Seminar Problem in ECON 4335 Economics of Banking, Fall 2016

**Problem set 3 (September 23, 2016)**

Consider the market described in Diamond and Rajan (2011). In particular, let's assume that $P_1$ is exogenous, and a fraction $\beta$ of each bank's assets is composed of financial securities that can be sold in $t = 0$ at $P_0$ or in $t = 1$ at $P_1$. The rest of the assets can be liquidated. Each asset has liquidation value denoted $l$, distributed uniformly between 0 and Z. Both the securities and the other assets have face value $Z$ in period 2. The value of deposits is $D$, a shock hits in period 1 with probability $q$, and in case of shock depositors withdraw an amount $fD$ of deposits in period 1. Assume that $P_1$ is sufficiently large that the bank expects to be solvent in period $t = 1$ even if it does not sell any security in period $t = 0$.

1) What condition should $P_0$ and $P_1$ satisfy to ensure that investors are indifferent to buy securities in either $t = 0$ or $t = 1$?

2) Let's say that the bank plans to sell a fraction $\eta_1$ of its securities at $t = 1$ (if the shock hits), and not sell any security in $t = 0$. What fraction of the assets will be liquidated in case of shock? What is the average $l$ of the liquidated assets? Can you find an expression for $\eta_1$?

3) Let's say that the bank plans to sell a fraction $\eta_0$ of its security at date 0 AND NOT SELL ANY SECURITY IN $t = 1$. Moreover, assume that $P_0$ and $P_1$ are such that the bank is indifferent to sell its securities in $t = 0$ or in $t = 1$. What fraction of the assets will be liquidated in case of shock? What is the average $l$ of the liquidated assets? Can you find an expression for $\eta_0$?

4) Is is true that for $P_1$ and $P_0$ that satisfy the condition you found in question (1) the bank is indifferent between selling securities in $t = 0$ or in $t = 1$?

**Problem 2**

Consider a market in which there are N banks and N buyers of securities. Each banks owns a security that ensures a return R in the next period. Half of the securities ensure a return $R = 1$, and half ensure a return $R = 0$. If a bank does not sell the security, the security is worth $\frac{1}{2}R$ to the bank in the next period, while buyers get a utility from a security equal to its return. The time discount factor is normalized to 1. Banks know the return of their own security, while buyers only know the distribution of returns.

1) Is there a price for which all securities are sold?

2) Is there a price for which securities are sold only if $R = 0$?

3) Assume now that the security is worth $k \in (0, 1)$ to the bank. For which values of k there exists a price for which all securities are sold?