



International MSc. in Business Administration  
Economics of Business and Markets  
Problem Set 2

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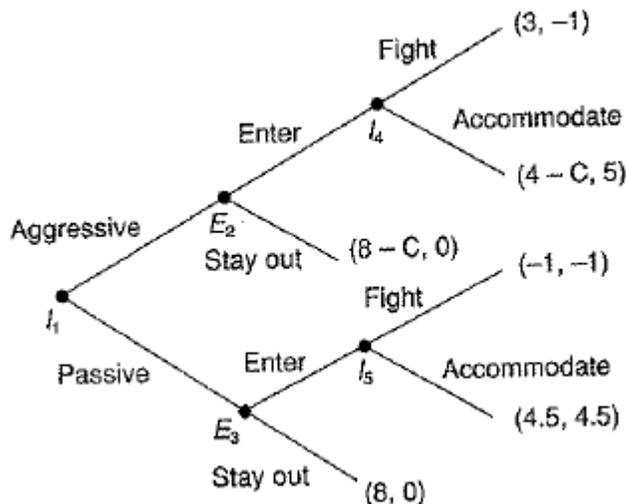
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2<sup>nd</sup> assignment is due on January 3<sup>rd</sup>

**Exercise 1**

Suppose the extensive form for a dynamic game between an incumbent and entrant firm as described in the figure below. The incumbent firm moves first and chooses whether or not to spend  $C$  as a means of enhancing its ability to be aggressive (you can think on  $C$  as an investment in capacity). The entrant moves next and decides whether or not to enter the market. If the entrant enters then the incumbent decides whether to accommodate its new rival or to fight. If the entrant does not enter, the incumbent earns  $8 - C$  if it has made the investment and  $8$  if it has not. If the entrant does enter, the incumbent's payoffs depend on whether it fights or accommodates. Fighting when the investment  $C$  has been sunk yields a payoff of  $3$ . Fighting is bloodier when the incumbent has not spent  $C$ . Accommodation when  $C$  has been spent wastes the investment. The final payoffs are described in parentheses, the first being the incumbent's payoff and the second the entrant's.

- Under which conditions will the equilibrium of this game be such that the incumbent is able to prevent entry?
- Which is the main difference, in terms of efficiency to preclude entry, between this case and the situation where the incumbent threatens the entrant announcing a price war. Discuss this question in general terms.



Nodes labeled *I* indicate that it is the incumbent's turn to move. Nodes labeled *E* indicate that it is the entrant's turn to move.

## **Exercise 2**

- A. J. Sutton argues that in industries in which product differentiation through advertising is possible, advertising expenditures will be high. Such industries will therefore be characterized by both considerable sunk cost and high degree of concentration. Explain carefully this argument.
- B. Under Sutton's argument the high advertising–high concentration link will likely be strongest precisely when price competition is very intense. Explain and give an example of an industry where you can observe this kind of situation.
- C. One of the most famous antitrust cases was against Standard Oil. Between the years 1870 and 1899, John Rockefeller built a dominant 90% market share for Standard Oil in the U. S. petroleum refining industry. He did this by acquiring more than 120 rival companies. The conventional story is that Rockefeller would first make an offer to acquire a rival refiner and, when rebuffed, would cut prices until the rival exited the market. After achieving its market dominance in oil refining capacity and distribution, Standard Oil raised prices to oil producers. This eventually led to its federal prosecution and dissolution in 1911 under the Sherman Antitrust Act of 1890.

Do you think that Standard Oil engaged in predatory pricing? Explain carefully your argument.

## **Exercise 3**

Firm Noisy is the only firm producing vuvuzelas in Portugal. Its expert in marketing says that the inverse demand function in Portugal of a representative consumer is equal to  $P=110-Q$ , where  $Q$  is the number of units sold and  $P$  is the unit price in euros. The marginal cost of production is constant and equal to 10 €.

- a) If the firm charges a single unit price, which price should it charge and what is its profit level?
- b) Define the optimal quantity discount and compute the resulting profit.

Suspicious of the qualities of its marketing expert, the CEO of Noisy hires a consultancy firm to determine the demand for vuvuzelas in Portugal. The market research concluded that we

could find two types of consumers in Portugal: (i) consumers type 1 with the demand indicated by the marketing expert and (ii) consumers type 2 with a demand given by  $P = 85 - m \cdot Q$ , where  $m$  is a parameter greater than zero that changes with time.

- c) If the parameter  $m$  assumes values bigger than one ( $m > 1$ ), is it possible to extract the entire consumer surplus of both consumer types using a unique two-part tariff scheme? Present a graphical analysis.

Consider the case where consumers of type 1 ( $P = 110 - Q$ ) represent a proportion  $\beta$  of the total market and consumers type 2 ( $P = 85 - m \cdot Q$ ) represent a proportion  $1 - \beta$ .

- d) If the parameter  $m$  assumes positive values ( $m > 0$ ), indicate the conditions, as a function of the parameters  $m$  and  $\beta$ , under which Noisy will be able to sell its product **to the entire market** and **extract the entire surplus** of at least one consumer type under **a two-part pricing scheme**.

**Exercise 4**

*“Word processors and spreadsheets are separate computer software products. During the 1990’s, software producers shifted from selling word-processors and spreadsheets separately to selling them as a part of a suite...”*

*...A recent study has found that 43% of home PC users used both programs, 50% used only one, and 7% used neither. Among business PC users, 63% used both programs, while 37% used only one...”*

- a) Taking into consideration the evidence described in the text, explain why did software makers changed from selling the products separately to selling them as a bundle.

Suppose that XPTO, a notorious software maker, found that its three biggest client’s willingness-to-pay for spreadsheets (S) and word processors (WP) is specified by the following table:

Willingness-to-pay	Spreadsheets(S)	Word processors (WP)
<b>A</b>	14	5
<b>B</b>	10	10
<b>C</b>	3	13

- b) If XPTO decides to sale the products separately, which prices should it practice?
- c) Imagine that XPTO is set to create a bundle that includes a spreadsheet and a word processor. Which price should it practice in a *pure bundling* situation?
- d) Determine the set of optimal prices in a *mixed bundling* situation.