EC7212: Labour Economics and Wage-Setting Theory

Spring 2016

Assignment

Due: 2016-05-09 at 16.00 (the latest) to Carolina Lindholm

The assignment should be solved in groups of two persons.

It must be handed in by using the mailbox for assignments on the 4th floor in House A or by email to carolina.lindholm@ne.su.se.

When you hand in your assignments remember to:

- *staple your papers*
- *clearly state the course's name, your names and your TA's name*

Question:

Individual workers have a utility function $\ln I - h^{1+\delta}/(1+\delta)$, where I = after-tax income, h = working time (hours worked per person) and $\delta > 0$. For an employed person $I = wh - T(wh)$, where w = the hourly wage and T = the tax. For an unemployed person $I = b$, where b = the unemployment benefit (which is not taxed), and $h = 0$. The economy consists of a number of firms, each with a pool of labour, M, attached to it. The whole pool of labour is organised in a firm-specific trade union. There is no mobility of labour between firms. The probability of being employed is N/M, where N is employment (the number of employed persons), and the probability of being unemployed is $1 - N/M$.

The production function of a firm is $F(L)$, where $L = Nh$ = the total number of hours worked in the firm. The firm's wage bill is $wL = wNh$. The firm determines employment (the number of employed persons) through profit maximisation.

The tax system is characterised by the coefficient of residual income progression $v = [1 - T'(wh)]/[1 - T(wh)/wh]$, which measures the degree of tax progressivity. $T'(wh)$ is the marginal tax rate and $T(wh)/wh$ is the average tax rate.

(i) Show that the coefficient of residual income progression is equal to the elasticity of the after-tax wage income, $wh - T(wh)$, with respect to before-tax income, wh. Why does it measure the degree of tax progressivity? Which value does it take when the tax system is proportional?

(ii) Assume that working time is determined by individual workers through their labour supply decision. Derive an equation showing how working time depends on tax progressivity. How is working time affected by a decrease in tax progressivity (i.e. an increase in *v)*?

(iii) Assume that the wage is set by a monopoly union maximising the expected utility of a representative worker. Derive an equation showing how the after-tax wage income of an employed person depends on the unemployment benefit, tax progressivity and the labour demand elasticity (w.r.t. the wage), when the firm decides employment and workers decide working time.

(iv) How is the hourly wage *w* in (iii) affected by a decrease in tax progressivity?

(v) Assume now that the wage is set in collective bargaining (Nash bargaining) between the trade union and the firm, whereas working time is still decided by individual workers and employment by the firm. Derive an equation showing how the after-tax wage income of an employed person depends on the unemployment benefit, tax progressivity, the labour demand elasticity and the profit elasticity. How does the result differ from the one in (iii).

(vi) How is the hourly wage w in (v) affected by a decrease in tax progressivity?

(vii) Assume now that both the wage and working time are determined by a monopoly union, whereas the firm still decides employment. Write out the two FOCs. Solve them so that you get reduced-form equations for the after-tax wage income and working time according to which they depend on the unemployment benefit, tax progressivity and the labour demand elasticity. Compare then outcomes for working time and the after-tax wage income in this case with the outcomes in (ii) and (iii). Explain the intuition for the differing results.

(viii) Assume now that both the wage and working time are determined in collective bargaining (Nash bargaining) between the union and the firm. Write out the two FOCs. Solve them so that you get reduced-form equations for the after-tax wage income and working time according to which they depend on the unemployment benefit, tax progressivity, the labour demand elasticity and the profit elasticity. Compare the outcomes for working time and the after-tax wage income in this case with the outcomes in (ii), (v) and (vii). Explain the intuition for the differing results.

(ix) How is the hourly wage in (vii) and (viii) affected by a decrease in tax progressivity?