Written Re-exam at the Department of Economics winter 2019-20

Microeconomics III

Final Exam

10-02-2020

(2-hour closed book exam)

This exam question consists of 3 pages in total

Falling ill during the exam

If you fall ill during an examination at Peter Bangs Vej, you must:

- contact an invigilator who will show you how to register and submit a blank exam paper.
- leave the examination.
- contact your GP and submit a medical report to the Faculty of Social Sciences no later than five (5) days from the date of the exam.

Be careful not to cheat at exams!

You cheat at an exam, if during the exam, you:

- Make use of exam aids that are not allowed
- Communicate with or otherwise receive help from other people
- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text
- Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
- Or if you otherwise violate the rules that apply to the exam

Re-Exam

Autumn 2019

Important: Please make sure that you answer all questions and that you properly explain your answers. For each step write the general formula (where relevant) and explain what you do. Not only the numerical answer. If you make a calculation mistake in one of the earlier sub-questions, you can only get points for the following sub-questions if the formula and the explanations are correct!

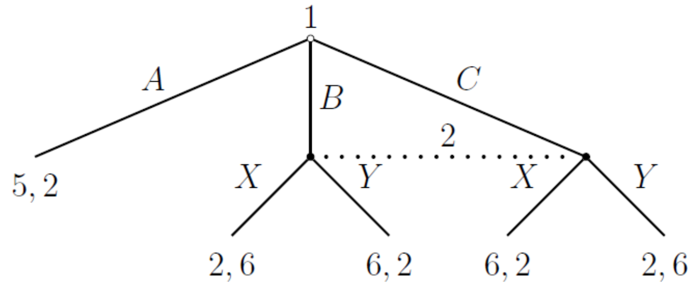
1. Short questions.
   (a) "When applying iterated elimination of *weakly* dominated strategies, it is possible to eliminate Pure Strategy Nash Equilibria." 1) State if this is true or false 2) Provide a small example proving your point.
   (b) "In a mixed strategy NE players must be indifferent between their respective pure strategies." 1) True or false? 2) Give a small example and explain he example in 2-3 sentences.
   (c) In a family, there are 3 sisters, named Alice, Beatrice, and Caroline. They have a big piece of cake, whose size we normalize to 1. Alice divides the cake into 3 pieces, which can be of different sizes. Next, Beatrice picks one of the pieces for herself. Next, Caroline picks one of the remaining two pieces. Alice picks the last piece. Each sister's payoff is the size of the cake she gets. 1) Using backward induction, show how Alice will divide the cake. Explain your steps, the pure outcome is not enough. 2) Repeat (1) assuming instead that Beatrice picks a piece for Alice; Caroline picks a piece for Beatrice, and the remaining piece is given to Caroline. Explain your steps.
   (d) 1) Explain what is meant by the term common values and distinguish this from private values. 2) Explain why the winner's curse arises with common values but not with private values.

2. Two city farmers, Mia and Iben, let their chickens run around on their rooftop garden. They can choose to use the common resource lightly or heavily and the resulting strategic interaction may be described as a simultaneous-move game. The payoff matrix is the following:

		Iben: Light	Iben: Heavy
Mia	Light	$40, 40$	$20, 55$
	Heavy	$55, 20$	$30, 30$

   (a) Find the Nash equilibrium of the game and explain why it is an example of "Prisoners' Dilemma" games.
   (b) Suppose that the same game is repeated infinitely. Is the (light, light) outcome a SPNE if both players play a trigger strategy and have a discount factor of 0.7?

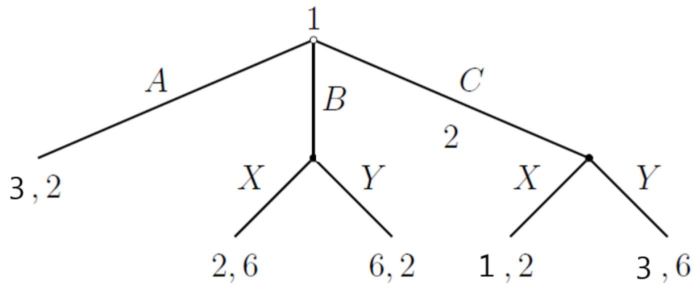
3. Have a look at the following game:



(a) Is it a dynamic or static game? How many proper subgames are there?

(b) Which solution concept is appropriate to apply in this game and why? What does the equilibrium look like? (Hint: Describe the reasoning of each of the players).

(c) Suppose that we delete the information set between player 2's decision nodes. This means 2 can observe whether 1 chose B or C. What solution concept should we apply now? Find the unique equilibrium under that concept.



(d) Now consider the second version of the game (the one without the dotted line). Find all pure strategy nash equilibria of this game.

(e) Which of these are subgame perfect?

4. Bose and Soundbox are competing for customers in Copenhagen who like to listen to good music. The demand for Bose's products are given by $q_1(p_1, p_2) = 11 - p_1 + 0.5p_2$. The demand for Soundbox products are given by $q_2(p_1, p_2) = 11 - p_2 + 0.5p_1$. Bose faces a cost of supplying its products of $C(q_1) = 4q_1$ and Soundbox of $C(q_2) = 4q_2$.

(a) What type of competition is this? Cournot or Bertrand?

(b) Compute the SPNE when both companies simultaneously set their prices. Calculate the resulting profits.

(c) Suppose now that, before the choice of prices, Bose can develop a new technology at the cost of 10 units, which will reduce its marginal cost to zero. However, Soundbox will immediately receive the new technology paying a fixed cost of 5 (simultaneous game, no decision necessary). Calculate the SPNE of the given game. Will Bose develop the new technology?

(d) Explain intuitively what would happen to prices and to profits if Bose and Soundbox would be selling non-homogeneous goods and if Bose would increase its prices.