Ec721 PROBLEM SET 1

1. An economy has a population of poor entrepreneurs of varying ability $a \in [0, 1]$ that seek to borrow in order to finance an investment project. All entrepreneurs have zero wealth of their own, and zero outside option. An entrepreneur of ability a needs to borrow $(1 - a)$ to start the project, which is successful with probability e and a failure otherwise. The project generates $Q > 1$ if successful and nothing otherwise. There is only one lender L who they can approach for funds. The lender can lend any amount at a constant opportunity cost of ρ. Loans are subject to limited liability. The probability of success e is chosen privately by the borrower after getting a loan, at a personal cost of $\frac{e^2}{2k}$. L can observe any borrowers ability before deciding whether to lend, but not their choice of e. The parameters satisfy $4\rho > kQ^2 > 2\rho$ and $kQ < 1$. All parties are risk-neutral.

(a) Suppose L acts as a monopolist. For entrepreneurs of any given ability type a, will L agree to lend to them and if so at what interest rate?

(b) Suppose the government imposes a cap of $\frac{Q}{4} - 1$ on the interest rate that lenders can charge. What will the impact of this be on loan outcomes, borrower welfare and social (utilitarian) welfare for each ability type?

(c) Describe how your answer to (a) and (b) would change if the credit market involved Bertrand competition between L and another lender in the market with the same opportunity cost of lending.

2. Consider the Eswaran-Kotwal model of farming households in an economy with a smooth, strictly concave CRS production function $f(h, n)$ of land and labor used in cultivation, and a utility function given by $Y + U(R)$, Y denoting income and R its leisure. U is strictly increasing and strictly concave; both U and f satisfy Inada conditions. Each household has an endowment of one time unit, can apply its own labor on its own farm, and hire in or out its own labor on a competitive labor market. Households differ in their landholdings, and can lease in or out their land on a competitive rental market. Households are subject to a working capital constraint, which depends on how much land they own. *In contrast to the Eswaran-Kotwal model, hired labor is perfectly trustworthy and does not need to be supervised.*

(a) For poor cultivating households who are forced to hire out their labor to augment their working capital, show that they are indifferent between applying their own labor or hiring in workers to work on their own farm. Prove that as these households become richer, they hire out less labor.

(b) Now consider households who own enough land that they do not hire out their own labor. Show that these farms are as productive as those of the poorer households.