

Written Exam for the B.Sc. in Economics winter 2011-2012

Microeconomics B

Final Exam

20 January 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.

Question 1

Consider a monopoly with the cost function and demand curve:

$$C(q) = 200 + 10q + 3q^2$$

$$p(q) = 100 - 6q$$

- a) Solve the profit maximization problem for the monopolist.
- b) The government proposes a regulation that requires the firm to set its price equal to the marginal costs ($p = MC$)
 - 1) What does this imply for the price and quantity produced? Find the new price and quantity
 - 2) How can the government subsidise the monopoly such that it does not suffer a loss and terminates production
- c) The government cannot find a majority for the proposal in b) and in a secret working group a civil servant suggests giving a subsidy to production (per unit produced) in combination with a lump-sum tax.
 - 1) What should the size of the subsidy be to ensure that price and quantity produced corresponds to the case of perfect competition?
 - 2) What lump-sum tax should be imposed on the monopolist to ensure that the profit corresponds to a perfect competition case?
- d) Which of the two programs in b) and c) is the most expensive for the government? Explain why this is the case.

Question 2

Consider an island in the Pacific Ocean, where different types of bikes are sold. The consumers cannot really tell the quality of the different bikes apart, but are capable of distinguishing them into two general types: Carbon bikes (C-bikes) and Aluminum bikes (A-bikes). The willingness to pay for A-bikes is 600 Euro and for C-bikes it is 1500 Euro. The sellers of these bikes are willing to sell them for 500 Euro (A-bikes) and 1200 (C-bikes).

Assume that the consumers are risk neutral and that they assume that a share of q is C-bikes. The producers cannot change the supply of the two types of bikes (since they are on a deserted island in the middle of the Pacific).

- a) What is the maximal price the consumers will pay for a bike in this market?
- b) What must be required from q in order for both types of bikes to be traded in the market? What is the consequence if this is not satisfied.
- c) It has been discovered that the consumers of bikes are willing to pay 300 Euro more for a bike having a relatively longer guarantee on the frame. This means that you can assume that the consumers will want to get as long a guarantee as possible. The sellers of C-bikes can therefore issue a guarantee on their bikes, since they only have additional costs related to the guarantee of $C_C(y) = 25y$, while sellers of A-bikes will have costs of $C_A(y) = 50y$ where y is the number of years a guarantee is offered. What is the required number of years that must be offered on C-bikes such that the sellers of C-bikes can have a higher profit compared to the existing market? Is it possible that a seller of good bikes can get a higher profit compared to the existing market? How?

Question 3

Comment on the following statement:

It can be a good idea to reduce the quality in the economy class for an airline company in order to increase the profit.

Question 4

Consider a Robinson Crusoe (Koopmans) economy with one consumer having a utility function $u(n; c; x) = h(\bar{n} - n; c) - x$, over n labor time, c a consumer good, and x smoke, which he takes a given when he makes his choice.

We also have a firm with a production function $f(l) = y$ that transforms labor input to the consumer good, y . The firm also produces smoke, $z=y$ as a by-product.

The consumer is the only owner of the firm and receives all profits from the firm.

- Give an expression for the Walrasian equilibrium in this economy and comment on the equilibrium expression.
- Find an expression for the Pareto optimal allocation in this economy? Explain why the Walrasian equilibrium is not Pareto optimal?
- Let n^{PO} be the solution that satisfies the Pareto optimality condition you found in b). Prove that the level of the externality in Pareto optimum is smaller than in the Walrasian equilibrium. (Hint: assume that $x^{PO} \geq x^{WE}$ and then try to prove that this leads to a contradiction)

- Show that a tax on smoke equal to $\tau = \frac{p}{\partial h(\bar{n} - n^{PO}, c^{PO}) / \partial c}$ will result in the Pareto optimal level of smoke and explain what the tax level corresponds to. Remember that in a model like this we must also spend the revenue. Hence, the revenue from the tax is given to the consumer as a lump-sum subsidy (Hint: does this change the first order conditions for the consumer?). Comment this result briefly.

Question 5

Why is it that we do not leave it to the market to provide public goods and what are the (theoretical) possibilities for a regulator to interfere with the market to deal with the provision of public good?

Question 6

True or False:

If a monopoly exercises price discrimination of degree 3, the mark-up over marginal costs will be higher for those groups with a higher (numerically) demand elasticity (with respect to the price).

We assume that demand is differentiable and declining in price.