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

Mikro A

Final Exam

11 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.

Problem 1

Consider Tom who consumes bread (commodity 1) and beer (commodity 2) in non-negative quantities. Tom's preferences can be represented by the utility function $u(x_1,x_2) = v(x_1) + x_2$, with v being a twice differentiable function, $v'(x_1) > 0$, $v''(x_1) < 0$, and $v'(x_1) \to \infty$ for $x_1 \to 0$. Consider a certain consumption plan $(\underline{x}_1,\underline{x}_2)$, with both quantities being strictly positive.

- What happens to the marginal rate of substitution (MRS) if the quantity of bread is increased?
- What happens to MRS if the quantity of beer is increased?
- What happens to MRS if both quantities are doubled?
- Show that the interior solution to Tom's utility maximization problem, when the price system is p, and his income is I, is $x_1(p_1, p_2, I) = (v')^{-1}(p_1/p_2)$ and $x_2(p_1, p_2, I) = [I - p_1 \cdot x_1(p_1, p_2, I]/p_2$
- Is bread a normal good? Inferior? Giffen good?
- Is beer a normal good? Inferior?

Note: When answering the questions, please disregard corner solutions and focus on consumption plans with strictly positive quantities of bread and beer, i.e. interior solutions.

Problem 2

Consider an Edgeworth exchange economy with private ownership. In the economy, there are two goods, good 1 being food, good 2 being housing. Consumer A has the initial endowment (2,8), i.e. two units of food and eight units of housing. Consumer B has the initial endowment (8,2). The preferences of A can be represented by the utility function $u_A(x_1,x_2) = x_1^3 \cdot x_2$, and similarly we have $u_B(x_1,x_2) = x_1 \cdot x_2^3$.

- Using housing as numeraire, i.e. letting p_2 be 1, find the Walrasian (competitive) equilibrium allocation for this economy and the corresponding equilibrium price for food.

Problem 3

Consider a firm which has the production function $f(l) = \ln(1+l)$, where l is the quantity of labor input. The price received for each unit of output is p, and w is the price of labor.

- Solve the firm's profit maximization problem
- Express the firm's supply of output, and its demand for labor, as functions of price and wage
- Express the maximum profit level as a function of price and wage

Problem 4

Anthony and Beatrice both consume M different goods, and both have convex and differentiable preferences. At the price system p*, both Anthony and Beatrice consume a positive quantity of each of these M goods, although their consumption patterns naturally differ.

- Verify that it is not possible to re-allocate consumption goods between them in a way that makes at least one of them better off while not harming the other.

Problem 5

Discuss, as a micro-economist, the following statement which might be found in a journalistic article printed in the business pages of a newspaper:

- "It is absolutely obvious, and a universal truth, that in order to induce people to work more, taxes on income must be reduced, such that the after-tax wage is increased, because this will strengthen the incentive to work more".

Problem 6

A firm, existing in a world of perfect competition, uses labor and capital to produce food, having the production function f.

- Define and comment on the concept of TRS (technical rate of substitution)
- If the producer chooses a production plan, with positive quantities of both production factors, for which TRS equals the relative factor prices, is this a necessary condition for profit maximization?
- Is it a sufficient condition?