

KABARAK



UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF ECONOMICS AND
MATHEMATICS**

COURSE CODE: ECON 322

COURSE TITLE: ECONOMETRICS II

STREAM: Y4S2

DAY: THURSDAY

TIME: 11.00-1.00 P.M.

DATE: 11/12/2008

INSTRUCTIONS:

1. Answer question ONE and any other TWO questions
2. Question ONE carries 30 marks and the rest 20 marks each
3. Show all your workings clearly

PLEASE TURN OVER

- 1 (a) Given the following general linear regression model in matrix notation

$$Y = X\beta + \varepsilon$$

- (i) Derive the ordinary least squares (OLS) estimator β for the model
(10 marks)

- (ii) Explain the main properties of the parameter estimate in a (i) above
(6 marks)

- (b) An economist wanted to investigate the effects of income levels (Y) and market rate of interest (r) on savings level (s) over a twenty three (23) year period. The economist collected the relevant data and came up with the following preliminary computations of the data expressed in deviation form from their respective means:

$$\bar{S} = 12, \bar{Y} = 10, \bar{R} = 5$$

$$\Sigma s^2 = 10, \Sigma sy = 10, \Sigma sr = 8$$

$$\Sigma yr = 8, \Sigma y^2 = 12, \Sigma r^2 = 12$$

The model to be estimated is specified as;

$$S = f(y,r) = \alpha_0 + \alpha_1 Y + \alpha_2 r + e$$

- (i) Complete the estimation of the specified model using matrix algebra and interpret your results **(8 marks)**
- (ii) Compute the variance – covariance matrix of the parameter estimates **(5 marks)**
- (iii) Calculate the value of the forecasted value of savings when the income level equals to 10 units and the market rate of interest equals to 15 units. **(1 mark)**

2. An economics student has specified a demand model for a commodity he intends to estimate using 20 observations as

$$Y = \alpha X_1^{\beta_1} \cdot X_2^{\beta_2} e^u$$

Where Y = quantity demanded

X_1 = price of commodity Y

X_2 = Income level

U = The random disturbance term

The student has collected the relevant data and made the following computations in deviation form by taking the natural logarithm of each variable.

$$X'X = \begin{bmatrix} 29.16 & 30.80 \\ 30.80 & 133.80 \end{bmatrix}$$

$$X'Y = \begin{bmatrix} 3.12 \\ 26.99 \end{bmatrix}$$

$$(X'X)^{-1} = \begin{bmatrix} 0.0454 & -0.0105 \\ -0.0105 & 0.0100 \end{bmatrix}$$

$$Y'Y = 7.59$$

$$\bar{Y} = 4$$

$$\bar{X}_1 = 2.1$$

$$\bar{X}_2 = 3.2$$

- (i) Estimate the model as a log-linear regression equation and interpret your results. **(8 marks)**
- (ii) Compute the standard errors of the parameter estimates. **(8 marks)**
- (iii) Conduct tests of hypothesis that $\beta_1 = 1$ and $\beta_2 = 0$ at 5% level of significance **(4 marks)**

3. (a) Explain in detail the assumptions of classical linear regression model **(10 marks)**

- (b) Consider the following macroeconomic model
- | | |
|---|-------------------------|
| $Y_t = C_t + I_t + G_t$ | (National Income Model) |
| $C_t = a_0 + a_1 Y_t + a_2 C_{t-1} + e_1$ | (Consumption Function) |
| $I_t = b_0 + b_1 Y_{t-1} + b_2 Y_t + e_2$ | (Investment Function) |

- (i) Identify the exogenous and endogenous variables in the model **(3 marks)**
- (ii) Using order and rank condition establish the identification state of consumption and investment function. **(7 marks)**

4. (a) Define the following terms:

- | | |
|----------------------------|-----------------|
| (i) Stationary Series | (1 mark) |
| (ii) Random Walk | (1 mark) |
| (iii) Order of Integration | (1 mark) |
| (iv) Spurious regression | (1 mark) |

- (b) Explain any two methods used to test the order of integration of a time series.

(8 marks)

- (c) Explain the consequences of omitting a relevant variable in an econometric model.

(8 marks)

5. A researcher wanted to analyze the effects of advertising expenditure (X_1) and consumers income (X_2) on sales (Y) using the following data set;

X1	14	15	26	23	30	33	33	38	42	46
X2	32	33	35	36	40	41	44	44	47	48
Y	302	338	362	361	422	380	408	447	495	480

- (i) Specify the model to be estimated **(3 marks)**
(ii) Estimate the model specified in (i) above **(13 marks)**
(iii) Interpret your result in (ii) above **(4 marks)**