UNIVERSITY OF ESWATINI

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

MAIN EXAMINATION

DECEMBER 2018

TITLE OF PAPER:	**ECONOMETRIC METHODS I**
COURSE CODE:	**ECO 419**
TIME ALLOWED:	**2 HOURS**
INSTRUCTIONS:	**ANSWER QUESTION ONE (1) AND ANY TWO (2) OTHER QUESTIONS** **QUESTION ONE CARRIES 40 MARKS.** **THE REST OF THE QUESTIONS CARRY 20 MARKS EACH**

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Question One (Compulsory) **[40 Marks]**

1. The following 2 structural equations represent a simple demand- supply model-:

Demand-: $Q_t = a_0 + a_1 P_t + a_2 Y_t + u_{1t}$ $a_1 < 0$ and $a_2 > 0$

Supply-: $Q_t = b_0 + b_1 P_t + u_{2t}$ $b_1 > 0$

Where Q is quantity, P is price, and Y is consumer's income. It is assumed that the market is cleared in every year so that Q_t represents both quantity bought and sold in year t.

(a) Explain why this is a simultaneous equation model? [5]

(b) Which are the endogenous and exogenous variables of the system? [3]

(c) Why would the estimation of the demand & supply functions by OLS give biased and inconsistent parameter estimates? [5]

(d) Write the reduced form equations corresponding to the structural equations. [20]

(e) Why are these reduced form equations important? [3]

(f) What do the reduced form coefficients measure in this market model? [4]

Answer Any Two Questions From The Following: **[20 Marks Each]**

Question Two

2. (a) What are the main differences between Box-Jenkins and VAR approaches to economic forecasting? [5 Marks]

(b) Consider the following equation for per capita consumption of beef in Eswatini:

$$\hat{B}_t = -330.3 + 49.1 lnY_t - 0.34 PB_t + 0.33 PRP_t - 15.4 D_t \quad (1)$$

Se=	(7.4)	(0.13)	(0.12)	(4.1)
t=	6.6	-2.6	2.7	-3.7

$R^2 = 0.70$ n= 28 DW= 0.94

Where: B_t = the annual per capita kilograms of beef consumed in Eswatini in year t

$\ln Y_t$ = the log of real per capita disposable real income in Eswatini in year t

PB_t = average annualized real wholesale price of beef in year t (in cents per kilogram)

PRP_t = average annualized real wholesale price of pork in year t (in cents per kilogram)

D_t = a dummy variable equal to 1 for years in which there was a "health scare" about the dangers of red meat, 0 otherwise

Test for serial correlation using the Durbin–Watson d test at the 5-percent level. [5 marks]

(c) Assume you applied the method of Generalized least squares to the estimation in (b) above and obtained the following-:

$$\hat{B}_t = -193.3 + 35.2lnY_t - 0.38PB_t + 0.10PRP_t - 5.7D_t \quad (2)$$

Se= (14.1) (0.10) (0.09) (3.9)

$R^2 = 0.857$ n= 28 $\hat{\rho}$= 0.82

(i) Test for serial correlation using the Durbin–Watson d test at the 5-percent level. [8 marks]

(ii) Compare Equations 1 and 2. Which do you prefer and why? [2 marks]

Question Three

3. (a) With the aid of graphs, distinguish between stationary & non-stationary time series. [15 marks]

(b) Consider the following time series model-:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \varepsilon_t$$

Outline the consequences for OLS estimates of this model if the error term ε_t has the following structure-:

$$\varepsilon_t = 0.4\varepsilon_{t-1} + u_t$$

Where u_t is a classical error term (i.e., white noise error term) [5 marks]

Question Four

4. (a) The following results are a computer output for testing for unit roots on the logarithm of disposable personal income (LGDPI).

Augmented Dickey-Fuller Unit Root Test on LGDPI

Null Hypothesis: LGDPI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.322310	0.4154
Test critical values 1% level	-4.186481	
5% level	-3.518090	
10% level	-3.189732	

*MacKinnon (1996) one-sided p-values.

Would you say LGDPI is stationary at levels or not? Use the 5% level of significance to support your answer. [5]

(b) (i) Describe the concept of cointegration. [3]

(ii) Discuss 3 problems associated with differencing time series. [6]

(iii) State 3 benefits of using an error correction model? [6]