Linear Panel Data

April 1, 2019

The goal of this exercise is to apply linear panel data techniques. You are allowed to use the pre-programmed OLS estimator in your preferred statistical package.

Exercise 1 Data

Load the data "Koop - Tobias", which comes from Koop and Tobias (2004) Labor Market Experience Data. (See Koop, G. and J. Tobias, "Learning About Heterogeneity in Returns to Schooling," Journal of Applied Econometrics, 19, 2004, pp. 827-849.

The data file is in two parts. The first file contains the panel of 17,919 observations on the Person ID and 4 time-varying variables. The second file contains time invariant variables for the individual or the 2,178 households.

Variables in the file may be changing over time

- PERSONID = Person id (ranging from 1 to 2,178),
- EDUC = Education,
- LOGWAGE = Log of hourly wage,
- POTEXPER = Potential experience,
- TIMETRND = Time trend.

or time invariant

- ABILITY = Ability,
- MOTHERED = Mother's education,
- FATHERED = Father's education,
- BRKNHOME = Dummy variable for residence in a broken home,
- SIBLINGS = Number of siblings

Represent the panel dimension of wages for 5 randomly selected individuals.

Exercise 2 Random Effects

We are interested in

$$LOGWAGE_{it} = \alpha_i + \beta_1 EDUC_{it} + \beta_2 POTEXPR_{it} + \epsilon_{it} \tag{1}$$

Where α_i is a random effect. Estimate the random effect model under the normality assumption of the disturbance terms.

Exercise 3 Fixed Effects Model

We are interested in

$$LOGWAGE_{it} = \alpha_i + \beta_1 EDUC_{it} + \beta_2 POTEXPR_{it} + \epsilon_{it} \tag{2}$$

Where α_i is individual fixed effect. Estimate the following estimators

- Between Estimator
- Within Estimator
- First time difference Estimator

Compare the estimates of β_1 and β_2 under the different models.

Exercise 4 Understanding Fixed Effects

In the rest of the assignment, we consider only a random selected 100 individuals. We are interested in

$$LOGWAGE_{it} = \alpha_i + \beta_1 EDUC_{it} + \beta_2 POTEXPR_{it} + \epsilon_{it} \tag{3}$$

Where α_i is individual fixed effect.

- Write and optimize the likelihood associated to the problem and estimate the individual fixed effect parameters
- Run a regression of estimated individual fixed effets on the invariant variables.
- The standard errors in the previous may not be correctly estimated. Explain why, and propose an alternative method to compute standard errors.