Information Economics, Fall 2013
Homework 6

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Note 1. This homework is due **8:30 am, December 16, 2013**. Please submit a hard copy into the instructor's mail box. As each team only needs to submit one copy, please indicate the names and student IDs of all team members on the first page.

Note 2. Each team must have **exactly three** students unless a special approval is obtained.

1. (30 points) Recall that when the seller in Chen and Huang (2013) prices by quantity, it is optimal to offer a menu to screen consumers.

    (a) (20 points) If a menu cannot be offered and only a single contract (Q, P) can be offered, what is the optimal offer?

    (b) (10 points) Compare your answer in Part (a) with that of pricing by minutes in Chen and Huang (2013). Highlight the similarities and differences and provide economic implications.

2. (40 points; 10 points each) Consider the signaling game illustrated in Figure 1. First of all, player F's type $t \in \{H, L\}$ is drawn randomly, where $\Pr(t_1) = \Pr(t_2) = \frac{1}{2}$. Then player F selects between actions L and R. Then player C selects between actions B and N without observing player F's type.
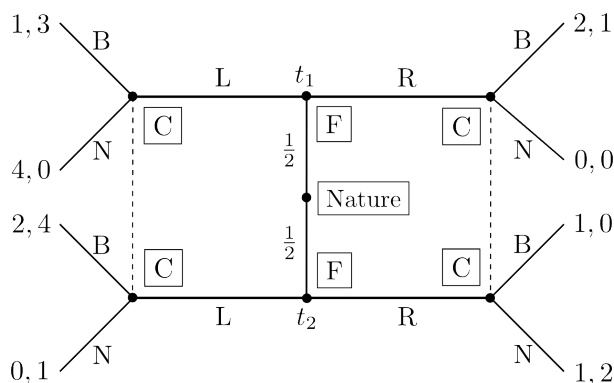

Figure 1: A signaling game

    (a) (5 points) What do the two dashed lines represent?
    (b) (5 points) Is there a pooling equilibrium in which both types of player F play L?
    (c) (5 points) Is there a pooling equilibrium in which both types of player F play R?
    (d) (5 points) Is there a separating equilibrium in which type t_1 plays L and type t_2 plays R?
    (e) (5 points) Is there a separating equilibrium in which type t_1 plays R and type t_2 plays L?
    (f) (5 points) Completely write down all the pure-strategy equilibria of this game. Please do not forget that an equilibrium include each player's strategy and the posterior belief.
    (g) (10 points) Let's call player F "leader" and player C "follower" in this problem. In the experiment in class,[1] we obtain the following result: Three type-1 leaders played L with the followers playing B; two type-1 leaders played R with the followers playing B; one type-1 leader played R with the follower playing N; two type-2 leaders played L with the followers playing B; one type-2 leader played R with the follower playing N; one type-2 leader played R with the follower playing B. What are your opinions about this result? If students have more time to analyze this game, will their strategies be more similar or more diverse? Why?

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[1] In that experiment, we call the two types r_H and r_L and player F's actions 1 and 0.

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3. (20 points; 10 points each) Consider the signaling game illustrated in Figure 2, which is the one we studied in the videos. In this problem, we will assume that all the parameters are the same except that r_H may vary within $[0.2, 1]$.
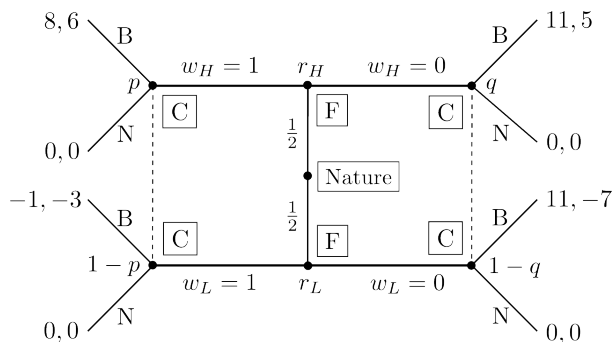

Figure 2: A signaling game

(a) For what values of r_H there is a separating equilibrium in which the reliable firm offers a warranty and the unreliable one does not? What may be the consumer strategy in this separating equilibrium?

(b) For what values of r_H there is a separating equilibrium in which the unreliable firm offers a warranty and the reliable one does not? What may be the consumer strategy in this separating equilibrium?

4. (10 points) Find a real-world example of signaling that is not introduced in videos or in class. Provide essential references if necessary.

References

Chen, Y.-J., K.-W. Huang. 2013. Pricing data services: pricing by minutes, by Gigs, or by Mega bytes per second? forthcoming in Information Systems Research.