SØK 2010
Final exam
May 27, 2019

Text in English

Answer all questions. The number of points indicate weights in the final grade.

1. (15 points) The classical textbook version of basic banking describes the bank as an institution that accepts deposits and tries to make a profit investing the deposited money in loans. Does that give a good description of the typical workday of a modern banker? Why or why not?

Answer: Today's bankers seek to make money by lending money. Loans have to be financed, but deposits are only one way of financing. Bond issues and money market loans are more important in practice. Each bank is connected with the entire financial system.

2. (15 points) In regard to a bank balance sheet, explain the following:
   a. The difference between assets and liabilities
   b. Why deposits are liabilities
   c. Why loans are assets
   d. Why equity is entered on the liability side
   e. Why liquid money (currency, deposits with the central bank) are assets, whereas capital is a liability.
   f. The risks on the asset side and the liability side

Answer:

a. Assets are objects you own and the claims you hold on others. Market securities and loans to clients are typical bank examples. Liabilities are the claims that others hold on you. Deposits you have accepted and bonds you have issued are examples.
b. Deposits are like loans from your clients and thus a liability.
c. Loans are claims that you hold on your loan clients.
d. Equity is, by definition, the excess of assets over other liabilities. It is your net worth. You put it on the liability side so as to make the two sides equal.
e. Deposits with the central bank is a claim on the central bank and hence an asset. Currency is an object that you own and thus an asset. Alternatively, and formally, you can think of currency as a claim on the government. By a bank's capital with essentially mean its equity. Thus, it belongs on the liability side. Note: Capital is not a collection of objects, but the overall difference between assets and liabilities.
f. On the asset side, the bank faces default risks for its loans and market risk for securities. On the liability side, the main risk is for a run.

3. (15 points) On Jan 21 of this year, the yields to maturity of Norwegian government bonds of one-, two-, and three-year Norwegian government bonds were as follows:
   1 year: 1.02%
   2 years: 1.13%

3 years: 1.22%

Compute the implicit forward one-year rates one and two years hence.

Answer:

The formulas for implicit forwards:

$$(1+y_3)^3 = (1+r_{01})(1+r_{12})(1+r_{23})$$
$$(1+y_2)^2 = (1+r_{01})(1+r_{12})$$
$$y_2 = r_{01}$$

Solve:

$$r_{12} = \frac{(1+y_2)^2}{1+y_1} - 1 = 1.24\%$$

$$r_{23} = \frac{(1+y_3)^3}{(1+r_{01})(1+r_{12})} - 1 = \frac{(1+y_3)^3}{(1+y_1)\,(1+y_2)^2/(1+y_1)} - 1$$
$$= \frac{(1+y_3)^3}{(1+y_2)^2} - 1 = 1.40\%$$

Approximate method:

$$r_{12} = 2y_2 - y_1 = 1.24\%$$
$$r_{23} = 3y_3 - 2y_2 = 1.40\%$$

The approximation is very close because all the yields are small.

4. (15 points) What is the basic difference between stocks and bonds? It is sometimes claimed that bonds only have downside risk, whereas stocks have upside as well as downside risks. Is this claim correct? Why or why not?

Answer:

Stocks give you (partial) ownership of the company, including the right to dividends. A bond is nothing but an "I owe you," i.e. a promise of a certain number of coupon payments and the eventual payment of the face value. Bonds are debt, stocks are equity. Stocks certainly have upside as well as downside risks. A bond has only downside risk if held to maturity. However, bonds may appreciate unexpectedly before maturity, e.g. if interest rates fall.

5. (15 points) Explain risk weighting of bank assets and the difference between the risk-weighted capital ratio and the leverage ratio. What are the advantages and disadvantages of basing bank regulation on the risk-weighted capital ratio and the leverage ratio, respectively?

Answer: All the bank's assets are assigned a weight according to their considered riskiness. The riskiest loans and securities are weighted 100%, the safest ones, like government securities, are assigned zero weight. The weights can either be based on a standardized approach or on an intern ratings (IRB) system, based on the bank's past experience. Such a system must be approved by the regulator agency. The weighted values of the bank's assets are then summed up to yield the total Risk Weighted Assets (RWA). The leverage ratio is the bank's unweighted assets divided by its capital. Both measures thus are fractions with the bank's capital in the numerator. The denominators are RWA and total (unweighted) assets, respectively.

6. (25 points) Whenever Norges Bank raises or cuts its policy interest rate (the Sight Deposit/Folio) rate, commercial banks usually move their lending rates similarly. Explain the various steps of the process from the central bank decision to the rate changes of the commercial banks.

Answer: The first step is for the Norges Bank to adjust the amount of liquidity it offers to the banks so as to make sure that it's just the amount needed to clear the market at the new policy rate (cf graph from lectures). Arbitrage then makes the NOWA rate match the new policy rate. Via further arbitrage ,this change then is reflected in the interbank NIBOR market, the T-bill market, and the bond market. As funding costs thus rise, banks see the need to raise lending rates. Deposit rates are raised so as to attract deposits for funding purposes. In practice, the banks anticipate this complicated process and just raise rates without much further considerations.