# Final Exam – 2nd date

## 2.10.2012

### 1. General information:

1. Make sure that your final exam is complete. The final exam consists of 4 problems.
2. Only use the provided sheet of paper. Write your matriculation number immediately and clearly on each page!
3. Please do not remove the staples from the provided sheet of paper.
4. 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.
5. Use a permanent pen (no pencil).
6. Mobile phones have to be turned off and removed from your place!

### 2. Hints about doing the exam:

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

We wish you every success!

1. **Rate-of-return regulation and Averch-Johnson-effect**

Consider a public utility, which supplies water and is subject to a rate of return regulation. The production technology is characterized by

*Y* = *K3/4 L1/4.*

*Y* denotes the delivered and purified water in m3 per year. The capital stock *K* is 976 m. € and the number of employees is *L* = 61. The cost of capital is given by 12 % (*r* = 0.12). The costs per employee are 0.36 Mio. per year (*w* = 0.36).

(Round your answers to four decimal places.)

1. What quantity does the public utility provide and what are the resulting costs?
2. Does this information support the existence of an Averch-Johnson-Effect? If so:
	1. What are the optimal i.e. the cost minimizing stock of capital and number of employees given the output calculated in (a)?
	2. What cost savings can be attained if the firm moves to efficient production?
3. **Baron-Myerson framework** **with extensions**

Suppose that the demand function is q = 150 - p. The firm's rent has a weight of  = 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 *cL* = 40 with probability  = 1/3 and *cH* = 70 with probability (1 - ). The known fixed costs of the firm are 350.

* 1. Determine the optimal menu of regulatory contracts (i.e. *pL*, *pH*, *TL*, and *TH*). Explain which constraints have to be satisfied to ensure truthful revelation. Calculate the quantities, the consumer surplus, and the firms’ rents for the different types. What is total welfare in this case?
	2. Illustrate the welfare maximizing price distortion graphically and give a short description of the two opposing effects which determine it.

Suppose now that the regulator appoints an auditor to find out the true costs of the firm. Unfortunately, the auditor reports the true type only with uncertainty. In case the firm is of type *L*, the auditor cor­rectly reports this type with probability 3/4. In case the firm is of type *H*, the auditor correctly reports this type with probability 2/3. Assume that the firm is risk neutral and there are no financial constraints.

* 1. Determine the (absolute minimal) transfers which allow the regulator to induce truthful revelation and marginal cost pricing. What is the change in welfare compared to your result from part b.? Interpret and discuss your results.
1. **Peak-load pricing**

The (inverse) demand for phone calls during the day (between 6 a.m. and 6 p.m.) is given by

$$p\_{D}\left(x\_{D}\right)=20-0.01x\_{D}$$

and during the night by

$p\_{N}\left(x\_{N}\right)=10-0.01x\_{N}$.

The variable costs of one phone call equal the electricity costs which are negligibly small and therefore assumed as 0. Thus we have solely to consider the costs for the extension of the existing infrastructure which are given by 5 monetary units. This means it costs 5 monetary units per day if an additional unit of capacity is provided. The additional unit capacity could be used during the day as well as during the night.

Determine the optimal capacity and the off-peak and peak prices. Interpret your pricing pattern and briefly discuss whether it is optimal in general.

1. **Yardstick competition and access regulation**
	1. Currently, there is a discussion about the implementation of a yardstick competition in the water supply industry. What is meant by this regulatory policy? Discuss the mechanism as well as the pros and cons of this type of regulation.
	2. In the EU, competition in the telecommunications sector is based on access regulation, where incumbent network operators need to allow entrants access to their network in order to provide services. Sketch how such a regulation might look like and discuss potential problems.