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Department of Economics

Examination paper for SØK2010 – Banking

Examination date: 21.05.2021

Examination time (from-to): 09:00 – 13:00

Permitted examination support material: A / All support material is allowed

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OTHER INFORMATION

Make your own assumptions: If a question is unclear/vague, make your own assumptions and specify them in your answer. Only contact academic contact in case of errors or insufficiencies in the question set.

Weighting: The weighting of the problems is only indicative.

Saving: Answers written in Inspera Assessment are automatically saved every 15 seconds. If you are working in another program remember to save your answer regularly.

Cheating/Plagiarism: The exam is an individual, independent work. Examination aids are permitted, but make sure you follow any instructions regarding citations. During the exam it is not permitted to communicate with others about the exam questions, or distribute drafts for solutions. Such communication is regarded as cheating. All submitted answers will be subject to plagiarism control. *Read more about cheating and plagiarism here.*

Citations: We do not require referencing/citations

Notifications: If there is a need to send a message to the candidates during the exam (e.g. if there is an error in the question set), this will be done by sending a notification in Inspera. A dialogue box will appear. You can re-read the notification by clicking the bell icon in the top right-hand corner of the screen. All candidates will also receive an SMS to ensure that nobody misses out on important information. Please keep your phone available during the exam.

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The additional 30 minutes are reserved for submission. If you experience technical problems during upload/submission, you must contact technical support <u>before</u> the examination time expires. If you can't get through immediately, hold the line until you get an answer.
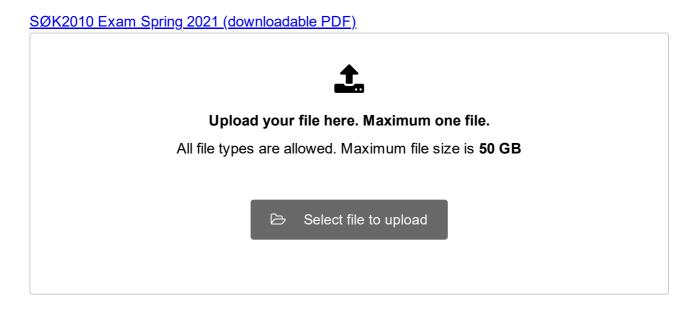
Your answer will be submitted automatically when the examination time expires and the test closes, if you have answered at least one question. This will happen even if you do not click "Submit and return to dashboard" on the last page of the question set. You can reopen and edit your answer as long as the test is open. If no questions are answered by the time the examination time expires, your answer will not be submitted.

Withdrawing from the exam: If you become ill or wish to submit a blank test/withdraw from the exam for another reason, go to the menu in the top right-hand corner and click "Submit blank". This cannot be undone, even if the test is still open.

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1 Exam

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SØK2010 Spring 2021 Exam

Make the assumptions you find necessary. The weighting of the problems is only indicative.

Part I: Short Questions

1. Central Bank (10%)

A central bank balance sheet is a financial statement that summarizes the central bank's assets (i.e. what the central bank owns) and liabilities (i.e. what the central bank owes) at a specific point in time.
Which of the following items belong on the assets-side of a central bank balance sheet:
  i.   Securities
  ii.   Foreign reserves
  iii. Reserves of banks
  iv.   Currency in circulation
  v.   Discount loans to banks
  vi.   Gold
  vii. Buildings

2. Bank run (15%)

List three possible ways to stop or reduce the risk of a bank run. Discuss how they work and their limitations or challenges.

3. Agency Problems (13%)

The following examples describe either an adverse selection problem or a moral hazard problem. Classify each example and explain why it is an adverse selection problem or a moral hazard problem.
  a) Government deposit insurance encourages banks to pursue risk-shifting. To see the point, note that if deposits are insured by the government, no depositor has incentive to monitor her bank and to run on bad banks. With less monitoring, banks invest in high-risk and high-expected return projects. By doing so, the bankers expect high profit in a short period, but leave the risk to the government.
  b) Some firms may seek funding for risky projects with negative net present value. The projects can still be profitable for the firms if it is financed with a loan. If the project goes well, the firm makes money and pays back the lender, if it goes poorly, it is the lender's money that is lost. The lender is expected to lose on such loans, but it is difficult for the lender to determine if the borrower is good or bad.

4. Agency Problems (12%)

Suggest how to mitigate each agency problem in Question 3. Explain.

Part II:

5. Central Banking (20%)

How will the following actions by the central bank affect the (interbank overnight) interest rate:

a) Open market sale of government bonds.
b) Decrease in the required reserves ratio.
c) Decrease in the discount rate.

6. Debt, Collateral and Agency Problems in Banking (30%)

Consider that a borrower (firm) with limited liability signs a debt contract with the lender (bank) to finance a project. Both contract parties are risk-neutral. There are two dates, 0 and 1. The discount rate is zero.

- The project needs initial investment, 1, at date 0, and will generate a stochastic payoff at date 1. With probability p, the project will be a success and generate a payoff U, and with probability $1 - p$, the project will be a failure and generate a payoff D. U and D are positive constants and $U > 1 > D$.

- The borrower has no wealth, so the project will be fully financed by debt.

- The debt contract is signed at date 0, with the loan size (1), maturity (1) and the interest rate (r). In the following, let $R = 1 + r$ to simplify notations.

- Interest will be paid only at maturity. Namely, for the one unit of loan, the borrower needs to pay back to the lender R at maturity (date 1).

With the above settings, answer questions.

a) What is the net present value (NPV) of the project?

In the following, we assume that the project has positive NPV.

b) If the bank is a monopolist in the credit market, what is R? Instead, if the credit market is competitive, what is R?

In the following, assume that the credit market is competitive.

c) What is the change in R for an increase in p, U or D, keeping all else equal? Show mathematically and explain your intuition.

d) The borrower can pledge collateral with value C, where $C < 1 - D$ is a positive constant. What is R? What is the change in R for an increase in C, keeping all else equal? Show mathematically and explain your intuition.

Assume that $p = 0.4$, $U = 1.5$, and $D = 0.6$. The firm can also choose a safe project where the payoff is 1.25 for sure, and the initial investment is 1.

e) The bank asks for an interest rate of 10%. Which project will the firm choose to undertake? Give an answer by comparing the firm's payoff from the two projects. Can the bank break even?

f) Instead, if the bank asks for an interest rate of 5%. Which project will the firm choose to undertake? Can the bank break even?

g) Suppose that the bank cannot observe the firm's project choice, so the firm is free to choose which of the projects to undertake. Denote the interest rate as r. For what range of r will the firm undertake the safe project?