Answers Exam ECON 4335, Economics of Banking, Fall 2015

Problem 1.

1.a) The fundamental value of the plot is $\sum_{i=1}^{\infty}(1+r)^{-i}x$.

1.b) Yes, it can. Even if all traders are rational, there can be a bubble that results in the price of the plot being higher than its fundamental value. For the bubble to exist the following conditions must hold: (a) the expected return from buying the plot and reselling it later must be at least as large as the risk-free rate, (b) the risk-free rate must be below the growth rate of the economy, (c) it must be the case that it is not easy to find new land to use for agriculture in the area around the plot, (d) there must be infinitely many investors to which the bubble can be passed on.

1.c) If the price of the plot increases, either because its fundamental value increases or because of a bubble on its price, then the farmer has more collateral to pledge to lenders and so the farmer has access to more credit and/or to better conditions on the loans she takes.

Problem 2.

Market illiquidity: the drying-up of interbank or capital markets resulting from a general loss of confidence or very pessimistic expectations. When the market is illiquid, banks have to give large discounts in order to sell their less liquid assets.

Funding illiquidity: refers to a situation in which banks find it difficult to borrow liquid assets. Funding liquidity is low if the bank/firm can only borrow at high rates, or it can not borrow at all.

Both market and funding illiquidity are not exogenous. They depend on the behavior of other banks/firms and this is what creates a risk of contagion.

Old models of contagion: bank A borrows from bank B, B borrows from C. If bank A defaults, then bank B suffers a loss. If bank B also defaults as a result, then bank C also incurs a loss and might default.

This is a limited view of contagion that does not take into account how banks act in anticipation and as a result of defaults. New models of contagion focus on:

I) Asset-price spiral: Bank A sells assets $\rightarrow$ Prices of assets drop $\rightarrow$ Bank B holds those assets; Bank B suffer losses as its balance sheet is marked-to-market $\rightarrow$ Bank B sells assets to deleverage (= bring the leverage ratio back to the level where it was before the asset price drop)$\rightarrow$ Prices of assets drop..

II) Margin/haircut spiral: : Banks A sells assets $\rightarrow$ Prices of assets drop $\rightarrow$Bank B holds those assets; Bank B suffer losses as its balance sheet is marked-to-market $\rightarrow$ Creditors of Bank B ask for higher haircuts $\rightarrow$ Bank B must aim for a lower leverage ratio $\rightarrow$ Bank B must sell assets $\rightarrow$ Price of assets drop..

Problem 3.

3.a) If there is no bank, there are no values of I for which the project is financed. For a project of size I, the investor needs to lend $I_i = I$. In order to convince the investor to lend, the entrepreneur must promise a payment that satisfies $d_i \geq \frac{I}{Pr(return=R)} = 2I$. But the project returns at most $RI < 2I$. So regardless of the size I the project is not financed. If the assumption $2 > R > 1$ is relaxed (so that $R > 2$), then the project can be financed even without a bank.

3.b) If the bank lends without checking, the bank's expected profit is: $\pi^{NC} = \frac{1}{2}d_b - I_b$. If the bank checks before lending, the bank chooses the alternative use of capital whenever the project is bad, so the bank's expected profit is $\pi^C = \frac{1}{2}d_b + \frac{1}{2}I_b\lambda - C - I_b$. The bank prefers checking before lending rather than lending without checking whenever $\pi^C \geq \pi^{NC}$ which is equivalent to $I_b \geq \frac{2C}{\lambda}$. The size of I_b matters because for a large I_b the return from the alternative use $(I_b\lambda)$ is large and therefore the bank has a strong incentive to check the quality of the project rather than lending without checking.

3.c) The bank prefers to check and then lend if and only if the project is good rather than directly investing in the alternative use of the capital whenever $\pi^C \geq (\lambda - 1)I_b$. This is equivalent to $d_b \geq 2C + \lambda I_b$. The size of d_b matters for the choice of the bank because if the bank checks and lends it earns d_b with probability $1/2$, while if the bank opts for the alternative use without checking it never earns d_b.

3.d) The investor must contribute $I_i = I - I_b = I - \frac{2C}{\lambda}$. If the project is good the entrepreneur can pay back to the investor at most $RI - d_b = RI - 4C$, so $d_i \leq RI - 4C$ (1). As the bank checks, the project is financed only if it is good and the investor's expected payoff from investing is $\pi_i = \frac{1}{2}d_i + \frac{1}{2}I_i - I_i$. The profit if the investor refuses to invest is 0. $\pi_i \geq 0$ is equivalent to $\frac{1}{2}(d_i - I_i) \geq 0$ or $\frac{1}{2}(d_i - I - \frac{2C}{\lambda}) \geq 0$ (2). Inequalities (1) and (2) can be satisfied at the same time if and only if $\frac{1}{2}(RI - 4C - I - \frac{2C}{\lambda}) \geq 0$ which is equivalent to $\frac{(R-1)I\lambda}{2(2\lambda-1)} \geq C$.

So the project is financed if and only if $I \geq I(C) \equiv \frac{2C(2\lambda-1)}{(R-1)\lambda}$.

Large projects ensure large returns. Only large projects ensure a return high enough to cover the cost of monitoring (C).

If $C > \frac{(R-1)\lambda}{2(2\lambda-1)}$, then $C > \frac{(R-1)I\lambda}{2(2\lambda-1)}$ for every I and the project is never financed.