UGANDA MARTYRS UNIVERSITY

FACULTY OF SCIENCE

DEPARTMENT OF ECONOMICS

UNIVERSITY EXAMINATIONS
SEMESTER I, 2012/13

THIRD YEAR EXAMINATIONS FOR BACHELOR OF SCIENCE
(B.ECON & GEN)

ECO 3202: ECONOMETRICS II

DATE: 12TH DECEMBER 2012

TIME: 9:00 – 12:00 NOON

Instructions:

i) Attempt FOUR questions ONLY.
ii) Clearly indicate all your working..

Question one.

(a) Explain the effect of including an irrelevant variable in the model estimation process [5*marks*]

(b) Measurement errors are often a problem in linear regressions. Using a standard linear model $Y = \beta X + \varepsilon$, describe the problems if **X** is measured with an error [5*marks*]

(c) Explain the traditional approach to model selection [7*marks*]

(d) Given a simple log-linear Earnings model. The standard errors are in parentheses;

$LGEARN = 1.35 + 0.079S$

(0.112) (0.008) $R^2 = 0.14$

Where $LGEARN$ = Natural logarithm of Earnings (in dollars)

S = Years of schooling

Give the interpretation of the slope coefficient in the model [3*marks*]

(e) Given the model $Y = \beta_0 + \beta_1 InX + u_i$. State the type of the model and give the interpretation of the slope coefficient. [5*marks*]

Question two

(a) What is meant by the term multicollinearity and how does it arise? [6*marks*]

(b) Given a multiple linear regression model $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + u_i$. Show that in the presence of multicollinearity, the parameter estimates of the independent variables will be indeterminate [6*marks*]

(c) What do you understand by the term heteroscedasticity and when does it arise (5*marks*)

(d) Outline four (4) practical consequences of heteroscedasticity in economic modelling (4*marks*)

(e) Given the following data

RSS_1 based on the first 30 observations = 55, df = 25

RSS_2 based on the second 30 observations = 140, df = 25

Carry out the Goldfeld-Quandt test of heteroscedasticity at 5% level of significance. (Use the critical value = 1.94) [4*marks*]

Question three

(a) For each model below, use differential calculus to obtain the slope expressions. Show the manipulations necessary to obtain the elasticities.

(i) $InY_i = \alpha + \beta X_i + u_i$ [5*marks*]

(ii) $Y_i = \alpha + \beta InX_i + u_i$ [5*marks*]

(b) The following model represents the household demand for Tilapia in a certain village

$TIL_t = 12.2 + 0.23INC_t - 1.33PT + 0.44PB + 3.50C_t + 1.22S_t$

(Assume that all the coefficients are statistically different from zero)

Where; TIL = Quantity of Tilapia consumed per month in Kilos

INC = Monthly household income in thousands of shillings

PT = Price per Kilo of Tilapia in thousands of shillings
PB = Price per Kilo of beef in thousands of shillings
C = 1 if household head is a catholic, 0 otherwise
S = 1 if household is located within 0.5 kilometers of Lake Victoria, 0 otherwise

(i) Identify the type of model used in the study above [2*marks*]

(ii) Interpret the parameter estimates of the dummy variables in the model [4*marks*]

(iii) Basing on the model and using the knowledge of economics, explain the consumption relationship between Tilapia and Beef [4*marks*]

(iv) Given that the monthly household income is $100,000/=$ and the price per Kilo of Tilapia is $5000/=$, compute the quantity of Tilapia consumed by a household headed by a catholic and it is within a distance of 1Km -2 Km from Lake. Victoria [5*marks*]

Question four

(a) Discuss the procedure for detecting Autocorrelation in regression models using the Durbin-Watson test and state the assumptions made when using this test (8*marks*)

(b) Explain the Cochrane – orcutt procedure for detecting autocorrelation in regression models [6*marks*]

(c) A researcher obtained the following results for a study of personal consumption expenditure for 60 consumers. (the figures in the parentheses are the standard errors).

$$Y_t = -5.74 + 0.129X_t + 0.13Y_{t-1}$$
$$(1.39)\ \ (0.29)\ \ (0.112)$$
$$R^2 = 0.942 \qquad \text{DW=2.18}$$

Where Y_t = personal consumption expenditure, X_t = Personal disposable income

Y_{t-1} = Lagged personal consumption expenditure

(i) Carry out the Durbin- Watson test to check for autocorrelation. (4*marks*)

(ii) Use Durbin h-test to check for autocorrelation. (4*marks*)

(iii) Compare and contrast your results in (b) and (c).what are your conclusion (3*marks*)

Question five

(a) Briefly explain the following concepts, giving examples where possible

(i) Differential intercept [4*marks*]

(ii) Base category [4*marks*]

(iii) ANCOVA model [4*marks*]

(b). Given a simple model $Y_i = \beta_0 + \beta_1 D_{1i} + \beta_2 D_{2i} + u_i$ where

$Y_i = Income$ of the farmer (in dollars)

$D_{1i} =$ 1 if the farmer grows coffee, 0 otherwise

$D_{2i} =$ 1 if the farmer grows cotton, 0 otherwise

Data was collected on the defined variables from farmers in Mpigi District and OLS regression produced the following results

Income |	Coef.	t	P>|t|
D_{1i} |	331.8409	2.04	0.001
D_{2i} |	111.7273	2.64	0.132
cons |	158.3864	1.98	0.045

(i). Write down the fitted model [2*marks*]

(ii) Identify the type of model used above [1*mark*]

(iii) Give a written interpretation of each of the coefficient estimates and comment on their statistical significance in the model [6*marks*]

(iv) Compute the average income of the farmer who grows both coffee and cotton [4*marks*]

Question six

Consider the following simultaneous equation model

$C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 r_t + \alpha_3 C_{t-1} + u_{1t}$ (Consumption)

$I_t = \beta_0 + \beta_1 r_t + \beta_2 Y_t + \beta_3 I_{t-1} + u_{2t}$ (Investment)

$Y_t = C_t + I_t + G_t + Z_t$ (Income identity)

Where I, Y, r, G and Z represent Investment, Income, Interest rate, Government expenditure and Net exports respectively

a) Identify the endogenous and exogenous variables in the model [4*marks*]

b) Is the model complete? Explain. [3*marks*]

c) Investigate the identification of each of the equations and hence the overall model. [8*marks*]

d) Obtain the reduced form of the model. [10*marks*]

END (GOOD LUCK)