Macroeconomia II – 2011.2

Lista 5

Data: 10 de novembro de 2011

Monitora: Laura Candido de Souza

1) **Freixas e Rochet – capítulo 7 – exercício 7.8.1**

Bank runs and Moral Hazard

Consider a Diamond-Dybvig economy with a unique good and three dates, where banks managers have a choice of the technology they implement. This choice is unobservable and consists in investing one unit in either project G or B, where project G yields G with probability p_G and zero otherwise, and project B yields B with probability p_B and zero otherwise, where $G < B$, and $p_G G > p_B B$.

A continuum of agents endowed with one unit at time $t = 0$. Of these agents, a nonrandom proportion π_1 will prefer to consume at time $t = 1$, and the complementary proportion π_2 will prefer to consume at time $t = 2$.

The agents' utility function is:

$$\begin{cases} U(C_1) & for\ impatient\ consumers, \\ \rho U(C_2) & for\ patient\ consumers, \end{cases}$$

So that the ex-ante expected utility is $\pi_1 U(C_1) + \pi_2 \beta U(C_2)$.

If there are any bank runs, they coincide with sunspots that occur with probability α.

a) Assuming that the risk-neutral bank manager brings in equity, and the other agents have deposit contracts, compute under what conditions the G allocation is obtained. Interpret the condition in terms of regulation.

b) In what follows, we restrict our attention only to the particular case of risk-neutral depositors, $U(C) = C$. What is the optimal contract? What are the manager's incentives to implement G? Do they depend upon a? Could we propose a better contract by defining an equity economy?

2) **Freixas e Rochet – capítulo 7 – exercício 7.8.2**

Bank Runs

Consider an economy with a unique good and three dates, with a storage technology that yields a zero net interest and a standard long-run technology that yields R units with certainty at time $t = 2$, but yields only $L < 1$ if prematurely liquidated at time $t = 1$. Both technologies are available to any agent.

A continuum of agents is endowed with one unit at time $t = 0$. Of these agents, a nonrandom proportion π_1 will prefer to consume at time $t = 1$, and the complementary proportion π_2 will prefer to consume at time $t = 2$.

The agents' utility function is:

$$\begin{cases} \sqrt{C_1} & for\ impatient\ consumers, \\ \rho\sqrt{C_2} & for\ patient\ consumers, \end{cases}$$

So that the ex-ante expected utility is $\pi_1\sqrt{C_1} + \pi_2\rho\sqrt{C_2}$.

Assume first that $\rho R > 1$.

a) Compute the first-order condition that fully characterizes the optimal allocation. Compare it with the market allocation that is characterized by $C_1 = 1$ and $C_2 = R$.

b) Consider a banking contract where a depositor's type is private information. Are bank runs possible? If so, for what parameter values?

c) Is the optimal contract implementable within an equity economy, where each agent has a share of a firm that distributes dividends, and a market for ex-dividend shares opens at time $t = 1$, as suggested by Jacklin?

Assume now that $\rho R > 1$.

d) What would be the optimal banking contract? Are bank runs possible? If so, for what parameter values?

e) Is the optimal contract implementable within an equity economy à la Jacklin?

3) **Freixas e Rochet – capítulo 7 – exercício 7.8.3**

Information-Based Bank Runs

This problem is adapted from Postlewaite and Vives (1987). Consider a one-good, three-dates, two-agent economy in which the gross return is $r_1 (< 1)$ for an investment during the first year ($t = 0\ to\ t = 1$), r_2 for an investment during the second year, and r_3 for an investment during the third year. Assume$2r_1 - 1 > 0$, and $2r_1r_2 - 1 > 0$. The preferences can be of three types. If an agent is of type 1, her utility is $U(x_1)$; of type 2,$U(x_1 + x_2)$; and of type 3, $U(x_1 + x_2 + x_3)$. The probability that agent 1 is of type i and agent 2 is of type j is p_{ij}.

The (exogenous) banking contract allows each agent to withdraw the amount initially deposited without penalty at dates 1 and 2, but interest can be collected only if the agent waits until date 3.

a) Define a_j^i as the strategy that consists in withdrawing everything at time t. Write the matrix of payments when both agents initially deposit one unit.

b) Consider the restriction of the game to strategies a_1^i and a_2^i. What is the equilibrium if $r_1 > (2r_1 - 1)r_2$, and $1 > r_1 r_2$? Is this an efficient allocation?

c) Returning to the initial matrix, assume that $(2r_1 - 1)r_2 r_3 > 1$. Describe the equilibrium by establishing the optimal strategy for each type. Will there be any bank runs?