EC366-6-AU **UNIVERSITY OF ESSEX**

FINAL YEAR EXAMINATIONS 2011

MARKET STRUCTURE AND STRATEGIC BEHAVIOUR

Time allowed: 2 hours.

Candidates must answer any TWO questions.
All questions carry equal weight.
This paper consists of FIVE questions.
Candidates are allowed to bring into the examination room: calculators (hand held, containing no textual information).

Question 1

Answer *both* parts [a] and [b]. They are separate questions.

Part [a.] Two shops, shop A and shop B, sell the same laptop in the High Street of Colchester. The two shops have a linear cost function and their marginal cost is equal to 0. High street is a single straight road of length 1, on which those two shops are located. Shop A is located at $a \in [0, 1/2]$, while shop B is located at $1 - b$, where $b \in [0, 1/2]$. There is a continuum of consumers uniformly distributed along High street. Location is measured as the distance from location 0. A consumer located at x, who buys at the shop located at $y \in \{0, 1\}$, has to incur, in addition to the price of the laptop, a travel cost of $t(x - y)^2$, where $t > 0$ is a positive constant. Each consumer wishes to purchase a single laptop and her willingness to pay is v. It is assumed that v is sufficiently large so that the market is covered in equilibrium. The two shops simultaneously choose their prices

[a_1.] [10 marks] For a given pair of prices (p_A, p_B), show that the demand of shop A is

$$\frac{a + (1 - b)}{2} + \frac{p_B - p_A}{2t[a - (1 - b)]}.$$

[a_2.] [15 marks] Suppose now that shop A is located at 0 and shop B is located at 1, i.e., $a = b = 0$. Derive the unique Nash equilibrium.

[a_3.] [10 marks] Suppose again that shop A is located at 0 and shop B is located at 1. Furthermore, suppose that $t = 0$. For a given pair of prices (p_A, p_B), what is the demand of shop A? What is the Nash equilibrium?

Part [b.] [15 marks] ”Firms operating at or near capacity are unlikely to instigate price wars”. Develop an argument in support of this claim.

Question 2

Answer *both* parts $[a]$ and $[b]$. They are separate questions.

Part $[a.]$ There are two producers, producer 1 and producer 2. Each producer has a constant marginal production cost which is equal to $c = 0$. Producers sell an homogeneous good and they simultaneously choose prices.

There is one potential buyer in the market, who wishes to buy one good and her maximum willingness to pay is $v > 0$. With probability $1/3$ the buyer observes the price charged by both producers. With probability $1/3$ the buyer observes only the price of producer 1 and with the remaining probability the buyer observes only the price of producer 2. If the buyer observes the price of both producers then she buys from the producer charging the lowest price; if prices are the same then the buyer buys from producer i with probability $1/2$, $i = 1, 2$.

$[a_1]$ [15 marks] Derive the expected demand of producer 1 and producer 2 for arbitrary pair of prices (p_1, p_2).

$[a_2]$ [20 marks] Show that at equilibrium firms price according to an atomless price distribution $F(p) = 1 - \frac{v-p}{p}$ defined for all prices belonging to the support $\sigma = [\frac{v}{2}, v]$.

Part $[b.]$[15 marks] "There is empirical evidence that price dispersion is lower in markets with repeated purchase". Develop an argument in support of this claim.

Question 3

Let two non-cooperative firms, firm A and firm B, face the following payoffs to pricing high or low in each period: if both firms price high they each get 200, if they both price low they each get 100, if firm A (respectively firm B) charges a high price and firm B (respectively firm A) charges a low price then firm A obtains 50 and firm B obtains 250.

[a_1.] [7marks] What is the Nash equilibrium of the game, assuming it is played in only a single period.

[a_2.] [8 marks] Suppose the game is played for an finite number of periods and at the end of each period each firm observes the price charged in the last period. What is the subgame perfect Nash equilibrium of the game?

[a_3.] [20 marks] Suppose the game is played for an infinite number of periods and at the end of each period each firm observes the price charged in the last period. Give an example of a Trigger Strategy that the firms could play to improved both firms' payoffs in every period of the game, relative to your answer in part a_2. Show any calculations you need to support your example.

[a_4][15 marks] Discuss the factors which might make collusion between firms more difficult to achieve.

Question 4

Answer *both* parts $[a]$ and $[b]$. They are separate questions.

Part $[a.]$ There are two firms, firm A and firm B. Each firm can decide whether to introduce in the market a new product or not to introduce it. If both firms decide to introduce a new product they each obtain a profit of 0. If firm A (respectively firm B) introduces the new product, while firm B (respectively firm A) does not, firm A (respectively firm B) obtains a payoff of 5, while firm B (respectively firm A) obtains a profit of 1. If both firms do not introduce their product each of them obtains a profit of 2.

$[a_1.]$[10 marks] Suppose that firms simultaneously choose whether to introduce the new product or not. Derive all possible pure strategy Nash equilibria.

$[a_2.]$ [15 marks] Suppose now that firms play the following two-stage game. In the first stage firm A decides either to introduce the new product or to not introduce it. In the second stage, firm B observes the decision of firm A and then firm B decides either to introduce the new product or not. Derive the subgame perfect Nash equilibrium.

$[a_3.]$ [5 marks] How does the answer in part a_1 differ from that in part a_2? Provide an intuition.

Part $[b.]$ [20 marks] With reference to the paper of Iyer et al (2005) discuss the role of targeting advertising in determining the amount of total advertising expenditures.

Question 5

Answer *both* parts [a] and [b]. They are separate questions.

Part [a.] Two firms, A and B, produce a homogenous good. Their cost functions are linear. Firm A has marginal cost $c_A = 0$, while firm B has a marginal cost $c_B \in [0, 1/3]$. The inverse demand function is $p = 1 - Q$, where $Q = q_A + q_B$ and q_i is the quantity of firm $i = A, B$.

Consider the following two-stage game. In the first stage firm A chooses its quantity. In the second stage, firm B observes the choice of firm A and chooses its own quantity.

[a_1.][10 marks] Derive the subgame perfect Nash equilibrium of this game.

[a_2.] [10 marks] Compute the difference in equilibrium profits between firm A and firm B.

[a_3.] [10 marks] Show that the difference in equilibrium profits that you computed in (a_2) increases with an increase in $c_B \in [0, 1/3]$. Provide an intuition.

Part [b.] [20 marks] ”Limit pricing by an incumbent monopolist deters entry”. Develop an argument in support of this claim.

End of Paper

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