Written Exam at the Department of Economics summer 2020

Financial Frictions, Liquidity and the Business Cycle

Final Exam

29 May 2020

(3-hour open book exam)

Answers only in English.

Upload your answers in Digital Exam as one pdf. file (including appendices) and name your pdf with your examination number only, e.g., 12.pdf or 127.pdf

This exam question consists of 3 pages in total including this front page.

This exam has been changed from a written Peter Bangsvej exam to a take-home exam with helping aids. Please read the following text carefully in order to avoid exam cheating.

Be careful not to cheat at exams!
You cheat at an exam, if you during the exam:

• Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text. This also applies to text from old grading instructions.
• Make your exam answers available for other students to use during the exam
• Communicate with or otherwise receive help from other people
• Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
• Use parts of a paper/exam answer that you have submitted before and received a passed grade for without making use of source referencing (self plagiarism)

You can read more about the rules on exam cheating on the study information pages in KUnet and in the common part of the curriculum section 4.12.

Exam cheating is always sanctioned with a warning and dispelling from the exam. In most cases, the student is also expelled from the university for one semester.

1 (20 points) Answer true, false, or uncertain. Justify your answer.

In Geanakoplos (2010) scary bad news (like the sudden outburst of a pandemic) would lead to a market collapse as "optimists" net worth is wiped out, and to an inflow of new investors that lever to purchase the asset.

2 (20 points) Answer true, false, or uncertain. Justify your answer.

In Kurlat (2013) adverse selection produces amplification of transitory negative productivity shocks in the goods market.

3 (20 points) Answer true, false, or uncertain. Justify your answer.

In Holmstrom and Tirole (1998), holding a portfolio of claims on all firms in the economy provides an efficient level of liquidity when investors have commitment problems or there is no outside store of value (to be used to hoard liquidity).

4 (20 points) Answer true, false, or uncertain. Justify your answer.

In Kiyotaki and Moore (1997) amplification of transitory shocks is mostly due to the feedback from asset prices that further reduces entrepreneurs' net worth.

5 (20 points) Answer true, false, or uncertain. Justify your answer.

In Lorenzoni (2008), a coordinated decision by entrepreneurs to increase initial investment increases social welfare.

6 (100 points) Consider an economy that lasts for three periods, $t = 0, 1, 2$, and has one consumption good. To transfer wealth from $t = 0$ to later periods there are two technologies. One is a storage technology with unitary gross return, such that a unit of the good invested in t gives a unit of the good in $t + 1$. The other technology is a long term investment project that gives $R > 1$ units of the good in date 2 per unit of the good invested in date 0. If liquidated at date 1, the return is $L < 1$.

There is a continuum of agents endowed with a unit of the good at date 0. Of these, a fraction π will be "impatient", and prefer to consume in $t = 1$, while the rest will be "patient" and prefer to consume in $t = 2$. Their type is private information and only revealed at date $t = 1$. Their preferences are given by

$$\sqrt{c_1} \qquad \text{for impatient consumers,}$$
$$\rho\sqrt{c_2} \qquad \text{for patient consumers.}$$

Where c_i represents consumption in date i. Thus, the ex ante expected utility is $\pi\sqrt{c_1} + (1 - \pi)\rho\sqrt{c_2}$.

a) Determine the optimal investment and utility of a household that lives in autarky.

b) Assume that at date 1 households can borrow or lend in competitive markets. Determine the optimal investment, borrowing and utility in this situation.

For c) to f) assume that $\rho R > 1$.

c) Find the first order condition that characterizes the optimal allocation. Compare to the market allocation found in b).

d) Can a financial intermediary implement the optimal allocation? Is it possible to have bank runs? If so, for what parameter values? Explain why runs are inefficient.

e) Consider two types of narrow banking, i) that the bank must hold only liquid assets (to perfectly match asset and liability maturities), ii) that the bank must be able to satisfy all repayment demands (i.e. withdrawals by all depositors) at all times. Derive the optimal banking contracts under these two restrictions. Compare with the result you found in a).

f) Suppose there is deposit insurance in place. This is funded by a tax on all households at date 0, the proceeds are stored by the government and are used to pay depositors who have not been paid by their bank. Derive the optimal banking contract with this type of deposit insurance. [Hint: you must make sure that for every possible level of date 1 withdrawals, $c_1 \leq c_2$, and that you charge the lowest tax for this.]

For the remainder of the exercise assume that $\rho R < 1$.

g) Characterize the optimal allocation. Compare to the market allocation found in b).

h) Explain why an intermediary cannot implement the optimal allocation. Find the constrained optimal deposit contract (Hint: it must satisfy an incentive constraint such that patient consumers do not want to withdraw funds in date 1). Is it possible to have bank runs? If so, for what parameter values?

Now assume that the central bank would react to a bank run by suspending the convertibility of bank deposits.

i) Explain why if the bank could commit to implement this policy the equilibrium with a bank run is eliminated. Characterize the optimal ex post policy when the central bank has no commitment power, but can choose a threshold $\pi^S \geq \pi$ of deposits that get paid in date 1. Does this policy prevent runs? Explain.

j) Assume parameters are such that runs cannot be prevented by suspension of convertibility (or this is not a policy option). Assume households have an endowment e_1 at date 1 and the government can raise a tax from all households at date 1, the proceeds of which are used to make whole all depositors who have not been repaid by their bank. Derive the optimal banking contract under this policy and find the optimal tax. [Hint: you must make sure that for every possible level of date 1 withdrawals, $c_1 \leq c_2$, and that you charge the lowest tax for this.]