ECON 4335 – fall 2014

Problem set 5 – seminar #5 (October 7, 2014)

Problem 1

In an economy there are two groups of risk-neutral entrepreneurs (each group of size one), both having an investment opportunity with an expected gross return, μ, and the same expenditure I. The first project can be described by the "lottery" $\{(S,p),(0,1-p)\}$, where S is the gross return if success, that happens with probability p. If failure, there is no return. The second project can be described by $\{(B,q),(0,1-q)\}$, where gross return if success is B, that happens with probability q; or there is no return with probability $1-q$. Assume that $1>p>q>0$, $pS=\mu=qB$; hence $B>G$. Both types of entrepreneurs need external finance for undertaking the project, but to get a loan, a risk-neutral bank demands collateral $K<I$.

i) Derive the variances of the two projects.

ii) What is the expected profit for each type of entrepreneur if the loan agreement requires a gross payment $(1+R)\cdot I<G$, from both if success, while the collateral is lost if failure. Which project is the most profitable, and why?

iii) Derive a critical rate of interest for each type of project making each type of entrepreneur indifferent between investing and not investing. How will demand for loans vary with R? Illustrate!

iv) When granting a loan the bank cannot distinguish between the various borrowers/entrepreneurs, but has information about each project as outlined above. How will the bank's profit, denoted V, vary with R, when you take your finding from above into account, and when the bank's unit cost of funding is $(1+r)$. Show also the relationship between R and the bank's expected profit per krone in loan, v. What projects should the bank finance?

Problem 2

Suppose the parameters characterizing the return structure in the Hellmann-Murdock-Stiglitz model will change with the business cycle. Discuss shortly under what circumstances the government should impose a countercyclical capital requirement (along with a deposit-rate ceiling) within the setting of that model.