ECON4240 - Spring semester 2013

Problem 1

Consider a relationship between a principal and an agent in which the value of the product, denoted *x*, can be either $x_1 = 50{,}000$ or $x_2 = 25{,}000$. The agent's effort, denoted *e*, takes on one of three possible values, $e_1 = 5$, $e_2 = 20$, or $e_3 = 40$. The probability of the good result, x_1, is 0.25 for effort level e_1, 0.5 for effort level e_2, and 0.75 for effort level e_3.

Assume that the principal is risk neutral, so that the principal's utility is given by $x - t$, where *t* is the transfer from the principal to the agent. The agent is risk averse with utility function

$$U(t,e)=\sqrt{t} - e$$

The agent has a reservation utility of 120.

(a) Find the optimal contract under symmetric information for each level of effort. What is the principal's expected profit in each case? Which effort level does the principal prefer?

(b) Find the optimal contract when there is a moral hazard problem. As usual, we assume that the principal has all bargaining power and formulates the contract. Which effort level will be induced? How does the moral hazard problem have its influence?

(c) Discuss briefly what might happen if both sides have some bargaining power.

Problem 2

Consider a sharecropping arrangement between a landlord (the principal) and a tenant (the agent). The tenant chooses between two effort levels, namely 0 and 1. Output *q* is stochastic and can either be q^H (high) or q^L (low). Let π_i denote the probability that the output is high for effort level e_i where i=0,1. Assume that $\pi_1 > \pi_0$. The landlord cares about maximizing the expected value of the output net of transfers to the tenant (standard case!). Further, the tenant is risk-neutral and cares about the transfers and the disutility of effort (if he undertakes any).

Suppose there is limited liability in that transfers to the tenant cannot be negative.

Set up the landlord's problem and characterize the optimal contract.

Now suppose that there is a *linear sharing rule* between the landlord and the tenant, with the landlord offering the tenant a share α of the realized output. So now the landlord's problem essentially boils down to the choice of the optimal share α.

Now characterize the optimal contract. Does the limited liability constraint bind in equilibrium?

Calculate the expected utilities to the landlord and the tenant under the two different scenarios: the original problem and the one with the linear sharing rule.

Which one would the tenant prefer and which one would the landlord prefer?