Labor Economics II
Assignment 3
Spring 2006

Due Date: February 28

In this exercise you are asked to estimate a neoclassical labor supply model in which a large proportion of the population are at a corner solution (i.e., don't participate). To keep things simple, we will use the same labor supply function as in the Del Boca and Flinn paper, so that

$$h_i^* = Z_i\gamma + \beta w_i + \delta Y_i + \varepsilon_i,$$

and where wages are generated according to

$$w_i = X_i\eta + u_i.$$

We assume that

$$\begin{pmatrix} \varepsilon_i \\ u_i \end{pmatrix} \overset{i.i.d.}{\sim} N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{bmatrix} \sigma_{\varepsilon\varepsilon} & \sigma_{\varepsilon u} \\ \sigma_{\varepsilon u} & \sigma_{uu} \end{bmatrix}\right).$$

An individual is at a corner whenever $h_i^* \leq 0$.

The data are selected from the October 2002 CPS, the same sample used in the earlier search assignment. Rows correspond to married women between the ages of 35 and 44, inclusive. Besides wages, hours, and nonlabor income, the only other variables available to you are the woman's age and her schooling level (transformed into years of schooling completed, roughly). The variables in Z_i include age and a constant. You should include schooling and a constant term in X_i.

1. Write down the log likelihood for the complete sample (that is, including those not working), and find the point estimates of the parameters.

2. Write down the conditional likelihood function, the one which only uses data from the employed subsample. Find point estimates of the parameters from this model. Compare your FIML and CML estimates. If there are notable differences, what features of the model specification do you think generates them?

3. Assume that your sample corresponds to the entire population of a closed labor market. Using your estimates of model parameters from (1) and/or (2), perform the following policy experiment. Let all wages be taxed at a rate of 30 percent, with the revenues from the tax distributed as an equal lump sum transfer to all population members (i.e., both employed and unemployed). What are the effects of this transfer scheme on the participation rate in the market? Hours worked? Average (pre-tax) wages?

4. Del Boca and Flinn do not estimate a version of the model in which individuals are forced to accept or reject offers consisting of {wage,hours} pairs (see Aaberge et al. for the estimation of a model that shares a number of the similar features). Assume that the distribution of wage-hours offers is given by $G(w, h)$, and that an individual receives one draw from this distribution and then must decide to accept or reject it. Assuming the utility function is as given in equation (3) of the paper, write down the likelihood function for the sample. You should assume that $\alpha = \alpha_0 + \varepsilon$ in this part of the exercise, where α_0 is a constant. In terms of the (w, h) draws, assume that they are i.i.d. Devote most of your attention to identification issues - are all of the parameters identified given the CPS data to which you have access?

Data

The data set is in a text file named hours.txt so that you can use it with whichever programming language you choose. The data are extracted from the October 2002 Current Population Survey, and contain observations on married women 35-44 years of age. Individuals who report themselves as unemployed have been excluded. The layout is

Column	*Variable*	*Values*
1	Age	$35 - 44$
2	Schooling	Years Completed
3	Weekly hours	0 if not working
4	Hourly Wage	0 if not working
5	Y	Nonlabor income

Total sample size is 588.