Assignment 1

The assignment should be done in groups of two students. It is due on 2019-02-15 before 3 pm to Carolina Persson at carolina.persson@ne.su.se or hand-written on paper addressed to Carolina Persson at the post box on the 4th floor of the A-building. Write clearly your names and the name of the course.

1) A representative individual has a utility function $U = U(C, L)$, where $C =$ consumption of goods and $L =$ leisure.

    a. Derive the slope of an indifference curve.

    b. Derive the condition for convexity of the indifference curves.

2) Assume now that the representative individual's utility function is $U(C) + V(L)$. The total time endowment is L_0. Hence working time (labour supply) is $h = L_0 - L$. Consumption of goods equals total income, which is $wh + R - T$, where $w =$ the hourly wage, $R =$ non-wage income and $T =$ total tax payment. $T = twh + a$, where $t =$ the marginal tax rate and the intercept $a =$ the tax payment (which may be positive, negative or zero) when the individual has no labour income.

    a. Draw the individual's budget constraint in the C-L plane. How is the budget line affected when t is reduced? How is it affected when a increases?

    b. Derive mathematically how working time is affected when the marginal tax rate t is reduced. Illustrate the effect in a diagram with indifference curves and a budget line. Explain the intuition for the results.

    c. Derive mathematically how working time is affected when the intercept a increases. Illustrate the effect in a diagram. Explain the intuition for the result.

    d. Now assume that the marginal tax rate t is reduced at the same time as the intercept a is increased in such a way that the total tax payment T *at the initial number of hours worked* is held constant (a

budget-neutral cut in the marginal tax rate when abstracting from "dynamic" effects due to behavioural changes). The implication is that $dT = whdt + da = 0$. How is working time affected in this case? Illustrate the effect in a diagram. Explain the intuition for the result.

e. Now assume instead that we take the "dynamic" behavioural effect of the cut in the marginal tax rate into account. The intercept a is then increased in such a way that the total tax payment T is held constant when we take account of the change in working time that occurs. This means that we set $dT = whdt + twdh + da = 0$. How is working time affected in this case? Illustrate the effect in a diagram. Explain the intuition for the result.

f. Compare the changes in working time in (d) and (e). Which change is the larger? Explain the intuition for the result.