PGDM, 2015-17

Elements of Basic Econometrics

DM-602

Trimester – VI, End-Term Examination: February 2017

Time allowed: 2 Hrs 30 Min
Max Marks: 50

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means.** All other instructions on the reverse of Admit Card should be followed meticulously.

Sections	No. of Questions to attempt	Marks	Marks
A	3 out of 5 (Short Questions)	5 Marks each	3*5 = 15
B	2 out of 3 (Long Questions)	10 Marks each	2*10 = 20
C	Compulsory Case Study	15 Marks	15
		Total Marks	**50**

Section: A

1. What are the assumptions of Classical Linear Regression Model?
2. What are the properties of Ordinary Least Square (OLS) estimators?
3. 'High R- square value in a regression model does not mean that the model is robust' please explain this statement?
4. What happens with a regression model if the independent variables suffers from multicollinearity?
5. What is the importance of testing the normality of residuals in a regression model?

Section: B

1. Please calculate parameters, standard error of parameters and standard deviation of error term from the following data, where X is independent variable and Y is dependent variable.

Variables										
X	80	100	120	140	160	180	200	220	240	260
Y	70	65	90	95	110	115	120	140	155	150

2. Please draw a flow chart of hypothesis testing in OLS regression models?

3. While building a regression model an analyst has incurred a problem where some of the t-values of parameters are insignificant but F-statistic of the model is significant. Similarly, overall R-square value is also very high. Explain what kind of problem the analyst is facing and what can be the impact of this problem on the model robustness?

Section: C

The result of regression function which has been given below describe the relationship between Real GDP, Employment and real fixed capital of Mexico from 1955 to 1974. Real GDP is the dependent variable and employment and fixed capital is independent variable. This is an attempt to fit the Cobb-Douglas production function. The results of the regression test are given below. Given below is also the diagnostics of residuals of the regression model. Please comment on the robustness of the model keeping hypotheses testing in mind. As well comment if you find any sign of multicollinearity in the results.

Results

```
Residuals:
     Min       1Q   Median       3Q      Max
-0.057144 -0.016249 -0.005791  0.023511  0.038740

Coefficients:
            Estimate   Std. Error   t value  Pr(>|t|)
(Intercept) -1.65242    0.60620      -2.726    0.0144 *
lne          0.33973    0.18569       1.830    0.0849 .
lnc          0.84600    0.09335       9.062    6.42e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02829 on 17 degrees of freedom
Multiple R-squared:  0.9951,

Adjusted R-squared:  0.9945
F-statistic:  1719 on 2 and 17 DF,  p-value: < 2.2e-16
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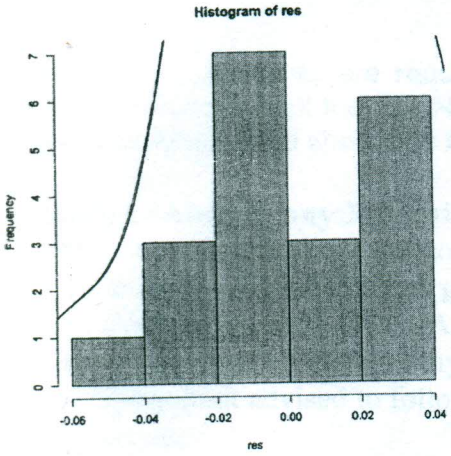
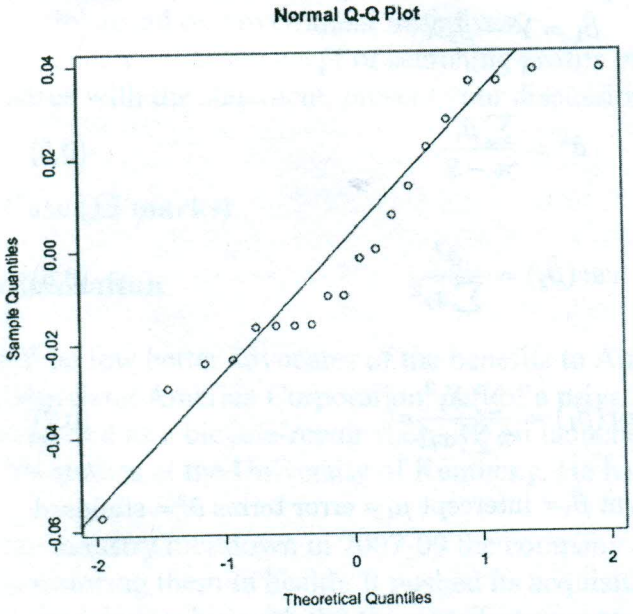
Residual diagnostics

Histogram of residuals



Normal Q-Q Plot



Jarque-Bera Test Results

X-squared= 0.4383, df=2, p-value= 0.8032

Formula

February 11, 2017

$$x_t = X_t - \bar{X} \tag{0.1}$$

$$y_t = Y_t - \bar{Y} \tag{0.2}$$

$$\hat{\beta}_2 = \frac{\sum y_t x_t}{\sum {x_t}^2} \tag{0.3}$$

$$\hat{\beta}_1 = \bar{Y} - \hat{\beta}_2 \bar{X} \tag{0.4}$$

$$\hat{\sigma}^2 = \frac{\sum \hat{\mu_t}^2}{n-2} \tag{0.5}$$

$$var(\hat{\beta}_2) = \frac{\hat{\sigma}^2}{\sum {x_t}^2} \tag{0.6}$$

$$var(\hat{\beta}_1) = \frac{\sum {X_t}^2}{n \sum {x_t}^2} \sigma^2 \tag{0.7}$$

Where: $\hat{\beta}_2$= slope coefficient $\hat{\beta}_1$= intercept μ_t= error terms $\hat{\sigma}^2$= standard deviation of error term