

i Candidate instructions

ECON4335 – The Economics of Banking – Postponed exam – Home exam

Exam date and time: Tuesday, 11 January, 2022 from 09.00 – 14.00 (five hours)

Language: The examination text is given in English, and you must submit your response in English.

Guidelines: You should answer Question 1 (verbally) in Inspera. For questions 2 and 3 applies: You should upload your text in pdf format - **one pdf per problem**. You can scroll back and forth in the problem set.

You should familiarize yourself with the rules that apply to [the use of sources and citations](#).

The answers to your exams are not expected to meet the formal requirements for references and citations in the fall 2021 exam. However, you should make references by indicating the source in the text. Creating a bibliography is not required. Whether you choose to do so, or not has no impact on your grade. The purpose of a reference is that the examiner should be able to look up the source him/herself, either to read it or to evaluate your interpretation. If you are referring to a limited part of the source, the reference should indicate which part of the source you refer to by using page numbers. If you are quoting directly from a source, follow the normal citation practice – with quotations marks and references to the source.

The exam lasts for only five hours. We recommend that you use the available time to work on the problem set, as well as allocate time to scan attachments with graphs and/or equations.

The problem set: The problem set consists of three questions, with several sub-questions. They count as indicated. Start by reading through the whole exam, and make sure that you allocate time to answering problems you find easy.

Note: You can resize the question by clicking on the three dots on the right, hold and pull to the right. Similarly for the three dots at the bottom, click, hold and pull down. Then the text will be larger. **Or, you can download the pdf file to your own device by using the link to the right (recommended).**

Digital hand drawings/graphs/equations: You will find information about options for hand drawings on this website: <https://www.uio.no/english/studies/examinations/submissions/options-for-hand-drawings.html>

Submission in Inspera

- Read more about exam and submission in Inspera. <https://www.uio.no/english/studies/examinations/submissions/>.
- Remember: It is your responsibility to upload the **correct version of the correct answer**. (Check that this is the right answer.) Be sure to allocate enough time to upload your answers.
- When your answer is uploaded, you will see that the exam is uploaded and saved.
- To submit your answer, please see https://www.uio.no/english/studies/examinations/submissions/submit_answer/. You can either choose the “submit now” or the “Automatic submission”.
- You can make changes in your exam until the deadline.

- You will find the answer under Archives (please check that this is the right answer by opening the file).

Do you have any questions during the exam?

Please send an e-mail, titled "ECON4335" To hjemmeeksamen@sv.uio.no from your university email.

Grading: The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

1 Question 1(a)

Weight: 10 points

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

"Securitization does not change asset return; instead, it only changes the distribution of asset return among investors. Therefore, securitization does not affect investors' welfare."

Fill in your answer here

Maximum marks: 10

2 Question 1(b)

Weight: 10 points

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

"To reduce the enormous social cost of destructive bank runs, central bank shall always commit to bail out troubled banks to fully eliminate bank runs."

Fill in your answer here

Maximum marks: 10

3 Question 1(c)

Weight: 10 points

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

"Bubbles are not sustainable; they cannot grow forever, so that they will surely burst sometime in the future and worth nothing afterwards. Knowing this, rational investors never invest in bubbles in the first place."

Fill in your answer here

Maximum marks: 10

4 Question 1(d)

Weight: 10 points

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

"If banks care about their profit in the long run, they will take less risks today. Because taking more risks today implies that in the future banks will be more likely to fail, exit the business and miss the profit in the long run. Knowing this, forward-looking banks take less risks in the first place."

Fill in your answer here

Maximum marks: 10

5 Question 2(a)

Weight: 10 points

In an economy there are two risk-neutral entrepreneurs who are protected by limited liability, and they have no initial wealth so that they need to borrow from the bank. Each of the entrepreneurs needs to start her project at a cost of 1. The financing of their projects is done by a monopolistic and risk-neutral bank, who is taking deposits from depositors and lending to entrepreneurs.

One entrepreneur (call her the good entrepreneur) owns a project that yields a gross return of 2 with a probability of 0.8. Otherwise the project's gross return is 0.

The other entrepreneur (call her the bad entrepreneur) owns a project that yields a gross return of 3 with a probability of 0.3. Otherwise the project's gross return is 0.

Whether an entrepreneur is good or bad is known only to the entrepreneur herself. The bank only knows the payoff structures of these two projects, but it does not know whether an entrepreneur is good or bad. We further assume that the bank does not have deposit insurance. Given that the bank is a monopoly, depositors are happy as long as they receive an expected repayment of 1 for each unit of deposit.

The bank's problem is to choose its lending rate that is charged from borrower(s). Suppose the bank can choose a gross lending rate that ranges from 1 to infinity, show how the bank's lending rate affects which entrepreneur(s) will borrow from the bank.



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Maximum marks: 10

6 Question 2(b)

Weight: 10 points

The bank is willing to do business only if its expected profit is non-negative. Compute the bank's optimal lending rate and its expected profit under such lending rate.



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7 Question 3(a)

Weight: 15 points

Consider a one-good, three-date economy: There are many ex ante identical consumers whose population is normalized to be 1. Each consumer is endowed with one unit of resource in $t = 0$. A consumer's consumption may take place either in $t = 1$ or $t = 2$, while the consumer's preference on the timing of her consumption is only revealed in $t = 1$. With probability π , a consumer is an impatient one, who only values consumption in $t = 1$, while with probability $1 - \pi$, a consumer is a patient one, who only values consumption in $t = 2$. Although the value of π is publicly known, a consumer's type is her private information and cannot be observed by anyone else. A consumer's utility from consuming c_t in date t (t is either 1 or 2) is $(c_t)^{\frac{1}{2}}$.

The economy has two technologies of transferring resources between periods: Storage technology with gross return equal to 1, and a long-term investment technology with a constant gross return R (with $R > 1$) in $t = 2$ for every per unit invested in $t = 0$. If necessary, an on-going long-term project can be liquidated, or, stopped prematurely in $t = 1$, with a return $0 < c < \frac{1}{R}$.

In this economy, only banks own the long-term investment technology, so that consumers have to deposit in the banks in $t = 0$ if they want to benefit from the long-term investment. When a consumer deposits her endowment at a bank in $t = 0$, she makes a deposit contract with the bank that states:

- If she claims to be an impatient consumer in $t = 1$, she will be repaid c_1 by the bank in $t = 1$;
- Otherwise if she claims to be a patient consumer, she will be repaid c_2 by the bank in $t = 2$.

After collecting deposits in $t = 0$, banks invest a share α (with $0 \leq \alpha \leq 1$) of their funds in storage and a share $1 - \alpha$ of their funds in the long-term investment. Banks engage in perfect competition so that they maximize consumers' expected return in $t = 0$ and make zero profit.

Specify a bank's maximization problem in $t = 0$ and compute its optimal c_1 , c_2 , α . What condition is needed to ensure that the deposit contract is correctly implemented, i.e., consumers choose the timing of withdrawing from banks according to their preferences, even if their preferences are not observed by banks?



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Maximum marks: 10

8 Question 3(b)

Weight: 10 points

Show that $c_1 < 1$. Why is an impatient consumer willing to accept the deposit contract, even if his consumption (that is, c_1) is lower than the gross return of investing in the storage technology (which guarantees a gross return of 1)?



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Maximum marks: 10

9 Question 3(c)

Weight: 15 points

Besides the equilibrium that you have characterized in Question 3(a) (that is, an impatient consumer claims c_1 from her bank in $t = 1$ and a patient consumer claims c_2 from her bank in $t = 2$), show that there is another equilibrium that is characterized by

- All consumers -- both impatient and patient consumers -- claim c_1 from their banks in $t = 1$;
- Banks cannot meet the consumers' claims, and banks have to fail in $t = 1$.



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Maximum marks: 10