



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 ECONOMICS & STATISTICS

BACHELOR OF ECONOMICS AND FINANCE

BACHELOR OF ECONOMICS

EES 404: ECONOMETRIC MODELING AND METHODS

DATE: 9/12/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS:

- (i) Answer Question **ONE** and any other **TWO** questions
- (ii) Show all your workings clearly

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain two reasons why econometric modeling is necessary in explaining and predicting economic phenomena. (4 marks)
- b) Distinguish between fixed and random effects models. (4 marks)
- c) A real estate company is interested in determining the factors that influence students' choices for off-campus hostels in Machakos University. As a researcher you are consulted to conduct a study and estimate an appropriate econometric model.
 - i) Explain the steps that you would follow to develop this econometric model using a suitable economic theory (8 marks)
 - ii) Explain four ways that you can use to assess the validity of the econometric model. (4 marks)
- d) A researcher sought to determine the patterns of households' expenditures. He sampled eight families and recorded their data on monthly incomes and expenditures in thousands of Kenya Shillings as follows.

Households	A	B	C	D	E	F	G	H
Incomes	10	18	17	15	13	19	16	12
Expenditures	1	7	6	5	3	8	5	2

- i) Estimate and interpret an expenditure model of the household. (3 marks)
- ii) Calculate the residual expenditure for a monthly income of KShs 15,000 (1 mark)
- iii) Evaluate the statistical significance of the model on the basis of the following.
 - (i) Coefficient of determination. (2 marks)
 - (ii) Standard error test (4 marks)

QUESTION TWO (20 MARKS)

Suppose as an economics student you have been contracted to conduct a market survey to determine factors influencing students' purchases for different brands of mobile phones. You are required to develop an econometric model to estimate the purchases of different brands.

- a) Explain five features that the model should have. (5 marks)
- b) Explain the economic theory that you would use to base your model. Describe one dependent and four independent variables you would consider for the model. (7 marks)
- c) Explain five key components of your model. (8 marks)

QUESTION THREE (20 MARKS)

- a) Briefly explain four factors that determine the choice of regression analysis technique for data analysis. Give appropriate examples in each case. (8 marks)
- b) Explain how you would measure the relationship between earnings and level of education among employees in a certain sector. (6 marks)
- c) A marketing firm wanted to confirm whether sales agents in different regions made any statistically different sales of a particular product. The research department of the firm sampled ten sales agents from four regions and observed their monthly mean sales. Anova test was conducted on SPSS and the following results were obtained.

Sales

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	79.821	4	19.955	0.002	.0008
Within Groups	4287.619	95	45.133		
Total	4367.440	99			

- i) State the null and alternative hypothesis for the test. (2 marks)
- ii) Interpret the above Anova results. (4 marks)

QUESTION FOUR (20 MARKS)

- a) Econometric models can be classified into four main categories. Discuss. (8 marks)
- b) The director of education for Machakos County wanted to analyze the 2020 KCSE performance for all the secondary schools in the County.
 - i) Discuss how the relationship between performance of certain subjects and gender of the candidates can be measured. (4 marks)
 - ii) Explain how it can be established whether the difference in performance among various schools is statistically significant. (4 marks)
 - iii) Explain how the unique variations among schools that determine their performance but are not explicitly captured by independent variables can be measured using an appropriate model. (4 marks)

QUESTION FIVE (20 MARKS)

- a) Explain three merits and three demerits of simulation models. (6 marks)
- b) A research firm conducted a study to determine the influence of several variables on corruption of different countries. The variables were expressed as follows: poverty index (poverty), gross domestic product (gdp), external debt, inflation, lending interest rate (interest_rate) and political instability (instability). Dummy variables (d_i) for each country were also generated. A regression analysis was conducted using STATA and the following results were obtained.

reg corruption poverty gdp external debt inflation interest rate instability d1 d2 d3 d4 d5 d6 d7

Source	SS	df	MS			
Model	292791.627	13	22522.4328	Number of obs = 120		
Residual	9795.29008	106	92.4083969	F(13, 106) = 243.73		
Total	302586.917	119	2542.7472	Prob > F = 0.0000		
				R-squared = 0.9676		
				Adj R-squared = 0.9637		
				Root MSE = 9.6129		

corruption	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
poverty	.9938312	.4878725	2.04	0.044	.0265766	1.961086
gdp	.2508318	.2529471	0.99	0.324	-.2506603	.752324
externaldebt	-.009376	.0281441	-0.33	0.740	-.0651745	.0464225
inflation	.622916	.1320872	4.72	0.000	.3610403	.8847916
interest_r~e	.3155497	.228477	1.38	0.170	-.1374282	.7685275
instability	1.164066	.1817272	6.41	0.000	.803774	1.524358
d1	5.049172	4.45445	1.13	0.260	-3.782209	13.88055
d2	18.00946	3.938966	4.57	0.000	10.20008	25.81885
d3	21.72966	4.339904	5.01	0.000	13.12538	30.33394
d4	73.42814	4.413486	16.64	0.000	64.67798	82.17831
d5	-1.155234	3.740895	-0.31	0.758	-8.571922	6.261454
d6	117.2776	5.157596	22.74	0.000	107.0522	127.503
d7	6.269812	3.566737	1.76	0.082	-.8015908	13.34121
_cons	22.59928	5.449104	4.15	0.000	11.7959	33.40265

- i) Evaluate the predictive power of the model. (1 mark)
- ii) Discuss the statistical significance of the estimated coefficients of the model (6 marks)
- iii) Discuss the impact of the dummy variables. (5 marks)
- iv) Give two policy recommendations on the basis of the findings. (2 marks)