

Problem Set 9 (due date: 13.01.2014)

1. You had an idea for a new product. The per unit production costs would be c_L . Marketing studies have shown that the marginal willingness to pay is $P = B - bx$. On the other hand you know that there is a potential imitator who could supply the product with unit costs of c_F after you have started production.
 - a) With how much quantity would you start producing if there is no possibility of later reversal of this quantity? What is market price? (Hint: This is the Stackelberg case.)
 - b) Compare this result with a situation in which you and your rival had this idea simultaneously and had to decide how much to produce simultaneously.

2. Two stores are located side by side and attract consumers for themselves and their competitor with advertisement expenditure x_i , $i = 1, 2$. The profit functions are given by $\pi_1(x_1, x_2) = (60 + x_2)x_1 - 2x_1^2$ and $\pi_2(x_1, x_2) = (105 + x_1)x_2 - 2x_2^2$.
 - a) Assume that both stores have to set their advertisement expenditures simultaneously and calculate the Nash equilibrium. What are the stores' advertisement expenditures and profits?
 - b) Suppose the manager of store 1 has the opportunity to act as a Stackelberg leader and to set the advertisement expenditure first. Calculate the equilibrium advertisement expenditures and profits of both stores.
 - c) Compare your results from part a) and b). Explain the difference with a diagram of both shops' best response functions.
 - d) Now suppose that both stores have the same owner. Calculate the equilibrium advertisement expenditure and profit. Compare your result with the results from the previous tasks. Is it possible to give a statement about the differences between a) and d) without numerical calculations and if so, why?

3. The Gizmo Company has a monopoly on the production of gizmos. Market demand is described as follows: at a price of 1000€, 25 000 units will be sold; whereas at a price of 600€, 30 000 units will be sold. The only costs of production are the initial sunk costs of building a plant. Gizmo Co. has already invested in capacity to produce up to 25 000 units.
 - a) Suppose an entrant to this industry could capture 50 percent of the market if it invested in 10 million € to construct a plant. Would the firm enter? Why or why not?
 - b) Suppose Gizmo could invest 5 million € to expand its capacity to produce 40 000 gizmos. Would this strategy be a profitable way to deter entry?

4. Consider a homogeneous product industry with inverse demand given by $p = 100 - 2Q$. Variable cost is given by $C = 10q$. There is currently one incumbent firm and one potential competitor. Entry into the industry implies a sunk cost of F .
- Determine the incumbent's optimal output in the absence of potential competition.
 - Suppose the entrant takes the incumbent's output choice as given. Show that the entrant's equilibrium profit is decreasing in the incumbent's output.
 - What output should the incumbent firm set in order to deter entry?
 - Assuming that the incumbent firm decides to deter entry, determine the Lerner index as a function of F . Discuss the result.
 - Determine the lowest value of F such that the incumbent firm prefers to deter entry.