

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THARAKA UNIVERSITY COLLEGE

EXAMINATION FOR THE AWARD OF
MASTERS OF SCIENCE IN ECONOMICS

MSEC 832: ECONOMETRICS

STREAMS: MSEC

TIME: 2 HOURS

DAY/DATE: MONDAY 05/08/2019

2.30 AM – 4.30 PM

INSTRUCTIONS:**Answer Question One and any other Two Questions****Question One**

- (a) Econometrics is the application of mathematical statistics to economic data to lend empirical support to models. Discuss in details the methodology of econometrics in its traditional economic theory. [10 marks]
- (b) Given the following function $y_i = \alpha_0 + \alpha_1 x_i + e_i$ derive the ordinary least squares estimators of $\hat{\alpha}_0$ and $\hat{\alpha}_1$. [10 marks]
- (c) Regression analysis is a set of statistical processes for estimating the relationships among variables. Discuss five of its assumptions. [5 marks]
- (d) Distinguish between null hypothesis and alternative giving relevant examples. [5 marks]

Question Two

- (a) Given the following $y_i = \alpha_0 + \alpha_1 x_i + e_i$
Using the data given below:

n	1	2	3	4	5	6	7	8
y_i	12	14	10	13	17	12	11	15
x_i	5	11	7	8	11	7	6	9

Required:

- (i) Calculate the intercept and slope of the above regression equation. [3 marks]
- (ii) Estimate the regression equation of Y on X. [4 marks]
- (ii) Compute the magnitude and direction of change in y arising from a 10% decrease in parameter α_0 [1 mark]
- (iii) Compute the coefficient of determination (R^2). [2 marks]
- (b) You have been assigned as a consultant hired to evaluate fertilizer input subsidy programme in Tharaka Nithi County. The following data has been provided. The output of wheat from the county fertilizer and insecticides inputs in tonnes from the subsidy programme.

Year	1	2	3	4	5	6	7	8	9	10
Output of wheat	40	44	46	48	52	58	60	68	74	80
Fertilizer inputs	6	10	12	14	16	18	22	24	26	32
Insecticide inputs	4	4	5	7	9	12	14	20	21	24

Required:

- (i) Estimate the relationship between wheat output and film output subsidy provided by the programme. [4 marks]
- (ii) Test the statistical significance of parameter estimates. [3 marks]
- (iii) Provide a policy direction for the county government of Meru on whether they have upscale or downscale a fertilizer subsidy programme provided to wheat farmers. [3 marks]

Question Three

- (a) Discuss the six assumptions of classical linear regression model (CLRM) [6 marks]
- (b) Explain the procedure of general hypothesis testing. [4 marks]
- (c) Econometrics is the quantitative analysis of the actual economic phenomena based on concurrent development of theory and observation related by appropriate methods of inference. Explain the scope of econometrics. [10 marks]

Question Four

- (a) In a study of the relationship between income in thousands of dollars and the amount of charitable contributions in thousands of dollars researcher specified the following regression model.

Y	4	1	3	6	7	5	3	4	5	2
X	50	20	30	80	60	60	25	55	70	25

Required:

- (i) Determine the least square estimate of $\hat{\beta}_0$ and $\hat{\beta}_1$ [2 marks]
- (ii) Predict the amount of charitable contributions for a person whose income is 100,000 dollars. [2 marks]
- (iii) Estimate the variance of the errors (δ^2) [2 marks]
- (iv) Test the hypothesis that $\hat{\beta}_0$ and $\hat{\beta}_1$ is significantly different from zero. [2 marks]
- (v) Calculate the coefficient of determination and interpret your results. [2 marks]
- (b) Given the following estimated model

$$\hat{Y} = 3.2 + 2.2x_1 + 0.8x_2$$

$$\text{S.E (1.2) (1.9) (0.2)}$$

$$R^2 = 0.65 \quad n = 2$$

Required:

- (i) Determine the goodness of fit of the model. [2 marks]
- (ii) Test the statistical significances of the co-efficient of x_1 and x_2 [3 marks]
- (iii) Write short notes on Spearman's rank correlation test. [5 marks]
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