Exam SØK2010, fall 2022

Question 1 (25%)

Briefly explain the following terms:

a) Money
b) Hyperinflation
c) Commercial bank
d) Illiquid asset
e) Collateral
f) Risk aversion
g) Cryptocurrency
h) Coupon bond

Question 2 (40%)

Consider projects in a two-period case. All projects have investment I in Period 0 and receive a payoff in Period 1. The investors have equity of E and need a loan L, where L = (I – E). The projects have an uncertain payoff. The payoff is U with probability p and zero with probability (1 - p).

a) Formulate the condition that an investor will invest in the project.
b) Formulate the condition that a bank will provide a loan.
c) What will be the interest rate on the loan?
d) What is the effect on the interest rate of an increase in E?

Now consider that there are alternative projects to the risky type above. The alternative projects are safe with known payoff V in Period 1. Otherwise, they are similar to the risky projects. The share of safe projects is α and the share of risky projects is $(1 - \alpha)$. There are many investors, but each investor has only one investment option. Only the investor knows whether it is a risky or safe project. The banks know U, V, p and α.

e) Describe the asymmetric information in this case.
f) Formulate the condition that the bank will provide a loan to an investor.
g) What will be the interest rate on the loan?
h) What is the effect on the interest rate of an increase in E?
i) Explain how the kind of asymmetric information in this case can give inefficient market outcomes. Is it possible that the market will be efficient with this kind of asymmetric information? Explain.
j) Consider the following values of the parameters in the model: U=13, V = 12, I = 10, E = 5, p = 0.8, and $\alpha = 0.5$. For these parameter values, calculate the net present value of the two types of projects, the expected profit for the two types of investors, and the expected profit of the bank. Comment on the results.

Question 3 (35%)

A bank is about to issue fixed term bonds that will mature in three years.

a) Develop the relationship between the price of the bond and the interest rate of the bond.
b) The face value of the bond (the amount paid at maturity) is 100 and the interest rate for the credit rating of the bank is 7%. What will be the price of the bond?
c) Develop a demand and supply framework which includes the price of the bond and the number of bonds.
d) Use the demand and supply framework to discuss the effect on demand, supply, the price and the interest rate of the bond in the following cases.
    i. Improved credit rating of the bank
    ii. Increased inflation
    iii. The central bank increases the policy rate
    iv. Improved business confidence (expectations of future development for the firms)
e) Why do banks issue bonds?
f) Why do governments issue bonds?