

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 5: Hausman and Chow Test (100 points)

Instructions: Use the WHO health care attainment data that you prepared for homework assignment 4. Don't forget to comment the keep command in the do file: “// keep if oecd==1” First, finish writing your do file and print the log file. Don't add commands for calculation asked to the do file; **handwrite to report statistics or show your calculation!** 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. Submit your answer to my office by Wednesday, March. 14th.

Question 1 (5 points) Fit your pooled OLS of regressing *log* transformed health care attainment (`lcomp`) on *log* per capita health expenditure (`lhexp`) and *log* disability adjusted life expectancy (`lda1e`). Then fit fixed time effect model (within estimation) and random time effect model using `.xtreg` and time variable `year`.

Question 2 (27 points). Hausman test.

Question 2.1 (**2 points**) Report parameter estimates of regressors of fixed and random effect models. Calculate the difference between them. Please, *handwrite*. Keep in mind that parameter estimates of the fixed effect model go first.

Question 2.2 (**3 point**) Report variance-covariance matrices of parameter estimates in fixed and random effect models. Don't forget to exclude variance-covariance elements of the intercept. Calculate the difference between them. Again, *handwrite*. Keep the four digits below the decimal point in calculation.

Question 2.3 (**5 point**) Calculate the Hausman statistic. Show formula and matrices used in calculation.

Question 2.4 (**2 points**) Calculate the p-value of the statistic using `chi2tail()`. Do not forget the report the degrees of freedom.

Question 2.5 (**2 points**) Get the Hausman statistic using `.hausman`. Do not forget that the fixed effect model precedes the random effect model.

Question 2.6 (**10 points**) Conduct the Hausman test. Follow all five steps strictly and take the p-value approach.

Question 2.7 (**3 points**) Which model would you choose? Explain your rationale.

Question 3 (23 points). Poolability test

Question 3.1 (1 point) Fit the pooled OLS and report its SSE.

Question 3.2 (2 points) Fit the year specific OLSs and report their SSEs. Then calculate the sum of SSEs.

Question 3.3 (1 point) Report n , T , and k .

Question 3.4 (5 points) Calculate the Chow statistic. Show formula and matrices used in calculation.

Question 3.5 (2 points) Calculate the p-value of the Chow statistic. Report both degrees of freedom.

Question 3.6 (10 points) Conduct the chow test. Follow all five steps strictly and take the p-value approach.

Question 3.7 (2 point) Are your data poolable? Why or why not?

Question 4 (20 points). Chow test (original version)

Question 4.1 (2 points) Create 10 interaction terms of log health expenditure and log disability adjusted life expectancy, and year dummies (e.g., $lhexp93 = lhexp * year93$).

Question 4.2 (2 points) Regress log health care attainment on log health expenditure, log disability adjust life expectancy, four interaction terms for log health expenditure, four interaction terms for log disability adjusted life expectancy, and four year dummy variables. Let us drop the interaction term and dummy for 1995 and use them as reference points.

Question 4.3 (5 points) Report five parameter estimates of log per capita health expenditure. Ignore parameter estimates of disability adjusted life expectancy. Show your calculation clearly.

Question 4.4 (5 points) Report five intercepts. Show your calculation clearly.

Question 4.5 (5 points) Obtain the Chow statistic using `.test` with the `accum` option. See Stata do file available on the course Web page. Remember, do not include `lhexp` and `ldale`.

Question 4.6 (1 point) Compared the result in 4.5 with that of 3.4. Are they identical?

Question 5 (15 points). Run “`list country year lcomp lhexp ldale`” to get the list of data. Look at the data very carefully. How are these data related to the results of F-test/LM test (Breusch-Pagan test) for fixed and random effect models that you conducted in questions 3-4? What can you learn about the time effect in you panel data?

Question 6 (10 points). Based on questions 1-5, determine your model. Which model do you think is most plausible? Tell me your rationale in detail. What is your next plan to analyze your data? (staying here and stopping now or trying other approaches?)

End of homework assignment 5.