EE431/438 Economics of Financial Markets and Institutions

Exercise 5 : Financial Institutions

Guidance and Solutions

1. The bank you own has the following balance sheet:

Assets		Liabilities	
Reserves	$75 million	Deposits	$500 million
Loans	$255 million	Bank Capital	$100 million

   (a) If the bank suffers a deposits outflow of $20 million with a required reserve ratio on deposits of 10%, does the bank has enough reserves to meet the reserve requirement?

   Solution.
   When there ia a deposit outflow of $20 million, the bank deposits and bank reserves decline by $20 million.
   Deposits declined from $500 million to $480 million (500 - 20) and reserves declined from $75 to $55 million (75-20).
   With $480 million of deposits, the bank is required to hold $48 million of reserves.
   The bank has $55 million of reserves, which is more than than the required reserves of $48 million.
   Therefore, the bank has enough reserves to meet the reserve requirement.

   (b) If the bank suffers a deposits outflow of $50 million with a required reserve ratio on deposits of 10%, does the bank have enough reserves to meet the reserve requirement?

      i. *Solution.* (go back to the original balance sheet as the starting balance sheet)
      When there ia a deposit outflow of $50 million, the bank deposits and bank reserves decline by $50 million.
      Deposits declined from $500 million to $450 million (500 - 50) and reserves declined from $75 to $25 million (75-50).
      With $450 million of deposits, the bank is required to hold $45 million of reserves.
      The bank has $25 million of reserves, which is less than than the required reserves of $45 million.
      Therefore, the bank does not have enough reserves to meet the reserve requirement.

      ii. *Solution.* (use the balance sheet in question (a) as the starting balance sheet)
      When there ia a deposit outflow of $50 million, the bank deposits and bank reserves decline by $50 million.
      Deposits declined from $480 million to $430 million (480 - 50) and reserves declined from $55 to $5 million (55-50).
      With $430 million of deposits, the bank is required to hold $43 million of reserves.
      The bank has $5 million of reserves, which is less than than the required reserves of $43 million.
      Therefore, the bank does not have enough reserves to meet the reserve requirement.

   * To avoid confusion occurs when there are consecutive questions, the exam questions may specify clearly which balance sheet a candidate must use as the starting balance sheet. *

2. Suppose that you are the manager of a bank whose $75 million of asset have an average modified duration of 4, while its $75 million of liabilities have an average modified duration of 6. Conduct

a duration analysis for the bank and show what will happen to the net worth of the bank if interest rate rise by 2%.

Solution.

Percent change in market value of security = - percent change in interest rate × modified duration
As the interest rate rise by 2%, the market value of the bank's asset falls by 8% (2 × 4).
The bank's asset declines from $75 million to $69 million (75 - 8%(75)).
As the interest rate rise by 2%, the market value of the bank's liability falls by 12% (2 × 4).
The bank's liabilities delines from $75 million to $66 (75-12%(75)).
The net result is that the net worth (the market value of asset minus the liabilities) is increased by $3 million.

3. Suppose that you are the manager of a bank that has $15 million of fixed-rate assets, $30 million of rate-sensitive assets, $25 million of fixed rate liabilities and $20 million of rate-sensitive liabilities. Conduct a gap analysis for the bank, and show what will happen to bank profits if interest rate rises by 5%.

   Solution.

   Suppose that interest rate rises by 5%. The income on asset rises by $1.5 million ($30 million of rate-sensitive assets × 5%).
   The payments on the liabilities rise by $1 million ($20 million of rate-sensitive liabilities × 5%).
   The bank's profit now rises by $0.5 million.

   The gap is equal to the amount of rate-sentitive asset minus the amount of rate-sensitive liabilities. In this case, the gap is equal to 30 -20 = $10 million.
   The gap is positive. Therefore, the bank profits will rise when the interest rate increases.