EC2084 Finalist Paper

UNIVERSITY OF WARWICK

Summer Examinations 2017/18

Industrial Economics 1: Market Structure

Time Allowed: 2 hours.

Answer **ALL THREE** questions from **Section A** (20 marks each), and **FIVE** out of **SIX** questions from **Section B** (40 marks in total). Answer Section A questions in one booklet and Section B questions in a separate booklet.

Approved pocket calculators are allowed.

Read carefully the instructions on the answer book provided and make sure that the particulars required are entered on each answer book. If you answer more questions than are required and do not indicate which answers should be ignored, we will mark the requisite number of answers in the order in which they appear in the answer book(s): answers beyond that number will not be considered.

Section A: Answer ALL THREE questions

1. Firm 0 and 1 sell beer on the beach. The beach is 1km long. Consumers are located uniformly along the beach: each consumer has location x, with $0 \leq x \leq 1$. Each consumer buys exactly 1 beer, but she chooses the seller so as to minimize her total cost. In particular, a consumer located at x pays $p_0 + t*x$ if she shops at Firm 0, and $p_1 + t*(1-x)$ if she shops at Firm 1. p_0 and p_1 denote the prices charged by Firm 0 and 1, t represents the average cost of transportation for consumer located at x (so that the transportation cost is $t*x$ for Firm 0 and $t*(1-x)$ for Firm 1). Assume that firms have zero costs.

   (a) Assume the firms decide simultaneously where to locate. Moreover, assume both firms charge 1 pound per bottle. What is the equilibrium in the location game? Explain. **(5 marks)**

   (b) Now assume that the firms play a two-stage game: first, Firm 0 chooses its location, then Firm 1 chooses its location. Again, we assume both firms will charge 1 pound per bottle. What is the SPNE of this game? Explain. **(5 marks)**

   For the next questions, assume that the firms are already located at the extremes of the beach: Firm 0 is in location 0 and Firm 1 in location 1. The firms simultaneously decide their prices.

(Question 1 continued overleaf)

    (c) Characterize the location of the indifferent consumer, and derive the demand for firm 0, given prices chosen by 0 and 1. **(4 marks)**

    (d) What is the equilibrium of the pricing game? **(6 marks)**

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2. Consider an industry where an incumbent (I) operates, and a potential entrant (E) is considering whether to enter. The game is as follows: in the first stage, E decides whether to enter or not; in the second stage, if E is out, then I produces as a monopolist; if instead, E entered, then the two firms compete in quantities. Assume market demand is equal to $P=100 - Q$, where Q is the total quantity produced, $Q= q_I + q_E$. Also, assume that I has constant marginal cost equal to C, while E has production cost equal to zero. Finally, if E enters, it pays an entry cost $F=1600$.

    (a) Suppose E has chosen to stay out. Compute the monopolist optimal quantity, and profit, as a function of C. **(4 marks)**

    (b) Suppose that E has entered the market. Compute the Cournot optimal quantity, profits and price as a function of C. **(6 marks)**

    (c) For what values of C would E enter the market? **(5 marks)**

    (d) If C=35, how much would the incumbent I be willing to pay to decrease C to a level that makes the entry profit of E equal to zero? Explain. **(5 marks)**

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3. A firm is composed by an upstream (U) and a downstream (D) division. The upstream division produces engines, and every engine is used by the downstream division to produce a car. Market demand for cars is equal to $P_F =180-3q$. The total cost of producing engines for U is $C(q)=2q^2$. Division D, instead, has constant marginal cost equal to 20 to assemble a car. Hence, the total cost D pays is equal to $p*q+20q$, where p denotes the price of engines.

    (a) What are the profit functions for D and U (as a function of p and q)? **(3 marks)**

    (b) Suppose divisions interact as follows: first, U decides the price of engines, given his forecast of D's demand; then D observes U's price and decides how many cars to produce. How many cars are produced in equilibrium? What is the price of an engine? **(5 marks)**

(c) Now instead suppose divisions interact as follows: first, D decides the price of engines, given his forecast of U's supply; then U observes D's price and decides how many engines to produce. How many cars are produced in equilibrium? What is the price of an engine? **(7 marks)**

(d) What is the optimal transfer price in this setting? If the firms applied it, would the quantity of cars be higher or lower than in previous cases? Why? **(5 marks)**

Section B: Answer FIVE questions.
Please use a separate booklet.
In each case, decide whether the statement is **True**, **False**, or **Uncertain**. Explain the reason for your answer **(one or two sentences)**. Most or all of the credit will be given for the explanation.

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4. Firm A produces engines and sells them to Firms B and C, which both produce tractors. It would be more profitable for Firm A to make its engines custom-built for the tractors produced by a specific client, so that A could sell them at a higher price. **(8 marks)**

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5. Consider a duopoly. Suppose one firm has the option to move before his opponent (instead of deciding simultaneously). There is never a strict incentive not to take advantage of this option. **(8 marks)**

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6. In a market where firms are price takers, firms make zero profits in equilibrium. **(8 marks)**

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7. If firms compete on prices, competition is going to be harsh, as firms lose most of their demand if they choose a price higher than competitors' prices. **(8 marks)**

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8. Suppose a Cournot duopolist has the option to invest in a technology that would simply increase considerably the cost of modifying the level of quantity produced. It would be profitable to invest in such technology. **(8 marks)**

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9. A monopolist produces a durable good and might offer one of the following policies to his consumers: Policy A guarantees a price reimbursement if the price of the good decreases in the next year. Policy B, instead, guarantees free replacement for one year if the good gets broken. Statement to evaluate: Consumers should prefer Policy B. **(8 marks)**

(End)