University of Colombo – Sri Lanka

Faculty of Arts

Third Year Examination in Arts (Economics) – 2017/18

(End of the First semester)

ECN 3145: Introduction to Econometrics

Time allowed: Two (02) Hours Only

Answer Three (3) Questions Only

Calculators are allowed

Question 01 is compulsory. Answer any other two (02) additional questions

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1. COMPULSORY QUESTION

Consider following hypothetical sample of data;

No of road accident related death	No of road accidents
200	5000
400	7000
900	9000

Assume the following regression equation;

$$Y_i = \beta_0 + \beta_1 X_{1i} + u_i \qquad (1)$$

(a) Derive OLS estimator for $\hat{b}_1$ for the above equation.

(04 marks)

(b) Estimate the standard error of $\hat{b}_1$. What factors determines the size of the standard errors of the estimated coefficient?

(04 marks)

(c) Test the significance of $\hat{b}_1$ at 5% level of significance

(04 marks)

(d) Construct 90% confidence interval for $\hat{b}_1$

(04 marks)

(e) List down the required assumptions for the above estimation

(04 marks)

2. A cross-sectional regression was run on a sample of 44 countries in an effort to understand the determinants of welfare spending undertaken (standard errors in parentheses):

$$w_i = -148.0 + 0.841P_i - 0.0115C_i - 0.0078E_i$$
$$\quad (12.5) \quad (0.03) \quad (0.17) \quad (0.001)$$

where: wi = annual spending (millions of rupees) on welfare in the *i*th country
Pi = welfare programmes launched in the *i*th country per year
Ci = annual wage bill (compensation in millions of rupees) for workers in welfare-oriented institutions/ministries in the *i*th country
Ei = the number of workers employed in welfare-oriented institutions/ministries in the *i*th country.

(a) Do all of the above coefficients match your expectations? Explain your reasoning.

(04 marks)

(b) Calculate t-scores and test for significance of the above results at the 5% level

(04 marks)

(c) Do you suspect the presence of multicollinearity among variables? If yes between which variables? What are the consequences of multicollinearity?

(04 marks)

(d) What recommendation would you make for a re-run of this equation with a different specification? Explain your answer.

(04 marks)

(e) What are the other econometric issues that the above model may suffer from? Justify your answer.

(04 marks)

3. Consider the following population regression equation (PRE)

$$Y_i = \beta_0 + \beta_1 X_{1i} + u_i \qquad (2)$$

Assume that you fit a sample regression equation (SRE) by employing Ordinary Least Square (OLS) estimator.

(a) What steps you may follow when fitting a regression model to a real world data set? Briefly explain

(04 marks)

(b) Show OLS estimator is BLUE

(08 marks)

(c) Assess the importance of BLUE property

(02 marks)

(d) "Heteroskedasticity is a minor issue in cross-sectional regression models" Do you agree with this statement? What are the consequences of heteroskedasticity? Explain your answer.

(02 marks)

(e) "A grater variation in independent variable enhances the precision of the estimated results" Do you agree with the statement? Explain your answer

(02 marks)

4.

A researcher examined the determination of hourly wage using the Labour Force Survey (LFS) 2016 of Sri Lanka. Following table reports the estimated results relating to a Mincerian earning function.

Table: Determinants of Hourly wages

Dependent variable: log hourly wage

	Estimate coefficient	Standard error
Constant	2.5	0.25
Education (in years)	0.08	0.01
Experience (in years	0.03	0.01
Experience square	-0.0001	0.00001
Male (1=male; 0=female)	0.24	0.12
R^2		0.28
No of observations		25,000

(a) Discuss the theoretical underpinning of the specified model

(06 marks)

(b) Discuss the estimated results

(08 marks)

(c) "Dummy variables play an important role in regression models" Do you agree with this statement? Explain your answer

(04 marks)

(d) What is dummy trap?

(02 marks)

5. Write short notes on following topics (04 marks each)

(a) Population regression equation and sample regression equation

(b) Simple Regression Model and Multiple Regression Model

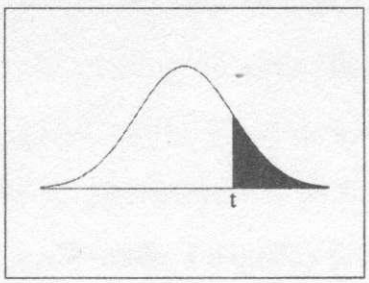
(c) Autocorrelation and Durbin Watson statistic

(d) Normality and Logarithm transformation

(e) Endogenity and Instrument variable estimator

**********END**********

t-Distribution Table



The shaded area is equal to α for $t = t_\alpha$.

df	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
32	1.309	1.694	2.037	2.449	2.738
34	1.307	1.691	2.032	2.441	2.728
36	1.306	1.688	2.028	2.434	2.719
38	1.304	1.686	2.024	2.429	2.712
∞	1.282	1.645	1.960	2.326	2.576