Introduction to Econometrics

Fall 2004

Assignment 10

Today’s Date: 12/6/2004
Due Date: 12/13/2004

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

1. W 13.3
2. W 14.1
3. W 14.2
4. Say that you want to estimate the following model:

\[ y_{it} = \beta_0 + \beta_1 a_{it} + \beta_2 s_i + \varepsilon_{it}, \quad i = 1, \ldots, I; t = 1, \ldots, T; \]

where \( y_{it} \) is earnings of individual \( i \) in period \( t \), \( a_{it} \) is the age of individual \( i \) in period \( t \), and \( s_i \) is the years of schooling completed of individual \( i \). (It is assumed that schooling is completed before the sample period begins and does not change over the sampling period.). We assume that

\[ \varepsilon_{it} = \eta_i + u_{it}. \]

We assume that \( \eta_i \) and \( u_{it} \) are independently distributed for all \((i, t)\), and that \( u_{it} \) is independently distributed with respect to the regressors. The mean and variance of \( u_{it} \) are \((0, \sigma_u^2)\).

1. If \( \eta_i \) is mean independent of the regressors, is the OLS estimator of \( \beta \) unbiased? If so, is it efficient? If not, propose a consistent estimator of \( \beta \) that dominates the OLS estimator in large samples.
2. Describe the fixed effects estimator of the model. Which parameters in \( \beta \) are identified using this estimator? Are these estimators unbiased even if \( \eta_i \) is not mean independent of the regressors?
3. Describe a testing strategy that you could use to decide whether to use the fixed effects or the random effects estimators of \( \beta \).