Written Exam for the B.Sc. in Economics summer 2015

Microeconomics B

Final Exam

11. August 2015

(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.

This exam question consists of 3 pages in total

Problem 1

Consider the worker Bjarne Blucollar who lives in a private-ownership economy with perfect competition. He has an initial endowment of 24 hours. These hours may be consumed as leisure or sold in the labor market. He consumes two goods, leisure and a composite consumption good. The price of labor is w, while the consumption good price is 1. In the face of such market conditions, we observe that Bjarne chooses to work for 10 hours, i.e. he sells 10 hours of his time in the labor market.

The government now introduces a proportional income tax, with employees paying a share, t, $0 < t < 1$, of their earnings in income tax; hence the after-tax-wage becomes $(1–t)\cdot w$.

After the tax has been introduced, Bjarne chooses, after careful considerations, to maintain a labor supply of 10 hours.

- Show, in a clear diagram, how there may be a dead-weight loss, even though his labor market behavior has not been affected. Please add comments.

Problem 2

The insurance company Principal Insurance (which is risk-neutral) is planning to sell an insurance contract to a von-Neumann-Morgenstern agent who is at risk of an accident happening which will reduce her income. The agent is able, through choice of behavior, to reduce the risk of the relevant accident happening; however, risk-reducing behavior requires effort which costs her in terms of disutility. The company is not able to control the behavior of the agent.

- Present and discuss the two constraints, Individual Rationality and Incentive Compatibility, which the company has to consider.

Problem 3

The market for sandwiches on campus has a demand side characterized by the demand function $D(p) = \max\{ 40 – p, 0\}$. Suppose, for simplicity, that sandwiches can be produced at zero costs by any firma active in the market.

The firm Allan's Sandwiches is already established, while Benny is considering establishing himself with Benny's Sandwiches. However, he is only able to decide his output after Allan has chosen his output; hence, if Benny enters the market, it will be as a Stackelberg-follower, Allan already having determined the number of sandwiches he is producing.

To enter the market and start up producing sandwiches, however, will cost Benny the fixed amount FC. We will consider four different cases for the level of these fixed establishing costs.

Determine, for each of the four cases, a) through d), the following:

- The output from each of the firms
- The market price
- The profit for each of the firms

- a) FC = 0
- b) FC = 105
- c) FC = 9
- d) FC = 4

Problem 4

Consider an economy with two agents, Hillary and Iris, who share the driveway leading to their two houses. The lighting of this driveway at night is a public good for the two of them, and is measured by the quantity $G \geq 0$. Financing 1 unit of lighting costs 1 unit of the private good, hence $C(G) = G$. Initially, the women have strictly positive initial endowments of the private good, e_H and e_I. Hillary has the utility function $u_H(x_H,G) = v_H(G) + x_H$, while Iris has $u_I(x_I,G) = v_I(G) + x_I$. We assume that both v_H and v_I are strictly increasing, strictly concave and differentiable, so both $v_H'(G)$ and $v_I'(G)$ are decreasing in G.

- Argue why voluntary private donations from Hillary and Iris, these donations being g_H and g_I, respectively, will result in a sub-optimal level of lighting

Problem 5

The McKinley High School Choir consists of ten boys and ten girls. It has been suggested that a famous music instructor, Mr. Schuester, is hired to improve the choir's chance of winning the state competition for choirs, coming up in two weeks. The cost of hiring him is 2,000 $. If he is hired, every member pays an even share of this amount. Each girl is willing to pay 120 $ to hire the instructor, and each boy is willing to pay 81 $.

The school principal is considering interviewing the kids to find out how much they are willing to pay. However, his wife, who is a professor in Economics warns him that they may not be truthful in their answers. She talks him into introducing a Clarke-Grove mechanism to find an efficient solution.

- What will the outcome be: Will the instructor be hired? And how much will each of the boys and each of the girls pay?

Problem 6

Kenneth Arrow contemplated on ways to create a Social Choice Function, which would basically aggregate individual preferences into society's preferences, in a way that obeys a number of axioms.

- Show that choosing some specific citizen's preferences to be those of society will satisfy Arrow's axioms, except the "No Dictatorship" axiom.