INTERNATIONAL UNIVERSITY OF JAPAN
Public Management and Policy Analysis Program
Graduate School of International Relations

ACC6512 (Winter 2012)
Topics in Data Analysis: Panel Data Models

Homework 3: Fixed Effect Model (100 points)

Instructions: Use the WHO health care attainment data that you prepared for homework assignment 1 and 2. Do not work on the original file; Change file name to, say, homework3.dta. First, finish writing your do file and print the log file. Don't add answers in your do file; I did just for pedagogical purpose. Second, write down your answers on the print-out of your log file. You may add separate sheets if needed. Use the .05 significance level in hypothesis test. Submitted in the class on Wednesday, Feb. 22nd (my mailbox in security room or my office).

Question 1 (5 points) Fit your pooled OLS and linear regression model (LSDV1) used in homework 1 and 2. You may change specification under the same conditions (i.e., You must include at least health expenditure and educational attainment as regressors; The number of regressors (excluding dummy variables) should be 4-7; At least the parameter of health expenditure should be statistically significant at the .05 level). When you change specification, fit the pooled OLS and LSDV1 again.

Question 2 (40 points). Within estimation for the fixed time effect model.

Question 2.1 **(10 points)** Fit a model of "Within estimation" using `.regress`. You need to transform data using group (individual/entity/time/year) means of dependent and independent variables. Do not forge to suppress the intercept.

Question 2.2 **(5 points)** Report F, SSM, SSE, SEE, df$_{error}$, and R^2 and adjusted R^2. Compare them with those of LSDV1. Do not simply list statistics; Explain them explicitly as if you are reporting the result to your boss (your boss will get upset if you just toss a series of numbers to him! Be polite to your boss, your clients, and the instructor).

Question 2.3 **(5 points)** Report coefficients and their standard errors of health expenditure and educational attainment. Do they differ from those in the LSDV1?

Question 2.4 **(5 points)** Calculate correct standard errors of health expenditure and educational attainment. Show me your calculation clearly.

Question 2.5 **(7 points)** Conduct hypothesis test on the parameter of educational attainment. Use the test statistic approach with the critical value of 1.96 (N is large enough!). Please follow all five steps described in the class note. Don't be a rude person who reports the result to his boss by saying, "Hey boss, reject the null hypothesis!"

Question 2.6 **(8 points)** Calculate the actual intercept of all years (1993-1997). Show me your computation clearly. You need to use group means you obtained in 2.1. List group means of dependent and independent variables first. Make sure your results are the same as dummy parameters in LSDV2 although there might be some rounding errors.

Question 3 (30 points). Within Estimation Using `.xtreg`.

Question 3.1 **(5 points)** Fit a fixed time effect model (within estimation) using `.xtreg`. You need to run `.tsset time country`. Don't forget to add the `fe` option.

Question 3.2 **(5 points)** Report F, SSM, SSE, SEE, df_{error}, R^2, and adjusted R^2. Compare them with those of the within estimation in 2.1. Explain the difference clearly. You may use `e(mss), e(rss), e(r2)`, and `e(r2_a)`.

Question 3.3 **(2 points)** Report coefficients and their standard errors of health expenditure and educational attainment. How do they differ from those in 2.1.

Question 3.4 **(5 points)** Examine if the parameter of health expenditure is zero using the p-value approach. You don't need to show how the corresponding t statistic is calculated.

Question 3.5 **(3 points)** Report F statistic and p-value at the bottom of the `.xtreg` output. You should get the same statistics as those of question 2.10 in homework 2.

Question 3.6 **(8 points)** Conduct the hypothesis test to examine if there exists fixed time effect. Use statistics in 3.6. Again follow all five steps and take the p-value approach.

Question 3.7 **(2 points)** Do you think there is a significant fixed effect in your panel data? Adding dummy variables is worthwhile?

Question 4 (20 points). Fixed Effect Model Using `.areg`.

Question 4.1 **(2 points)** Fit the same model using `.areg`.

Question 4.2 **(5 points)** Report F, SSM, SSE, SEE, df_{error}, R^2, and adjusted R^2 using `e(rss)`, `e(r2)`, etc. Compare them with those of the within estimation in 3.2.

Question 4.3 **(3 points)** Report the intercept and its standard error. They are identical to those you obtained in 3.1. What does the number (intercept) mean? See Q 4.1 in homework 2.

Question 4.4 **(5 points)** What are the advantages of using `.areg`? Under which circumstance do you think this command can be best utilized?

Question 5 (10 points). Fixed Group (country) Effect Model.

Question 5.1 **(3 points)** Fit the fixed group (country) effect model using `.xtreg`. You may run run `.tsset counry time` or add `i(country)` option in `.xtreg`.

Question 5.2 **(2 points)** Report coefficients and their standard errors of health expenditure and educational attainment. How do they differ from those in 3.3.

Question 5.3 **(5 points)** Test if there is significant fixed group effect in data. Follow five steps and take the p-value approach.

End of homework assignment 3.