



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019

SECOND SEMESTER EXAMINATION FOR DEGREE OF MASTER OF ECONOMICS

EES 800: ECONOMETRICS I

DATE: Tuesday 26th March 2019

TIME: 9.00a.m -12.00p.m

INSTRUCTIONS: ANSWER ALL Four (4) QUESTIONS

QUESTION (1) [15 marks]

- (a) Given the following model in equation (1.0) which is in matrix form.

$$y = X\beta + u \quad (1.0)$$

What are the classical linear regression model assumptions in order to estimate the unknown parameters in (1.0) using OLS? (5 marks)

- (b) Using the matrix approach show that the OLS estimators are BLUE. (5 marks)

- (c) Given the following results:

$$1. \quad \hat{Y} = 30 + 0.957X_1 - 0.06789X_2 + 2.14X_3$$

(4.77) (1.467) (-0.678)

$$R^2 = 0.96 \quad F = 74 \quad n = 25$$

$$2. \quad \hat{X}_1 = -0.579 + 0.0896X_2 + 1.23X_3$$

(-0.145) (14.78) (3.5)

$$R^2 = 0.92 \quad F = 89 \quad n = 25$$

$$3. \quad \hat{X}_2 = 1.34 + 0.576X_1 + 1.45X_3$$

(1.36) (1.5) (1.34)

$$R^2 = 0.97 \quad F = 120 \quad n = 25$$

$$4. \quad \hat{X}_3 = 0.48 + 1.34X_1 + 3.4X_2$$

$$(0.23) \quad (2.9) \quad (1.4)$$

$$R^2 = 0.86 \quad F = 167 \quad n = 25$$

In brackets are the t-ratios. Using the t-ratios, R-squares and VIFs, show whether or not multicollinearity is present. **(5 marks)**

QUESTION (2) [15 marks]

- (a) The following equation (2.0) was estimated using data for consumption of maize flour (Y), price of maize flour (X_1) and income of the consumers (X_2).

$$\hat{Y} = 3.45 - 2.24X_1 + 1.96X_2 \quad (2.0)$$

$$(1.35) \quad (0.56) \quad (0.25) \quad \text{s.e.}$$

$$R^2 = 0.89 \quad F = 160 \quad n = 45$$

Using the same dataset, the equation was estimated in double log form and the following are the results given in equation (2.1).

$$\ln \hat{Y} = 2.45 - 1.43 \ln X_1 + 1.29 \ln X_2 \quad (2.1)$$

$$(1.25) \quad (0.48) \quad (0.79) \quad \text{s.e.}$$

$$R^2 = 0.76 \quad F = 140 \quad n = 45$$

Interpret all results from the two equations and provide the differences between the estimated parameters. Are the parameters statistically significant? Support your answer.

(7 marks)

- (b) The results of the Breusch –Pagan test are displayed as follows:

Breusch –Pagan for Heteroskedasticity

H_0 : Constant Variance

$$\text{Chi2}(1) = 4.39$$

Prob> chi2 = 0.0578

What does the results above imply for the regression coefficients, standard errors, hypothesis testing and confidence intervals? (2 marks)

(c) What is heteroskedasticity? Explain and illustrate its consequences to OLS estimations. (6 marks)

QUESTION (3) [15 marks]

(a) Given the following information

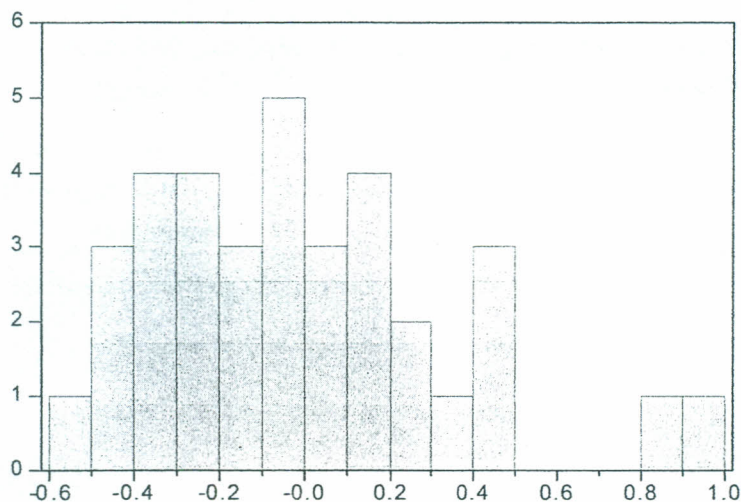
Y(Income)	100	110	120	150	180	200	210	240	300	330
X1 (labour)	2	10	5	8	15	20	29	32	36	40
X2 (Advert costs)	80	60	45	35	20	18	16	14	8	6

Assuming $Y = f(X1, X2)$

- Estimate the function using matrix approach. (6 marks)
- Test for the significance of the parameters. (6 marks)
- Interpret the results obtained in (i) to (ii) above. (3 marks)

QUESTION (4) [15 marks]

- What do you understand by specification errors? (4 marks)
- State the null and alternative hypotheses for testing for residual normality. Using the result below test for the stated hypothesis. (2 marks)



Series: Residuals	
Sample 1 35	
Observations 35	
Mean	1.15e-16
Median	-0.029701
Maximum	0.972181
Minimum	-0.505102
Std. Dev.	0.356788
Skewness	0.880996
Kurtosis	3.508042
Jarque-Bera	4.903965
Probability	0.086123

(c) What is Ramsey Reset Test? State the null and alternative hypothesis for this test. Using the following result, is there evidence of mis-specification? Support your answer. **(5 marks)**

Omitted Variables Test

Null hypothesis: X4 are jointly significant

Equation: UNTITLED

Specification: Y C X1 X2

Omitted Variables: X3

	Value	df	Probability
t-statistic	2.008112	6	0.0914
F-statistic	4.032514	(1, 6)	0.0914
Likelihood ratio	5.140717	1	0.0234

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	1000.822	1	1000.822
Restricted SSR	2489.949	7	355.7071
Unrestricted SSR	1489.128	6	248.1880

LR test summary:

	Value	df
Restricted LogL	-41.77655	7
Unrestricted LogL	-39.20619	6

Unrestricted Test Equation:
 Dependent Variable: Y
 Method: Least Squares
 Date: 02/01/19 Time: 16:54
 Sample: 1 10
 Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20.41723	26.01803	0.784734	0.4625
X1	0.449913	0.285921	1.573556	0.1667
X2	1.028216	2.284630	0.450058	0.6685
X3	0.529058	0.263461	2.008112	0.0914
R-squared	0.987548	Mean dependent var		244.0000
Adjusted R-squared	0.981322	S.D. dependent var		115.2726
S.E. of regression	15.75398	Akaike info criterion		8.641238
Sum squared resid	1489.128	Schwarz criterion		8.762272
Log likelihood	-39.20619	Hannan-Quinn criter.		8.508464
F-statistic	158.6175	Durbin-Watson stat		1.719522
Prob(F-statistic)	0.000004			

(d) Given the dataset below, test for the presence of autocorrelation. (4 marks)

Y	120	160	170	190	290	310	370	390	400	470	470	460	510	560
X	12	55	57	64	65	69	73	80	120	150	160	170	190	200