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FACULTY OF ECONOMICS
AND MANAGEMENT

Advanced Labor Economics

(20628)

Examination Summer Semester 2012

Examiner: Prof. Dr. Andreas Knabe

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The following aids may be used: Non-programmable pocket calculators
Bilingual English language dictionaries without individual entries or marking

Time: 60 minutes

Including the front page this exam contains 3 pages with 2 questions, each question containing 4 subquestions. The total amount of points to be obtained is 60. When a written explanation is asked for, please answer in short, but complete sentences and **not** just in catchwords. Remember that you should carefully explain all elements when providing graphical illustrations.

Good luck!

Question 1 (25 points): Labor Supply

Assume that an individual possesses a utility function $U(C, L)$, where C is the consumption of goods and L is the consumption of leisure. Furthermore $U_i(C, L) > 0$ and $U_{ii}(C, L) < 0, i \in \{C, L\}$ and $U_{CL}(C, L) = U_{LC}(C, L) > 0$. The working time is h , the total amount of time an individual possesses is $L_0 = L + h$, the real net hourly wage is w and incomes received from outside the labor market (including social benefits) are denoted by R . Assume that leisure is a normal good.

- Show graphically the optimal level of labor supply when the individual maximizes its utility function. (2 points)
- Assume that there is only one type of working contract specifying a fixed number of hours worked which is strictly smaller than L_0 . Assume further that in an initial equilibrium the individual maximizes its utility by not participating in the labor market. Show in a graphic that a reform of the social benefit system **and** of the tax system can lead to a new equilibrium where the individual participates in the labor market. Explain the effects of both measures in your own words. (4 points)
- Why does a change in w have an ambivalent effect on labor supply? Propose a graphical representation and decompose the effect of a change in w on labor supply into several consecutive stages. Furthermore describe each stage very shortly in your own words. (9 points)
- The Marshallian elasticity of labor supply takes the following form (where $R_0 = wL_0 + R$):

$$\eta_w^{h^*} = \eta_w^{\bar{h}} + \eta_{R_0}^{h^*} \frac{w\bar{h}^*}{R_0}$$

Referring to this equation, explain intuitively which effect an increase in the wage has and label each term. (For simplicity, assume that $\eta_w^{\bar{h}}$ and $\eta_{R_0}^{h^*}$ are constant.) Furthermore, provide a graphical representation of a typical labor supply curve that illustrates these effects. (10 points)

Question 2 (35 points): Labor Demand

Assume a production function $F(K, L)$, where K denotes the amount of capital with capital costs R and L the amount of labor with labor costs W . Furthermore, $F_i > 0$ and $F_{ii} < 0$ with $i \in \{K, L\}$. The total costs are $C = RK + WL$. The total output is denoted by Y . The cost function with respect to output and the conditional factor demand function for labor are homogenous of degree $\frac{1}{\theta}$ and the production function is homogenous of degree θ .

- a) Explain the difference between conditional and unconditional factor demand. Furthermore propose a graphical explanation for conditional factor demand. (5 points)
- b) Show that the elasticity of the conditional labor demand takes the following form (Hint: You should apply Shephard's lemma):

$$\bar{\eta}_w^L = -(1 - s)\sigma$$

Note that:

$$s = \frac{w\bar{L}}{C}$$

$$\bar{\eta}_w^L = -\bar{\eta}_R^L$$

$$\sigma = \frac{C C_{WR}}{C_W C_R}$$

Explain the meaning of σ and s and describe intuitively which effect a variation of them has on the elasticity of the conditional labor demand in absolute terms. (10 points)

- c) Derive the wage elasticity of output, η_w^Y (Note: You should use Shephard's lemma again). (10 points)

Note that (where $P(Y)$ is the inverse demand function):

$$P(Y) = v C_Y$$

$$C_Y = \frac{C}{\theta Y}$$

$$v = \frac{1}{(1 + \eta_Y^P)}$$

$$\eta_Y^C = \frac{1}{\theta}$$

- d) Using the results derived above, one can show that the elasticity of the unconditional labor demand is given by (you do not have to do this here):

$$\eta_w^L = -(1 - s)\sigma + \frac{vs}{\theta - v}$$

Label each term according to the effects of a). What is the meaning of v ? Describe the economic intuition behind the impacts of v , s and σ on the elasticity of unconditional labor demand in absolute terms? How does the effect differ compared to b)? (10 points)