

OLABISI ONABANJO UNIVERSITY, AGO-IWOYE

FACULTY OF MANAGEMENT SCIENCES

DEPARTMENT OF ECONOMICS

2007/2008 SESSION, HARMATTAN SEMESTER EXAMINATION

COURSE CODE/ TITLE: ECO317- INTRODUCTORY ECONOMETRICS

INSTRUCTION: ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS

TIME ALLOWED: ~~1hr~~ 40 mins

*Economics
Statistics
Related Courses*

1. The table below depicts the data on output and capital expenditure in millions of naira for a period of ten months for a manufacturing industry.

Months	1	2	3	4	5	6	7	8	9	10
Capital expenditure (# ' m), X	2	3	7	6	8	9	11	10	11	12
Company's output (# ' m), Y	5	8	7	8	9	11	10	13	14	15

*n = 10
n < 30*

Required:

- Compute the correlation coefficient and interpret your result.
- Test for the significance of the correlation coefficient when $t_{0.05} = 1.86$
- Estimate the parameters of the linear stochastic regression model.
- Find and interpret the coefficient of determination.
- Calculate the standard errors of the estimated parameters in (iii) above.
- Test for the statistical significance of the estimated parameters in (iii) above given the critical value of t at 5% = 1.96.
- Forecast the value of capital expended when output is 12 million naira and the output level when the capital expenditure is 15 million naira.

(30 marks)

2. (a) What is an econometric model? Evaluate the link between Mathematical economics, Statistics and Econometrics.
- (b) Discuss in details the criteria you would use to evaluate the results of an estimated relationship.
- (c) Explain vividly the goals of an econometric model and the steps required in econometric analysis.

(20 marks)

$$Y = \frac{\lambda}{a + bX}$$

$$e^{a + bX}$$

3. (a) Explain what is meant by model specification?
 (b) From the economic relationship specified as $Y_i = b_0 + b_1 X_i + e_i$
 * (i) Give five (5) reasons why the error terms (e_i) are included in the above?
 (ii) What are the assumptions underlying its inclusion in the relationship?
 (iii) Derive the formulae for estimating the parameters of the linear stochastic regression model
 (c) Explain how to test the statistical significance of the estimated coefficients of the regression model?

(20 marks)

4. (a) Distinguish clearly between the point estimate and interval estimate.
 (b) What are the desirable properties of an estimate?
 (c) The table below includes the rankings of ten courses (of Economics Dept., O. O. U.) by two students, one studying Economics and one Economics Education.

Course code/ Eco	301	302	303	304	305	306	307	314	316	317
Eco's ranking	8	5	1	9	6	2	4	7	3	9
Eco Ed's ranking	5	4	7	3	9	8	2	3	6	9

Required:

- (i) Can you infer from the data above that the ten courses are equally popular among the students?
 (ii) Interpret the economic meaning of the obtained rank correlation coefficient.
 (iii) Highlight the limitations of the theory of linear correlation.

(20 marks)

(a) Compare and contrast the differences between coefficient of multiple determination and the adjusted coefficient of multiple determination.

(b) The intermediate results of the quantity demanded of a commodity (Y), its price (X_1) and consumer's income (X_2) are given below from sample data of fifteen (15) observations.

$\sum Y = 5515.4$, $\sum X_1 = 6041.4$, $\sum X_2 = 120$, $\sum Y^2 = 66042.3$, $\sum X_1^2 = 84855.1$, $\sum X_2^2 = 280$, $\sum YX_1 = 74778.4$, $\sum YX_2 = 4250.9$, $\sum X_1X_2 = 4796$. Compute

- (i) the unadjusted and adjusted R^2 and interpret the results.
 (ii) the parameters of the regression model and state the meaning of your results.
 (iii) the variances and the standard errors of the estimated parameters.
 (i) test for the statistical reliability of the estimates (b_0, b_1, b_2) at 5% level of sign. (i.e., $t_{0.025} = 2.365$)
 (ii) what percentage of the total variation in Y is explained by both X_1 and X_2 .

Unadjusted $R^2 = \frac{\hat{b}_1 \sum X_1 Y + \hat{b}_2 \sum X_2 Y}{\sum Y^2}$ (20 marks)

$$\hat{b}_1 = \frac{(\sum X_1 Y)(\sum X_2^2) - (\sum X_2 Y)(\sum X_1 X_2)}{(\sum X_1^2)(\sum X_2^2) - (\sum X_1 X_2)^2}$$

$$\hat{b}_2 = \frac{(\sum X_2 Y)(\sum X_1^2) - (\sum X_1 Y)(\sum X_1 X_2)}{(\sum X_1^2)(\sum X_2^2) - (\sum X_1 X_2)^2}$$