LAIKIPIA UNIVERSITY

UNIVERSITY EXAMINATIONS

2ND SEMESTER 2023/2024 ACADEMIC YEAR

THIRD YEAR EXAMINATION FOR THE DEGREE BACHELOR OF SCIENCE IN ECONOMICS AND STATISTICS

ECON .321: ECONOMETRICS II

STREAM: ***TIME: 2 HRS***

DAY: THURSDAY [11.30-1.30 P.M] ***DATE: 11/04/2024***

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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Instructions

1. Answer question **ONE,** and any other **TWO** questions.
2. Question **ONE** is compulsory and carries **30** marks
3. All other questions carry **20** marks each.
4. Clearly show all your calculations.
5. Ensure your handwriting is neat and your sentences are grammatically correct.

QUESTION ONE

a) "Pure heteroskedasticity does not lead to biasedness in coefficient estimates". True or false? Justify. **(3 marks)**

b) Distinguish between a linear and a nonlinear model. **(3 marks)**

c) "Multicollinearity is not a modelling problem but a data problem". True or false. Justify. **(2 marks)**

d) Explain **THREE** econometric consequences of multicollinearity. **(6 marks)**

e) Results for Breusch-Godfrey Serial Correlation LM Test for some hypothetical OLS model estimates were reported as,

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.216916	Prob. F(2,4)	0.8139
Obs*R-squared	3.033226	Prob. Chi-Square(2)	0.2195

Required:

i) Is classical linear model assumption of serially uncorrelated residuals violated or not? Justify. **(3 marks)**

ii) The Durbin-Watson test reported a statistic of 1.914165. Does it support the LM test results or not? Justify. **(2 marks)**

f) Results for Breusch-Pagan-Godfrey Test for some hypothetical OLS model estimates were reported as,

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.386216	Prob. F(24,6)	0.9555
Obs*R-squared	18.81859	Prob. Chi-Square(24)	0.7616
Scaled explained SS	0.761308	Prob. Chi-Square(24)	1.0000

Is classical linear model assumption of homoscedasticity violated or not? Justify. **(3 marks)**

g) A political scientist studying voter turnout during a general election in country X used the probit model. The author postulated a linear relationship between an index of voter turnout **I** and certain voting attributes based on government policies on a number of issues. The postulated model is,

$$I = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \cdots \ldots \ldots + \alpha_k \alpha_k + \xi$$

Variables	Coefficient	Standard Error
Education	+0.154	0.061
Education squared	+0.013	0.004
Employment	-0.131	0.053
Taxation policies	-0.104	0.045
Policy on Multiparty	-0.187	0.055
Women's Rights	+0.111	0.055
n=1750	R^2 =0.510	

Required:

i) Explain why education squared is included in the model? **(1 mark)**
ii) Interpret individual parameter the results. **(6 marks)**
iii) Interpret the overall model performance. **(1 mark)**

QUESTION TWO

a) Suppose a researcher estimated the following regression of output Y on labour L and capita K based on 20 observations.

$$\widehat{logY_t} = 0.980 + 0.41 logL_t - 0.28 logK_t$$

t = (1.689) (1.41) (-1.00) R^2 = 0.86

Required:

i) What is the possible econometric problem with these results? Give reasons for your answer. **(5 Marks)**
ii) Suggest five remedies for the problem in 2(i). **(5 marks)**

b) Suppose you are given the following data on income (X), number of families at income X (N_1) and number of families owning a house (n_1).

X	N_1	n_1
5	30	6
8	40	10
11	50	14
13	75	30
16	58	28
19	38	22
21	20	17

Required:
Estimate the data using the Logit model. **(10 Marks)**

QUESTION THREE

a) Explain **FOUR** sources of autocorrelation in the data. **(8 marks)**
b) Explain **TWO** consequences of autocorrelation in the data. **(4 marks)**
c) Derive the maximum likelihood given the following two variable regression model,

$$Y_i = \beta_0 + \beta_1 X_i + \mu.$$ **(8 Marks)**

QUESTION FOUR

a) Explain **THREE** sources of heteroscedasticity in data. **(6 Marks)**
b) Explain **THREE** methods of detecting for autocorrelation in data. **(6 Marks)**
c) Discuss **FOUR** methods of detecting the presence of severe multicollinearity in the data. **(8 marks)**

QUESTION FIVE

a) Explain **THREE** consequences of autocorrelation in data. **(6 Marks)**
b) You are given the following hypothetical data on home ownership Y(1= owns a house, 0 = does not own a house) and X is number of years worked by employees.

Employee	Y	X
1	0	8
2	1	16
3	1	18
4	0	11

5	0	12
6	1	19
7	1	20
8	0	13
9	0	9
10	0	10
11	1	17
12	1	18
13	0	14
14	1	20
15	0	6
16	1	19
17	1	16
18	0	10
19	0	8
20	1	18

Required:

i. Estimate the linear probability Model. **(10 Marks)**

ii. Interpret the results obtained in part (i). **(4 Marks)**