

Econometrics I, Part II
Assignment 5
Fall 2007

Today's Date: Wednesday, 12/5

Answers will be discussed in class, 12/11. The assignment will not be graded.

Please answer each question and show all of your work. Clearly indicate your final response to each question.

1. You have cross-sectional data (that is, from a point-in-time sample) that includes the wage rate of those currently employed and the proportion of individuals unemployed. We can summarize all of the information by the sequence $\{w_i\}_{i=1}^N$, where $w_i = 0$ for individuals who are unemployed and otherwise > 0 .

Consider estimation of a stationary search model in which there is no on-the-job search. The rate of arrival of offers while unemployed is $\lambda > 0$, the separation rate from jobs is $\eta > 0$, the utility flow in the unemployment state is b , and the discount rate is $\rho > 0$. Individuals are assumed to be expected wealth-maximizers, and as such, employ a reservation wage strategy in deciding whether to accept a job offer. The distribution of job offers is given by G .

You know the true value of the discount rate to be $\rho = .01$. Determine whether the model is identified under the following two assumptions regarding G . If the model is identified, provide a description of the estimation procedure you would employ to obtain maximum likelihood estimates of the identified parameters. If it is not identified, clearly show why this is the case.

- (a) G is uniform with support $[0, d]$, $d > 0$, with d unknown.
 - (b) G is uniform with support $[a, d]$, $0 \leq a < d$, with a and d unknown.
2. Individuals have Cobb-Douglas preferences over consumption and leisure,

$$u_i(c, l) = \alpha_i \ln(l) + (1 - \alpha_i) \ln(c).$$

Their total time endowment is T . They have no nonlabor income (i.e., $Y_i = 0$ for all i). Individual earnings are taxed. The marginal tax rate is 0.2 for all earnings up to 200, at which point it increases to 0.4. The distribution of α in the population is given by

$$G(\alpha) = \alpha^\delta, \alpha \in (0, 1), \delta > 0.$$

You have access to a random sample of observations with information on (gross) wage rates for those who are working, along with hours of work, $\{w_i, h_i\}_{i=1}^N$, where

$h_i = 0 \Rightarrow w_i = 0$ (that is, is unobserved). Write down the (conditional) likelihood function for the subsample of observations for which $h_i > 0$. Is the parameter δ identified using only the subsample of working individuals? If so, what makes it possible to consistently estimate a population parameter using an (endogenously) selected subsample?