

Money Prelim – May 2009

The exam consists of Questions I, II, and III

Question I: *Answer either A or B but not both*

A. Holmstrom and Tirole

Holmstrom and Tirole claim that when they have aggregate shocks their model of intermediation implies that it is necessary for the government to intervene to support good outcomes.

(i) Sketch out a simple version of the Holmstrom Tirole model.

(ii) Show the sense in which their model implies the necessity of government intervention. More precisely, define a notion of constrained efficiency and show the sense in which the equilibrium without government intervention is not efficient.

(ii) Critique this argument. Do Holmstrom and Tirole build into the model a trivial advantage for the government?

B. Sophisticated Monetary Policy

A simple sticky price model with one period sticky prices can be log-linearized to give an Euler equation for consumers

$$y_t(\eta^t) = E [y_{t+1}(\eta^{t+1})|\eta^t] - \psi (i_t(\eta^{t-1}) - x_t(\eta^{t-1})) + \eta_t,$$

an optimality condition for flexible price consumers

$$\pi_t(\eta^t) = \kappa y_t(\eta^t) + x_t(\eta^t)$$

and an optimality condition for sticky price producers

$$x_t(\eta^{t-1}) = E[y_t(\eta^t) + \pi_t(\eta^t)]$$

where x_t is the rate of change in prices of the sticky price producers (relative to the aggregate price level), π_t is the inflation rate, y_t is output, and i_t is the interest rate.

(i) Show that with constant interest rates $i_t = \bar{i}$ there is a continuum of equilibria.

(ii) Define of more sophisticated notion of equilibrium in which it is possible to uniquely implement any competitive equilibrium.

(iii) Sketch the argument for unique implementation

Question II:

Consider a standard search model economy with pairwise meetings, $K > 3$ types of agent with equal measures of each type, a single indivisible fiat money, perfectly divisible goods, a unit upper bound on money holdings, and a prohibition on gift giving. Agents of type j get utility from consuming good j , but they can only produce good $j + 1$. All agents have period preferences $u(c) - q$, where c is consumption and q is production. In a pairwise meeting, the potential buyer with money gets to make a take-it-or-leave-it offer to the potential seller. A fraction $M = \frac{1}{2}$ of agents have a unit of money

(i) Suppose that at the end of each period in some matches there will be a transfer from the agent with money to the agent with 0 money. This transfer will occur with probability π . Assume that π is public information but agents in a match do not know if they will be subject to the tax-transfer in their match. How would the quantities traded in a single coincidence matches differ from those for the case when $\pi = 0$?

(ii) How would your answer to (i) change if the potential seller in a match knew that the tax/transfer were going to occur in the match, but the potential buyer does not have this information?

(iii) What about if the buyer had the information, but the seller did not?

Question III: *Answer either A or B but not both*

A. Consider a Diamond-Dybvig economy with no aggregate uncertainty; that is, the fraction of impatient agents is t with probability 1. In this economy, there are two long term technologies. A “no-commitment” technology $\{-1, 1, R_n\}$ and a “commitment” technology $\{-1, 0, R_c\}$, where $R_n > R_c$. The no-commitment technology allows a unit of investment in period 0 to be pulled out in period 1 without a loss. The commitment technology essentially does not permit period 0 invests to be withdrawn until period 2. In addition, there is a short term technology $\{-1, 1, 0\}$.

(i) How much would the planner invest in each of the technologies to maximize ex ante social welfare? Call this welfare w^* .

(ii) Assume that there is a commitment bank that can only invest in the short-term technology and the commitment technology and a no-commitment bank that can only invest in the short-term technology and the no-commitment technology. Find the no-suspension deposit contracts for these banks that maximize the welfare of depositors.

(i) Suppose there is a random variable (sunspot) in this economy that takes on the value 1 with prob π and 0 with prob $1 - \pi$. For what values of π would all agents choose to deposit in the commitment bank?

(iv) Can w^* be achieved by the banking system? Why or why not?

B.

(i) Consider an economy in which agents have Jacklin preferences rather than Diamond-Dybvig preferences. Suppose that the optimal allocation is (c_1^*, c_2^*) can be implemented by a deposit contract that is incentive feasible. Can there also be a bank run equilibrium in this economy? Explain why or why not.

(ii) Consider a Diamond-Dybvig economy with aggregate uncertainty. The two states that can occur are t_1 and t_2 , which occur with probabilities π and $1 - \pi$, respectively.

The government has the ability to tax deposits in period 0. It also can commit to paying off depositors in period 1 if banks should run out of money. It also has access to the same technologies as banks, and, like banks, is subject to the sequential service constraint.

Let v be the proportional tax on deposits and z be the amount that the government guarantees depositors in period 1. Given that banks and the government want to prevent bank runs, what should banks' deposit contract look like and how should the government set v and z to prevent the bank run equilibrium? Will this achieve the ex ante welfare maximizing allocation?