Economics 204 B
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UCSC

Final Examination

Instructions. In class, closed book, three hours, only official double-sided page of notes allowed. When insufficient information is provided, please write down a plausible specific assumption and proceed to the solution. Partial credit will be awarded for partial solutions and for brief, relevant remarks, but not for rambling. Points (pts) are marked total is 100.

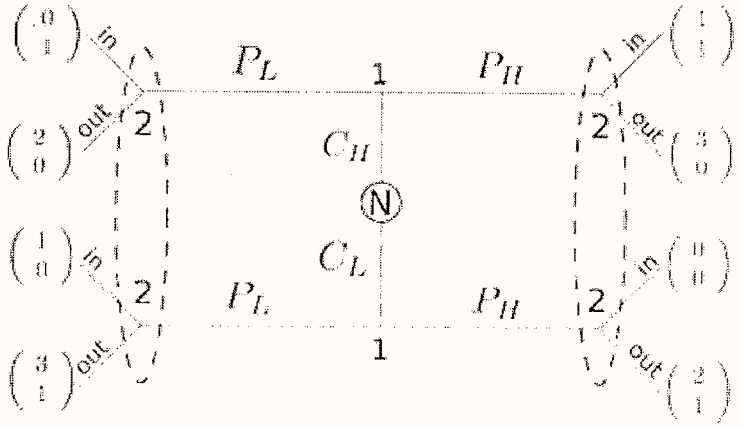
1. [Entry deterrence version 1] An incumbent firm can prepare to fight (P) at cost c = 15, or not prepare (N). In either case, a potential entrant firm then can enter (E) or not (D). If it enters the incumbent firm can fight (F) or go easy (G). Payoffs to (incumbent, entrant) are (50-c, -20) for (PF, E) and (-20, 10) for (NF, E). The payoff vector is (100-c, 0) for (PF, D) or (PG, D), and is (40-c, 30) for (PE, G); the corresponding payoffs for (N*, *) are the same except that c=0 instead of c=15. The entrant assesses the probability that the incumbent is prepared as p. All this is common knowledge.

(a) Draw the extensive form game where the incumbent moves first. Be sure to label the nodes and branches with the notation and payoffs given above. (4 pts)

(b) For what values of p does the entrant want to enter? (4 pts)

(c) Find all subgame perfect Nash equilibrium strategies and payoffs. Be sure to specify entire strategies for both players, not just strategy fragments. (8 pts)

2. [Entry deterrence version 2]A monopoly incumbent(player1) faces a potential entrant(player2). The monopoly has private information about its costs which may be either high (c_H) or low (c_L). The monopoly chooses either a high price (P_H) or a low price (P_L). The price is then observed by the potential entrant who then decides to enter (in) or to stay out of (out) the market. The potential entrant's prior belief is that there is an 80% chance that the monopoly is a low cost type (c_L). The payoffs are as follows (don't worry if they seem odd, just take them as given).



(a) Find a subgame perfect Nash equilibrium if, contrary to the figure above, there were perfect information (so the potential entrant knew whether the monopoly had high or low cost). Be sure to clearly state the complete equilibrium strategies and expected payoffs. (6 pts)

(b) In the game shown, the monopolist's cost is private information. For this game, find a separating perfect Bayesian equilibrium (PBE) or show that none exists, completely specifying the equilibrium strategies and beliefs. (8 pts)

(c) In the game shown, find a pooling PBE or show that none exists, completely specifying the equilibrium strategies and beliefs both on and off the equilibrium path. (8 pts)

3. A three-player game (players labelled i = 1,2,3) has ChF (or worth) $w(S) = |S| \sum_{i \in S} i$, where $|S|$ is the number of members of the coalition S. For example, if S = {1, 3} then w(S) =2(1+3) = 8.

(a) Find the core and identify a point in the core. (5 pts)

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(b) Find the Shapley Value. (5pts)
(c) Is the Shapley value in the core? Is there any general reason it should in the core? (2 pts)
(d) Find the Nash bargaining solution. (5 pts)

4. There are 10,000 individuals on Endromy Island, 40% of which are high risk (H) type with expected annual health care costs (measured in thousands of dollars per year) of $c_H = 2$ with standard deviation 2. The remaining 60% are low risk (L) type, with expected annual health care costs of $c_L = 1$ with standard deviation 1. The distribution of types is common knowledge, but only individuals know their type. All individuals have utility function: $U(x) = Ex - 0.2\ Var(x)$, where x is income net of health care expenses, E denotes expected value and Var denotes variance.
(a) Find the willingness-to-pay (w) for health insurance for each type of individual. (4 pts)
(b) Suppose the Island's government adopts a uniform price, actuarially fair mandatory insurance program. What premium (P) does the government charge each person? (4 pts)
(c) A new government takes over, and repeals the mandatory program in part (b). Instead, each person chooses whether to purchase insurance policies offered by risk neutral private insurance companies seeking to maximize profit. If they charge the same premium P as in part (b), which types individuals will purchase insurance, and what is the companies' profit? (4 pts)
(d) Government regulators now allow the private insurance company to earn a $400 expected rate of return per customer. What is the premium and profit with this type of regulation, and which types of customers are served? (4 pts)
(e) Now the industry is deregulated except that firms have to charge the same price to all potential customers. Assuming free entry, what is the competitive outcome? (4 pts)
(f) Describe how a single private insurance company can successfully overcome the asymmetric information and serve all customers in a voluntary market. No equilibrium calculations are necessary, but be sure to state what type of model you are using, the relevant constraints, the components of any contract, and why neither type will try to mimic the other. (4 pts)
(g) Is maximizing U equivalent to maximizing the expected value of some utility function u ("Bernoulli function") of net income? If so, what is the function? If not, why does no such u exist? (3 pts)

5. Consider the following payoff bimatrix, where $-2 < x < 10$.

	T1	T2
S1	3, 3	0, 5
S2	5, 0	x, x

(a) Is this game strategically symmetric? Explain very briefly. (2 pts)
(b) For which values of x (if any) does the game have a unique NE, and that NE is in mixed strategies? Is that NE stable in terms of monotone evolutionary dynamics? (4 pts)
(c) For which values of x (if any) does the game have a unique NE, and that NE is in pure strategies? Is that NE stable in terms of monotone evolutionary dynamics? (4 pts)
(d) For which values of x (if any) does the game have two pure strategy NE? What are their basins of attraction (if any)? (4 pts)
(e) Let $x = 1$. For $0 < q < 1$, suppose that the game always continues for another period with independent probability q. Under what conditions, if any, can the stage game outcome with maximal payoff sum (=6) be supported as a SPNE of the repeated game? Be sure to specify the relevant repeated game strategies. (4 pts)

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