



# MACHAKOS UNIVERSITY

University Examinations for 2018/2019 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:

TIME:

## INSTRUCTIONS

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

## QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the term non-linear model using examples. (4 marks)
- b) You are given the following Stata output (Table 1) of probit model on the determinants of technology adoption in agriculture for Uganda and Tanzania.

**Table 1: Determinants of technology adoption (improved seeds) in Tanzania and Uganda**

Variables	Adoption decision (o/1)	Adoption decision (o/1)	Adoption decision (o/1)	Adoption decision (o/1)
	Improved Seeds in TZ	Improved Seeds in TZ	Improved Seeds in UG	Improved Seeds in UG
	Probit	FE	Probit	FE
Age of household head	-.0027(0 .0033)	.0003(0,0003)	-.0179(0 .002) ***	-.0002(0.000)
Age of household head square	-.000012(0 .00004)	-.0009(0.003) **	.00019(0.00003) ***	-0.000(0.000)
Education of the head	-.035(0 .0100) ***	-.004(0 .001) ***	----	.0012(0. 0006)***
Family size in AEU	.0246(0 .0091) **	-.000(0.000)	.0452(0 .007) ***	.004(0.003)
Gender of household head	.0045(0 .0383)	-.001(0.0033)	-.326(0 .024) ***	

Farm size per AEU	2.270(0 .308) ***	.312(0 .021) ***	.283(0 .016) ***	.040(0.0016) ***
Farm equipment per AEU	.475(0 .0393) ***	.0013(0 .001)	-0.000(0.000)	-0.000(0.000)
Distance to the market	.0151(0 .0023) ***	.005(0.0003) ***	.0054 (0 .0013) ***	0.000(0.000)
Contact with Government extension agents	.727(0 .149) ***	-.016(.002) ***	.200(0 .052) ***	.028(0.007) ***
Contact with other extension agents	.013(0 .0039) ***	.007(0.0003) ***	.277(0 .052) ***	.0063(0.008)
Practice of soil and water conservation	.952(0 .040) ***	.242(0.002)	.103 (0 .0052) ***	.115(0.004) ***
Number of improved seed varieties	0.00(0.00)	.069(0.010) ***	.728(0 .034) ***	.263(0.005) ***
Access to credit	-.187(0 .090) **	-.046(0.007) ***	.176(0 .014) ***	.0192(0.0016) ***
Access to off-farm activities	-.029(0 .028)	.011(0 .003) ***	-.351(0 .025) ***	-.009(0.006)
Access to media (TV viewing)	---		.195(0.105)	.046(0.01) ***
Constant	-1.536(0 .0954)	.235(0.012) ***	-6.346(82.91)	.042(0.023) *
Number of obs	36,588	36,588	43,714	43,714
Log likelihood	-2653.8803		-7127.72	
LR chi2(21)	9408.66		7947.89	
Prob > chi2	0.000	0.000	0.000	0.000
Pseudo R2	0.6393	0.5984	0.358	0.3286

**Note Statistical Significance at 99 (\*\*\*) , 95% (\*\*) and 90% (\*) confidence levels. The number in brackets show standard errors.**

**Required:** Interpret these findings while highlighting similarities and differences regarding determinants of technology adoption in the two countries. (20 marks)

- c) Give justification as to why shadow pricing practices should be adopted in project planning and implementation with reference to Kenya. (6 marks)

### QUESTION TWO (20 MARKS)

- a) Explain Philips curve (4 marks)
- b) Suppose an economy has the following Philip's curve:  $\pi_t = \pi_{t-1} - 0.5(\mu - 0.06)$ , where;  $\pi_t$  is the inflation rate at time  $t$ , and  $\mu$  is the rate of unemployment.
- i) What is the natural rate of unemployment? (4 marks)
- ii) How much of cyclical unemployment is necessary to reduce inflation by 5 % points? (4 marks)
- iii) Distinguish between Classical and Keynesian school of thoughts on unemployment. (8 marks)

### QUESTION THREE (20 MARKS)

A simple economy with two sectors has the following Leontief input-output matrix:

$$A = \begin{pmatrix} 0.6 & 0.3 \\ 0.1 & 0.8 \end{pmatrix}$$

If consumers demand for the first sector is \$8M and for the second sector is \$ 2 M.

- a) Find the gross output of the two sectors (10 marks)
- b) Derive comparative static matrix and indicate what it represents (4 marks)
- c) d) Discuss any two (2) reasons behind rational expectation hypothesis. (6 marks)

### QUESTION FOUR (20 MARKS)

- a) What is the cost of unexpected inflation? (8 marks)
- b) Fourth year students of statistics and programming of Machakos University estimated factors explaining student performance at the University using OLS Model (Linear regression). The output of their estimation is as follows:

$$Y = -3.5 + 0.016CA + .86CRC + 0.08LT + 0.02HSG + 27.95LSR$$

Where; Y=Grade in unit X(performance), CA=class attendance, CRC=class room characteristics, LT=Lecturers title, HSP=high school grade and LSR=Lecturer student ratio.

Use this information to questions (i), (ii) and (iii).

- i) Explain the effect and magnitude of explanatory variables on Y. (6 marks)
- ii) Interpret the value, -3.5 in the equation. (2 marks)
- iii) Discuss any two challenges which could have biased the estimates in the equation. (4 marks)

### QUESTION FIVE (20 MARKS)

- a) Using well labelled diagrams, discuss the effect of minimum wages on unemployment. (10 marks)
- b) Critically analyse Harrod-Domar Model while giving its assumptions. (10 marks)