Competition Policy: Exercise I

HEC Lausanne

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Question 1

Consider a monopolist that produces for two periods. The demand curves in both periods are $q_t = 1 - p_t$ for $t \in \{1, 2\}$. The marginal costs are $c > 0$ in the first period and $c - \lambda q_1$ in the second period, where λ is a small positive number. There is a discount factor of $\delta \in [0; 1]$ between the two periods.

(a) Explain briefly how the monopolist's problem changes compared to a situation where the marginal cost is c in both periods.

(b) Neglecting second-order conditions find the quantities q_1 and q_2 that the monopolist chooses in the two periods.

Question 2

Consider a market where a total profit of Π can be earned by the firm which obtains the monopoly right to sell in that market. Suppose that there exist n identical firms, which attempt to gain this monopoly right. Each firm i has to simultaneously decide the amount x_i it wants to spend on lobbying and other rent-seeking activities, knowing that the probability to win the race is given by $\frac{x_i}{\sum_{j=1}^{n} x_j}$.

(a) Find the symmetric equilibrium level of expenditure of each firm, and the expected equilibrium profit of each firm.

(b) Show that as n tends to infinity, the total expenditures made by the firms equal the total monopoly profit.

Question 3

In 2007, Webasto, a German auto parts maker, decided to license the rights to one of its best-selling products – a roof-top solar panel for trucks – to the highest bidder at a public auction. Assume that the demand for trucks is $p = 100 - q$ and that Webasto's roof-top solar panel allows truck manufacturers to reduce the constant marginal cost of production from 70 to 60.

(a) Confirm that this is a non-drastic innovation and that the marginal cost would have to be reduced to less than 40 for the innovation to be drastic.

(b) Suppose that the truck industry is monopolistic. Determine how much the monopolist is willing to pay to acquire the innovation from Webasto.

(c) Suppose that the truck industry is Bertrand-oligopolistic with n firms. Before the innovation, all firms have the same marginal cost of 70. After the innovation, one of them has a lower cost of 60. Compute how much the latter firm is willing to pay for the innovation.

Question 4

Consider the following market: two firms compete in quantities, i.e. they are Cournot competitors. The firms produce at constant marginal costs equal to 20. The inverse demand curve in the market is given by $p(q) = 260 - q$.

(a) Find the equilibrium quantities under Cournot competition as well as the quantity that a monopolist would produce. Calculate the equilibrium profits in Counrot duopoly and the monopoly profits.

(b) Suppose that the firms compete in this market for an infinite number of periods and their joint discount factor is $\delta \in [0; 1]$. The firms would like to collude in order to restrict the total quantity produced to the monopoly quantity. Write down possible trigger strategies that the firms could use to achieve this outcome.

(c) Find the values of δ for which collusion is sustainable with the trigger strategies from (b).

Question 5

Consider two firms i and j producing homogenous goods and choosing quantities in each period for an infinite number of periods. Demand in the industry is given by $p = 1 - Q$, where Q denotes the sum of the individual outputs. The two firms are identical: they incur zero marginal costs, and have the same discount factor δ. Consider the following trigger strategies: each firm sets an output $q \in [\frac{1}{4}, \frac{1}{3}]$ at the beginning of the game, and continues to do so unless a deviation occurs. After a deviation, each firm forever sets the quantity q^C, which is the Cournot equilibrium of the one-shot game.

(a) Find the conditions for collusion to arise in this industry.

(b) Show that, the lower q (i.e. the more collusive the output choice) the less likely that the above collusive trigger strategies are sustained at equilibrium.