ECB 201: Principles of Microeconomics, Midterm Exam 3

January 18, 2024

Name and section: _____

Instructions: There are three sections to this exam worth 65 points in total:

- 8 multiple choice questions, (20 points)

- 5 True/false questions, (10 points)

- 7 short answer questions, (35 points)

Clearly mark your answers in the exam book. For True/False questions, if the answer if false, briefly explain why. You may use a calculator but no other resources are permitted.

<table>
<tr><td align="center">Help Received:

</td></tr>
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"A Cadet will not lie, cheat, steal, nor tolerate those who do."

1. In the Bertrand model of oligopolistic competition, firms compete with each other on:

   A. Quality

   B. Quantity

   C. Price

   D. Marketing

   E. None of the above

2. Use backward induction to predict the outcome of the game below, assuming all players are self-interested nad rational.
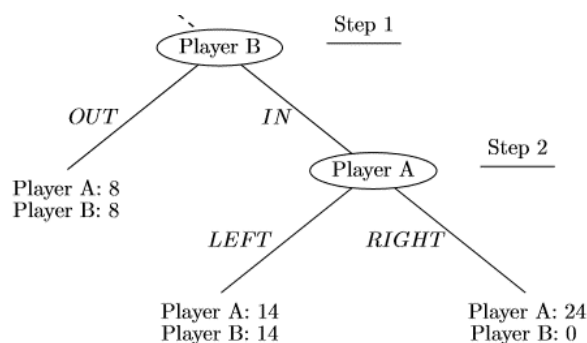
   A. Player B: Out, Player A, Right

   B. Player B: Out, Player A, Left

   C. Player B: In, Player A, Right

   D. Player B: In, Player A, Left

   E. Not enough information

3. Ideally, a tax imposed to minimize the dead-weight loss caused by a negative externality should be equal to:

   A. Marginal Private Cost

   B. Marginal Social Cost

   C. Marginal Damage Cost

   D. Average total cost

   E. Marginal Social Benefit

4. Which of the following features best differentiates oligopoly markets from other market structures?

    A. Perfect information

    B. Homogeneous products

    C. Few, interconnected firms

    D. Differentiated products

    E. Free entry/exit

5. If there is a negative externaltiy in a market, then there will likely be:

    A. Dead-weight loss due to under production.

    B. Dead-weight loss due to over production.

    C. Dead-weight loss due to a shortage.

    D. Dead-weight loss due to a surplus.

    E. No dead-weight loss and overall welfare will be maximized.

6. In the Cournot model of oligopoly competition, firms compete on:

    A. Quality

    B. Quantity

    C. Price

    D. Marketing

    E. None of the above

7. A seafood cannery emits pollution, damaging forests in the area used as an input for a paper mill, resulting in lost profits to the paper mill. According to the Coase Theorem, this problem may be solved by:

    A. The fishery owning the property rights to the forest

    B. The paper mill owning the property rights to the forest

    C. Either the paper mill or the seafood cannery having clear property rights to the forest

    D. Legislation banning all pollution form the seafood cannery

    E. None of the above

8. If a good has positive externalities associated with its consumption, then there will likely be:

    A. Dead-weight loss due to under production

    B. Dead-weight loss due to over production

    C. Dead-weight loss due to a shortage

    D. Dead-weight loss due to a surplus

   E. No dead-weight loss and overall welfare will be maximized.

1. In the cartel model of oligopolistic competition, firms collude so that all firms maximize their *individual* profits.

2. If a set of strategies is a Nash equilibrium for a game, then the outcome is the best possible outcome for all players

3. A game does not have a Nash equilibrium if the players do not have dominant strategies

4. A store announces that they will have a 50% off sale next month. This will cause demand for their product in the current month to decrease.

5. Under certain competition structures, oligopolies maximize their profits by setting their price equal to their marginal cost.

1. *Nash Equilibrium:* Find all Nash equilibria for the game below.

| (row player, column player)	Left	Center	Right
Top	2,1	3,8	0,0
Middle	0,0	0,0	0,0
Bottom	0,0	0,0	20,20

2. *Backwards Induction:* Use backward induction to predict the outcome of the game below, assuming that all players are rational and self-interested. Payoffs are given in the form (Player 1, Player 2)
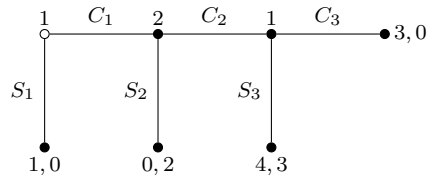
3. *Positive Externalites:* Draw an example marginal social benefit curve for this market if there is a positive externality associated with consumption of this good. Shade in the area representing the dead weight loss.
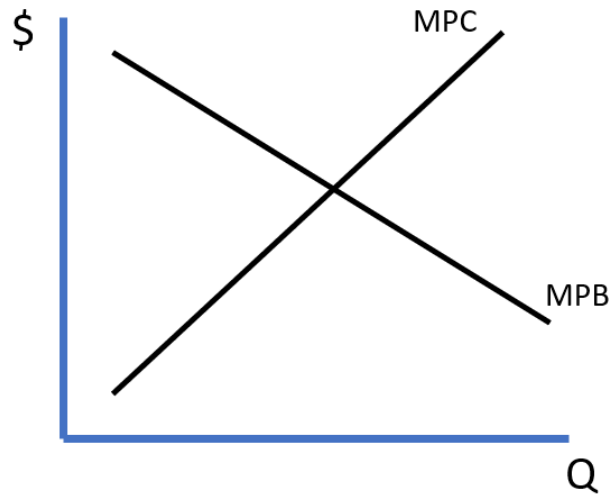
4. *Negative Externalites:* Draw an example marginal social cost curve for this market if there is a negative externality associated with the production of this good. Shade in the area representing the dead weight loss.
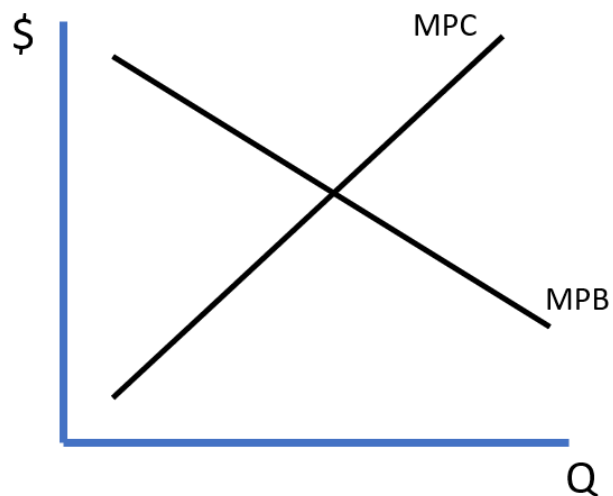
5. *Max-min strategy:* In contrast to our usual fully rational and self-interested agents, we can model extremely risk-averse players using 'maximum-minimum' strategies. If players play a 'maximum-minimum' strategy, they choose the action that gives them the best worst case outcome, ignoring their partners' incentives. What would the outcome of the game below be if both players use this kind of strategy to make their choices?

(row player, column player)	Left	Center	Right
Up	-1,-1	3,8	0,0
Down	-10,0	0,8	20,20

6. *Sequential games:* Twitter is trying to negotiate a lower service fee to sell subscriptions for their app through the Apple App Store. They offer Apple an ultimatum: "Either give us a discounted service fee or we will remove our App from your platform."

Assume that Twitter would earn:

- $10 million if they remain on the App store with no discount given
- $12 million if they remain on the App store with a discount
- $5 million if they leave the App store

and that Apple would earn:

- $3 million if Twitter stays on the platform and Apple gives no discount
- $1 million if Twitter stays and Apple gives a discount
- $0 if Twitter leaves

Using these hypothetical numbers, assign a numerical payoff to each letter (a through h,) so that the game tree below models this interaction. Each payoff should be in the form (Apple's earnings, Twitter's earnings.)
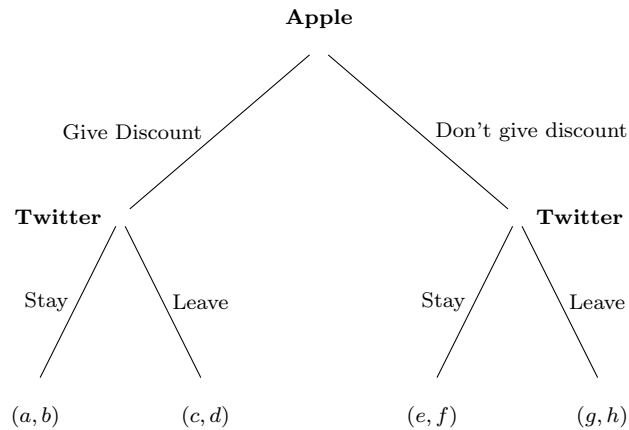
Letter	Payoff amount, (million $)	Letter	Payoff amount, (million $)
a	1	e	3
b	12	f	10
c	0	g	0
d	5	h	5

7. *Analysing incentives:*: Using the game tree from the previous question, is Twitter's threat to pull their app from the App Store credible? Why or why not?