

1. Are the following statements true, false, or uncertain? Briefly explain (40 points)

Question	Question title	Marks	Question type
i	Candidate instruction		Information or resources
1(a)	Question 1(a)	10	Text area
1(b)	Question 1(b)	10	Text area
1(c)	Question 1(c)	10	Text area
1(d)	Question 1(d)	10	Text area

2. Shorter Analytical Questions: Moral Hazard and the Information Rent (20 points)

Question	Question title	Marks	Question type
2(a)	Question 2(a)	10	Essay
2(b)	Question 2(b)	10	Essay

3. Longer Analytical Questions: Fundamental-Driven Bank Runs and Deposit Insurance (40 points)

Question	Question title	Marks	Question type
3(a)	Question 3(a)	15	Essay
3(b)	Question 3(b)	15	Essay
3(c)	Question 3(c)	10	Text area

i Candidate instruction**ECON4335 – The Economics of Banking**

Written examination

Wednesday, 20 December, 2023 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 1(a)**Weight: 10 points**Is the following statement true, false, or uncertain? Briefly explain in words.

"Bank capital is costly, as shareholders usually ask for high return on equity. Requiring banks to hold more capital will thus eventually force banks to charge higher loan rates from borrowers. Therefore, to reduce borrowers' financing cost and increase banks' efficiency, regulators should allow banks to increase leverage and reduce capital holdings."

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.

"If the central bank requires banks to hold more reserves, banks' demand for reserves will be higher. This will lead to a rise in interbank lending rate, hence a rise in banks' cost of funding liquidity, which makes it more costly for banks to issue new loans. Therefore, higher reserve requirement always implies monetary tightening."

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.

"When house prices are rising, mortgage loan borrowers' loan-to-value ratio will fall, and their borrowing constraints will no longer be binding. Such borrowers shall use the opportunity to increase borrowing from banks until the borrowing constraints are binding again, in order to increase their consumption."

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.

"More competition among banks will force banks to increase deposit rates for depositors and reduce loan rates for borrowers, which benefits both depositors and borrowers. Therefore, bank regulators should enhance bank competition as much as possible, in order to improve social welfare."

Fill in your answer here

Maximum marks: 10

2(a) Question 2(a)

Consider an economy in which many entrepreneurs want to invest in either of the two types of projects:

(1) Good projects. A good project needs 1 unit of initial investment. With probability 0.8, a good project will be successful with a gross return of 1.5; otherwise the project will fail with a gross return of zero.

(2) Bad projects. A bad project needs 1 unit of initial investment. With probability 0.4, a bad project will be successful with a gross return of 1.5; otherwise the project will fail with a gross return of zero. If an entrepreneur invests in a bad project, she will receive a private benefit (not observable to the public) of 0.1, no matter whether the project is successful or not.

Entrepreneurs do not have any initial wealth, so they have to borrow from a *monopolistic* lender in the economy. The objective of this lender is to maximize the profit by setting a gross lending rate of R on lending.

First, an entrepreneur makes a choice on which type of project to invest in, then she borrows from the lender at a gross lending rate of R and starts her project. Each entrepreneur has limited liability, that is, she pays back the lender out of the return that is generated from her project. The return of a project is verifiable, that is, the actual return of a project is publicly observable.

(Weight: 10 points) Suppose each entrepreneur's choice of her project is observable to the lender, before she borrows from the lender.

What will the lending rate R be in equilibrium? What will the entrepreneurs' choices of their projects be in equilibrium?

Fill in your answer here

Maximum marks: 10

2(b) Question 2(b)

(Weight: 10 points) Suppose the lender can never observe entrepreneurs' choices of their projects.

(1) What will the lending rate R be in equilibrium? What will the entrepreneurs' choices of their projects be in equilibrium?

(2) Explain using words, not maths, why your results here are different from those that you obtain in Question 2(a).

Fill in your answer here

Maximum marks: 10

3(a) Question 3(a)

Consider an economy that extends over three periods, $t = 0, 1, 2$. There are many ex ante identical consumers (whose population is normalized to 1) in this economy, each of the consumers is endowed with one unit of resource in $t = 0$. A consumer may want to consume either in $t = 1$ or $t = 2$, but whether this consumer prefers to consume early or late is only revealed in $t = 1$: With probability p a consumer is an impatient consumer (call such a consumer a type 1 consumer), who only values consumption in $t = 1$; with probability $1 - p$ a consumer is a patient consumer (call such a consumer a type 2 consumer), who only values consumption in $t = 2$. The value of p is public information, but *a consumer's type is private information that is only known to the consumer herself*.

Let c_t denote the consumption of a type i ($i = 1, 2$) consumer. In $t = 0$, without knowing her type, a consumer's expected utility from consumption is $u = p \ln(c_1) + (1 - p) \ln(c_2)$.

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

(Weight: 15 points) Assume that the long-term investment technology is exclusively owned by banks, so that the consumers have to deposit in the banks to benefit from the long-term return. For each bank, it collects deposits from consumers and makes a deposit contract with them: If a consumer claims to be type 1, she will be entitled to withdraw c_1 from the bank in $t = 1$; if a consumer claims to be type 2, she will be entitled to withdraw c_2 from the bank in $t = 2$. After making deposit contracts and collecting deposits, for every unit of deposit that is collected from a consumer, a bank invests α in storage, and $1 - \alpha$ in the long-term investment.

Banks are competing with each other, so all of them try to maximize consumers' expected utility in $t = 0$ when they make deposit contracts. As banks are symmetric, we can focus on one representative bank -- call it Silicon Peak Bank.

(1) Specify this bank's maximization problem in $t = 0$ and calculate its optimal choices of c_1 , c_2 , and α . Remember to include the incentive compatibility constraint $c_1 \leq c_2$ in the bank's problem.

(2) Why is this incentive compatibility constraint necessary for the bank's deposit contract?

Fill in your answer here

Maximum marks: 15

3(b) Question 3(b)

A bank run is defined as an event in which *all* type 2 consumers want to withdraw in $t = 1$. We further rule out the "sunspot" bank run equilibrium so that we assume a bank run *only* happens if a bank is truly unhealthy.

Suppose that, in the beginning of $t = 1$, there is unexpected news that the gross return of Silicon Peak Bank's long-term investment will become \tilde{R} , and $\delta < \tilde{R} < R$.

(Weight: 15 points)

(1) Show that, after the news is revealed to the public, if \tilde{R} is below a threshold value \underline{R} , there will be run on Silicon Peak Bank such that all its type 2 consumers will want to withdraw in $t = 1$.

(2) Compute the threshold value \underline{R} .

Fill in your answer here

Maximum marks: 15

3(c) Question 3(c)

Suppose that Silicon Peak Bank was enrolled in a deposit insurance scheme in $t = 0$, and the scheme provides *full* coverage -- that is, a consumer that claims herself to be type i is guaranteed to receive c_i (exactly the same c_i that is specified in the deposit contract) when she withdraws in $t = i$.

(Weight: 10 points)

(1) Show that in words, not by maths, under such an insurance scheme with full coverage, there will be no bank run in $t = 1$ even after the bad news is revealed.

(2) Explain in words, not by maths, why in reality deposit insurance only provides partial coverage such that deposits are only guaranteed up to a certain threshold.

Fill in your answer here

Maximum marks: 10