



TECHNICAL UNIVERSITY OF MOMBASA

UNIVERSITY EXAMINATIONS 2016/2017

DEGREE OF DOCTOR OF PHOLOSOPHY IN BUSINESS ADMINISTRATION
BMS 6103: ECONOMETRICS

SET A

DATE: DECMBER 2016

DURATION: 2 HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER THREE

QUESTION ONE (a)

a) What is the meaning of the following terms / acronyms

- (i) Econometrics
- (ii) BLUE
- (iii) Causation
- (iv) Homoscedasticity
- (v) Autocorrelation

(9 marks)

b) Describe the methodology of econometrics

(16 marks)

QUESTION TWO (a)

(a) Define z and t-distribution. What is their difference? When do you use z or t-Distribution

(10 marks)

(b) Suppose you estimate the linear model $y_i = 93 + 0.68X$ sample of 20 farmers using OLS and obtain $\hat{\beta}_1 = 64.2$ and $se(\hat{\beta}_1) = 0.25$. Given $n=18$ and level of significance to be 5%, determine significance of the parameters using:-

- i) Standard Error test
- ii) t-test

(15 marks)

QUESTION THREE (a)

i) Are the following models linear regression models? Why or why not?

- i. $Y_i = e^{\beta_1 + \beta_2 X_i + \bar{u}_i}$
- ii. $Y_i = 1 / (1 + e^{\beta_1 + \beta_2 X_i + \bar{u}_i})$
- iii. $\ln Y_i = \beta_1 + \beta_2 \left(\frac{1}{X_i} \right) + u_i$
- iv. $Y_i = \beta_1 + (0.75 - \beta_1) e^{-\beta_2 (X_i - 2)} + u$
- v. $Y_i = \beta_1 + \beta_2^3 X_i + u_i$

(10 marks)

b.

Consider the following formulations of the two-variable PRF:

Model I: $Y_i = \beta_1 + \beta_2 X_i + u_i$

Model II: $Y_i = \alpha_1 + \alpha_2(X_i - \bar{X}) + u_i$

- i. Find the estimators of β_1 and α_1 . Are they identical? Are their variances identical?
- ii. Find the estimators of β_2 and α_2 . Are they identical? Are their variances identical?
- iii. What is the advantage, if any, of model II over model I?

(15 marks)

QUESTION FOUR

You are given the data below. Fit the following model to these data and obtain the usual regression statistics and interpret the results:

$$\frac{100}{100 - Y_i} = \beta_1 + \beta_2 \left(\frac{1}{X_i} \right)$$

Y_i	86	79	76	69	65	62	52	51	51	48
X_i	3	7	12	17	25	35	45	55	70	120

(25 marks)

QUESTION FIVE

Explain the differences between heteroscedasticity and autocorrelation. How can these problems be detected? Explain in general, the procedure for dealing with each. .

(25 marks)

QUESTION SIX

Consider the following regression output:

$$\hat{Y}_i = 0.2033 + 0.6560X_i$$

$$se = (0.0976) (0.1961)$$

$$r^2 = 0.397 \text{ RSS} = 0.0544 \text{ ESS} = 0.0358$$

where Y = labor force participation rate (LFPR) of women in 2004 and X = LFPR of women in 2000. The regression results were obtained from a sample of 19 cities in a certain Country.

- a. How do you interpret this regression?
- b. Test the hypothesis: $H_0: \beta_2 = 1$ against $H_1: \beta_2 > 1$. Which test do you use? And why? What are the underlying assumptions of the test(s) you use?
- c. Suppose that the LFPR in 2000 was 0.58 (or 58 percent). On the basis of the regression results given above, what is the mean LFPR in 2004? Establish a 95% confidence interval for the mean prediction.
- d. How would you test the hypothesis that the error term in the population regression is normally distribute? Show the necessary calculations.

(25 marks)