

# Final Exam

24.7.2012

## 1. General information:

- a. Make sure that your final exam is complete. The final exam consists of 4 problems.
- b. Only use the provided sheet of paper. Write your matriculation number immediately and clearly on each page!
- c. Please do not remove the staples from the provided sheet of paper.
- d. Allowed items at your workplace: Student ID, writing utensils (no red pen, no ink eraser, no pencil case), ruler, set square, non programmable calculator, food and drinks.
- e. Use a permanent pen (no pencil).
- f. Mobile phones have to be turned off and removed from your place!

## 2. Hints about doing the exam:

- a. Read each task carefully. The tasks could be extended over several pages.
- b. Please work on all tasks and state each on a new page. Please write your answers in a readable way.
- c. You may write your answers in English or in German.
- d. Label the axes of your illustrations.
- e. The exam lasts 90 minutes!

We wish you every success!

## 1. Ramsey prices etc.

Consider a telecommunications market in which a regulated monopoly provides services to two consumer groups. The demand functions are given by  $x_1 = 50 - p_1$  and  $x_2 = 75 - p_2$ . Arbitrage between both consumer groups is not feasible, i.e. price discrimination is enforceable. The cost function of the monopolist features marginal costs equal 0. The fixed costs for providing the network are given by 1092.

- a. What are the first-best prices and quantities? What is the welfare level in this case? Discuss how and under what circumstances, respectively, such a result might be achievable.
- b. Determine the optimal (second-best) prices and quantities if the monopoly has to break even and price discrimination is not feasible. Calculate total welfare.
- c. Show that the optimal (second-best) prices and quantities if the monopoly has to break even and can price discriminate (Ramsey prices) are  $p_1 = 8$  und  $p_2 = 12$ . Calculate total welfare.
- d. Compare cases a. – c and discuss your results. Under what conditions could the results in b. and c. arise in market equilibrium?

## 2. Baron-Myerson framework with extensions

Suppose that the demand function is  $q = 120 - p$ . The firm's rent has a weight of  $\alpha = 0$  in the social welfare function. The firm's marginal costs  $c$  are not known to the regulator. However, the regulator knows that they are  $c_L = 30$  with probability  $\phi = 1/3$  and  $c_H = 50$  with probability  $(1 - \phi)$ . The known fixed costs of the firm are 150.

- a. Determine the rent of the L-type firm if the regulator wants to induce truthful revelation, when prices are set according to marginal cost. What is total welfare in this case?
- b. Determine the optimal menu of regulatory contracts (i.e.  $p_L, p_H, T_L$ , and  $T_H$ ). Calculate the quantities, the consumer surplus, and the firms' rents for the different types. What is total welfare in this case?
- c. Suppose now that regulation is performed by a self-interested regulator who is potentially informed about the firms true cost. Discuss the consequences of this problem. How might a benevolent government act in such a situation? What are the consequences of the problem and the government's policy for the regulator, the regulated firm and for welfare? (No calculations necessary!)

### 3. Access Regulation and entry

Suppose that a vertically integrated utility  $M$  supplies its service to two regions,  $U$  and  $R$ . The population share of region  $U$  is 90 %, 10% of the population lives in  $R$ . Each consumer buys one unit.  $M$ 's cost has two components, network cost  $c_N$  and service cost  $c_S$ . The costs for the two regions are  $c_S^U = c_S^R = 10$ ,  $c_N^U = 20$ , and  $c_N^R = 70$ .

- a. Calculate the (regulated) uniform retail price, at which  $M$  breaks even, if it is obliged to serve consumers in both markets at this price.

Now competition is introduced in the market. Assume that potential entrants can gain access to the incumbents network by paying an access charge  $a$  per unit of access.

- b. Suppose that the access charge is equal to the network costs in each region, i.e.,  $a^U = c_N^U = 20$  and  $a^R = c_N^R = 70$ . Suppose potential entrants can provide the service (but not the network). What condition concerning its cost must a potential entrant satisfy in order to be able to enter the market if the incumbent's price is set at the price calculated in a. What problem might arise with respect to entry?
- c. Calculate the value of  $a$  if it is set according to geographical average cost. Are potential entrants, which can provide the service (but not the network) equally efficient than  $M$  but which are not regulated, able to enter the market (if the incumbent's price is the one calculated in a.)?
- d. Under what circumstances are potential entrants, which can provide both the service and the network but which are not regulated, able to enter the market? Which problem might arise?
- e. What kind of policy could ensure that only efficient entry takes place?

### 4. Price-cap vs. rate of return regulation

Describe briefly the meaning of price-cap-regulation and rate of return regulation. Discuss the pros and cons of the two approaches in terms of the problems they solve and cause, respectively.