

Midterm Exam – Economics 713

1. (20 points)

Suppose that players 1 and 2 play the game below, and that it is common knowledge between them that both of them are rational. If we make no other assumptions about the players' knowledge, what is our best prediction about how they will play the game?

		2				
		a	b	c	d	e
1	A	1, 4	0, 6	5, 2	2, 3	2, 5
	B	2, 2	3, 1	3, 1	4, 3	3, 3
	C	7, 3	3, 5	0, 0	3, 2	0, 0

2. (20 points)

Consider an infinite repetition of the game below, and consider the following repeated game strategy (which can be used by either player): "Play A in even periods and B in odd periods until someone deviates from this. Once anyone has deviated, play C forever." For what values of δ is it a subgame perfect equilibrium for both players to follow this strategy?

		2		
		A	B	C
1	A	3, 3	3, 5	0, 0
	B	5, 3	2, 2	0, 0
	C	0, 0	0, 0	1, 1

3. (10 points)

Does every normal form game have a Nash equilibrium in which no player places positive probability on a weakly dominated pure strategy? Explain why this is true or provide a counterexample.

4. (50 points (5, 5, 15, 10, 15))

Two firms compete in quantities. Firm 1 chooses between the Cournot quantity (strategy C) and the Stackelberg leader quantity (strategy L). Firm 2 chooses between choosing the Cournot quantity (strategy c) and the Stackelberg follower quantity (strategy f). The payoffs from the simultaneous move version of this game are presented below.

		2	
		c	f
1	C	4, 4	6, 3
	L	3, 1	5, 2

(i) What are the Nash equilibria of this simultaneous move game?

(ii) Suppose that player 1 moves first, and that his choice is observed by player 2 before she moves. What are the subgame perfect equilibria of this game?

Suppose again that player 1 moves first. After player 1 moves, player 2 observes a signal from the set $\{C', L'\}$. If player 1 plays C , player 2 receives the signal C' with probability $1 - \varepsilon$ and sees the signal L' with probability ε . Similarly, if player 1 plays L , player 2 sees L' with probability $(1 - \varepsilon)$ and sees C' with probability ε . Assume that $\varepsilon \in (0, \frac{1}{4})$.

(iii) Draw the extensive form of this game, and find all of its pure strategy sequential equilibria.

(iv) Are all (pure and mixed) perfect Bayesian equilibria of this game sequential equilibria?

(v) Are there any sequential equilibria (pure or mixed) in which player 2 responds to signal L' by playing f with certainty?