ECON 222/2
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Assignment

1. The file Data4-a contains data on the MBA programs at the top 25 business schools in the US. The variables are defined as follows:

   Source: R. Ramanthan, *Introductory Econometrics with Applications*, p. 221.

TUITION	Annual tuition in $000
SLRYGAIN	Average salary gain in $000
Z1	MBA skills in being analysts
Z2	MBA skills in being team players
Z3	MBA skills in having a global view
Z4	Teaching evaluations
Z5	Curriculum evaluation

(a) Regress TUITION on the other variables. Comment on the results
(b) Use the t-stats from (a) as a guide to dropping some variables. Rerun the regression. Use a F-test to determine whether it was a good idea to drop the variables.
© What do you think is the best model [in the sense of the model that best explains salary differences with the smallest number of variables]? Comment on the results.

2. The file Data4-b contains data for 104 countries including the variables:

   Source: R. Ramanthan, *Introductory Econometrics with Applications*, p. 374.

GRTH	Log of change in income 1960-1985 [dependent variable]
Y60	Log of income in 1960
INV	Average Investment to GDP ratio over 1960-1985
POP	Measure of population growth in logs
SCHOOL	Measure of percentage of population in school
DN	Dummy for non-oil producing countries
DI	Dummy for industrialized countries
DOECD	Dummy for OECD countries

(a) Estimate a model with growth as the dependent variable and the remaining variables -not including the dummies- as explanatory variables. What signs do

you expect for each of the coefficients? Are your intuitions confirmed by the regression results?

(b) Now add slope dummies related to each of the variables: income, investment, population, schooling. Re-estimate this more general model. Comment on the results.

(c) Would you drop any of the variables? Why? Re-estimate what you think is the best smaller model involving these variables. Does the F-test confirm the decision to drop the variables?

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Assignment

Heteroscedasticity

Consider the data presented in file Data5.

Source: Greene, *Econometric Analysis* [2nd ed.], p. 385.

1. Find the least squares estimates in a regression of school expenditures on a constant, per capita income and per capita income squared.

2. Plot the least-square residuals against income. Is there evidence of heteroscedasticity?

3. Test (two ways) for heteroscedasticity.

4. Find robust standard errors; compare with least squares standard errors.

5. Suppose heteroscedasticity is directly related to income. Transform the model using this information. Find new parameter estimates based on the transformed model. How do they differ from the original estimates?.

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Assignment

Serial Correlation

Consider the data presented in file Data6 with explanation of variables in Data6_read.

Source: R. Ramanthan, *Introductory Econometrics with Applications*, p. 483.

Generate the variables lph = Log(housing/pop), lpcgnp = log(gnp/pop), and lr = log(intrate). Consider the following model:

$$lph = \beta_0 + \beta_1 lpcgnp + \beta_2 lr + u \ .$$

5. Find the least squares estimates of this model.

6. Plot the least-square residuals against time. Is there evidence of serial correlation? What does the Durbin-Watson test indicate?

7. If the DW test is significant, transform the model to reflect the presence of serial correlation. How do the parameter estimates and their variances compare with the OLS estimates.

4. Retest the model for serial correlation. What are your conclusions?