Written Exam for the B.Sc. in Economics summer 2012

Microeconomics A

Final Exam

XX August 2012

Question 1
Assume that Goran lives in two periods and that he in period 1 has an income of 50,000 and in period 2 he has an income of 500,000.

Assume that we have 2 different consumer goods - beer and other consumption goods. The price on other consumption goods is equal to 1 and the price on beer is equal to p_b. The prices are the same in the two periods.
Goran has preferences over the two goods, that can be described by the utility function $u(x_{1,t}, x_{2,t}) = 5000 \ln(x_{1,t}) + x_{2,t}$ where $x_{i,t}$ is demand of good i in period t.

a) If we do not have any financial market, what will Goran's consumption of the two consumer goods be in the two periods? Comment on the results.

Goran is a very impatient person, who would prefer a higher consumption today rather than postponing everything until tomorrow. This means that he has preferences over consumption today, c_1 and tomorrow c_2 that can be described by the utility function $u(c_1, c_2) = 3 \ln(c_1) + \ln(c_2)$. Where c_t can be considered as the money he spends on consumption in period t.

b) If we have a financial market and that the interest rate is 5%, what will Goran's total expenditure be in the two periods. With these changed budgets in the two periods, what will the resulting demand of the two consumer goods be in each period?
c) The government is afraid that the current very low interest rate will lead to an overconsumption in the first period with inflation being the result. It therefore suggests to introduce an interest tax, τ %, that is added to the interest rate, r.
How will the interest rate influence Goran's consumption in the two periods and how about his total welfare? Explain.

Answers
a) The consumption of beer in the two periods remains the same, because preferences over consumption goods are quasi-linear and income therefore does not influence demand. Hence $x_b=5000/p_b$ and $x_c=M_t-5000=45,000$ and 495,000
b) The financial market enables Goran to increase his consumption in period 1 by borrowing money at the interest rate r. His utility over the two periods is a monotone transformation of a

*Cobb-Douglas utility so total expenditure in the two periods are C_1=3/4*M/(1+r) = 3/4*M_1+3/4*1/(1+r)M_2= 394,642.9 and C_2=1/4*M = 1/4*(1+r)M1+1/4M2 = 138,125 giving a consumption of other goods equal to 389,642,9 and 133,125 in the two periods respectively.*
c) Goran's consumption in period 1 will decrease, but his consumption in period 2 will not increase by the same quantity due to the tax. The tax will induce a dead weight loss.

Question 2
Christine has 60 hours per week available (she is fast asleep for the remaining hours). She has preferences for leisure and a general consumer good. If she chooses to sell some of her available time to an employer, she can earn a wage of 80 kr per hour. Christine's preferences for leisure and the consumption good is described by the utility function $u(l, c) = l^{\frac{1}{3}} c^{\frac{2}{3}}$

a) What is Christine's income per week?
b) Assume that Christine is prescribed a new energy pill that reduces the number of hours she needs to sleep by 20 hours. How does this influence Christine's consumption of the consumer good?
c) Assume that the government introduces an income tax t=0.25 (25% of the income is paid in tax). How does that influence Christine's labour supply? Can we always be certain that the effect of an income tax works this way?
d) If the government returns the tax revenue and gives it back to Christine as a lump sum subsidy, will Christine be as well of as before? (Hint: you could consider the size of the subsidy and compare this to the size of a Hicks compensation)

Answer:
*a) She will consume l= L/3=20 hours leisure and have a consumption of c=2/3 *wL=2/3*80*60=320, which is also her income.*
*b) Her income is increased by 2/3*20*80=40/3*80*
c) In this case Christine does not change her supply of labour, even though it also means that the price of leisure is increasing. We can see that from the leisure demand function We cannot be certain that the effect always works like that. Depending on the size of income (including endowment) and substitution effects the opposite effect on labour supply could be realised.
d) Since the tax influences the relative price between consumption and leisure, there is a potential risk for a dead weight loss despite the lump sum compensation. This can be formally shown using the hint.

Question 3
Argue why a decrease in the income tax rate may or may not lead to an increase in labour supply. You should relate to a mathematical model in your arguments

The main arguments that should be included in the answer is that time is an endowment, which means that a decrease in income tax lead to a price increase in the price on time (leisure) time. However, there is also an income effect coming from the increase in the value of the endowment. The final outcome is therefore dependent on which effect is (numerically) the larger: the substitution effect (unambiguously) leading to an increase in labour supply (demand for leisure decreases) or the wealth effect (normal income plus endowment income), which (if leisure is a normal good) can be both positive or negative and if positive that it is positive enough to compensate for the negative substitute effect.

A simple mathematical model can support the arguments - it shows a good overview if the Slutsky equation is used in the arguments

Question 4

Comment on the statement:

When we calculate the consumer's surplus as the area under the ordinary demand curve, we always overestimate the 'true' dead weight loss of e.g. income taxes.

Part of the statement is true. It is true that we calculate a larger DWL when a tax is increased, because the ordinary demand curve is shallower than the compensated demand curve, when we consider normal goods. But when we have inferior goods the opposite is true. When we have goods where there is no income effect (e.g. quasi linear goods) we even have that the two demand curves coincide and thus that the CS measured either under the compensated or under the ordinary demand curve is equal.

Question 5

Consider an exchange economy with private ownership.

Then consider the following statement:

Any efficient allocation has to be such that everyone would agree to switch to that allocation from the endowment allocation - or at least no one would object to such a switch.

Argue whether the statement is true or false and why this must be the case.

Answer: False

That is true for mutually beneficial allocations - which are mutually beneficial with reference to the endowment allocation. But it is not true for efficient allocations - it's generally efficient to give everything to one person, even if that makes everyone else worse off. That's because an allocation is efficient so long as it cannot be changed in a way as to make some people better off without making anyone else worse off - and that is the case at an allocation where one person gets everything.

Question 6

A price increase always leads to a decrease in:

a) The compensation demand

b) The demand

Which of a) or b) do you think is correct? Show or prove why your answer is correct.

A) is the correct answer. The substitution effect is always negative. If the consumer is optimising, then she will prefer the bundle x^0 rather than the bundles in the original budget set. The consumer's new choice will thus be x^0, or the bundles that are in the new budget set, but not in the old set. But such bundles will include less of good 1, compared to x^0.