Economics of Business and Markets
MSc in Business Administration

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Final Exam (June 8, 2009)

1. You may access a **two-pages A4 sheet** with personal notes.
2. **Questions 1 and 2** are mandatory.
3. Answer **two of questions 3-5**. Each values 25 points.
4. You have **2:00 hours** for solving the exam.
5. Be as **complete and clear** as possible.
6. **Good luck.**

1. **(30 points)** The Hirshman-Herfindahl Index (HHI) is a measure of market concentration.

   a) What is this index? How is it computed? What information does it provide?

   b) Consider two alternative markets, each with three firms:
   - In market A firms have shares of 3/7, 3/7 and 1/7;
   - In market B firms have shares of 3/8, 3/8 and 1/4.

   Compute the HHI for each market. Which market is more concentrated?

   Solution: Market A is seen as more concentrated than market B, as $HHI_A = 0.3878$ and $HHI_B = 0.3438$.

   c) Show that the above market shares correspond to the equilibria in the following situation:
   - The three firms produce homogenous goods for a market with demand $Q = 1 - p$;
   - Firms 1 and 2 have cost functions described by $C_i(q_i) = q_i^2$, and firm 3 has cost function $C_3(q_3) = 0.5q_3$;
   - In case A, firms compete by independently and simultaneously choosing quantities;
   - In case B, firms 1 and 2 collude.

   Solution: Computing the equilibrium in market A, one gets $q_1 = q_2 = \frac{3}{16}$ and $q_3 = \frac{1}{16}$. For market B one gets $q_1 = q_2 = \frac{3}{20}$ and $q_3 = \frac{2}{20}$. So the market shares are as given in the previous question.

   d) What sort of limitation on the HHI does the above analysis suggest?

   Solution: This suggests that the HHI may not be a good measure to capture the impact of collusion in market performance.

2. **(20 points)** Avira, a German company with around 70 million customers and 250 employees, is a worldwide supplier of computer security solutions for professional and private use. Its anti-virus software is available for individuals and small businesses in several versions, from the free Avira Antivir Personal version, for home use only, to the Avira Small Business Suite, at a price that starts at 399 euros. Discuss the rationale and possible limitations of such a pricing policy, namely highlighting reasons why it makes available a free version of the software.

3. Two part tariffs are a common pricing tool in many businesses.

   a) Describe what is a two part tariff. What are its advantages over a choice of a single unit price? When and how might it be a good tool for a firm's pricing strategy?

   b) Illustrate the application of a two part tariff, by identifying the best such tariff for a monopolist that faces a single customer with demand $Q = 10 - p$, and cost function $C(q) = q^2$.

   Solution: The optimal quantity will then be $q = \frac{10}{3}$. Therefore, the price per unit should be $p = \frac{20}{3}$ and the fixed fee should be $F = \frac{50}{9}$.

   c) In your view, should regulators be concerned with the practice of two part tariffs, or not?

4. Advertising is an important managerial tool for many companies.

   a) Describe the Dorfman-Steiner rule for the identification of the optimal expenditure of advertising. Explain its rationale.

   b) Consider a monopolist with a demand function described by $Q = 10 - p + \sqrt{a}$, that can produce with a constant marginal cost of 5. Determine the optimal price and advertising decisions. Compute the relevant elasticities for this optimal decisions, and show that the Dorfman-Steiner rule is satisfied.

   Solution: The monopolist will select $q = 5$ and $a = \frac{25}{4}$. Therefore $\epsilon_p = -\frac{3}{2}$, $\epsilon_a = \frac{1}{4}$, and $\frac{a}{pq} = \frac{1}{6}$. Hence, the Dorfman-Steiner rule is satisfied.

   c) Should regulators worry about the possibility of an incumbent use advertising as a way to deter entry by a new firm?

5. Consider a market with two clusters of potential consumers: one cluster located at 0 and another cluster located at 2. The demand from either cluster for a product located at distance d is $Q = 10 - d - p$. A firm is considering to enter this market and it may locate in any point x on the segment $[0, 2]$. In each location the firm's cost will be given by $C(q) = F + q$, where $F > 0$ is a fixed cost.

   a) If this firm is the unique firm considering to enter in this market, should it enter in a single location or in two locations? Describe in detail your solution, namely identifying locations, prices and quantities sold in the alternative solutions.

Solution: If the firm considers a single location it could consider the locations 0, 1 or 2. The highest profit is obtained in location 1, $\pi_I = 32 - F$. If the firm decides for two locations, they will be 0 and 2, and the profit will be $\pi_{II} = 2 \times 4.5^2 - 2F$. A single location will be preferred if $F > 8.5$.

b) How should the firm's strategy change if it knows that, after it enters, another firm will decide whether or not to entry? Again, provide a detailed analysis.

Solution: TO BE WRITTEN