902: Issues in Economic Systems and Institutions

Department of Economics, Delhi School of Economics

Final exam. Winter Semester, 2016-17.

PART A

Answer any **two** *questions. Each question carries 15 marks.*

1. In verifiable message games, the sender communicates with the receiver by presenting (or witholding) verifiable evidence, i.e., they can be vague but cannot lie. Explain Milgrom and Roberts' "unraveling result" in the context of such games. How does it contrast with cheap talk games where the truth of the sender's claims is not verifiable? Discuss some factors which may prevent unraveling.

2. Discuss two scenarios in which a concern for reputation may lead decision makers or experts to ignore their private information and follow popular or safe courses of action and speech. In each case, discuss if reputational concerns necessarily reduce social welfare compared to a scenario where the actors have no concern for reputation.

3. What is the difference between statistical and taste based discrimination? Explain one empirical methodology that has been used to detect discrimination in social and economic interactions. Explain another method which can be used to identify if discrimination has a taste based component. Does statistical discrimination call for any corrective intervention? Why or why not?

PART B

Answer any **two** *questions. Each question carries 20 marks.*

4. This question is based on Hermalin's model of leadership. Two players, 1 and 2, are engaged in team production. The output of the team is given by:

$$q = \theta\left(e_1 + e_2\right)$$

where q is team output, e_i is player i's effort level and θ is a productivity parameter which can take one of two values, 4 or 6, with equal probability. Member i always receives a share α_i of team output regardless of how much effort they put in individually ($\alpha_i > 0$ and $\alpha_1 + \alpha_2 = 1$). Efforts are chosen simultaneusly unless otherwise mentioned. Each player has a private cost of supplying effort given by $c(e_i) = \frac{1}{2}e_i^2$. Team member i's payoff is then given by

$$u_i\left(e_i, e_j; \theta\right) = \alpha_i \theta\left(e_i + e_j\right) - \frac{1}{2}e_i^2$$

(a) If the realization of θ is observable to player 1 (the leader) but not player 2 (the follower), and if the leader has no way to communicate information about productivity to the follower, derive their respective effort choices as a function of θ.

(b) In the scenario above, calculate the shares (α_1, α_2) that will maximize total surplus for the team. How does it compare with optimal shares when there is symmetric information about θ?

(c) Now assume equal shares and suppose the leader chooses her effort after observing θ while the follower chooses his effort after observing the leader's effort. Characterize the lowest effort separating equilibrium where the leader signals productivity through her own effort choice.

(d) Assuming equal shares, is the team more efficient when the follower is informed about the realization of θ from the outset than when he is not?

3+5+10+2=20

5. This question is based on the Crawford-Sobel model of cheap talk with uniform-quadratic preferences. The state-of-the-world θ is uniformly distributed on $[0, 1]$. Its realization is private information to the sender, who sends a costless message m to the receiver, potentially containing some information about θ. The receiver takes an action $a \in [0, 1]$, and preferences are given by

$$U_R = -(a - \theta)^2$$
$$U_S = -(a - b - \theta)^2$$

where b is the sender's bias parameter.

(a) Suppose $b = \frac{1}{18}$. Find all the Perfect Bayesian equilibria.

(b) Suppose the receiver can delegate the choice of action to the sender subject to a ceiling, i.e., the sender is not allowed to choose an action greater than some $\overline{a}$. Does delegation provide higher or lower ex ante payoff to the receiver compared to cheap talk? Prove your claim and also find the optimum ceiling.

(c) Returning to the cheap talk game, consider a variant of the basic model. The sender's bias is either $b = 1$ (probability α), or $b = 0$ (probability $1 - \alpha$). The true bias is private information to the sender. As before, the sender learns θ and sends a message m to the receiver. Find a Perfect Bayesian equilibrium. (Hint: try to find an equilibrium where the exact value of θ is revealed in equilibrium as long as θ is below some threshold $\overline{\theta}$). What happens in the limits as $\alpha \to 0$ and $\alpha \to 1$?

7+6+7=20

6. A company will decide whether or not to undertake a new project by asking three junior managers to vote on it. If the project is not not undertaken, the company's profit is 0. If it is undertaken, the profit is stochastic and is given by the sum of 4 components: $x_0 + x_1 + x_2 + x_3$. It is common knowledge that each variable x_i ($i = 1, 2, 3$) is an independent random draw from the uniform distribution on $[-1, 1]$, but only manager i knows the exact realization of x_i. On the other

hand, x_0 is a public component of profit whose exact value is known to everyone. The managers' objective is to maximize expected profit for the company but they cannot communicate with each other before casting their votes.

(a) Consider voting strategies with a threshold property: manager i votes in favour of investment if and only if the realization of x_i falls above a certain threshold. Find the equilibrium voting thresholds (as a function of x_0) in a symmetric, responsive equilibrium when the voting rule for investment is (i) simple majority (ii) unanimity.

(b) Calculate the ex ante probability of investment being chosen (again, as a function of x_0) under simple majority and unanimity rules.

(c) Let $x_0 = 0$. Compare the ex ante expected profit (calculated before x_i's are realized) for the company under the two voting rules and identify which rule is better.

10+5+5=20