



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR  
BACHELOR OF SCIENCE IN STATISTICS AND PROGRAMMING

SST 405: ECONOMETRICS III

DATE: 10/12/2021

TIME: 8.30 - 10.30 AM

## INSTRUCTIONS

- Answer question ONE and any other TWO questions. Question one carries 30 marks and the other questions carry 20 marks each.
- Do not write on the question paper

## QUESTION ONE (30 MARKS)

- a) You are given the following Stata output (Table 1) of OLS model on the determinants of enterprise performance in Kenya.

Table 1: Determinants of enterprise performance

Enterprise Performance (Y)	Coef.	Std. Err.	t	P>t
Power Outage	-.4054	0.0899	-4.51	0.000
Capital	-.470994	3.794482	-0.12	0.901
Labor	-.00549	.0035942	-1.53	0.128
Firm Age	-.00545	.0185829	-0.29	0.770
Energy	.0066908	.0012215	5.48	0.000
Total Factor Productivity(A)	.0049399	.000048	101.51	0.000
_cons	4.553383	1.503646	3.03	0.003
Obs	1,001			
Adj R-squared	0.9856			
Prob > F	0.0000			

**Required:**

- i) Comment on the fitness of the model (2 marks)
  - ii) Explain  $R^2$  (2 marks)
  - iii) Interpret these findings with reference to p-values and the sign of coefficients. (20 marks)
- b) Distinguish between deterministic and stochastic functions using equations. (6 marks)

**QUESTION TWO (20 MARKS)**

You are given the following 10 values of  $Y$  and  $X$  depicting the relationship between  $Y$  (job Performance) a dependent variable and  $X$  (education level) an independent variable.

Y	40	80	90	85	70	60	95	100	50	70
X	80	100	150	110	90	40	120	150	30	70

**Required:**

- a) Estimate:  $\hat{\alpha}_0$  and  $\hat{\alpha}_1$  (6 marks)
- b) Express the relationship between  $\hat{y}$  and  $x$ , and interpret the results. (4 marks)
- c) Compute the  $r^2$  and interpret the results. (4 marks)
- d) Explain any two advantages and two disadvantages of panel data. (6 marks)

**QUESTION THREE (20 MARKS)**

- a) Write short notes on the following:
  - i. Cross-sectional study (4 marks)
  - ii. Time series study (4 marks)
  - iii. What is censoring in data analysis (Tobit model) (4 marks)
- b) Identify any four sources of Multicollinearity (4 marks)
- c) Explain the role of an error term in econometric models (4 marks)

**QUESTION FOUR (20 MARKS)**

- a) State and describe the four main steps involved in empirical econometric analysis. (8 marks)

b) Using hypothesis, interpret the results of the following diagnostic test outputs:

i) Multicollinearity test (Variable Inflation Factors) (2 marks)

Variable	VIF	1/VIF
$X_1$	5.83	0.171490
$X_2$	5.83	0.171648
$X_3$	1.47	0.679920
$X_4$	1.10	0.908289
Mean VIF	3.85	

ii) Shapiro-Wilk Normality Test (2 marks)

Variable	Obs	W	V	Z	Prob>z
r	320	0.85641	32.395	8.189	0.00000

c) Given the following table, compute t statistics for  $X_1$  - $X_4$  and interpret the results..

(8 marks)

Y	Coef.	Std. Err.	t
$X_1$	.0167962	.0058687	-
$X_2$	.8668781	1.316693	-
$X_3$	1.325903	.823754	-
$X_4$	.5452621	.2854932	-
_cons	-3.500225	.9709277	-

### QUESTION FIVE (20 MARKS)

- Differentiate between stationary and non-stationary time series, normal and non-normal distributions. (6 marks)
- Distinguish between OLS and probit models (4 marks)
- What is meant by data cleaning in research? (4 marks)
- How is the challenge of heteroscedasticity corrected in OLS model? (2 marks)
- Explain the process of data coding using SPSS software. (4 marks)