Written Exam for the B.Sc. in Economics winter 2013-14

Microeconomics A, 2nd Year

Final Exam

16 January 2014

(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 a consumer who consumes two goods in continuous quantities and whose preferences can be represented by a differentiable, quasi-linear utility function.

- a) Show that the marginal rate of substitution (MRS) will depend on the quantity of only one of the goods (equivalently, will be independent of the quantity of the other good).
- b) How will the map of indifference curves look for such a consumer?

Problem 2

Peter consumes beer (commodity 1) and sandwiches (commodity 2), both in continuous quantities. Peter has preferences which can be represented by the utility function $u(x_1,x_2) = x_1^{½} \cdot x_2^{½}$.

- a) Please find the expression for Peter's Marshall demand function x(p,I).
- b) Please find the expression for Peter's Hicksian (compensated) demand function h(p,u)

Peter is on a stipend, giving him an exogenous money income of 120. Currently, the price of beer is 1, and the price of sandwiches is 1.

- c) Which consumption plan is optimal for Peter?

However, to reduce students' drinking, the minister of health, Ms. Crowe, levies a heavy tax on beer, increasing the price of beer from 1 to 4.

- d) How does Peter's consumption plan change after this price increase for drinks?
- e) Please divide the changes into a substitution effect and an income effect, respectively.

Problem 3:

Charlie consumes health services (commodity 1) and a composite consumption good (commodity 2), both in continuous quantities, and has the utility function $u(x_1,x_2) = 10 \cdot \ln(x_1) + x_2$.

The price system is $p = (p_1, 1)$, with commodity 2 being numeraire, and Charlie has the exogenous income I.

In the following, consider only interior solutions (i.e. consumption plans having strictly positive quantities of both commodities).

- a) Please find the expression for Charlie's Marshall demand function, x(p,I).
- b) Please find the expression for his Hicksian (compensated) demand function, h(p,u)
- c) Consider the following Slutsky equation describing what happens when the price of health services increases marginally, and verify that the following two equations hold true, with u = u(x(p,I)):

$$\partial x_1(p,I)/\partial p_1 = \partial h_1(p,u)/\partial p_1 - [\partial x_1(p,I)/\partial I] \cdot x_1(p,I)$$

$$\partial x_2(p,I)/\partial p_1 = \partial h_2(p,u)/\partial p_1 - [\partial x_2(p,I)/\partial I] \cdot x_1(p,I)$$

Problem 4:

Please define and explain, for a firm producing an output by using labor and capital as inputs, what is meant by the firm's "conditional factor demand".

Problem 5:

In a Koopmans economy, the consumer Robinson has utility function $u(x_1,x_2) = x_1 \cdot x_2$, commodity 1 being time which can be enjoyed as leisure or allocated in production, giving the output food (commodity 2), both goods being continuous.

The production technology is described by the following production function, with y being the quantity of food output, and z being the number of hours worked in food production:
$y(z) = \max \{ z - 2, 0 \}$.

The initial endowment of time is 24 hours, while there is no initial endowment of food.

- a) Identify the efficient (Pareto Optimal) allocation
- b) Is it possible to implement this allocation as belonging to a Market Equilibrium with transfers?

Problem 6:

Please present The First Welfare Theorem. What does it state, which are the assumptions behind it, what are the implications of it, and what are the limitations?

Mtn, 22 December 2013