Written Exam at the Department of Economics summer 2019

Microeconomics III

Final Exam

June 24, 2019

(2-hour closed book exam)

Answers only in English.

This exam question consists of 3 pages in total (including the current page)

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- leave the examination.
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- Or if you otherwise violate the rules that apply to the exam

PLEASE ANSWER ALL QUESTIONS
PLEASE EXPLAIN YOUR ANSWERS

1. Consider the following game G, where Player 1 chooses the row and Player 2 simultaneously chooses the column.

		Player 2		
		D	E	F
	A	$8,-1$	$2,0$	$1,0$
Player 1	B	$7,6$	$0,1$	$0,3$
	C	$2,2$	$4,3$	$0,0$

   (a) Show which strategies in G are eliminated by following the procedure of 'Iterated Elimination of Strictly Dominated Strategies'.

   (b) Find all Nash equilibria (NE), pure and mixed, in G. Show which NE gives the highest payoff to *both* players, and denote this equilibrium strategy profile by $e(1)$.

   (c) Now consider the game $G(2)$, which consists of the stage game G repeated two times. For the time being, you can assume that players have discount factor $\delta = 1$, i.e. they place equal weight on period-1 and period-2 payoffs.

   Find one pure strategy Subgame Perfect Nash Equilibrium (SPNE) where *both* players are better off than they were in part (b). That is, where both players earn at least as much as in $e(1)$, in each period, and earn strictly more than in $e(1)$ in at least one period. (*NOTE: make sure to consider deviations in any subgame)*. Denote the equilibrium strategy profile you found by $e(2)$.

   (d) Now consider the game $G(\infty)$, which consists of the stage game G repeated infinitely many times. Assume that players discount future payoffs with factor $\delta \geq 1/7$.

   Find one pure strategy SPNE where *both* players are better off than they were in part (c). That is, where both players earn at least as much as in $e(2)$, in each period, and earn strictly more than in $e(2)$ in at least one period.

2. Suppose we are in a private value auction setting. There are two bidders, $i = 1, 2$. They have valuation v_1 and v_2, respectively. These values are distributed independently and uniformly with $v \sim U(3, 4)$. The auction format is sealed-bid first price. In case of a tie, a fair coin is flipped to determine the winner.

   (a) Suppose player j uses the strategy $b(v_j) = cv_j + d$, where c and d are constants. Show that if bidder $i \neq j$ bids b_i, his probability of winning is

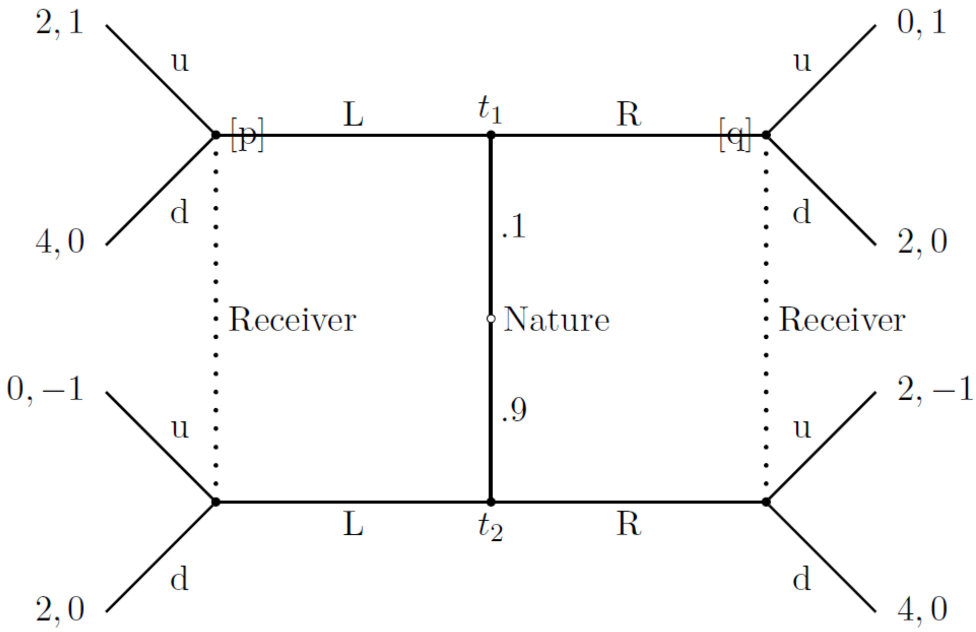
   $$P(i \;\; wins|b_i) = \frac{b_i - d - 3c}{c}$$

   whenever $3c + d \leq b_i \leq 4c + d$.
   Hint: Recall that if $x \sim U(a, b)$ then $P(x \leq y) = \frac{y-a}{b-a}$

   (b) Using the result in (a), show that there is a symmetric Bayes Nash equilibrium (BNE) in linear strategies $b(v_i) = cv_i + d, i = 1, 2$. Find c and d.

   (c) Check that, in the symmetric BNE from part (b), the lowest-type bidder will place a bid equal to his valuation, whereas all other bidders will bid strictly less than their valuation, and comment briefly on why this is the case. Does this relate to the 'winner's curse'? Briefly justify your answer (*NOTE: please attempt this subquestion even if you did not complete part (b))*.

3. Now consider the following game G':



Note that in this game, the prior probability that the sender is of type 1 is equal to 0.1.

(a) Briefly explain whether G' is a static or a dynamic game (1 sentence), and whether or not G' is a cheap talk game (1 sentence).

(b) Find a separating equilibrium in G', and find a pooling equilibrium where both sender types play R.

(c) Check whether the two equilibria you found in part (a) satisfy Signaling Requirements 5 ('strict domination') and 6 ('equilibrium domination').

(d) Now suppose that we modify G', so that the prior probability of the sender being type t_1 is given by the parameter $\alpha \in [0, 1]$. For what values of α does a pooling equilibrium exist where both sender types play R? (*NOTE: parts (a) and (b) of this question considered the special case where* $\alpha = 0.1$).

(e) Briefly comment on why a pooling equilibrium where both sender types play R exists for some values of α, but not for others. What is the intuition for this result?