KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2010/2011 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF SCIENCE IN ECONOMICS AND MATHEMATICS

COURSE CODE: ECON 322

COURSE TITLE: ECONOMETRICS II

STREAM: Y3S2

DAY: WEDNESDAY

TIME: 9.00 – 11.00 A.M

DATE: 15/12/2010

INSTRUCTIONS:

- Answer question **ONE** and any other **TWO** questions.

PLEASE TURNOVER

(I) The table below contains observations on quantity demand (y) of a certain commodity its Price (X_1) and consumers' income (X_2).

n	Quantity demanded (y)	Price (X_1)	Income (X_2)
1	100	5	1,000
2	75	7	600
3	80	6	1,200
4	70	6	500
5	50	8	300
6	65	7	400
7	90	5	1,300
8	100	4	1,100
9	110	3	1,300
10	60	9	300

(i) Describe the assumptions of the multiple regression model (8 marks)

(ii) Estimate the parameters of the classical lnear regression model stated below

$$Y= b_0 + b_1X_1 + b_2X_2 +u$$ (8 marks)

(iii) Test whether the parameters are significant or not. (6 marks)

(iv) Calculate the coefficient of determination for this regression. (4 marks)

(v) Calculate the adjusted co-efficient of determination. (4 marks)

2. (a) Explain the advantages of using the dummy variable approach when testing for structural stability. (4 marks)

(b) Explain how we can use dummy variables to quantify qualitative information in a regression model . Use appropriate examples from the economic theory. (5 marks)

(c) Describe the steps involved in conducting the chow test for structural stability. Is the Chow test preferable to the dummy variables approach? Explain why or why not.

(11 marks)

3. (a) A population regression line is believed to have the form:

$$E\,(y) = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4.$$

This equation is estimated from a random sample of size n=25, for which, in terms of deviations from means,

$$(X^1X)^{-1} = \begin{bmatrix} 0.03 & 0.004 & -0.031 \\ 0.004 & 0.028 & 0.015 \\ -0.031 & 0.015 & 0.275 \end{bmatrix}$$

$\varepsilon X_{2i} y_i = 226.2$

$\varepsilon Z_{3i} y_i = 259.1$

$\varepsilon x_{4i} y_i = 48.3$

$\varepsilon yi^2 = 6733$

Required:

(i) Calculate the oLs estimates of β_2, β_3 and β_4. (6 marks)

(ii) Compute R^2 and interpret your answer (2 marks)

(b) Consider the following model:

$y = x\beta + e$

Where: $\beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \cdot \\ \cdot \\ \cdot \\ \beta_k \end{bmatrix}$ $\quad e = \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ e_n \end{bmatrix}$

β is a Kx1 column vector of the β, estimator, e is an nx1 column vector of residents.

Required:

Show that β is an unbiased estimator of β (6 marks)

(c) Consider the classical linear regression model:

$y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \text{----} + \beta_K X_{Ki} + u_i$

If the error term u_i in this equation is known to be heteroskedastic.

Required:

State briefly the consequences on the ols estimators βs (or β) . (6 marks)

4. (a) (i) With an example, explain the term simultaneous equations bias. (2 marks)

(ii)Highlight the solutions to the simultaneous equation bias. (2 marks)

(b) Given the simple keynesian model of income determination.

$C_t = \propto_0 + \propto_1 y_t + u_1$

$I_t = b_0 + b_1 y_t + b_2 y_{t-1} + u_2$

$y_t = C_t + I_t + G_t$

Required:

(i) Derive the reduced form coefficients of the behavioral equations. (6 marks)

(ii) Show that the reduced form parameters measure the total effect, direct effect and indirect effect, of a change in the exogenous variable on the endogenous variable. Use as an example the reduced form of the above investment function. (2 marks)

(c) State two conditions which must be fulfilled for an equation to be identified. (2 marks)

(d) Examine the identification state of the following models of demand and supply.

(i) $q = \propto_1 + b_1 p + C_1 y + u_1$ (demand function).

$q = \propto_2 + b_2 p + b_2 p + C_2 R + u_2$ (supply function).

(ii) $q = \propto_1 + b_1 p + C_1 y + u_1$ (demand function)

$q = \propto_2 + b_2 p + u_2$ (supply function)

(iii) $q = \propto_1 + b_1 p + C_1 y + d_1 R + u_1$ (demand function)

$q = x_2 + b_2 p + u_2$ (supply function)

(Where q is quantity, p the price, y the income, R the rainfall, u_1 and u_2 are the error terms)

(6 marks)

5. (a) Differentiate between a stationery and a non-stationary series. (4 marks)

(b) What are the characteristics of a stationery time services. (3 marks)

(c) Using relevant examples explain the implication behind the AR and MA models.

(4 marks)

(d) Discuss analytically the three stages that are involved in the Box – Jenkins process for ARIMA model selection. (9 marks)