Exam

Incentives in Organizations and Innovation

Summer semester 2015

Please answer ***either*** Question 1 ***or*** Question 2. If you answer both questions, we will only consider ***Question 1***!

Question 1

A team consists of two identical agents ($i = 1, 2$). The production function is $Q = \sum_{i=1,2} e_i$,where e_i is the effort of agent i. The disutility of effort for each agent is given by the function $c(e_i) = 0{,}5\ e_i^2$. The wage of agent i ($i = 1, 2$) is equal to $w_i = \alpha_i Q$, where $\alpha_i > 0$ is agent i's share of the total output. The utility of wage is equal to w_i.

1. Identify the individual rational level of effort.
2. Identify the collective rational level of effort. Is it a Nash equilibrium?
3. Consider a repeated game with almost perfect information and a *finite* time horizon. Can cooperation with trigger strategy be a subgame-perfect equilibrium? If yes, what are the conditions?
4. Consider a repeated game with almost perfect information and an *infinite* time horizon. Can cooperation with trigger strategy be a subgame-perfect equilibrium? If yes, what are the conditions?

   Note: The discount factor is $\delta = 1/(1+r)$, with r being the interest rate.
5. Outline briefly potential empirical implications of this model.

Time (total): 120 minutes

Question II

A principal employs a risk averse agent. The expected utility of the agent is $EU = E(w) - 0{,}5\, e^2 - 0{,}5r\, Var(w)$, where w is the wage, e is the effort and r is the coefficient of absolute risk version. The reservation utility of the agent is $\bar{u}$. The production function is $q = e + \varepsilon$. The variable ε is a normally distributed random variable with the expected value $E(\varepsilon) = 0$ and the variance σ_ε^2. The principal cannot observe e but only q. Additionally, he can observe a signal η, that is normally distributed with the expected value $E(\eta) = 0$ and the variance σ_η^2. The random variables ε and η are correlated. The wage of the agent is $w = \alpha\, (q + \gamma\, \eta) + ß$, where α, $ß$ and γ are set by the principal.

1. Identify the participation constraint and the incentive-compatibility constraint.
2. Identify the principal's optimal γ and explain your result.
3. Identify the principal's optimal α and explain your result.
4. Identify the principal's optimal $ß$ and explain your result.

Time (total): 120 minutes