

ECON 4335 Seminar Week 11

March 1, 2013

Problem 1

The following problem is an extension of the private-information contracting problem with a competitive banking industry, presented in class. Rather than having only one instrument, as in the simplest case, we now turn to a situation where a monopolistic bank has two instruments: the size of a loan and the rate of interest.

Consider therefore a financial contracting problem between a monopolistic lender – a bank – and a borrowing firm, where the bank provides the firm with a loan. The loan is to be used to buy new equipment (with a price set equal to one). Let the size of the loan be k . Let the amount being repaid after one period be denoted t . The bank's payoff is given by $V = t - (1 + r)k$, with a gross funding cost for the lender as given by $1 + r$.

The borrower's payoff function is $U = sf(k) - t$, where $f(k)$ is a standard production function; with $f'(k) > 0$, $f''(k) < 0$. The parameter s is private information (observed only by the firm) and can be interpreted as a type-parameter or a productivity shock, with $s \in \{\underline{s}, \bar{s}\}$, and the probability distribution over types as given by

$\Pr(s = \underline{s}) = p$, for being a low-type, and $\Pr(s = \bar{s}) = 1 - p$, for being a high-type; $\bar{s} > \underline{s} > 0$. (This probability distribution is common knowledge.)

Assume that the bank's objective is to maximize expected profits. However, the lender cannot distinguish between the two types. (You cannot tell the potential borrowers apart.) The borrower will only accept a financial contract, stipulating a pair (k, t) , offering her a non-negative payoff. (Here t is the repayment of the loan including the interest rate charged by the lender.)

1. What would be the lender's optimal contract under complete and symmetric information; as given by a pair $\{t, k\}$, one for each type of the borrower, when the borrower's payoff is driven down to zero (her reservation payoff)?
2. When only the borrower knows her true type, as given by a value of s , show that if the first-best contract above should be offered, a \bar{s} -firm would pretend to be a low-type firm.
3. How can the lender, by properly designing the set of contracts, induce the high-type to choose the contract designed for her? Interpret your results!

(Hint: The “trick” is to offer a menu of contracts $\{(\underline{t}, \underline{k}), (\bar{t}, \bar{k})\}$; one for each type, so as to get each type of borrower to select the one designed for that type. Because the high-productivity type now must be induced not to mimick the low-productivity type – the reverse mimicking is not profitable – you have to put up a self-selection constraint (like an incentive compatibility constraint) for the high-productivity type which gives her a payoff from accepting (\bar{t}, \bar{k}) not falling below what she can obtain by taking the contract $(\underline{t}, \underline{k})$.)

Problem 2

A short essay on “Why do we have banks?”