Lecture 6:
The loan contract, continued
Credit rationing

A collateral is an asset which will be left to the disposal of the lender in the case that the borrower doesn't fulfil the engagement. It provides us with an additional tool for creating efficient loan contracts under asymmetric information.

We consider a model with two types of borrowers, namely (1) good investors having a high probability of success even when doing very little, and (2) bad investors who will have a small probability of success unless they put up considerable effort. *Types are observable* to the lender, what is hidden is their subsequent effort on the project. We assume that parameters are such that it is optimal for society that good investors use low effort and bad investors use high. This is however not supported by a simple system of contracts with using only repayment. Not very surprising given the context we find that collateral can solve the problem. Since the good investor should choose low effort anyway, there is no need for collateral here. But the bad investor must post a collateral, since – combined with a suitably low repayment rate – this will induce the choice of high effort, the investor is hurt now by loss of the collateral in the case of failure, and this will align the private assessment with that of society. You don't need to work through the computation of collateral and repayment in this case, but it is useful to have a close look at the result to see exactly how it improves the incentives.

The final section in this chapter is not part of our curriculum. However, the model is nice, so here is a brief outline which may be skipped at will:

The model considered, which deals with the phenomenon of *microfinance,* is due to Stiglitz, who at that time held a position in the World Bank. Microfinance was a very popular topic in the beginning of the 00es, and the founder of one of these banks, offering small-scale loans to communities in developing countries and having a fine record of repayments of debts, was awarded the Nobel Peace Prize. Over the years, the initial enthusiasm has faded somewhat, microfinance did not turn out to be the solution to the problems of economic under-development. But the idea of using joint responsibility for debt is certainly interesting.

The model (for which, by the way, you will not be held responsible at exam), uses the by now wellknown moral hazard model with two different investment technologies *G* and *B*, now extended slightly since the technologies can be applied on smaller or larger scale depending on an input variable *L*. As always, too high repayment rates will lead to *B* being chosen, due to the presence of *L* the border between *G* and *B* becomes slightly more complicated.

Having done with Chapter 5, we move to the next chapter dealing with the credit

rationing problem: According to our textbook knowledge of economics the market for credits should be balanced by the price mechanism, that is by the interest (or repayment) rate. But there are many cases where borrowers agree to pay very high interest rates but still cannot get a loan, why? With normal supply and demand functions for loans, equilibrium should occur at some suitable repayment rate. Since this does not happen, either demand or supply must be out of the normal, and we take a closer look at the supply.

Disequilibrium may occur if supply is backward-bended. But why should it be? It might be that *expected* repayment depends on *nominal repayment* in a less simple way, decreasing when nominal repayment becomes sufficiently large. So we search for an explanation of backward-bended relationship between nominal and expected repayment, and there are several,

(1) adverse selection (the Stiglitz-Weiss model),

(2) costly monitoring,

(3) moral hazard.

Each of the three give the explanation we are looking for, and there may be others as well. If time permits, we begin with the detailed discussion, starting from below. Anyway, probably we do not get very far into this.

The Stiglitz-Weiss model is one of adverse selection. All investors have projects which give the same mean but they differ in riskiness, it is assumed that they are ordered according to second-order stochastic dominance (one prospect dominates another if every risk averse investor would prefer it to the other one). In this setup, increasing interest rates give rise to adverse selection in the sense that the less risky prospects are not taken up, only the risky remain, which in its course may lead to a decrease in expected repayment. The S-W model does not say that backward bending supply occurs always, only that it can occur. The Stiglitz-Weiss model is fairly intuitive: the repayment rate restricts the demand for credits to projects which are sufficiently risky (the entrepreneur keeps the gains when it goes well and doesn't pay when it goes wrong, and consequently higher repayment rate increases the risk and eventually reduces expected repayment. The formalism behind the intuition may be somewhat demanding, and you don't need to memorize it, but it may be reassuring to see that the intuitive ideas can be formulated in a precise way.

We read:

Chapter 5, Section 4. Chapter 6, Sections 1 and 2.1.