

Problem Set 3 (due date: 04.11.2013)

1. The cost function of a monopolist located in Germany is $c(q) = 5q$. The monopolist sells his product in Germany and Austria. The demand functions are $q_D(p_D) = 55 - p_D$ resp. $q_A(p_A) = 70 - 2p_A$, where D stands for Germany and A for Austria.
 - a) Define "arbitrage". Assume that arbitrage is not possible between the German and the Austrian market so that the monopolist can price discriminate. What are the monopoly prices in these two countries if transport costs are zero?
 - b) How is the result changed if transport costs are 5 units per quantity unit?
 - c) Assume finally that transport costs are again zero, but that the monopolist has to charge the same price in the two countries. What is the demand function? What are the monopoly profits?
 - d) Compare the 3 equilibria of a), b) and c) with respect to the monopoly profit and consumer surplus. Illustrate your solution graphically.
 - e) Assume that demand in Austria is now $q_A(p_A) = 18 - 2p_A$. Calculate the monopolist's optimal price for the case in which arbitrage is possible. (No transport costs, demand in Germany unchanged!) How would you judge measure of the monopolist to prevent arbitrage from a social point of view?

2. Ferrari as the only supplier of exclusive sport cars sells its new model 458 Spider at a price of 80000€. Based on many years of experience Ferrari knows that the price elasticity of demand is -5. Due to the economic development Ferrari expects new sales potential in China but a recent market study shows that there is only a demand in China if the price is lowered by at least 15%. The management discusses whether Ferrari should expand its business to China or not. Giovanni, Member of the board of production, is strictly against this expansion and argues that the firm's production is optimally adjusted to the current sales potential and produces exactly according to its capacity constraints. Moreover, he asks why Ferrari should sell the 458 Spider at a lower price in China as this would only decrease profits. Chief market officer Luca, who holds a master degree in economics, argues that price discrimination might be superior and that arbitrage might be avoided by guarantee restrictions.
 - a) Assume that there are no capacity constraints and that Ferrari is able to increase its output with constant marginal costs. Should Ferrari expand its business and price-discriminate? Explain verbally, up to which quantity Ferrari should expand its output.
 - b) Now assume that there is a binding capacity constraint, i.e. Ferrari is not able to produce more cars as it currently sells outside of China. Show that even in that case, Ferrari is able to increase its profits if it sells part of its production to China at a lower price.

3. A profit-maximizing monopolist owns one manufacturing facility in Europe and one in the USA. Average and marginal costs are constant on both continents and equal 6. Demand functions in Europe and the USA are given by

$$D_E = 32 - p_E$$
$$D_U = 52 - 2p_U$$

with p_E and p_U as the prices in a standardized currency.

- a) Determine the equilibrium prices and quantities in Europe and in the USA if the monopolist is able to price-discriminate. Calculate the firm's equilibrium profit.
 - b) How does this result change if there are no transport costs between Europe and the USA?
 - c) How does the result change if we assume transport costs equal 3?
4. Discuss:
- a) True or false: Price discrimination always increases economic efficiency, relative to what would be achieved by a single, uniform monopoly price.
 - b) A nearby Pizza parlor offers pizzas in three sizes: small, medium, and large. Its corresponding price schedule is: 6€, 8€, and 10€. Do these Data indicate that the firm is price discriminating? Why or why not?
5. A monopolist with marginal costs of production of 40 sells to two distinct regions. In Region 1, demand is given by $Q_1 = 300 - p_1$. In Region 2, it is given by $Q_2 = 180 - p_2$
- a) Determine the profit-maximizing uniform price and output when discrimination is impossible.
 - b) Assume discrimination between the two regions is possible. What price will the firm set for each country? What quantity will be sold in each?
 - c) How does the discriminatory price relate to the elasticity of demand in each country?
 - d) How does the firm's profit and total welfare change in both countries if discrimination is possible?
6. The demand for AIDS drugs is $Q_U = 100 - P$ in the USA and $Q_A = a 100 - P$ in Africa. Show that with marginal costs $c = 20$ for such drugs, it must be the case that $a > 0.531$ if the drug manufacturer is to serve both markets while charging the same price in each market.