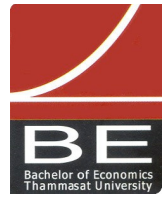




B.E. International Program

Faculty of Economics, Thammasat University



Semester: 2/2013

EE325 Introductory Econometrics

Homework#2 (Due on 18 February, 2014 in class)

1. Given the sample data of Y and X:

Y	X
3.5	1
-3.2	-1
-0.3	0
0.3	0

Suppose that $Y_i = \beta X_i + u_i$ where $E(u_i|X_i) = 0$ and $Var(u_i|X_i) = \sigma^2$

1.1 Plot the scatter diagram of the given data

1.2 Use Ordinary least square (OLS) method to find the value of β

1.3 Suppose that b is other estimators of β such that $e_i = Y_i - bX_i$. Fill in the table below and plot the graph. Let x axis be the values of b and y axis be the values of RSS(b). Observe whether the value of RSS(b) is the same as the value of $\widehat{\beta}_{OLS}$ in 1.2? How?

b	e_1	e_2	e_3	e_4	RSS(b)
3.60					
3.50					
3.35					
3.15					
3.00					

RSS = residual sum of square

2. Consider the following regression result

$$\begin{array}{rcl} \hat{Y}_i & = & (a) + 0.5091X_i \\ se & 6.4138 & (b) \\ t & 3.8128 & 14.2605 \end{array}$$

Y_i = weekly expenditure of households

X_i = monthly income of households

$N = 200$

- 2.1 Find the values of (a) and (b)
- 2.2 Interpret the meaning. Are they as expected?
- 2.3 Find the 99 %, 95 % and 90 % confidence intervals of the slope coefficient
- 2.4 Test the hypothesis that the value of slope coefficient is equal to 0.2

3. From the data collection of 13 automobile-parts manufacturing companies, consider this regression result:

$$\begin{array}{rcl} \hat{rd} & = & 0.7437 + (a)sales \\ se & = & (b) \quad (0.0664) \\ t & = & (0.8797) \quad (c) \end{array}$$

$$\text{where } \frac{\sum_{i=1}^{13} (sales_i - \bar{sales})(rd_i - \bar{rd})}{\sum_{i=1}^{13} (sales_i - \bar{sales})^2} = 0.6416$$

When rd_i = R&D expenditure (million baht), and

$sales_i$ = Annual sale (million baht)

- 3.1 Find standard error of the slope coefficient and the intercept, and the t statistic value of the slope coefficient.
 - 3.2 Interpret the meaning of the slope coefficient and the intercept.
 - 3.3 Find the 99%, 95% and 90% interval of the slope coefficient and the intercept.
 - 3.4 Test the hypothesis that the slope coefficient is more than or equal to 1 at 0.05 level of significance.
4. (Optional) If u_i is normally distributed, $\sum \hat{u}_i^2 = 9.8296$, and number of observation (n) = 13
- 4.1 Find the 95% confidence interval of σ^2 .
 - 4.2 Test hypothesis that $\sigma^2 = 0.6$ at 0.05 level of significance

5. Consider the following statement whether they are true or false and explain.

5.1 If the p-value is higher than the significance level, we will reject the null hypothesis H_0 .

5.2 We use t-test, F-test, and chi-square value in hypothesis testing that $H_0 : \beta_2 = 0$ where

$$\hat{Y}_i = \hat{\beta}_1 + \hat{\beta}_2 X_i$$

5.3 Type one error is the value of significance level (α) which we reject H_0 when it is true.

6. Suppose the indifference curve from consumption of goods X and Y is as follows:

$$\ln(Y_i / X_i) = \beta_1 + \ln(\beta_2 X_i^{\beta_3})$$

Quantity consumed of X	1	2	3	4	5
Quantity consumed of Y	4	3.5	2.8	1.9	0.8

6.1 How can we transform this model into regression model?

6.2 By using information from the table, estimate value of the parameters in the model from 6.1.

Also interpret the value of slope coefficient and test hypothesis whether the slope intercept is equal to zero at 95% confidence interval.

6.3 Find the 95% confidence interval of the slope coefficient from model in 6.1

7. Consider the following regression

$$\hat{Y} = 0.8345 + 1.9123X \quad R^2 = 0.564$$

$$se \quad 3.233 \quad 0.1417$$

How will the above result, including the values of se and R^2 , change if;

7.1 X is divided by k

7.2 Y is divided by k

7.3 Both X and Y are divided by k

Where k is a constant. Show your method and explain.