UNIVERSIDADE CATÓLICA PORTUGUESA — FACULDADE DE CIÊNCIAS ECONÓMICAS E EMPRESARIAIS

International Master of Science in Business Economics

Economics of Business and Markets

Problem Set 2

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Exercise 1

Consider that a new electronic store, MP3-4U, enters the market. It is specialized in selling two products: MP3 players (M) and high quality headphones (H). After consulting a market analyst, the store MP3-4U found out the reservation prices for each type of consumers (in euros):

	M	H
A	150	40
B	130	80
C	110	100
D	50	140

Furthermore, the company knows that 40% of its clients are of the type A, 30% of the type B 20% of the type C and the remaining part of type D. The firm also knows that each consumer is willing to buy at most one MP3 player and one set of headphones.
Knowing that the retail store buys the MP3 players at a constant price of 40€ and the headphones at 30€, compute the profits of the store MP3-4U for each of the following situations (identify in each case the consumers that are going to buy the product(s)):

a) If the store can only apply individual prices to its products.

b) If the store starts selling its products in a bundle, with one MP3 player and one set of headphones.

c) If the store applies a mixed bundling price scheme, with individual prices and a price for the bundle.

Answer:

a) Per-unit prices

	M	H	Distribution
A	150	40	40 %
B	130	80	30 %
C	110	100	20 %
D	50	140	10 %

By subtracting the unit cost for the MP3 players and the headphones (40€ and 30€, respectively), we get the profits for each unit sold:

Per-unit profit:

	M	H	Distribution
A	110	10	40 %
B	90	50	30 %
C	70	70	20 %
D	10	110	10 %

For each product, we need to see what price will yield the highest profit to the firm.

For the MP3 players:

Price P_M	Per-unit profit	Buyers	Proportion	Profit
150	110	A	40 %	0,4 · 110 = 44
130	90	A, B	70 %	0,7 · 90 = 63
110	70	A, B, C	90 %	0,9 · 70 = 63
50	10	A, B, C, D	100 %	1 · 10 = 10

For the headphones:

Price P_H	Per-unit profit	Buyers	Proportion	Profit
40	10	A, B, C, D	100 %	1 · 10 = 10
80	50	B, C, D	60 %	0,6 · 50 = 30
100	70	C, D	30 %	0,3 · 70 = 21
140	110	D	10 %	0,1 · 110 = 11

In summary, the firm can choose for the MP3 players a price of 110 or 130. For the headphones it should choose a price of 80 monetary units.

If we consider that "N" is the total number of consumers, the firm can expect to reach a profit of (63·N) from the MP3 players and a profit of (30·N) from the headphones.

b) Bundling

Here we consider that the firm is able to sell a bundle with one MP3 player and one set of headphones. Once again, it is helpful to construct a table that summarizes the information (notice that the cost of a bundle is equal to 70 = 40 + 30)

	M	H	Bundle (M+H)	Per-bundle profit	Distribution
A	150	40	190	120	40 %
B	130	80	210	140	30 %
C	110	100	210	140	20 %
D	50	140	190	120	10 %

Now, we just need to check which price for the bundle yields a higher profit:

Price P_{Bundle}	Per-unit profit (bundle)	Buyers	Proportion	Profit
190	120	A, B, C, D	100 %	1 · 120 = 120
210	140	B, C	50 %	0,5 · 140 = 70

Therefore, the firm should sell the bundle at a price of 190€. At this price all the four types of consumers are willing to buy the product. The profit will be equal to (120·N).

c) Mixed Bundling

Since every consumer just wants to buy one MP3 player and one set of headphones, with a price for the bundle of 190€, there will be no room for a mixed bundling price scheme. We need to check whether a higher bundle price combined with per-unit prices gives a higher profit to the firm.

With a price of 210€ for the bundle, only consumers of the types B and C will be buying the products. Hence, it is still possible to sell MP3 players and headphones to the consumers of the types A and D.

If the firm sells MP3 players at a price of 150€ and headphones at a price of 140€, consumers of type A will buy MP3 players and consumers of type D will buy headphones. The expected profit will be

Π = profit from the bundles + (profit from per-unit pricing)

$$\Pi = 0{,}5 \cdot 140 + (0{,}4 \cdot 110 + 0{,}1 \cdot 110) = 70 + 44 + 11 = 125$$

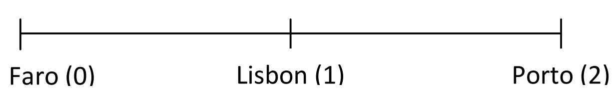
Since this profit is bigger than the one from using just bundling (=120), the firm should choose the following pricing scheme

- Sell the bundle at a price of 210€
- Sell the MP3 players at a price of 150€
- Sell the Headphones at a price of 140€

Notice that with these per-unit prices the consumers of the types B and C still prefer to buy the bundles.

<u>Exercise 2</u>

Consider the market for smart phones in Portugal. The firms that want to enter the market plan to construct a warehouse from where they distribute the smart phones to the customers. Once all the customers have bought one smart phone, they will keep that device for the rest of their life. For the purpose of the exercise, consider that the cost with the smart phones to the companies is insignificant.
There are three possible equidistant locations for the warehouses of firms operating in this sector, namely Faro, Lisbon and Porto. The Portuguese market for this product has N customers uniformly distributed along the range [0, 2].



These customers decide to buy from the warehouse that minimizes their total cost, that is, the price charged by the firm plus transportation costs. Those transportation costs are equal to $(v - x)^2$, where "v" is the location of the firm and "x" the location of the customer. The consumers will only buy the product if that total cost is not bigger than their reservation price, equal to 10 €.
Imagine that the company Alca-Tell wants to enter the market, and that the firm expects to be the only operating firm.

a) Where should Alca-Tell build its warehouse? What will be its profit, if building the warehouse is costless to Alca-Tell?

Imagine that Alca-Tell has chosen the best location but that it was surprised by the entrance of a new competitor (Sam-Sing) that decides to build one warehouse.

b) Where should Sam-Sing build its warehouse? Compute the profits for both firms, assuming that building the warehouse is costless to Sam-Sing.

Before both firms are allowed to sell the smart phones in Portugal, Sam-Sing is studying the opportunity to open a second warehouse in the remaining location, in order to gain a bigger market share.

c) Compute the profits in this new case. How would Sam-Sing´s market share change with this decision? Is it a good decision to open the second warehouse?

d) If, before entering the market, Alca-Tell had known that Sam-Sing could enter with one or two warehouses, where would be the equilibrium? Compute the profits in this case and explain the reason for this result.

Answer:

a) Being the only firm in the market, Alca-Tell will want to situate its warehouse in location 1 (this results from the quadratic transportation costs and the presence of a reservation price for the consumers).

The price of the smart phones will be such that the reservation price will be binding for a consumer on location 0 or location 2.

$$P + (v - x)^2 = 10 \Leftrightarrow P + (1 - 0)^2 = 10 \Leftrightarrow P = 9$$

With a dimension of "N" consumers, and since the firm will be serving all the market, the profit of Alca-Tell will be equal to

$$\Pi = P \cdot N = 9 \cdot N$$

b) Due to the symmetry of the problem, it is indifferent for Sam-Sing whether it builds its warehouse in location 0 or in location 2. For the following computations I will consider that it builds its warehouse in location 0.

As usual, we start by computing the indifferent consumer:

$$P_S + (0 - x)^2 = P_A + (1 - x)^2 \Leftrightarrow P_S - P_A = 1 - 2x \Leftrightarrow x = \frac{1 - P_S + P_A}{2}$$

Each firm will try to maximize its own profits, taking the competitor´s price as given. This problem is summarized in the following mathematical problem:

Firm Alca-Tell:

$$\underset{P_A}{Max} \qquad \Pi_A = P_A\left[\frac{N}{2} \cdot \left(2 - x(P_A, P_S)\right)\right] = \frac{N}{2} \cdot P_A\left[\frac{P_S - P_A}{2} + \frac{3}{2}\right]$$

$$FOC \qquad \frac{N}{2}\cdot\left[\frac{P_S}{2}-P_A+\frac{3}{2}\right]=0 \Leftrightarrow \frac{3}{2}-P_A+\frac{P_S}{2}=0$$

Firm Sam-Sing:

$$\underset{P_S}{Max} \qquad \Pi_S = P_S\left[\frac{N}{2}\cdot x(P_A,P_S)\right]=\frac{N}{2}\cdot P_S\left[\frac{1}{2}+\frac{P_A-P_S}{2}\right]$$

$$FOC \qquad \frac{N}{2}\cdot\left[\frac{1}{2}-P_S+\frac{P_A}{2}\right]=0 \Leftrightarrow \frac{1}{2}-P_S+\frac{P_A}{2}=0$$

The values for each of the prices result from solving the system with the two optimal conditions that come from the maximization problems:

$$\begin{cases}\frac{3}{2}-P_A+\frac{P_S}{2}=0\\ \frac{1}{2}-P_S+\frac{P_A}{2}=0\end{cases} \Leftrightarrow \begin{cases}P_A=\frac{7}{3}\\ P_S=\frac{5}{3}\end{cases} \Rightarrow x=\left[\frac{1}{2}+\frac{7/3-5/3}{2}\right]=\frac{5}{6}$$

These prices result in the following profits for the two firms:

Firm Alca-Tell: $$\Pi_A=\frac{N}{2}\cdot\frac{7}{3}\left[\frac{5/3-7/3}{2}+\frac{3}{2}\right]=\frac{49}{36}N$$

Firm Sam-Sing: $$\Pi_S=\frac{N}{2}\cdot\frac{5}{3}\left[\frac{1}{2}+\frac{7/3-5/3}{2}\right]=\frac{25}{36}N$$

c) When building the second warehouse, Sam-Sing will locate it in the remaining location (having now warehouses at the locations 0 and 2).

To solve this problem, we need to find now two indifferent consumers:

- Consumer X_1 – is indifferent between buying from location 0 (Sam-Sing) and from location 1 (Alca-Tell)
- Consumer X_2 – is indifferent between buying from location 2 (Sam-Sing) and from location 1 (Alca-Tell)

Notice that now we may have two different prices for Sam-Sing (P_{S1} for location 0 and P_{S2} for location 2).

Indifferent consumers:

$$P_{S1}+(0-x_1)^2=P_A+(1-x_1)^2 \Leftrightarrow P_{S1}-P_A=1-2x_1 \Leftrightarrow x_1=\frac{1-P_{S1}+P_A}{2}$$

$$P_{S2} + (2 - x_2)^2 = P_A + (1 - x_2)^2 \Leftrightarrow P_{S2} - P_A = -3 + 2x_2 \Leftrightarrow x_2 = \frac{3 - P_A + P_{S2}}{2}$$

Each firm will try to maximize its own profits, taking the competitor´s price as given. This problem is summarized in the following mathematical problem:

Firm Alca-Tell:

$$\underset{P_A}{Max} \qquad \Pi_A = \frac{N}{2} P_A \cdot (x_2 - x_1) = \frac{N}{2} P_A \left[\frac{2 + P_{S1} + P_{S2} - 2P_A}{2} \right]$$

$$FOC \qquad \frac{N}{2} \cdot \left[\frac{2 + P_{S1} + P_{S2}}{2} - 2P_A \right] = 0 \Leftrightarrow 2 + P_{S1} + P_{S2} - 4P_A = 0$$

Firm Sam-Sing:

$$\underset{P_{S1}, P_{S2}}{Max} \qquad \Pi_S = \frac{N}{2} P_{S1} \cdot x_1 + \frac{N}{2} P_{S2} \cdot (2 - x_2)$$

$$\Pi_S = \left[\frac{N}{2} P_{S1} \cdot \left(\frac{1 - P_{S1} + P_A}{2} \right) \right] + \left[\frac{N}{2} P_{S2} \cdot \left(\frac{1 - P_{S2} + P_A}{2} \right) \right]$$

$$FOC \qquad \begin{cases} \dfrac{\partial \Pi_S}{\partial P_{S1}} = 0 \\ \dfrac{\partial \Pi_S}{\partial P_{S2}} = 0 \end{cases} \Leftrightarrow \begin{cases} \dfrac{N}{2} \cdot \left[\dfrac{1}{2} - P_{S1} + \dfrac{P_A}{2} \right] = 0 \\ \dfrac{N}{2} \cdot \left[\dfrac{1}{2} - P_{S2} + \dfrac{P_A}{2} \right] = 0 \end{cases} \Leftrightarrow \begin{cases} P_{S1} = \dfrac{1}{2} + \dfrac{P_A}{2} \\ P_{S2} = \dfrac{1}{2} + \dfrac{P_A}{2} \end{cases}$$

By joining all the optimal conditions we find the following result:

$$\begin{cases} 2 + P_{S1} + P_{S2} - 4P_A = 0 \\ P_{S1} = \dfrac{1}{2} + \dfrac{P_A}{2} \\ P_{S2} = \dfrac{1}{2} + \dfrac{P_A}{2} \end{cases} \Leftrightarrow \begin{cases} 2 + \dfrac{1}{2} + \dfrac{P_A}{2} + \dfrac{1}{2} + \dfrac{P_A}{2} - 4P_A = 0 \\ P_{S1} = \dfrac{1}{2} + \dfrac{P_A}{2} \\ P_{S2} = P_{S1} \end{cases} \Leftrightarrow \begin{cases} P_A = 1 \\ P_{S1} = 1 \\ P_{S2} = 1 \end{cases}$$

Hence, we can compute the locations of the indifferent consumers:

$$\begin{cases} x_1 = \dfrac{1 - P_{S1} + P_A}{2} \\ x_2 = \dfrac{3 - P_A + P_{S2}}{2} \end{cases} \Leftrightarrow \begin{cases} x_1 = \dfrac{1}{2} \\ x_2 = \dfrac{3}{2} \end{cases}$$

Finding the profits is now straightforward:

$$\Pi_A = \frac{N}{2} P_A \cdot (x_2 - x_1) = \frac{N}{2} \cdot 1 \cdot \left[\frac{3 - 1}{2} \right] = \frac{N}{2} = \frac{18}{36} N$$

$$\Pi_S = \frac{N}{2} P_{S1} \cdot x_1 + \frac{N}{2} P_{S2} \cdot (2 - x_2) = \frac{N}{2} 1 \cdot \frac{1}{2} + \frac{N}{2} 1 \cdot \left(2 - \frac{3}{2}\right) = \frac{N}{2} = \frac{18}{36} N$$

Finally, we are going to compute at the market shares of Sam-Sing:

- 1 warehouse: $market \quad share = \frac{x}{2} = \frac{5/6}{2} = \frac{5}{12} \approx 41{,}7\%$
- 2 warehouses: $market \quad share = \frac{x_1 + (2 - x_2)}{2} = \frac{1}{2} = 50\%$

We see that opening the second warehouse enables Sam-Sing to increase its market share to 50%. However, this implies a reduction in its profits from $\frac{25}{36} N$ to $\frac{18}{36} N$, due to a increase in the price competition. Therefore, it is not a wise decision to open the second warehouse.

d) Assuming that Alca-Tell continues to be the first to choose its location, it has to check what will be the outcome if it locates its warehouse on one of the extreme locations (location 0 or 2).

<u>If Sam-Sing enters with 1 warehouse:</u>

Sam-Sing will place its warehouse on the other side of the market (for the computations I will assume that Alca-Tell chooses location 0 and Sam-Sing location 2). By locating its warehouse as far away as possible, it can reduce the competition in prices (principle of maximum differentiation).

Indifferent consumer x:

$$P_A + (0 - x)^2 = P_S + (2 - x)^2 \Leftrightarrow P_A - P_S = 4 - 4x \Leftrightarrow x = \frac{4 + P_S - P_A}{4}$$

Each firm will try to maximize its own profits, taking the competitor´s price as given. This problem is summarized in the following mathematical problem:

Firm Alca-Tell:

$$\underset{P_A}{Max} \qquad \Pi_A = P_A \left[\frac{N}{2} \cdot x(P_A, P_S) \right] = \frac{N}{2} \cdot P_A \left[\frac{4 + P_S - P_A}{4} \right]$$

$$FOC \qquad \frac{N}{2} \cdot \left[\frac{P_S}{4} - \frac{P_A}{2} + 1 \right] = 0 \Leftrightarrow 4 - 2P_A + P_S = 0$$

Firm Sam-Sing:

$$\underset{P_S}{Max} \qquad \Pi_S = P_S\left[\frac{N}{2}\cdot\left(2 - x(P_A, P_S)\right)\right] = \frac{N}{2}\cdot P_S\left[\frac{4 - P_S + P_A}{4}\right]$$

$$FOC \qquad \frac{N}{2}\cdot\left[1 - \frac{P_S}{2} + \frac{P_A}{4}\right] = 0 \Leftrightarrow 4 - 2P_S + P_A = 0$$

The values for each of the prices result from solving the system with the two optimal conditions that come from the maximization problems:

$$\begin{cases} 4 + P_S - 2P_A = 0 \\ 4 - 2P_S + P_A = 0 \end{cases} \Leftrightarrow \begin{cases} P_A = 4 \\ P_S = 4 \end{cases} \Rightarrow x = 1$$

These prices result in the following profits for the two firms:

Firm Alca-Tell: $\Pi_A = \frac{N}{2}\cdot 4\cdot 1 = 2N$

Firm Sam-Sing: $\Pi_S = \frac{N}{2}\cdot 4\cdot 1 = 2N$

<u>If Sam-Sing enters with 2 warehouses:</u>

In this case, Sam-Sing will occupy the two remaining locations (for computations I will assume that Alca-Tell occupies location 0 and Sam-Sing locations 1 and 2).

Once again, we need to find two indifferent consumers:

- Consumer X_1 – is indifferent between buying from location 0 (Alca-Tell) and from location 1 (store 1 from Sam-Sing)
- Consumer X_2 – is indifferent between buying from location 1 (store 1 from Sam-Sing) and from location 2 (store 2 from Sam-Sing)

Notice that now we may have two different prices for Sam-Sing (P_{S1} for location 1 and P_{S2} for location 2).

Indifferent consumers:

$$P_A + (0 - x_1)^2 = P_{S1} + (1 - x_1)^2 \Leftrightarrow P_A - P_{S1} = 1 - 2x_1 \Leftrightarrow x_1 = \frac{1 - P_A + P_{S1}}{2}$$

$$P_{S2} + (2 - x_2)^2 = P_{S1} + (1 - x_2)^2 \Leftrightarrow P_{S2} - P_{S1} = -3 + 2x_2 \Leftrightarrow x_2 = \frac{3 - P_{S1} + P_{S2}}{2}$$

Each firm will try to maximize its own profits, taking the competitor´s price as given. This problem is summarized in the following mathematical problem:

Firm Alca-Tell:

$$\underset{P_A}{Max} \qquad \Pi_A = \frac{N}{2} P_A \cdot x_1 = \frac{N}{2} P_A \left[\frac{1 - P_A + P_{S1}}{2} \right]$$

$$FOC \qquad \frac{N}{2} \cdot \left[\frac{1 + P_{S1}}{2} - P_A \right] = 0 \Leftrightarrow 1 + P_{S1} - 2P_A = 0$$

Firm Sam-Sing:

$$\underset{P_{S1},P_{S2}}{Max} \qquad \Pi_S = \frac{N}{2} P_{S1} \cdot (x_2 - x_1) + \frac{N}{2} P_{S2} \cdot (2 - x_2)$$

$$\Pi_S = \left[\frac{N}{2} P_{S1} \cdot \left(\frac{2 - 2P_{S1} + P_{S2} + P_A}{2} \right) \right] + \left[\frac{N}{2} P_{S2} \cdot \left(\frac{1 + P_{S1} - P_{S2}}{2} \right) \right]$$

$$FOC \qquad \begin{cases} \dfrac{\partial \Pi_S}{\partial P_{S1}} = 0 \\ \dfrac{\partial \Pi_S}{\partial P_{S2}} = 0 \end{cases} \Leftrightarrow \begin{cases} \dfrac{N}{2} \cdot \left[\dfrac{2 + P_{S2} + P_A}{2} - 2P_{S1} \right] = 0 \\ \dfrac{N}{2} \cdot \left[\dfrac{1}{2} - P_{S2} + \dfrac{P_{S1}}{2} \right] = 0 \end{cases} \Leftrightarrow \begin{cases} 4P_{S1} = 2 + P_{S2} + P_A \\ P_{S2} = \dfrac{1}{2} + \dfrac{P_{S1}}{2} \end{cases}$$

By joining all the optimal conditions we find the following result:

$$\begin{cases} P_{S1} = 2P_A - 1 \\ 4P_{S1} = 2 + P_{S2} + P_A \\ P_{S2} = \dfrac{1}{2} + \dfrac{P_{S1}}{2} \end{cases} \Leftrightarrow \begin{cases} P_A = 1 \\ P_{S1} = 1 \\ P_{S2} = 1 \end{cases}$$

Hence, we can compute the locations of the indifferent consumers:

$$\begin{cases} x_1 = \dfrac{1}{2} \\ x_2 = \dfrac{3}{2} \end{cases}$$

Finding the profits is now straightforward:

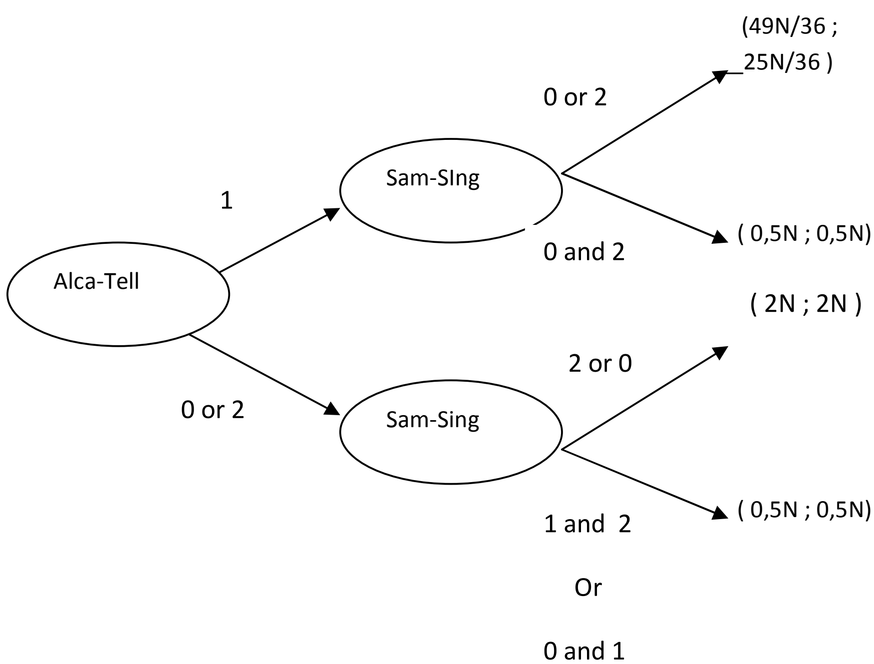
$$\Pi_A = \frac{N}{2} P_A \cdot (x_2 - x_1) = \frac{N}{2} \cdot 1 \cdot \left[\frac{3 - 1}{2} \right] = \frac{N}{2}$$

$$\Pi_S = \frac{N}{2} P_{S1} \cdot x_1 + \frac{N}{2} P_{S2} \cdot (2 - x_2) = \frac{N}{2} 1 \cdot \frac{1}{2} + \frac{N}{2} 1 \cdot \left(2 - \frac{3}{2} \right) = \frac{N}{2}$$

Hence, when Alca-Tell decides to enter on one of the extremes of the market (location 0 or 2), Sam-Sing will choose to enter just with one warehouse (on the opposite side of the market), because it will earn a higher payoff $\left(\Pi_S = 2N \quad > \quad \Pi_S = \frac{N}{2} \right)$.

Knowing that Sam-Sing will always enter just with one warehouse, it is optimal for Alca-Tell to enter at one of the limits of the range [0,2]. If it enters at the locations 0 or 2 it can expect to earn a profit of "2N", which is bigger than the profit of entering at location 1 (with a profit of $\frac{49}{36}N$).

Here is a representation of this decision game in an extensive form:



Exercise 3

A. "France Telecom SA has lost only a mere 3% of its home market in the first year since the industry was open to competition (1998). (…) France Telecom was probably the incumbent that did the best job at preparing for the arrival of competitors. Already in 1997, they decreased prices by 40%. Later, when entry actually took place, France Telecom made an effort to protect its best costumers, often matching the new entrants' lower prices.

France Telecom's strategy really desmotivated a lot of competitors."

a) Identify and explain France Telecom strategies.

b) Are those strategies always credible? Why?

Topics to answer:
a)

- FT used first a price limit strategy to signal an ex-post aggressive behaviour
- In the after-entry period FT might have used a predatory price if it had set prices under average costs in order to match new entrants' lower prices.

b) These strategies are credible if and only if:

- The entrant faces uncertainty about demand conditions and/or incumbent's cost conditions
- The incumbent firm has an actual cost advantage

B. *The ReaLemon brand, made by Borden, Inc., dominated the market for many years. When a rival firm, Golden Crown, entered the market with its own lemon juice product it found itself at a real disadvantage relative to ReaLemon, which had advertised heavily during the previous ten years. Even though Golden Crown's product was chemically identical, Golden Crown had to sell at a 15 to 25 percent discount relative to ReaLemon's price. When it did this, substantial price competition broke out between the two firms. As a result, ReaLemon lowered its price. In turn, this forced Golden Crown to reduce its price even further in order to maintain the relative discount necessary for Golden Crown to win any significant market share. After a few further rounds of such price cuts, Golden Crown found that it could barely break even. Were it not for the decision of the courts, Golden Crown would have been forced out altogether. Yet even with Golden Crown in the market, the degree of concentration remained quite high.*

a) Explain carefully the rationale for the Golden Crown's strategy.

b) How can you explain the high degree of concentration in the market?

Topics to answer:

a) This is a case where:
    - two firms sell close substitutes and where one firm, ReaLemon, gained a strategic competitive advantage by entering first in the market and building a strong brand through advertising.
    - The new firm, Golden Crown, chooses an aggressive price strategy to enter the market that leads to a price war.
    - Golden Crown did not anticipate the aggressive response from ReaLemon. By using price discount as an entry strategy, Golden Crown started a harmful price war that hurt both firms.
    - It might have been the case that Golden Crown expected ReaLemon to accommodate its entry letting GC to get a low market share using a discount price. If GC had chosen as an entry strategy, to invest in advertising it could had avoid a very expensive price war.

b)

- By making large investments in advertising the incumbent company increases the entry sunk costs that new entrants must incur.
- This is a strategic entry barrier that consists in increasing the endogenous sunk costs.
- New entrants must advertise heavily in order to get some brand recognition.

Exercise 4

1. It has been estimated that McDonalds's advertising-to-sales ratio is 0.222. Assume McDonald's can expect an advertising elasticity of demand of 0.20. Using the Dorfman-Steiner model, what does its behaviour imply about the value of McDonald's elasticity of demand? What do you advise McDonald's to do? Why?
2. Do you think that advertising is a barrier to entry? Explain your answer and give some examples that sustain your opinion. Find at least one example against that does not sustain your argument.

Topics to answer:

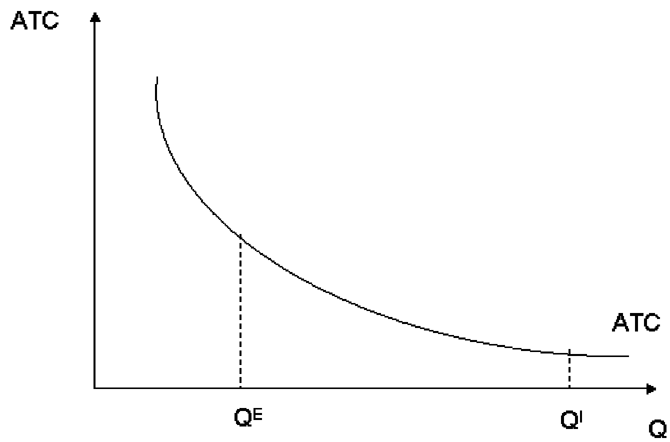
1. If the optimal condition of the Dorfman-Steiner model holds, we find that the value of McDonald's elasticity of demand should be 0.9.
2. Since the demand is inelastic McDonald's could increase prices. Sales will increase verifying the D-S condition.

Exercise 5

1. In an industry with no cost advantage for incumbent firms, would limit pricing become more or less viable as economies of scale become more significant? Explain, using one or more graphs.
2. The Federal Aviation Administration (FAA) sets safety standards for commercial airlines in the United States. Would you expect the most profitable carriers, such as Southwest and Jet Blue, to fight the FAA'a attempts to require costly additional safety features on commercial aircraft? Explain your reasoning.
3. Identify three markets in which product proliferation appears to be important. Would you categorize concentration in these markets as low, moderate or high? What does this suggest about the effect of product proliferation?

Topics to answer:

1. Limit pricing is more likely to prevent entry when economies of scale become more significant.

- Even if the incumbent firm does not have any cost advantage (in terms of cost function) larger scale production allows the incumbent firm to produce with lower average costs which eventually gives her an actual cost advantage.
- Entrant firm usually starts production at a lower level which means higher average costs.
- Significant economies of scale means relevant fixed costs magnitude. Therefore, by using price limit the incumbent firm forces the entrant firm to set low prices in such way that she is not able to cover the fixed costs.
- 

2. No because those costly additional safety features increase entry barriers (increase costs that firms must incur in order to accomplish with the requirements to enter the market).