} - \text{Value}_t) / \text{Value}_t$

- Duration analysis involves using the average (weighted) duration of a financial institution's assets and of its liabilities to see how its net worth responds to a change in interest rates.

$$\begin{aligned} \Delta NW &\approx (DUR_L \times L \times \Delta i) - (DUR_A \times A \times \Delta i) \\ \frac{\Delta NW}{A} &\approx \frac{(DUR_L \times L \times \Delta i) - (DUR_A \times A \times \Delta i)}{A} \end{aligned}$$

³ $DUR = \frac{\sum \frac{CF_t}{(1+i)^t} t}{\sum \frac{CF_t}{(1+i)^t}}$

Define

$$DUR_{GAP} = DUR_A - \frac{L}{A} \times DUR_L$$

Then

$$\frac{\Delta NW}{A} \approx -DUR_{GAP} \times \Delta i$$

- (b) To manage interest rate risk in an ideal world, we adjust the composition of balance sheet to make sure that duration of asset and liability stays as close as possible.
- However as one of the tasks for financial institutions is to create maturity transformation service, this idea is almost impractical. Typically, financial institutions issue financial securities which differ from the type of security that they hold. (Think about Bank as an example.)
 - Practically, most financial institutions engage one another in swap agreement. The idea of such contract is to swap the cash-flow in such a way that neutralizes the impact of the volatility of market rates to their balance sheet.

Practice questions:

[Q1] If a bank has _____ rate-sensitive assets than liabilities, then _____ in interest rates will increase bank profits.

- A) more; a decline
- B) more; an increase
- C) less; an increase
- D) fewer; a surge

[Q2] Mortgage Crisis occurred because of lending large amounts of money to _____ risk borrowers with _____ FICO scores, given _____ biased value appraisals.

- A) High, high, upward,
- B) Low, high, downward
- C) High, low, downward
- D) High, low, upward

[Q3] The maturity of a bond is always _____ than the duration of the bond. When the maturity of the bond is zero it automatically implies that the duration is _____

- A) smaller or equal, smaller or zero
- B) bigger, smaller
- C) smaller, bigger
- D) higher or equal, zero

[Q4] In the interest rate swap contracts, the bank who receives the _____ wins over the bank who receives the _____ when the interest rate _____

- A) Variable, fixed, decreases
- B) Variable, fixed, increases
- C) Fixed, variable, increases
- D) Fixed, variable, stays the same

[Q5] (Fall 2010) If a bank has rate-sensitive assets _____ than liabilities, a _____ in interest rates will reduce bank profits, while a _____ in interest rates will raise bank profits.

- A) fewer; rise; rise
- B) fewer; decline; decline
- C) more; rise; decline
- D) more; decline; rise

[Q6] (Fall 2010) Which of the following are not reported as assets on a bank's balance sheet?

- A) U.S. Treasury securities
- B) Checkable deposits
- C) Deposits with other banks
- D) Cash items in the process of collection

[Q7] (Spring 2009) Credit risk management tools include:

- A) interest rate swaps.
- B) duration analysis.
- C) deductibles.
- D) collateral

	Assets	Liabilities
Rate-sensitive	\$40 million	\$50 million
Fixed-rate	\$60 million	\$50 million

[Q8] Assuming that the average duration of its assets is four years, while the average duration of its liabilities is three years, then a 5 percentage point increase in interest rates will cause the net worth of First National Bank to _____ by _____ of the total original asset value.

- A) decline; 10 percent
- B) increase; 20 percent
- C) decline; 5 percent
- D) decline; 15 percent

[Q9] If interest rates rise by 5 percentage points, say from 10% to 15%, bank profits (measured using gap analysis) will _____.

- A) decline by \$0.5 million
- B) decline by \$2.5 million
- C) decline by \$1.5 million
- D) increase by \$2.0 million