



## Practice Set 4

### Pricing with Market Power

This problem set contains material for the relevant lab. Lab teachers are expected to provide sufficient guidance for the entire problem set. It is in the teacher's discretion to select the most representative tasks to solve instructionally in every lab. For the rest of the tasks, methodology, hints and final answers will be provided. Students are expected to work on practice problems, however, they are not required to submit written solutions. It is a non-negotiable policy in this course to not provide handouts with the solutions of practice problem sets.

- A monopolistic firm sells its product to two geographically separated markets: East and West. Inverse demand functions for the two markets are  $P_E = E - q_E$  and  $P_W = W - kq_W$  respectively. The monopolist's costs are zero.

  - Suppose that the monopolist can use third-degree price discrimination. Calculate the price, output, profit and deadweight loss in each market.
  - Suppose now that the law prohibits charging different prices in the two regions. Given that  $W > E$ , calculate the price and the output sold when the firm serves both regions and when it serves only one region.
  - Compare your results in (a) and (b) and explain what happens to the deadweight loss.
  - Suppose that the firm's costs are not zero any longer. Instead, the cost function is  $0.5\beta Q^2$ . If the monopoly can use third-degree price discrimination, how much output will it supply to each region? If  $W > E$ , show the combinations of  $(E, W)$  such that the monopoly serves both markets. [Hint: *ignore the sign of the realized profit.*]
- Consider a company with a cost function  $cost = C + cq$ . The company faces 2 different groups of consumers where demands are  $p_H = H - hq_H$  and  $p_L = L - lq_L$ .

  - Derive the conditions on  $H, h, L, l, C, c$ , so that the company would prefer to price discriminate charging  $p_H > p_L$  rather than charging a single price  $p$ .
  - Specify conditions so that  $p_H > p > p_L$ .
- The price of generic raw espresso coffee is 11 rubles per dosage. The price of the specialized espresso cartridges that only the Lacafessimo espresso machine uses, cost 19 rubles per dosage. Consider the price of the Lacafessimo espresso machine compared to the price of a generic espresso machine of similar quality. Is the price of Lacafessimo machine expected to be higher, lower or similar? Use economic reasoning and terminology in your answer.
- You are hired as Chief Economist by a firm which is interested to charge its customers with a two-part tariff. You order a survey for the demand and you discover that your potential customers have a linear demand of the form  $q = a - 0.53p$ . Your chief analyst tells you that the average for  $a$  is 10.233 with a particularly small variance. What will your recommendation be on using the two-part tariff?
- The local zoo asked you to consult them in setting admission prices. The zoo's managers recognize that there are two distinct demand curves for zoo admission. One demand curve applies to ages 12 to 64, while the other is for children and senior citizens. The two demand curves are:  $P_A = 9.6 - 0.08Q_A$  &  $P_S = 4 - 0.05Q_S$ , where A indexes ages 12 – 64 and S indexes the remaining ages. Crowding is not a problem at the zoo, so that the managers consider marginal cost to be zero.

  - If the zoo decides to price discriminate, what are the profit maximizing price and quantity in each market? Calculate total revenue in each sub-market.

- (f) What is the elasticity of demand at the quantities calculated in (a) for each market. Are these elasticities consistent with your understanding of profit maximization and the relationship between marginal revenue and elasticity as they were presented in the lecture?
6. Imagine a market where the inverse demand is given by  $P = 100 - Q$  and the inverse supply is given by  $P = 20 + 3Q$ . Calculate the equilibrium price and quantity, the deadweight loss and draw diagrams for each case above indicating the deadweight loss for each of the following markets:
- Perfect competition
  - Monopsony
  - Monopoly
  - Compare the deadweight loss under monopsony and monopoly and explain the difference.
7. Oleg and Maria consider joining the Fuera-de-Vista school of dancing. The owner of the school, Athena, offers lessons in two different dance styles: Kizomba and Tango. Athena has the following incomplete table of information on the reservation values for the two potential customers.

|       | Kizomba | Tango |
|-------|---------|-------|
| Oleg  | 25      | $x$   |
| Maria | 40      | 30    |

Find the range of  $x$ , on which bundling Kizomba and Tango together as one product will be the most profitable option for Athena and both potential students will buy the bundle.