Written Exam at the Department of Economics summer 2020

Micro II

Final Exam

3 June 2020

(3-hour open book exam)

Answers in English or Danish.

Upload your answers in Digital Exam as one pdf. file (including appendices) and name your pdf with your examination number AND the language in which you have answered, e.g. 12-ENG.pdf or 127-DA.pdf

This exam question consists of 4 pages in total including this front page.

This exam has been changed from a written Peter Bangsvej exam to a take-home exam with helping aids. Please read the following text carefully in order to avoid exam cheating.

Be careful not to cheat at exams!
You cheat at an exam, if you during the exam:

- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text. This also applies to text from old grading instructions.
- Make your exam answers available for other students to use during the exam
- Communicate with or otherwise receive help from other people
- 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
- Use parts of a paper/exam answer that you have submitted before and received a passed grade for without making use of source referencing (self plagiarism)

You can read more about the rules on exam cheating on the study information pages in KUnet and in the common part of the curriculum section 4.12.

Exam cheating is always sanctioned with a warning and dispelling from the exam. In most cases, the student is also expelled from the university for one semester.

Question 1

Two breweries, Tuberg and Carlsborg, are the only competitors in a market for very cheap beer. Both firms produce at a constant marginal cost of 1 and all fixed costs have already been paid and cannot be reversed. The inverse demand curve in the market for very cheap beer is the following:

$$P = 101 - \frac{1}{10}Q$$

where $Q = Q_T + Q_C$ and Q_T is the quantity (in liters) of beer produced by Tuberg and Q_C is the quantity (in liters) of beer produced by Carlsborg. Assume that the two firms are competing in quantities à la Cournot.

a) What is the maximization problem of Carlsborg as a function of Q_C and Q_T?

b) Which quantity of beer will the two firms produce together in equilibrium?

c) Assume that the firms are instead competing in prices à la Bertrand. How many liters will the two firms produce together in equilibrium?

d) Go back to the initial situation and assume that Tuberg and Carlsborg merge. Which quantity of beer will the resulting firm produce?

e) Will the resulting firm in d) have higher, lower or the same profits as the combined profits of Tuberg and Carlsborg in the initial situation? Explain the economic mechanism why profits are different or the same. There is no need to use calculations in your response.

f) Go back to the initial situation and assume that Tuberg now faces constant marginal cost of 3, while Carlsberg continues to produce at marginal cost of 1. Which quantities would the two firms produce in equilibrium?

g) What will happen under Bertrand competition if Tuberg faces constant marginal cost of 3, while Carlsberg continues to face marginal cost of 1? Explain in words whether the overall quantity produced in the market and the price will be different than under c), and – if yes – in which directions they will change relative to c), and why. It is not necessary to calculate the new market price and quantity.

Question 2

Suppose you are a member of the successful newcomer band "The Public Good Providers". "The Public Good Providers" have three fans, Claus, Søren and Niels, who have already purchased tickets for a concert of your band. Assume that there are no other guests at the concert. If your band practices, this increases the quality Q of the concert. Claus, Søren and Niels consider paying your band for practicing, and your band has offered them to practice as many hours as they want in return for receiving one kroner per hour. Music quality will be 0 without practice and increase by one unit with each hour of practice.

However, while Søren places great importance on the music being of high quality, Niels places not so much importance on it, and Claus does not care at all about the quality of the music and only goes to the concert to hang out with the others. They have the following utility functions, where x_C, x_S and x_N are the amounts of money Claus, Søren and Niels "consume" in the end, respectively:

$$u_C(x_C) = x_C$$
$$u_S(x_S, Q) = x_S + 4\sqrt{Q}$$
$$u_N(x_N, Q) = x_N + 2\sqrt{Q}$$

where u_C denotes Claus' utility function, u_S denotes Søren's utility function, and u_N denotes Niels' utility function. Niels, Claus and Søren each have an endowment of 100 kroner.

a) What levels of the public good of music quality Q^C, Q^S, Q^N will each of the three contribute if they make decisions individually and take the other players' decisions as given? What is the total amount provided?

b) What is the socially optimal level of music quality?

c) Your band understands that Claus, Niels and Søren will buy less music quality than the socially optimal level. Your band therefore decides to try to overcome this problem by letting them pay Lindahl prices. What are the Lindahl prices t^C, t^S, t^N that each of the three fans would have to pay in the Lindahl equilibrium?

d) Why may Claus, Niels and Søren be unwilling to truthfully provide the information you need to calculate the socially optimal level of the public good and the Lindahl prices? Explain in words.

Your band decides to set up the Vickrey-Clarke-Groves mechanism to elicit the willingness to pay for music quality from Claus, Niels and Søren. For simplicity, assume that music quality can be either 0 or 16. Your band decides to offer to provide music quality of 16 at a total price of 15, where each of the three would have to pay 5 kroner for the provision of the public good.

e) What are Claus', Niels' and Søren's net utilities, n_C, n_N and n_S, for going from music quality of 0 to music quality of 16 if each of them has to pay 5 kroner for the provision of the public good?

f) Assume that the Vickrey-Clarke-Groves mechanism is successful in the sense that all three report their true net utilities. Will the public good be purchased? Which agent is pivotal? What is the Clarke tax that this agent will have to pay?

Question 3

Mette, Asger and Jeanet want to go to the movies together. The movie preferences of the three are described in the following table.

Person/Movie	Star Wars Episode 23	Fast and Furious 17	Transformers 9
Mette	1	3	2
Asger	2	1	3
Jeanet	3	2	1

The numbers represent the ranking of Mette, Asger and Jeanet, respectively, i.e. in the first row, 1 stands for Mette's favorite movie and 3 for her least preferred movie and so on.

a) Mette suggests to apply the Democracy Social Choice Function (SCF) and find the optimal decision through pairwise voting. That is, the friends will vote between two movies, and the winning movie goes on to the next round, where there is a vote between that movie and another option which it has not yet won over. The process is repeated until there is an option that has won over all the other options. Explain what problem occurs in this process and how it arises.

b) Jeanet suggests to over-come this problem by forbidding voting on options that have already lost in a vote, and that she decides the order of the voting. The other two agree. Which pair of movies is Jeanet going to suggest for the first round of voting? Is she going to succeed in getting to watch her favorite movie in case all three vote according to their preferences? Explain what new issue occurs due to the change in the voting rules.

c) Asger thinks a step ahead and notices that, despite the fact that the voting is done in the order suggested by Jeanet, he can improve the outcome for himself through smart voting behavior. Which movie does he have to vote for (against his preferences) and in which voting round does he have to do so in order to improve his situation? Which movie would the three friends watch in that case? Assume that the other two will vote in accordance with their true preferences and that Asger knows this.

d) Can we apply the median voter theorem in the situation described under a)? Why or why not?

Question 4

Do you agree or disagree with the following statements? Explain your answers.

a) "Franchising contracts will typically involve no information rents to the agent, i.e. the agent will typically earn her reservation utility. This tends to be the case regardless of whether the agent is risk-neutral or risk-averse, and of whether the revenue is risky or not."

b) "In the grand scheme of things, allowing firms to take out patents for new products they have invented through research and innovation is a bad thing since it leads to market power." (Note: A patent guarantees a firm to be the only seller of a new product, typically for a duration of a few years.)