

Homework 5
Answer Key

Show all your work. Graphs should be clearly labeled. The total for the homework is 5 points. Start early. Homework is due in class on Wednesday, April 14 (or if you cannot make it to class, drop it off in the main office, Buchanan Tower 997, by the end of the class). No late homeworks are excepted.

Problem 1 (3 points)

Consider a balance sheet of a bank (see also Chapter 12 in Champ-Freeman, or Lecture 27), where H denotes total deposits, W – net worth, γ – reserve requirement. Suppose capital requirement (ratio of net worth to total assets) is 10%, and reserve requirement is 10%.

- How much does the bank invest in risk-bearing assets if $H = \$18$ million?
- Suppose bank's shareholders are considering to invest \$10 million of their risk-bearing portfolio into an asset that returns \$14 million with probability $\frac{1}{2}$ and \$6 million with probability $\frac{1}{2}$. Will shareholders decide to make this investment if they are risk-averse and require 5% risk premium? (HINT: recall that shareholders at most can lose the amount of net worth)
- What is the minimal capital requirement that would prevent such a risky investment?

ANSWER:

- Capital requirement is $W/(W+H)=0.08$, so that $W=0.1H/(1-0.1)=\$18/9=\2 million. Total assets then are $H+W=\$18+\$2=\$20$ million. Investment in risk-bearing assets is then $(1-\gamma)H+W=(1-0.1)\$18+\$2=\$16.2+\$2=\$18.2$ million.*
- In case of gain the net return to bank (and shareholders) is \$4 million, in case of loss shareholders lose \$2 million and depositors lose the remaining \$2 million. Hence the expected gross return for shareholders on this asset is $(0.5*\$14+0.5*(\$10-\$2))/\$10=\$11/\$10=1.1$, or 10% on net. Since this return exceeds the risk premium that they need to invest in a risky asset, they will decide to make this investment.*
- Capital requirement should be increased so that implied net return on such a risky investment is not more than 5% (risk premium that shareholders want). Let W_1 denote net worth under new capital requirement. In case of a loss in investment, shareholders would lose all of W_1 . Return on the asset in this case is $(0.5*\$14+0.5*(\$10-W_1))/\$10=1.05$, or $\$12-0.5*W_1=\10.5 , or $0.5W_1=\$1.5$, or $W_1=\$3$. So the capital requirement must be $W_1/(H+W_1)=\$3/\$21=0.14$, or 14%.*

Problem 2 (1 point)

How did the creation of the Bank of Canada in 1935 help the Canadian economy?
Provide and explain at least 2 reasons.

ANSWER: In the early 1930s Canadian economy was in the recession ("the Great Depression"), output and return on investment by banks was unexpectedly low, so that many banks were in need for liquidity. The Bank of Canada was a provider of such liquidity ("the lender of last resort"). The price of liquidity ("the Bank rate") was lower when the need was higher, such as at the time of the recession. In this sense, Bank of Canada was conducting monetary policy (in contrast, before the Bank, during the recession the rate was not decreased and hence much needed liquidity was very expensive).

Another benefit was unification of the national currency into one banknote, the Canadian dollar. Single unit of account allows the Bank of Canada to maintain a better control of the price level in the economy.

Problem 3 (1 point)

How did the introduction of LVTS help Canadian monetary policy?

ANSWER: LVTS increased efficiency and transparency of the clearing of firms' accounts by allowing them observe the balances from their daily transactions within the same day. Firms were allowed to trade outstanding balances with each other before settling residual account balances with the Bank of Canada. Hence, the residual balances more accurately represent the lack or excess of liquidity in the financial system, allowing the Bank to intervene more efficiently.