



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF ECONOMICS

EES 801: ECONOMETRICS II

DATE: Monday, 5th February 2018

TIME: 9.00 a.m. - 12.00 p.m.

INSTRUCTIONS: Answer ALL the questions

QUESTION ONE

(a) Given that $Y_t = a_0 + a_1 X_t + u_t$ $u_t \approx i.i.d.(0, \Omega)$

The following are Johansen cointegration test results from the above equation :

(i) Johansen ML Results (Trace Tests)

Null Hypothesis		λ_{trace}	5% value
$r=0$	$r \geq 1$	42.6	20.3
$r \leq 1$	$r=2$	8.9	9.8

(ii) Johansen ML Results (max eigen value tests)

Null Hypothesis		λ_{max}	5% value
$r=0$	$r=1$	38.6	15.3
$r=1$	$r=2$	8.6	9.3

- (i) State the null and alternative hypothesis for testing for cointegration. What is the rationale for testing for cointegration? (4 marks)
- (ii) Using the above results comments whether there is a longrun relationship (2 marks)
- (b) Given the function $Y=f(x)$, where $y=1, 0$, discuss the limitations you can encounter if this function is estimated by use of OLS (5 marks)

(c) Given the following results:

$$\hat{Y} = 30 + 0.957X_1 - 0.06789X_2 \quad eq1$$

(4.77) (1.467) (-0.678)

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

$$\hat{X}_1 = -0.579 + 0.0896X_2 \quad eq2$$

(-0.145) (14.78)

$r^2 = 0.92, \quad F = 89 \quad n = 25$

Interpret whether the coefficients are meaningful. Calculate the Variance inflation factor and comment on the answer obtained (4 marks)

QUESTION TWO

- (a) Given the following: $Y_t = \alpha_0 + \beta_0 X_t + \beta_1 X_{t-1} + \beta_{t-2} X_{t-2} + \dots + u_t$. Derive the Koyck Model (3 marks)
- (b) The following are estimated results for a consumption function. It is assumed that $C_t = f(Y^d)$ Where Y^d is disposable income

$$\hat{C}_t = -55.30 + 0.726Y_t^d + 0.46C_{t-1}$$

s.e (0.25) (0.169)

$R^2 = 0.97 \quad D.W = 0.76 \quad n = 27$

- (i) Assuming that this model resulted from a koyck-type transformation and that $\lambda = 0.46$, calculate median and mean lag. Interpret your answer in relation to the estimated model. (4 marks)
- (ii) Estimate H and comment on your answer (3 marks)
- (c) The following are estimated results from 60 observations

$$\Delta \hat{y}_t = 0.78 + 0.24 \Delta x_t - 0.32(u_{t-1})$$

(0.56) (0.12) (0.08)

(s.e in parentheses, u is the residual from a cointegrating relationship)

Interpret all the results (5 marks)

QUESTION THREE

- (a) The following are logit regression results for 200 high school students and their scores on reading and science subjects. The variable female is a dummy variable=1, if the student is a female and 0 if the student is a male.

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Iteration 0:  log likelihood = -115.64441
Iteration 1:  log likelihood = -84.558481
Iteration 2:  log likelihood = -80.491449
Iteration 3:  log likelihood = -80.123052
Iteration 4:  log likelihood = -80.118181
Iteration 5:  log likelihood = -80.11818
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Logit estimates

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Number of obs   = 200
LR chi2(3)      = 71.05
Prob > chi2     = 0.000
Pseudo R2      = 0.3072
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Log likelihood = -80.11818

variable	Coef.	Std. Err.	z	P> z	-
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female	1.482498	.4473993	3.31	0.001	
read	.1035361	.0257662	4.02	0.000	
science	.0947902	.0304537	3.11	0.002	
_cons	-12.7772	1.97586	-6.47	0.000	

Answer the following question:

- I. Interpret all the results (7 marks)
 - II. Estimate the odds ratio given that the student is a female and scores 30% in reading and 60% in science subject (3 marks)
 - III. Estimate the probability given that the student is a female and scores 30% in reading and 60% in science subject (2 marks)
- (b) Discuss the features of the logit model that makes it able to solve the limitations of the linear probability model (3 marks)

QUESTION FOUR

- a) Consider the equation $y_i = \beta_0 + \beta_1 x_i + u_1$ (1), where y represents income, x represents consumption. Under what circumstances would simultaneity arise in (1)? (2 marks)
- b) Is Ordinary Least Squares (OLS) appropriate for estimating simultaneous equations? Explain What OLS assumptions, if any, are violated in this case? (2 marks)

(c) Given the following equations

$$C = a_0 + a_1 Y^d + a_2 R + u_1 \quad (4.1)$$

$$I = b_0 + b_1 Y_t + b_2 Y_{t-1} + u_2 \quad (4.2)$$

$$Y_t = C_t + I_t + G \quad (4.3)$$

where $Y^d = Y_t - T$

Using the above equations where C, I, Y, Y^d, R, G, T represent consumption, investment, income, disposable income, rate of interest, government expenditure and taxes, respectively. Answer the following:

- Express the equations 4.1 and 4.2 in reduced form (4 marks)
- Are equations 4.1 and 4.2 identified? Show your answer (5 marks)
- With reference to identification status of equations 4.1 and 4.2 suggest their suitable methods for estimation (2 marks)