

## ECON 5P04 Panel data analysis assignment

**Due: Third Week of April, 2019**

### Option 1

What are the socioeconomic determinants of people's charitable contributions? We will attempt to answer this question using a balanced panel data provided in the datafile

**CharitableGiving\_Data** for which  $N=47$  and  $T=10$ . Hence, this is a micro-panel since the time dimension is less than the cross-section dimension.

For this dataset the definitions of the variables are provided below:

*Charity*: the total amount of charitable contributions in a given year

*Income*: the individual's total income

*Price*: defined as 1 minus the individual's marginal tax rate

*Age*: dummy variable (= 1 if the individual is 65 years or older; =0 otherwise)

*MS*: dummy variable (=1 if the individual is married; = 0 otherwise)

*DEPS*: number of dependents under the care of the individual.

Note that for each regression *Charity* is the dependent variable and the remaining variables are independent variables.

### Questions:

- Use a software package of your choice to estimate estimated pooled regression, individual fixed effects regression and individual random effects regression
- Comment on the estimated coefficients for the three estimated regressions: pooled regression, fixed effects regression and random effects regression
- Examine the estimate of the quasi-within transformation parameter  $\theta$  associated with the random effects model you estimated in Part (a). Is this estimate closer to fixed effects or to the pooled model? Explain
- Perform an F test for individual fixed effects versus the pooled model. Use 5% level of significance. Please be sure to indicate the relevant null hypothesis and alternative hypothesis.
- Perform a Breusch-Pagan test for the pooled model versus the random effects model. Use 5% level of significance. Please be sure to indicate the relevant null hypothesis and alternative hypothesis. Which is the better model?
- Perform Hausman's test results to test for the random effects model versus the fixed effects model. Use 5% level of significance. Please be sure to indicate the relevant null hypothesis and alternative hypothesis.
- Use your results in parts (d), (e) and (f) to determine the best model: the pooled model, individual fixed effects model, or random effects model
- As is well known in the panel data econometrics literature, an important limitation of a fixed effects regression is that time-invariant variables are eliminated. Can you provide an explanation as to why the dummy variables *Age* and *MS* have been retained in the empirical results reported above?
- Is it reasonable to be concerned about the problem of panel unit roots, panel cointegration and autocorrelation for this dataset? Explain.

- (j) Suppose that we modified the regressions you ran in part (a) to include a lagged Charity variable, resulting in a dynamic model. What would be the rationale for this modification?
- (k) Discuss why the fixed effects and random effects estimators would be inappropriate for estimating the parameters of the modified regression in Part (j).
- (l) As mentioned in class, there are several GMM estimators for estimating the parameters of dynamic panels (e.g. Arellano-Bond, Arellano-Bover and Blundell-Bond system GMM). Use one of the GMM estimators of your choice to estimate the parameters of the modified regression in part (j) and use the results to comment on the existence of habit persistence at 5 percent level of significance.
- (m) As mentioned in class, GMM estimators may not necessarily work for some dynamic panels. Why were you able to estimate the dynamic model in part(l) by GMM? Explain.
- (n) Explain the distinction between Generalized Method of Moments (GMM) and Method of Moments (MM).