

Written Exam for the B.Sc. or M.Sc. in Economics autumn 2011-2012

Mikro A

Final Exam

23 February 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

A consumer consumes two goods, has the utility function u , has an exogenously determined income I , and faces perfectly competitive markets with price system p .

Consider the statements below. Are they true or false? Please substantiate your answers (e.g. clearly providing a counter-example if you think a statement is false):

- “A good which is inferior, is a Giffen good”.
- “If the consumption of a good is increased when income increases, then the good is a luxury good”.
- “If both goods yield positive marginal utility, none of them can be a Giffen good”.

Problem 2

Consider a “Robinson Crusoe” (Koopmans) economy. The consumer has the utility function $u(x_1, x_2) = \min\{x_1, x_2\}$, with good 1 being time, which can be spent as leisure or used as labor input, and good 2 being food. The producer has the production function $f(l) = l$, with l being the quantity of labor input, and f designating the maximum level of food output. The consumer’s initial endowment is $(24, 0)$, i.e. twenty-four hours of time and no food.

- Identify the efficient (Pareto Optimal) state for this economy, i.e. production plan as well as consumption plan.

Assume, instead, that the technology is $g(l) = 2 \cdot l$.

- Now, identify the efficient state with this new production function and compare this state (production function g) with the above (production function f): What has happened to productivity of labor, and what happens to the efficient level of labor input? Comment.

Problem 3:

Consider the following claim; is it true or false, and why?

- “If
- agent A has quasi-linear preferences represented by the utility function $u_A(x_1, x_2) = x_1^{1/3} + x_2$, and
- agent B has quasi-linear preferences represented by the utility function $u_B(x_1, x_2) = x_1^{2/3} + x_2$,
then agents A and B have identical preferences...
because $x_1^{2/3}$ can be written as a monotonously increasing transformation of $x_1^{1/3}$
($x_1^{2/3} = f(x_1^{1/3})$, with $f(t) = t^2$ being a strictly increasing function for positive arguments)”.

Problem 4:

A consumer lives for two consecutive periods, being young in the first and old in the second. The consumer has an endowment of $e_1 > 0$ as young and $e_2 > 0$ as old, and has monotonously increasing

and convex preferences which can be represented by a utility function. The capital market offers the consumer the possibility to save or borrow at an interest rate r .

- Show that the decision to save or borrow corresponds to a life-time/inter-temporal utility maximization problem with $p_1 = (1+r)$ and $p_2 = 1$.
- Explain why savers, in general, may not always want to save more when the interest rate increases
- Show that if...
 - the consumer has Cobb-Douglas preferences of the form $u(x_1, x_2) = x_1 \cdot x_2$
 - the consumer, at the present interest rate, is a saver... then his savings will indeed go up, when the interest rate increases.
Please comment.

Problem 5

The firm Polsemaster produces salami using two inputs, meat and fat, and lives in a market environment characterized by perfect competition. The maximum output of salami is given by the production function $g(m, f) = m^{1/3} \cdot f^{1/3}$. The cost of one unit of meat is w_m , the cost of one unit of fat is w_f .

- Solve the cost minimization problem for this producer for a given level of output x .
- Find the conditional demand functions for meat and fat.
- Find the cost functions $C(x)$, $AC(x)$ and $MC(x)$
- Find an expression for Polsemaster's supply curve

The government introduces, for health reasons, a unit tax on the input fat, hence increasing the cost per unit fat used within food industries.

- Without doing a lot of calculations, but using your economic intuition: How will this affect the cost minimization problem? How will it affect the cost curves? How will it affect Polsemaster's demand for fat? And its supply curve?

Problem 6

Paul consumes two goods, beer (good 1) and potato chips (good 2) and has the utility function $u(x_1, x_2) = \ln(x_1) + x_2$.

- Identify the (Hicks-)compensated demand function, having prices and utility level as its arguments
- How does Paul's compensated demand for beer depend on the utility level?
- Identify the expenditure function $E(p_1, p_2, u)$ and show that the derivative of this function with respect to the price of beer is p_2/p_1 .

Note: All through this problem, consider only interior solutions, i.e. consumption plans with strictly positive quantities of beer and chips.