

PhD Programme
Exam in Labor Economics
Date: 21 August 2017
Time: 10.00—15.00

Instructions

Answer the following questions on separate sheets of paper. If you think that a question is vaguely formulated, specify the conditions used for answering it. Each question is worth 20 points.

Question 1

Explain the identification strategy Feldstein, M. (1995) “The Effect of Marginal Tax Rates on Taxable Income: A Study of the 1986 Tax Reform Act”. Discuss also weaknesses of this study, how these are addressed and how the identification differs in Gruber, Jon, and Emmanuel Saez (2002) “The elasticity of taxable income: evidence and implications” as well as in Blundell, R., Duncan, A., & Meghir, C. (1998) “Estimating labor supply responses using tax reforms”.

Question 2

- a) Show how the intergenerational income elasticity (a) is related to steady-state income inequality in a simple empirical model: $\ln(\text{Child income}) = \text{constant} + a \ln(\text{Parental income})$.
- b) Would you interpret a as a causal estimate of the impact of parental income on child productivity? Discuss why/why not.
- c) Several papers, among them Meghir and Palme (2005) and Pekkarinen et al (2009), have analyzed school reforms (expansion of compulsory schooling). How would you interpret their findings in an intergenerational context?

Question 3

Consider a CES production function with labor (L) and capital (K) as inputs, where σ is the elasticity of substitution between labor and capital, and θ_i indicates the importance of each factor in the production of the output:

$$y = \left(\theta_1 L^{\frac{\sigma-1}{\sigma}} + \theta_2 K^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

- a) Show how you under the assumption of perfect competition can get an expression for the relative demand function that can be estimated empirically (in principle).
- b) Discuss how the current discussion around mechanization/robots can be interpreted through the lens of the elasticity of substitution.
- c) Why and how is the elasticity of substitution important for the understanding of the reduced labor share of income?
- d) The CES-framework has also been used to understand the development of relative wages among high- and low-skilled workers. Show how this is applied and what is necessary to reconcile the relative wage patterns of last ~40 years (US) with the underlying model.

Question 4

Suppose that worker productivity (y) is determined by IQ and schooling (s):

$$y = \beta IQ + \gamma s$$

Schooling is observed at the time when a worker is first hired, but IQ is not.

True productivity is observed with error. Thus, observed productivity in each period (y_t^o) is given by

$$y_t^o = y + \epsilon_t$$

where the observation error is normally distributed with mean 0 and constant variance.

The labor market is competitive, and wages in each period equals expected productivity conditional on what has been observed up to that time point: $w_t = E_t(y|y_1^o, \dots, y_t^o, s)$. Employers use Bayesian updating to determine expected productivity. They have an initial prior about expected productivity; the initial prior is normal with mean $E_0(y|s)$ and a constant variance. With Bayesian updating, expected productivity at time t can be written as:

$$E_t(y|y_1^o, \dots, y_t^o, s) = \alpha_t \bar{y}_t^o + (1 - \alpha_t) E_0(y|s) \quad (1)$$

where \bar{y}_t^o is the mean of t draws from the observed productivity distribution.

- a) The coefficient α_t in equation (1) varies with t . Explain intuitively how the coefficient α_t varies with t .
- b) Derive an expression for the wage at the time of the initial hire.
- c) Altonji and Pierret (2001) use data from the NLSY containing, inter alia, information on wages, years of schooling, IQ , and labor market experience. Set up a wage regression, where wages are related to the other three variables, in a way that is consistent with the above framework. What are the key predictions concerning the regressions coefficients in that regression? Explain.
- d) To what extent are Altonji and Pierret's results consistent with the above framework? Give a brief account of their findings.