

SECOND MIDTERM EXAM
Econ 4011, Spring 2013

Do all questions. The questions have equal weight. You have 1hr and 20minutes.

1. Ultimatum Bargaining

Ann (Player1) and Bob (Player2) dividing a pie of size 1 between themselves. Ann makes an offer to have a share s (where $0 \leq s \leq 1$) for herself. Then, Bob can either accept or reject the offer. If he accepts, then each will obtain the share according to the offer just made (i.e., s and $1-s$, respectively). If he rejects, each will get nothing. Assume that the pie is infinitely divisible and that each player's objective is to receive as high a share as possible.

- Draw the extensive-form game tree.
- What is the subgame perfect equilibrium of this game?
- Is there a Nash equilibrium in which Bob obtains a share of 0.5 as its outcome?

2. Long Run-Short Run/Repeated Game

Consider the following simultaneous move stage game which is repeated infinitely.

	C	D
C	3,2	0,0
D	5,0	1,1

The row player (Player 1) is infinitely lived with discount factor equal to δ and there is a sequence of short-lived column players (Player 2).

- What is the static Nash Equilibrium of this game?
- Is $((C,C), (C,C), \dots)$ a subgame perfect equilibrium outcome path when $\delta=1/2$? (Do not confuse outcome path with strategies!)

Now, suppose both the row player and the column player is infinitely lived with a common discount factor δ . The game is modified in which the payoff to column player of (C, D) is 3.

- Is there a subgame perfect equilibrium in which row player's average payoff is 4?

3. Stackelberg Equilibrium

The market demand function for a new product is given by $p = 20 - x$ where x denotes the industry output (total production). The product must be developed first, and there is a fixed development cost R for the innovator. Once the product is developed, the cost of producing x_i unit is $3x_i$ for any firm i . However, there is another firm (imitator) who successfully imitates the product without incurring any development cost. So innovator moves first and decides how much to produce, and upon observing this, the imitator, decides how much to produce. The two firms can choose any positive level of production.

- What is the Stackelberg Equilibrium of this game?
- For what values of R , being imitator is preferable to being innovator?