Written Exam for the B.Sc. in Economics summer 2012

Mikroøkonomi B

8 June 2012

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

Problem 1

Consider an exchange economy in which there is uncertainty, as the economy will end up in one of two possible states. In state 1, Andy has an initial endowment of 24 units of the aggregate consumption good, while Bernie has 12. In state 2, Andy has an initial endowment of 12 units of the aggregate consumption good, while Bernie has 24. Prior to one of the states being realized, perfectly competitive markets are opened for trading state contingent goods.
Both agents have von Neumann-Morgenstern preferences, both represented by the utility function $\pi \cdot \ln(x_1) + (1-\pi) \cdot \ln(x_2)$, with π being the probability of state 1 occurring, $0 < \pi < 1$.

- Illustrate the set of possible allocations in an Edgeworth Box; is there aggregate risk in the economy?
- Identify the Walrasian equilibrium when $\pi = 2/3$, using the price of the good delivered in state 2 as numeraire, $p_2 = 1$.
- Identify the Walrasian equilibrium when $\pi = 1/3$.
- Compare the two equilibria and comment; especially as to how well off the two agents are in each case.

Problem 2

A firm, Speedeliver, is handling packages and is placed close to the fitness club, BeautiFit. Both firms act in perfectly competitive markets.
Speedeliver's personnel are able to catch glimpses of the attractive fitness customers as well as hear the upbeat music, and this increases their work motivation as well as their productivity.

- If both firms are independently maximizing profits, will the outcome be efficient? If you think so, please argue why; if you think not, how can the situation be remedied to ensure an efficient outcome?
- What would Coase argue?

Problem 3

A college town has 1000 "old" students graduating and thus leaving the campus. Each of them owns a used car. The quality of a car is given by a parameter g. The distribution of qualities is uniform from 1000 to 1999, i.e. there is one car of quality g = 1000, one of quality 1001, etc. up the best car having g = 1999. The students leaving all have the same preferences: An "old" student, knowing his car has quality g, is willing to sell it for $ g or more. The college community is growing, so more than a thousand "new" students are moving into campus. A new student is willing to pay up to $ $k \cdot g$ ($1 < k < 2$) for a car of quality g. We assume that if a car is trade, the price is determined by the buyer's willingness to pay. We assume that each old student knows the quality of his or her car, whereas the new students know only the distribution of qualities. Finally, we assume that all students are risk-neutral.

- Express the equilibrium price for used cars as a function of the parameter k.
- What happens as k converges to 1? As k converges to 2?
- Please comment on these results and on the role k plays.

Problem 4

Consider a perfectly competitive market for a good. Assume that the government decides to introduce a unit tax.

- Explain how the tax incidence ("who bears the tax burden?") depends on how elastic or inelastic the demand side, and the supply side, respectively, is with respect to price changes
- Explain how the unit tax will cause a deadweight loss.
- How do the degrees of elasticity on the two sides of the market affect the size of the deadweight loss?
- How do the two elasticities depend on production technology of firms, and the degree to which consumers can substitute from this good to other goods?

Problem 5

Consider the company PigRail running a local train, bringing commuters from a suburb into the city. The demand for train rides is, on a daily basis, $D(p) = \text{Max}\ \{1200 - 10 \cdot p, 0\}$, with p being the ticket price. The train company has the cost function $C(x) = x^2/20 + 10000$, with x being the number of customers. PigRail can act as a monopolist.

- Which ticket price should PigRail set, how many customers will it have, and how much profit will the company earn?
- Assume now that the local government wants to enforce an efficient outcome. Which price should it force PigRail to set; and how will this affect the number of customers and the profits earned?
- Answer the two questions above if fixed costs are not 10000, but 20000.

Problem 6

Art and Bob live in the same building and enjoy having lights outside; this light is a public good, one unit costing 1 $. Let G be the quantity of light (for simplicity, assume it is a continuous variable), and let x be money available for other consumption, after having contributed to the outside light. Art's preferences are represented by the utility function $u_A(x_A,G) = x_A - 1/G$, while Bob has utility function $u_B(x_B,G) = x_B - 3/G$. Initially, they both own 10 $.

- Find the Lindahl equilibrium implementing an efficient quantity of outside light
- How does the quantity depend on the initial wealth distribution? Is this a general result?

Ref.: mtn, 25. april 2012