ECON 4335 – fall 2014

Problem set 2 –seminar #2 (September 9, 2014)

Consider the one-good, two-type, three-date economy of Diamond and Dybvig. There are infinitely many identical individuals ex ante, each endowed with one unit of the good at t = 0. Consumption takes place either at t = 1 or t = 2. With probability π the consumption needs arrive at t = 1, and with probability $1-\pi$ at t = 2. There is an independent draw for each agent. Ex post the consumers can be divided into group 1, "early" or "impatient" consumers, and in group 2, those who will wait to t = 2 ("late" or "patient" consumers). An individual's type is private information.

Let C_1 be individual consumption of an impatient consumer, whereas C_2 is individual consumption of a late consumer. The utility function is $u(C) = \frac{1}{1-s} C^{1-s}$, and is the same irrespective of type, with s a constant, greater than one. There is no discounting.

The economy has two ways of transferring resources between periods: storage (called a short-term project) with gross return equal to 1, and a long-term investment project, with a gross return at t = 2, R > 1, per unit invested at t = 0. If necessary, the long-term project can be liquidated or stopped prematurely at t = 1, with a return $0 \leq L \leq 1$.

1. Derive the allocation that maximizes social welfare, as given by expected utility. How is initial wealth allocated between the two investment opportunities? Will there be any liquidation?

2. Let optimal consumption be C_1^* for a type 1-individual, and C_2^* for a type 2-individual. Who will have the higher consumption? Explain why an uneven distribution can be optimal? How is the optimal consumption profile affected by $s \to \infty$?

3. In the economy there is a competitive banking sector, where individuals can deposit their unit wealth at t = 0. The banks have the same investment opportunities as above. Suppose the banks offer the depositors to withdraw C_1^* at t = 1 or C_2^* at t = 2. Explain why and under what circumstances the optimal allocation can be realized as an equilibrium.

4. When banks offer the deposit contract $\{C_1^*, C_2^*\}$, explain why there are two (Nash) equilbria that are consistent with rational behaviour for all individuals; one where only the early consumers withdraw at t = 1, and another one where everyone withdraws at t = 1. What will the individual consumption level be in the latter equilibrium if you assume $L = 1$?

5. Suppose the banking sector offers the contract $\{C_1^*, C_2^*\}$ to depositors at t = 0. Imagine that a financial (or a bond) market is opened at t = 1. (A bond is here a promise to have one unit consumption at t = 2.) Late consumers are offered to buy bonds at a price p so that $pR = 1$. Will $\{C_1^*, C_2^*\}$ still be a Nash equilibrium? Explain!

6. Suppose that a small group of individuals is known by everyone else to be abnormally anxious and therefore expected to withdraw their deposits early in any case. (There is no financial market at t = 1, as under 5.) Will there still be two equilibria?