



Homework 4

due October 2, 2018

Homework must be on the instructor's desk at K9 by 15:10 sharp. Submissions at any other time or manner will be ignored. Any paper which does not resemble work by a student of a world-class institution (not in A4 sheets, not clean, illegible, unnamed, unstapled, unlabeled tasks, final results not in boxes etc.) will be penalized with up to 50 points at the discretion of the grader. Do not submit your work in plastic covers. Copying in homework will be penalized with a 0 in that assignment and an additional penalty of 10 points in the course homework average. Students who give their homework away for others to copy from will be penalized with 0 in that assignment and a penalty of 30 points in their course homework average. Repeated offenders will be terminated from the course.

1. A risk-neutral and residual claimant principal considers offering the contract $w = \alpha + \beta x$ to a single agent, who produces output according to $x = 2 + e + \varepsilon$, where e is the (unobservable by the principal) effort the agent exerts and $\varepsilon \sim N(0,1)$ is a production shock. The agent's utility function is: $u(w, e) = -\exp(-w + \frac{e^2}{4})$. The reservation utility for the agent is -1. Use the standard property for the lognormal distribution that: $x \sim N(\mu, \sigma^2) \Rightarrow E[\exp(x)] = \exp[\mu + \frac{\sigma^2}{2}]$ to derive the following:
 - (a) The optimal response of the agent e as a function of the contractual parameters. [20p]
 - (b) The optimal contract (α^*, β^*) . [30p]
 - (c) The expected wage, the variance of the expected wage and the expected utility for the agent. [10p]
 - (d) If the principal found another agent identical to the agent above, would he/she want to offer him the same contract you derived in (b) or she should offer both agents a relative contract? Explain. [10p]

2. Consider the choice between a relative and an absolute linear contract. Explain which one you would be more likely to prescribe in each of the following cases:
 - (a) Negligible common and high idiosyncratic uncertainty. [10p]
 - (b) Risk-neutral principal and risk-neutral agents. [10p]
 - (c) Agents with high reservation utility. [10p]

Good afternoon!

ICEF Industrial Economics is the course with the lowest failing rate among all UoL courses and all UoL affiliate universities in the entire world. This is because of two reasons. First, UoL examiners often "steal" ideas for questions we created for our course and use them in the exams. The second reason is that ICEF IE students are trained to see the homework not as a task that has to be solved for credit but as a challenge to learn how to think as a market economist. You get value even when you try to solve the &#@% question and you fail! A man or a woman who tries to run 10K and lasts only for 1K is not a loser; because next time he or she will be able to run 2K. Loser is the one who does not even try and has someone else to run the 10K for him or her. You do not need to get 100% of credit in every homework. You just need to do 100% of effort. When you exercise your brain using our tasks (even when you do not do them correct till the end), when you get used to connect the theory to examples and real cases, then the UoL exam will seem to you like a field trip! This year the challenge will be to drop the fail rate to |0|. Keep walking!

Kosmas

Estimated completion time: 80 min

Difficulty level (normalized to UoL standards): 1.5/5 2.5/5

Direct your homework questions to Valeriya Popova