Candidate instructions

ECON4335 – The Economics of Banking

Postponed written examination
Monday, 15 January, 2024 at 09.00 (3 hours)

About the exam

- The examination consists of three questions with several sub-questions.
- Question 1 counts for 40 points, question 2 counts for 20 points, and question 3 counts for 40 points of the total grade. Each sub-question is weighted as indicated.
- The examination text is in English and you must submit your response in English.

Digital candidate instruction

You will find candidate instructions for the school examination as an external resource in the text. The candidate instructions show how UiO conducts the school examination.

Examination support material

Dictionaries handed in before the examination.

Digital sketches

- You may use sketches on all questions.
- You are to use the sketching paper handed to you.
- You can use more than one sketching sheet per question.
- Read the instruction for filling out sketching sheets below.
- You will NOT be given extra time to fill out the "general information" on the sketching sheets (task codes, candidate number etc.)

After the exam

You will not have access to your answer right after the exam. The reason is that the sketches must be scanned into your answer. You will have access to the answer after approx. 2-3 days. You are encouraged to check your answer and see that all scantron sheets have been included and are correctly placed. If something is not correct, you must immediately send an email to post@econ.uio.no.

1(a) Question (1a)

Weight: 10 points

Is the following statement true, false, or uncertain? Briefly explain in words.

"Banks' funding liquidity may change drastically during crises, and many sources of funding that work well in normal times may suddenly dry out. It is therefore crucial for banks to always maintain more stable funding sources which are less vulnerable to market stress."

Fill in your answer here

Maximum marks: 10

1(b) Question 1(b)

Weight: 10 points

Is the following statement true, false, or uncertain? Briefly explain in words.

"There can never be any persistent excess demand for bank loans, because if there are any borrowers whose demand for bank loans is not met and who are willing to pay higher loan rate, profit-maximizing banks will always raise their loan rates, lend to these borrowers and clear the market."

Fill in your answer here

Maximum marks: 10

1(c) Question 1(c)

Weight: 10 points

Is the following statement true, false, or uncertain? Briefly explain in words.

"Although there are usually strict conditions for a central bank to conduct the lender-of-last-resort policy, in reality, when a bank is in trouble, the central bank is often forced to ignore these conditions and bail out the failing bank anyway."

Fill in your answer here

Maximum marks: 10

1(d) # Question 1(d)

Weight: 10 points

Is the following statement true, false, or uncertain? Briefly explain in words.

"Rational investors may have the incentive to invest in a bubble asset, even if they are fully aware of the fact that the bubble will certainly burst one day in the future."

Fill in your answer here

Maximum marks: 10

2(a) # Question 2(a)

Consider an economy where there is a large number of risk-neutral entrepreneurs (normalize their population to be 1) with limited liability and no initial wealth. Each of the entrepreneurs owns one project, and each project can only be initiated after 1 unit of initial investment. To finance the projects, each entrepreneur can borrow 1 unit from a monopolistic and risk-neutral bank, then pay back after her project returns. The bank collects deposits from depositors and lends to the entrepreneurs at a gross lending rate R for each loan. The bank does not have deposit insurance, and depositors are happy to deposit in the bank as long as the expected gross return rate of the bank deposits is equal to 1.

Among the entrepreneurs, half of the entrepreneurs' projects are safe projects: Each safe project generates a gross return of 2 with probability 0.85, or a gross return of 0 otherwise. Half of the entrepreneurs' projects are risky projects: Each risky project generates a gross return of 4 with probability 0.4, or a gross return of 0 otherwise. Entrepreneurs know the types of their own projects; the bank only knows the payoff structure of each type of the projects, but it does not know the exact type of any individual entrepreneur's project. As a result, the bank has to ask for the same gross lending rate R for every entrepreneur that borrows from the bank.

(**Weight: 10 points**) Suppose that the bank can choose any value of R.

1. Is there any range of R, under which **only** entrepreneurs with risky projects are willing to borrow from the bank?
2. Is there any range of R, under which **both** entrepreneurs with safe projects and entrepreneurs with risky projects are willing to borrow from the bank?

Fill in your answer here

Maximum marks: 10

2(b)

Question 2(b)

(**Weight: 10 points**) Following Question 2(a), given that the bank has two options

(a) Lend to all entrepreneurs,
(b) Only lend to entrepreneurs with risky projects,

show that the profit-maximizing bank will choose option (b). Compare option (b) to option (a), what is the bank's gain from choosing option (b) instead of option (a), and what is the bank's loss from choosing option (b) instead of option (a)?

Fill in your answer here

Maximum marks: 10

3(a)

Question 3(a)

Consider an economy that extends to 3 periods, $t = 0, 1, 2$. There are three types of agents in the economy and all of them are risk neutral:

- Depositors, who deposit in the banks in the beginning of $t = 0$ and withdraw in $t = 2$;
- Banks, who collect deposits from depositors and invest in illiquid long assets in $t = 0$, then repay depositors from the return of the illiquid assets in $t = 2$. Banks have limited liability;
- Investors, who have unlimited funds and are potential buyers of bank assets.

In the beginning of $t = 0$, after collecting deposits and investing in illiquid assets, each bank starts with a balance sheet that consists of

- Illiquid assets that will return Z in $t = 2$;
- Deposits with value D, and $D < Z$.

It is publicly known later during $t = 0$ that a liquidity shock is likely to take place in $t = 1$: With probability q (with $0 < q < 1$), a fraction f (with $0 < f < 1$) of depositors in each bank will withdraw in $t = 1$. The only way for banks to meet the cash demand of depositors in $t = 1$ is to sell the illiquid assets. Banks can either sell a fraction of the illiquid assets to investors in $t = 0$ or sell a fraction of the illiquid assets to investors in $t = 1$: For each piece of illiquid asset that generates one unit return in $t = 2$, its market price is P_0 if it is sold in $t = 0$, and its market price is P_1 if it is sold in $t = 1$. Assume that the market price P_1 is exogenously given.

(**Weight: 10 points**) After knowing about the liquidity shock in $t = 0$, what condition should P_0 and P_1 satisfy to ensure that investors are indifferent to buy the illiquid assets in either $t = 0$ or $t = 1$? If this condition holds, let us denote the price under which investors are willing to pay in $t = 0$ as P_0^{bid}.

Fill in your answer here

Maximum marks: 10

3(b)

Question 3(b)

Let us assume that P_0^{bid} is large enough, such that if banks sell enough illiquid assets at P_0^{bid} in $t = 0$, they would be solvent after $t = 1$, should the liquidity shock take place. Assume also that P_1 is so low that if banks only sell illiquid assets in $t = 1$, they would ***not*** be solvent after $t = 1$, should the liquidity shock take place, that is, $P_1[Z - (1 - f)D] < fD$.

(**Weight: 10 points**) In $t = 0$, after knowing that the liquidity shock is likely to take place in $t = 1$

1. If a bank decides to sell a fraction of its illiquid assets in $t = 0$ to fully prepare for the liquidity shock and not to sell any assets in $t = 1$, what is the bank's expected profit?
2. If a bank decides not to prepare anything in $t = 0$ and only sell assets in $t = 1$ if the liquidity shock takes place, what is the bank's expected profit?

Fill in your answer here

Maximum marks: 10

3(c)

Question 3(c)

(**Weight: 10 points**) Following Question 3(b),

1. If banks are indifferent to sell assets in either $t = 0$ or $t = 1$, what condition should P_0 and P_1 satisfy? If this condition holds, let us denote the price under which banks are willing to sell in $t = 0$ as P_0^{ask}.
2. Compare P_0^{ask} with P_0^{bid} that is derived in Question 3(a), show that there is no market in $t = 0$.

Fill in your answer here

Maximum marks: 10

3(d)

Question 3(d)

(Weight: 10 points) Someone claims that

"Banking regulator should focus more on sending banks warnings on market stress, rather than requiring banks to hold more liquidity; because if a bank is properly warned about a forthcoming liquidity crisis, it will have the incentive to build up sufficient liquidity buffer before the crisis takes place so that it will survive the crisis on itself."

Based on your findings in Question 3(c), comment in words, not using maths, on such the claim above.

Fill in your answer here

Maximum marks: 10