

Problème

One considers the simple model of task delegation : the principal wants to delegate a task to an agent. the agent has to produce a good (quantity will be noticed q) . This costs θq to him with $\theta \in \{\underline{\theta}, \bar{\theta}\}$ with $\underline{\theta} < \bar{\theta}$. The principal extracts a surplus $S(q)$. S being concave and increasing. The principal proposes a contract, (or a menu of contracts) (t, q) where t is the payment made to the agent against a quantity q . If he refuses the contract, the agent obtains (with an outside option) a profit $U_0(\theta)$. That means that an agent with type θ will accept only if his profit is higher than $U_0(\theta)$. In the course $U_0(\theta) = 0$.

Part I

perfect information with zero outside option (2points)

Assume first that the principal knows θ .

1. What are the (First Best) optimal contracts (\bar{t}^*, \bar{q}^*) and $(\underline{t}^*, \underline{q}^*)$ when $\forall \theta, U_0(\theta) = 0$.
2. What is the level of utility achieved by the two types of agents

Part II

Asymmetric information with zero outside option (4 points)

Assume that the principal does not observe θ but knows the probability ν that $\theta = \bar{\theta}$. We note (as usual) the contracts (\bar{t}, \bar{q}) and $(\underline{t}, \underline{q})$.

3. Recall the participation and incentive constraints.
4. Compute the optimal second best contracts $(\bar{t}^{SB}, \bar{q}^{SB})$, $(\underline{t}^{SB}, \underline{q}^{SB})$, and the profits $(\bar{U}^{SB}, \underline{U}^{SB})$ achieved by the two types of agents.

(see next page, please....)

Part III

Non zero outside option (10 points)

We assume now that $U_0(\bar{\theta}) = 0$ but $U_0(\underline{\theta}) = \underline{u} > 0$. That means that the good agent can obtain a “good” contract elsewhere where he can obtain \underline{u} .

We are still in the asymmetric information case.

5. What are the new incentive and participation constraints?(1 point)
6. What happens if $\underline{u} \leq \underline{U}^{SB}$? (2 points, that is a gift)
7. What is the optimal contract if $\underline{U}^{SB} < \underline{u} \leq (\bar{\theta} - \underline{\theta})\bar{q}^*$? (Hint : use a (q, t) picture with iso profit lines) (2 points)
8. What happens if $(\bar{\theta} - \underline{\theta})\bar{q}^* < \underline{u} \leq (\bar{\theta} - \underline{\theta})\underline{q}^*$? (1 point)

Assume now that $\underline{u} > (\bar{\theta} - \underline{\theta})\underline{q}^*$

9. Show that the bad agent could have an incentive to lie. (2 points)
10. What is the second best contract in that case? (2 points)

Questions (4 points)

1. In the standard moral hazard model, when the agent is risk-neutral, show that optimality needs a negative payment in case of bad result.
2. In the standard moral hazard model, why, then, limited liability is a bad news for the principal?