

**Topics in Labor Economics**  
**Assignment 1**  
**Fall 2004**

In this exercise you are asked to estimate a structural two-state (employment and unemployment) search model using the estimator developed by Flinn and Heckman in their 1982 *Journal of Econometrics* paper. I would like you to try to estimate the model under two distributional assumptions regarding the wage offer distribution. The distributions are both defined on the entire positive real line.

1. The lognormal distribution has a density given by

$$f(w) = (\sigma w)^{-1} \phi\left(\frac{\ln(w) - \mu}{\sigma}\right), \quad w \geq 0,$$

where  $\mu$  and  $\sigma$  ( $> 0$ ) are unknown parameters to be estimated and  $\phi$  denotes the probability density function of a standard normal random variate. The cumulative distribution function (c.d.f.) is given by  $\Phi\left(\frac{\ln(w) - \mu}{\sigma}\right)$ , where  $\Phi$  is the standard normal c.d.f.

2. The negative exponential distribution has a density given by

$$f(w) = \mu^{-1} \exp(-w/\mu),$$

with  $\mu > 0$  equal to the population mean of the wage offer distribution.

The data set is in a text file named cps2002.txt so that you can use it with whichever program you choose. The data are extracted from the October 2002 Current Population Survey, and contain observations on individuals 25-34 years of age. Only individuals working or unemployed are included in the file. The layout is

Column	Variable	Values
1	Weekly Wage	$> 0$ for employed individuals
2	Search Duration (Months)	$> 0$ for unemployed
3	Gender	1 male; 2 female
4	Race	1 white; 2 black

Some very low weekly wage draws have already been excluded from the data set. Total sample size is 2907.

You should estimate the structural search model for at least one demographic group (i.e., a {Gender,Race} pair. Prior to estimation, divide weekly wage data by 100 to

get the parameters to be of similar orders of magnitude (important for nonlinear estimation). After estimating the reservation wage and the parameters  $\lambda$ ,  $\eta$ , and  $(\mu, \sigma)$  or  $\mu$  (depending on the distributional assumption), solve for a consistent estimator of  $b$  under the assumption that the rate of discount  $\rho$  is equal to .005 (recall that time units are measured in months).

Using your model estimates:

1. Determine the effect of a 10 percent increase in  $\lambda$  on the expected duration of search and the mean accepted wage.
2. Determine the effect of a 10 percent increase in  $\eta$  on the expected duration of search and the mean accepted wage.