MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF BUSINESS AND ECONOMICS

FIRST SEMESTER EXAMINATION FOR THE

MASTER OF ARTS IN ECONOMICS

ECO 801: ECONOMIC DATA ANALYSIS AND COMPUTER APPLICATIONS

DATE:19/12/2022   **TIME: 9:00 – 12:00P.M**

INSTRUCTIONS:

   (i)   Answer question ONE and any other TWO questions

   (ii)   Show your workings clearly

QUESTION ONE (24 MARKS)

a)   Explain the types of data you are likely to interact with while doing an economic research

(6 marks)

b)   A student was interested in studying the effect of human capital on economic performance of a certain country. The student specified the following regression model

$$gdp_t = \beta_0 + \beta_1 hcaptal_t + \beta_2 phycaptal_t + \beta_1 tradop_t + \mu_t$$

Where **gdp** represents GDP, **hcaptal** represents human capital, represents physical capital formation, **tradop** represents trade openness.

   (i)   From the regression model, which type of data did the student use in the analysis? How do you know?   (3 marks)

   (ii)   The dependent variable was economic performance measured by Gross Domestic Product (GDP) and independent variable was human capital proxied by average years of secondary school. The researcher introduced more variables namely physical capital,

trade openness as shown in the model. What is the name given to these variables? What is their role in the estimation? (5 marks)

(iii) In carrying out estimation using stata, the student obtained the following summary statistics

Table 1: Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Natural log of GDP	42	13.57	1.73	10.71	16.31
Natural log of secondary school years of Duration	42	1.82	0.064	1.79	1.95
Natural logarithm of physical capital Formation	42	2.995	0.149	2.71	3.24
Natural logarithm of Trade openness	42	-0.671	0.226	-1.301	-0.317

i. Explain the role of statistics in the table above to the researcher. (3 marks)
ii. Interpret the descriptive statistics for natural log of secondary school years of duration (3 marks)

(a) A researcher sought to estimate determinants of participation in labour force. The dependent variable was binary and after carrying some tests, logit model was chosen. Explain what is likely to have informed the researcher to choose logit model over probit model. (4 marks)

QUESTION (12 marks)

a) What are the shortcomings of Linear Probability model that make Logit and Probit models suitable? (4 marks)
b) A researcher estimated the determinants of female labour force participation using logit model. The following results were obtained

Dependent Variable: Dummy variable taking 1 if a female is employed, 0 otherwise.

VARIABLES	Marginal Effects
Marital Status	0.843***
	(0.070)
Education	0.254***
	(0.069)
Household head	0.710***
	(0.080)
Age	0.019***
	(0.002)
Constant	-3.731***
	(0.155)
Observations	15,154

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Where marital status is 1 if the female is married, 0 otherwise; education is years of female schooling, household head is 1 if the female is household head 0 otherwise, disability is 1 if female is disabled, 0 otherwise, age is years when the female is productive (15-60 years).

(i) Do the sign of coefficient of each explanatory variable conform to economic theory? Explain   (4 marks)
(ii) Interpret the marginal effects results   (4 marks)

QUESTION THREE (12 MARKS)

A researcher was interested in estimating the effect of Interest rate spread on profitability of 11 commercial banks listed on Nairobi stock exchange. The profitability of commercial banks was measured by Return on Assets (ROA). The variables considered include lnirs representing natural log of interest rate spread, lnsize representing bank size and lnwc is natural log of working capital.

Dependent Variable: ROA

VARIABLES	Pooled OLS	Fixed Effects
lnirs	0.032***	0.010***
	(0.007)	(0.002)
lnsize	0.084***	0.075***
	(0.002)	(0.005)
lnwc	0.072***	0.019***
	(0.007)	(0.003)
Constant	0.213***	0.301***
	(0.011)	(0.015)
Observations	220	220
Number of Bank	11	11
Durbin-Watson Stat	0.43	0.70

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

(a) The researcher estimated the model by adopting pooled OLS. Though the results are good in terms of significance of the coefficient, the research proceeded to estimate and report the Fixed Effects (FE) model. What may have caused this shift from pooled OLS to FE?

(3 marks)

(b) Interpret the FE results   (6 marks)

(c) Differentiate the difference Augmented Dickey Fuller and Phillips-Perron test.

(3 marks)

QUESTION FOUR (12 MARKS)

(a) A student performed a unit root test on two variables using Stata and obtained the following results.

i. Show the stationarity status of both variables using both the ADF and PP unit root test

Augmented Dickey-Fuller				Phillips-Peron	
		Statistic	Critical value (5 percent)	Statistic	Critical value (5 percent)
Natural log of GDP	Level	-0.525	-2.955	-0.724	-2.955
	1st difference	-11.724	-2.958	-12.938	-2.958
Natural log of secondary school enrolment	Level	1.189	-2.955	1.411	-2.955
	1st difference	-6.398	-2.958	-6.398	-2.958

` (4 marks)

ii. From your answer in (i) explain the next step the researcher will take (4 marks)

(b) In estimating the effect of price and income on demand for a certain product, a researcher obtains the correlation between price and income. The correlation results are shown in the Table below

Variable	Price	income
Price	1.00	
Income	0.60	1.00

i. What is the role of a correlation matrix? (2 marks)
ii. Interpret the correlation results (2 marks)

QUESTION FIVE (12 MARKS)

a) A researcher was interested in estimating the effect of sex on one's wage. The specified model is as follows.

$$wage = \beta_1 + \beta_2 EDUC + \beta_3 FEMALE + \mu$$

Where wage is hourly wage in US dollars, EDUC is years of education of the worker, FEMALE is a dummy variable that assumes the value 1 for observations on females and 0 for observations on non-females and μ is a random error term.

Data from 160 individuals was obtained and estimation performed using Stata. The estimated equation is as follows:

$$wage = -2.841 + 2.456 EDUC - 5.021 FEMALE$$

Interpret the estimated coefficients on EDUC and FEMALE (4 marks)

b) A modeler seeks to investigate the effect of financial development on economic growth of a certain country. The specified model is as shown below.

$$gdp_t = \beta_0 + \beta_1 Findev_t + \beta_1 fdi_t + \mu_t$$

Where gdp is Gross Domestic product, $Findev$ is financial development measured by domestic credit to private sector, fdi is Foreign Direct Investment and is the error term.

If the modeler on using Johansen Cointegration test finds that the variables have long run relationship which estimation technique will you recommend to be used? Show the model.

(4 marks)

c) Write short notes on Autoregressive Distributed Lag (ARDL) and Vector Autoregressive (VAR) models. (4 marks)