B.E. International Program

Faculty of Economics, Thammasat University

Semester: 2/2014

EE325 Introductory Econometrics

Homework#4

Data is at http://goo.gl/Jups4q

1. Answer the following questions by using data from file **GPA1.dta** (use 5% level of significance)

1.1 Estimate a regression to study the relationship between College GPA (colGPA) and High school GPA (hsGPA), Admission Test Score (ACT), Number of times skipping class per week (skipped), and Dummy variable of having computer or not (PC) as following:

$$colGPA = \beta_1 + \beta_2 hsGPA + \beta_3 ACT + \beta_4 skipped + \beta_5 PC + u \qquad (1)$$

By OLS estimation, explain the relationship between colGPA and skipped and test whether it is statistically significant.

1.2 Test whether there is heteroscedasticity in the above OLS equation by using White's test

1.3 Estimate OLS equation using White's Heteroscedasticity robust standard error. Compare the result to (1.1) and test the significance of the equation.

2. Use the data of daily fish price at Fulton Fish Market in Manhattan from file **FISH.dta** to answer the following questions.

2.1 Estimate a regression showing the relationship between the log of fish price (lavgprc) and wavelength (wave2), which represents supply shock (the higher the wavelength, the lower fish caught and higher fish price).

$$lavgprc = \beta_1 + \beta_2 wave2 + u$$

Test the hypothesis whether an increase in wavelength results in higher fish price.

2.2 Test whether AR(1) autocorrelation problem occurs by Durbin-Watson Test.

3. Given the model of firm's salary in country Y's stock market

Model (1) $Salary_i = \beta_1 + \beta_2 Age_i + \beta_3 Sales_i + \beta_4 Profit_i + u_i$

Model (2) $Salary_i = \alpha_1 + \alpha_2 Sales_i + \alpha_3 Age_i + v_i$

where $Salary_i$ = salary of firm i ,

Age_i = age of firm i ,

$Sales_i$ = sales of frim i ,

$Profit_i$ = profit of firm i

3.1 If model (1) is a correct model but you use model (2) to estimate a regression, is there a chance that heteroscedasticity problem to occur? Explain.

$\hat{v}_i = \lambda_1 + \lambda_2 Sales_i + \lambda_3 Age_i + \lambda_4 Sales_i^2 + \lambda_5 Age_i^2 + \lambda_6 Sales_i Age_i + e_i$

From the above regression, how can above regression equation help to test heteroscedasticity? Explain your method of testing and drawing conclusion.

3.2 If model (1) is a correct model but you use model (2) to estimate the regression, is there a chance that autocorrelation will occur? Explain.

4. From economic data of country A during 1955-1985, the following regression results are obtained

Model 1: $C_t = 37.45 + 0.7391 GNP_t - 0.2529 D_t$

$se = (2.73) \quad (0.0060) \quad (0.0736) \quad R_1^2 = 0.999$

Model 2: $\frac{C_t}{GNP_t} = 32.47 \frac{1}{GNP_t} + 0.7135 - 0.2591 \frac{D_t}{GNP_t}$

$se = (2.22) \quad (0.0068) \quad (0.0597) \quad R_2^2 = 0.875$

where C_t = Consumption expenditure of household

GNP_t = Gross National Product

D_t = National defense expenditure

4.1. If we want to solve heteroscedasticity problem by transforming model (1) to model (2), can we solve the problem by this method? What is the assumption on the relationship between variance of disturbance term and explanatory variables in model (1)?

4.2. Interpret the regression result of model (1) and model (2)

4.3 Can we compare R^2 between model (1) and (2) ? Illustrate your answer.

5. To study the change in additional labor value to product value ratio during 1949-1964, consider following two models.

Model 1

$$\hat{Y} = 0.452 - 0.004t$$
$$t \quad (0.13) \quad (-3.96)$$
$$R^2 = 0.5284, d = 0.8252$$

Model 2

$$\hat{Y} = 0.478 - 0.001t + 0.0005t^2$$
$$t \quad (0.45) \quad (-3.27) \quad (2.77)$$
$$R^2 = 0.6629, d = 1.82$$

5.1. Is there autocorrelation problem in model (1) and model (2). Explain and test hypothesis of that problem.

5.2 If model 1 is applied, is there the violation of CLRM and how will it affect the estimation? Explain.

6. Consider the following regression:

$$GDP_t = 0.24L_t + 0.64K_t + 1.03FDI_t + 0.23FDI_t^2 + 0.12TP_t$$
$$P-value \quad (0.00) \quad (0.00) \quad (0.00) \quad (0.01) \quad (0.02)$$
$$R^2 = 0.6715, \ \bar{R}^2 = 0.6605, F = 9.81, n = 30, VIF = 2.03, \text{d} = 1.92$$
White's general test statistic : 48.0421 Chi-sq(20) P-value = 0.0000

Where L_t = Number of Labor Force in thousands people
K_t = Value of Capital Stock in million Baht
TP_t = Policy on Export Promotion in manufacture products

6.1. "From the preceding regression results, the independent variables FDI and FDI^2 might be highly correlated and creates multicollinearity problem" Do you agree or disagree? Explain

6.2 What is the effect of FDI on GDP? Will an increase in FDI make GDP rise in the increasing or decreasing rate? Is this effect reasonable? Discuss.

6.3. Is there any problems resulted from violating CLRM assumptions in above regression results? How to test? Explain the effect of the problem and provide some remedial measures.