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EE431 Economics of Financial Markets and Institutions, 2/2014  
Problem Sets 9 : Bank Run, Systemic Risk and Deposit Insurance

Please submit at the BE office, 5th floor department of Economics building.

Deadline of submission : Tuesday 19 May, 2015 before 15.00 hrs. (you may submit on or before)

Late submission will not be accepted.

1. The Diamond-Dybvig model of bank runs

Consider an economy where

- $U(C) = 1 - \frac{1}{C}$ ;  $U(C)$  is the utility function and  $C$  is consumption.
- There are 3 dates, date 0, date 1 and date 2.
- “Primary investment” costs 1 in date 0, and yields 1 if cashed in date 1, 1.44 if cashed at date 2.
- “Type 1” investors are those who need to consume at 1.
- “Type 2” investors are those who can choose to consumer at 2.
- At date 0, an investor does not know when he/she needs to consume, but each investors has a probability of 0.2 of being type 1 and 0.8 of being type 2.
- Total number of investors is 100. Suppose that the number of investors is large enough for the law of large number to hold.
- (The other settings are the same as The Diamond-Dybvig (2007), which are as follows. Each investor begins with 1 to invest on date 0. Investors face an uncertain horizon to hold the asset. Each will need to consume either at date 1 or 2. As of date 0, an investor does not know at which date he/she will need to consume. Each investor’s type is his/her own private information.)

Answer the following questions. Calculate to four decimal places.

- (a) The bank offers a deposit contract in which 1 unit invested at date 0, it will worth 1.386 at date 2, but only 1.15 at date 1.
- Why do investors would prefer the deposit contract to the primary investment? Explain economic reasons and show numerically.
  - Show numerically that the bank is able to offer the deposit contract (liquid asset), even though the bank invests in the primary investment (illiquid asset).

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- (b) Explain and show numerically what action investors will take in the following situation,
- i. Suppose that all depositors forecast that 30 depositors will withdraw at date 1.
  - ii. Suppose that all depositors forecast that 65 depositors will withdraw at date 1.

In each situation, would a bank run occur and how many depositors actually withdraw given their forecast? Explain.

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- (c) Suppose that all depositors forecast that  $\hat{f}$  fraction of depositors will withdraw. What is the tipping point (value of  $\hat{f}$ , for which type 2 depositors will be indifferent between withdraw at date 1 and withdraw at date 2)?

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