



NTNU – Trondheim
Norwegian University of
Science and Technology

Department of Economics

Examination paper for SØK2010 Banking

Academic contact during examination: Xunhua Su

Phone: 73 59 83 37

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Calculator: Casio fx-82ES PLUS, Citizen SR-270x, SR-270X College or HP 30S.

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Final Exam - SØK2010 Banking

(Lecturer: Xunhua Su)

Fall 2014

NOTE: The exam has two parts (four pages). Part I consists of five short questions, and Part II consists of two long problems on models of Banking. Each question or problem starts with a keyword that shows you the key to answer it.

Part I: Short Questions. (42%)

1. Subprime Mortgages. (6%)

U.S. housing policy has for some time been to encourage home ownership. To relax the “barriers” for low-income families to have a home: before 2007, banks offered interest-only mortgage loans, which did not need any down payment and hence enlarged the borrower pool. Explain, in the context of a big price drop of housing prices, why these mortgages raised banks’ risk. (Write down your answer with no more than 150 words).

2. Imperfection of Credit Markets. (6%)

In practice, when a bank lends to borrowers who have no account in the bank, collateral is more frequently demanded than for loans granted to borrowers who have accounts in the bank. Explain the possible reasons for this observation. (Write down your answer with no more than 150 words).

3. Bank Loan v.s. Bond. (6%)

Small- and medium-sized firms are crucial for economic growth, but in general it is difficult for them to get financed in the capital market. They thus mainly rely on bank loans to finance their investment and growth. Why is it difficult for small- and medium-sized firms to issue bonds? Give three specific reasons. (Write down your answer with no more than 150 words).

4. Agency Problem. (12%)

One of the following statements discusses an adverse selection problem in credit

markets, while the other one discusses a moral hazard problem. Point them out and explain the reasons for why it is an adverse selection or a moral hazard problem. (Write down your answer with no more than 200 words).

- a) Every home buyer wants to get a lower mortgage rate, but banks decide the rate based on the credit quality of the home buyer. The true credit quality is difficult to detect, so banks mainly rely on the historical credit records of the home buyer. For this reason, before applying for mortgages, home buyers dress up their credit records to impress banks. Some well-dressed home buyers with bad credit quality may finally get a loan with a pretty low interest rate.
- b) 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 obtain high profit in a short period but leave the risk to the government - the public in nature.

5. Monetary Policy (Central Banking). (12%)

In the following, *TWO* are widely used monetary policy tools of central banks. Point them out and explain how they work to affect money supply in an economy. (Write down your answer with no more than 200 words).

- a) Open market operations.
- b) Discount window lending.
- c) Taking deposits and granting loans.

Part II: Problems on Models in Banking

6. Debt, Collateral and Agency in Credit Markets (38%)

Suppose that you are risk-neutral and operate a limited-liability firm. The discount rate is zero. Consider two projects:

- The *safe* project: With initial investment 1 million, the payoff is 1.25 million for sure.

- The *risky* project: With initial investment 1 million, the payoff is 1.6 million with probability, 0.4, and the payoff is 0.6 million with probability, 0.6.

Suppose that you have 1 million in cash and you are not able to raise more funds.

- a) Which project will you choose to undertake? Give your answer by comparing the NPVs of the two projects.

Now suppose that you have no money, but you can borrow 1 million from a bank. (NOTE: Here we do not assume a perfect credit market.)

- b) The bank asks for an interest rate, 10%. Which project will you choose to undertake? Give an answer by comparing your payoffs from the two projects. Instead, if the bank asks for an interest rate, 1%, is there any change of your answer? Why?
- c) If the bank cannot observe your project choice, you are free to choose one of the projects to undertake. In this case, is it always good for the bank to ask for a higher interest rate? Give your answer by comparing the bank's payoffs from the two interest rates, 10% and 1%.
- d) If the bank cannot observe your project choice, you are free to choose one of the projects to undertake. Suppose that the bank's cost to provide 1 million loan is 1.05 million. Can you get the loan from the bank?

Now, assume that you have a house that is worth 0.3 million. The bank accepts your loan application only if you pledge the house as collateral.

- e) With the collateral, the bank asks for an interest rate r_0 . Solve the range of r_0 , in which you will undertake the safe project.
- f) With your house being pledged as collateral, is there any possibility that you choose the risky project? Why? (NOTE: Your answer should be based on calculation.)
- g) What is the role of collateral in the case, screening to solve adverse selection or monitoring to solve moral hazard? Why?

7. Financial Markets and Transaction Costs (20%)

Consider a two-period world. An agent has preference described by the utility function,

$$U(c_1, c_2) = \log c_1 + \beta \cdot \log c_2$$

where c_1 and c_2 are consumptions in the two periods respectively and β ($0 < \beta \leq 1$) denotes the agent's time preference. The agent has incomes or endowments, Y_1 in the first period and Y_2 in the second.

Suppose that the agent can borrow or lend at the rate of interest, r , in a perfect financial market. You can use $R = 1 + r$ to save notations in the following.

a) Write down the optimization problem of the agent. Solve the optimal borrowing or lending decision. Solve the consumptions in the two periods at optimum.

b) Let $\beta = 1$, $Y_1 = 1$, $Y_2 = 1.2$, and $r = 0.2$, calculate the optimal optimal borrowing or lending of the agent, and c_1 and c_2 .

Further assume that the financial market is not perfect. Specifically, market frictions drive different rates of borrowing and lending. The borrowing rate is r_b , and the lending rate is r_l , where $r_b > r > r_l$.

c) Let $\beta = 1$, $Y_1 = 1$, $Y_2 = 1.2$, $r_b = 0.25$ and $r_c = 0.15$. Calculate the optimal optimal borrowing or lending of the agent.

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