

# Practice problem set 17

## Self-selection pricing

This problem set constitutes recommended material for the relevant lab. The choice of tasks to be presented instructionally in every lab is in the discretion of the individual teacher. Students are expected to work on practice problems, however, are not required to submit written solutions. It is non-negotiable policy in this course to not provide hand-outs with the solutions of practice problem sets.

1. Consider a monopolist who faces two buyers. Buyer 1 has high demand

$$q_1 = 3 - p_1,$$

while buyer 2 has low demand

$$q_2 = 2 - p_2$$

for the monopolist's good. The monopolist can only distinguish between the two buyers by paying a fixed cost  $F$ . The average and marginal cost of production are constant at zero.

- The monopolist may either set a uniform price  $p$  or differentiated prices  $p_1$  and  $p_2$ . Calculate the profits for the monopolist under the following scenarios: (i) both buyers served at separate prices,  $p_1$  and  $p_2$  ( $F$  incurred); (ii) only buyer 1 is served ( $F$  incurred); (iii) both buyers served at a common price,  $p$  ( $F$  not incurred). For what values of  $F$  will the firm choose to serve both buyers at separate prices? For what values of  $F$  will it choose to serve both at the common price,  $p$ ? Explain the behavior of the monopolist with reference to the concept of price discrimination.
- Find the profit-maximizing (uniform) two part tariff  $\{G, p\}$ , where  $G$  is the fixed fee a buyer pays whenever he purchases a positive amount of the good and  $p$  is the price. Analyze both the case where all buyers are served and the case when only one buyer is served.
- Find the profit-maximizing packages  $\{G_1, p_1\}$  and  $\{G_2, p_2\}$  such that buyer 1 chooses the former and buyer 2 chooses the latter voluntarily without any need to spend the fixed fee  $F$  to distinguish between the two buyers. Explain and interpret the results in the light of price discrimination.

*UoL: 2010 za*

2. Consider a self-selection mechanism of price discrimination for a monopolist whose consumers are equally divided between types E and R, which the monopolist cannot distinguish. The monopolist has the ability to make the product available in two versions,  $l$  and  $h$ , where  $h$  is generally considered superior to  $l$ . The monopolist also knows that the utility of E dominates that of R for the same version of the product. Also knows that  $U_R(l) = 5$ ,  $U_R(h) = x$ ,  $U_E(l) = 10$  and  $U_E(h) = 12$ .

- Write down the IR and the IC for R.
- Write down the IR and the IC for E.
- Find the values of  $x$  that satisfy the regularity conditions for this problem.
- Calculate  $p_R$  and  $p_E$  so that the monopolist maximizes profit.
- Provide an economic explanation why  $p_E \neq U_E(h)$ .
- Find the value of  $U_E(h)$  for which the monopolist will want to not feature version  $l$  at all.

*Final exam – April 2017*

3. A monopolist supplies a 'basic' good (computers) that is used with a 'complementary' good (disks) in variable proportions. Disks are supplied by a competitive industry. The unit cost of computers is  $c_0$  and the unit cost of disks is  $c$ . There are two types of consumers, high users with demand  $q_H = \theta_H D(p)$  and low users with demand  $q_L = \theta_L D(p)$ , where  $\theta_H > \theta_L$ . The monopolist cannot observe the customer's type directly.
- Discuss how a tying arrangement can increase the monopolist's profit beyond the level obtainable under uniform pricing.
  - Discuss the welfare implications of such tying. What does your analysis suggest about the appropriate public policy toward tying arrangements?

*UoL: 2004 za/zb / 2008 zb*

4. 'Caffe' is a small shop located next to the Department of Economics where generations of economics students have bought their coffee in the breaks. Mr. George, the owner of 'Caffe', is a keen user of price discrimination. In particular, he sells either one cup of coffee for £1 or 10 cups of coffee for £8. As most people can only drink one cup of coffee at a time, people that buy 10 cups are allowed to spread the consumption over time using a system with a card. What type of price discrimination is this? Discuss how price discrimination could work in this particular example. Mr. George often hears students saying: 'No, I do not want to buy the card for 10 cups of coffee, because then I drink too much coffee'. Based on your knowledge about price discrimination, do you think that students with a card drink too much coffee? Explain.

*UoL: 2008 za*

5. A yoga instructor knows that she faces two types of potential students. The determined students and the ones that they are not yet sure if yoga is a hobby they want to pursue. The utility functions of the two groups are  $u(q) = 50q - q^2$  and  $v(q) = 30q - q^2$ . The instructor cannot distinguish between the two types of consumers and wants to apply bundling.
- How should she come up with the bundles?
  - How should she price the bundles?

*End of 3<sup>rd</sup> Module Examination – 2014*

6. A Sony PlayStation™ can only be used with games that have been developed exclusively for this console. Making the console able to run all game formats does not incur any extra cost for the producer (in reality it may be cheaper this way).
- Why Sony does not make its console able to run all formats (therefore better) if there is no extra cost to it?
  - What would be the effect on the price of the console if Sony made it such that could run all formats of games?

*Module 3 Test – 2015*

7. Nearly 30% of the top mobile applications follow a pricing scheme that will allow customers to obtain the app in two alternative versions: The first is a free version that usually includes ads and/or is deprived of some special features. The second is a pro version of the app with no ads and with full functionality for which the user has to pay some positive price.
- Use the knowledge you acquired from our discussion on 'pricing with market power' to explain why this pricing choice might be profit maximizing.
  - Specify the theoretical conditions under which this pricing choice will work.

*End-module 3 test – March 2016*