

Written Exam for the M.Sc. in Economics 2010-II

Advanced Industrial Organization

Final Exam

21 June, 2010

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by “eksamen på dansk” in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

ALL QUESTIONS BELOW SHOULD BE ANSWERED

Problem 1.

Consider a monopolist facing a continuum of consumers with different valuations for a good, v , distributed uniformly on the interval $[0, 1]$. A consumer wishes to buy at most one unit of the good in a period. If there is only one period this implies that all consumers with valuation v above the price p buys, so that the demand curve facing the firm is

$$1 - p$$

The firm has no cost, so if there were only one period, the profit maximizing price maximizes $p(1 - p)$ and is $p = \frac{1}{2}$.

There are two periods. In each period the consumers are as described just above. The firm and the consumers are both impatient, they share the discount factor $\delta \leq 1$. So viewed from period 1 the firm discounts period 2 profits with δ and the consumers discount period 2 surplus with δ .

The firm is able to keep track of who has bought its good. In period 2, the firm can therefore offer consumers different prices depending on whether they bought the good in period 1 or not. This is not possible in period 1. Call the first period price p_1 , let \hat{p}_2 be the second period price offered to a consumer who did not buy in period 1, and let p_2 denote the second period price offered to a consumer who bought in period 1. If the firm could not price discriminate in period 2, we know from Armstrong that it would choose a price $p = \frac{1}{2}$ in both periods. This is the benchmark, we will compare to below.

Suppose first consumers are not that smart - they are naive - so they do NOT realize that the price they are offered in the second period depends on whether they buy in period one or not. Suppose that the firm is unable to commit to second period prices already in period 1. When period 2 arrives the firm will choose second period prices which maximizes its second period profit.

a. Find the profit maximizing second period prices p_2 and \hat{p}_2 given an arbitrary price chosen in period 1, p_1 .

b. Find the first period price, p_1 , which maximizes the total discounted profit for the firm, taking into account the way it chooses prices in period 2.

c. Is such behaviour based price discrimination good or bad for (all/some) consumers, is it beneficial for the firm?

d. Now suppose that the consumers are all stud politter, and they are - as we know - smart. So now they realize that the price they will receive in period 2 depends on whether they buy in period 1 or not. A consumer is interested in maximizing her total discounted surplus. Find the consumer, who is just indifferent between buying in period 1 or not.

e. Find the optimal prices maximizing the total discounted profits for the firm (again under the assumption that commitment in period 1 to period 2 prices is not possible for the firm).

f. Is such behaviour based price discrimination good or bad for (all/some) consumers, is it beneficial for the firm?

g. Armstrong refers to Fudenberg and Tirole's theory about behavior based discrimination in a Hotelling duopoly. Discuss this shortly and compare with the results above. Discuss also whether behaviour based price discrimination in the Hotelling duopoly is good or bad for (some) consumers and whether it is beneficial for firms?

Problem 2:

In Tiltown there is only one disco. Guy Lucky, the owner, has to decide how to set entry prices to the disco. He knows his business well. Therefore, he knows exactly demand for entry to the disco from both women and men. In particular, he is aware that the demand from men will be higher the higher the number of women who enter the disco and vice versa. Assume Guy Lucky wants to maximize his profits. Suppose that the demand from men and women, respectively, are equal to:

$$N_m = 30 - B_m + aN_w$$

$$N_w = 30 - B_w + bN_m$$

where N_i is the number persons of type i , $i = m(\text{en}), w(\text{omen})$, who enter the disco and pay the entrance fee B_i .

- a) Verify that the demand of men and women can be written as, respectively:

$$N_m = \frac{(1+a)30 - B_m - aB_w}{1-ab},$$

$$N_w = \frac{(1+b)30 - B_w - bB_m}{1-ab}.$$

- b) When is this market two-sided according to the definition of Rochet and Tirole?
- c) Write down Guy's profit function. Verify that the optimal prices are $B_m^* = \frac{30(1-b)}{2-a-b}$ and $B_w^* = \frac{30(1-a)}{2-a-b}$. Who will pay more? Why?
- d) A well-known business strategy in the market for discos is to arrange "women's night" where women do not pay entry and may even get a drink for free. Can we justify such a strategy inside this framework?

Problem 3

In November 2008, the European Commission imposed fines, totaling €1 383 896 000 on Asahi, Pilkington, Saint-Gobain and Soliver for illegal market sharing and exchange of commercially sensitive information regarding deliveries of car glass in the EU, in violation of Article 81 of the EC Treaty. Asahi, Pilkington and Saint-Gobain are the three major players in Europe. They held regular discussions with the purpose of allocating between themselves car glass supplies and of keeping the market shares of the car glass suppliers as stable as possible. The Belgian company Soliver also took part in some of these discussions. These four companies controlled about 90% of the EU market for glass used in new cars and for original branded replacement glass, a market worth about €2 billion in the last full year of the infringement.

The Commission started this investigation on its own initiative on the basis of reliable information provided by an anonymous informant. The information prompted the Commission to carry out surprise inspections in 2005 at several sites of car glass producers in Europe. After the inspections, the Japanese Asahi Glass Co. and its European subsidiary AGC Flat Glass Europe filed an application under the 2002 Leniency Notice. Asahi/Glaverbel cooperated fully with the Commission and provided additional information to help to expose the infringement and its fine was reduced by 50%.

- (a) What is the rationale behind giving a fine reduction to a member of a cartel if it starts to cooperate after the cartel has already been discovered? Discuss.
- (b) Does the introduction of a leniency program unambiguously reduce collusion among firms?