

First Exam in the Course:
Labor Economics for Diplom/Master
10 August 2011

You have to provide answers to three of the following four problems. If you answer all problems only the answers to the first three problems 1, 2, and 3 will count.

Your answers have to be in English. If you are a Diploma student, your answers can be in English or in German. In case, please mark at the beginning of the exam, that you are a 'DIPLOMA' student.

The maximum number of credits is 90. To pass the exam you have to obtain 45 credits.

The exam lasts 90 minutes.

You may use a non-programmable calculator.

Please write your name and your immatriculation number (“Matrikelnummer”) on top of all answer sheets.

Use a new answer sheet for each problem.

The exam consists of **5** pages including the cover page. Please check the completeness.

This is a closed–book exam.

Good Luck!

Please provide answers to three of the following four problems. On the answer sheets, mark clearly which problems you solve.

1.) Consider the neoclassical static labor supply model.

- a) Describe and illustrate graphically the static labor supply model. Distinguish between participation and hours worked. What is the reservation wage?

[15 credits]

- b) There is a progressive income tax where the first 20,000 Euro are taxed with a marginal tax rate of 10% and all income above is taxed with a marginal tax rate of 20%. The new government wants to simplify taxation and implements a tax reform. After the reform the first 10,000 Euro are not taxed at all and all income above is taxed with a marginal tax rate of 15%. Use the static labor supply model to characterize labor supply of different worker types before and after the reform. What are the likely reform effects on participation and on hours worked?

[15 credits]

Hint: To solve this problem make appropriate further assumptions if necessary.

[30 credits]

2.) Consider human capital investment.

- a) Anne's wage-schooling locus for college is given in the table below. Derive the marginal rate of return schedule. When will Ann quit college if her discount rate is 8 percent?

Years of college	Earnings
1	\$28,000
2	\$35,000
3	\$38,000
4	\$40,000

[8 credits]

- b) Suppose there are two types of persons, high-ability and low-ability. A particular diploma costs a high-ability person \$8,000 and costs a low-ability person \$20,000. Firms wish to use education as a screening device where they intend to pay \$25,000 to workers without a diploma and \$K to those with a diploma. In what range must K be to make this an effective screening device? Explain. (Make further assumptions if necessary.)

[8 credits]

- c) Card (1993) uses the proximity to college as an instrument to estimate the returns to schooling. Why is it necessary to use an instrument in this regression? You should use a graph or a formal argument to illustrate the bias. Do you think the instrument Card uses is convincing? Explain. How do the instrumental variable estimates compare to the ordinary least squares (OLS) results? Why are they higher or lower?

[14 credits]

[30 credits]

3.) Assume a firm that uses two inputs, labor in persons (E) and physical capital (K), to produce one output good $q = f(E, K)$. Assume further that the firm maximizes profits

$$(1) \quad \Pi = pq - wE - rK$$

for given wage, w , and cost of capital, r . Let $f(., .)$ be the production function and p the output price.

a) Assume a constant p . Write down and interpret economically the first order conditions of the profit-maximization problem of the firm. Use the formulation of the Lagrangean with profits being maximized subject to the production function. Focus in particular on the economic interpretation of the Lagrange multiplier. [10 credits]

b) Show that the first order conditions of the profit maximization problem imply the following two conditions

$$(2) \quad \begin{array}{l} \text{Marginal rate of substitution} \\ \text{between labor and capital} \end{array} = \frac{w}{r}$$

$$(3) \quad \frac{w}{MP_E} = \frac{r}{MP_K}$$

where MP_E and MP_K denote the marginal products of capital and labor, respectively. Provide a specific economic interpretation for each of these two conditions. What is the link between the second condition and the Lagrange multiplier under a)? [10 credits]

c) Now assume that output demand $q(p)$ is a falling function of p with constant elasticity, i.e. p is not constant any more. Describe graphically and explain economically the substitution effect and the scale effect for labor demand in response to a reduction in the wage. [10 credits]

Hint: To solve this problem make appropriate further assumptions if necessary.

[30 credits]

4.) Consider the behavior of unemployment over the cycle.

- a) Describe roughly the trend and the cyclical movement of the aggregate unemployment rate as well as of the inflows into unemployment and outflows from unemployment for Germany during the last decade. In particular, describe how the German labor market has developed during the recent Great Recession. [10 credits]
- b) *„Short-time work has existed in Germany for a century. [...] In previous recessions, firms were expected to pay social security and other contributions of workers in full, causing average labor costs to rise with the reduction of hours.“* (Burda, Hunt; 2011)

Briefly describe short-time work schemes. Explain why the use of these schemes is attractive for firms during a recession, despite rising labor costs as mentioned in the quote above. Why do firms hoard labor? Describe whether short-time work schemes have been used during the recent Great Recession? Which other measures have been used to accommodate the fall in labor demand during the recent recession? Describe them and explain whether they have been successful to avoid an increase of open unemployment. [20 credits]

[30 credits]

END OF EXAM