7.5 Marks per

UNIVERSITY OF RUHUNA

2018/2019Academic Year
Bachelor of Arts (Special) Degree 2000 Level
2nd Semester Examination – 2020 August

ECN 22633/ STS 22623 – Basic Econometrics

Answer any Four (04) questions.
(Using calculator is allowed)

Time: 03 hours

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01. I. What are the objectives of learning econometrics as a subject ?

(05 marks)

II. As an economic analyst, you need to estimate the relationship between the variables in the economy. For this you can use the economics methodology. Explain how the above work is systematically carried out through economics methodology

(10 marks)

02. Consider the following econometric model

$$Y_i = \beta_0 + \beta_1 X_{1i} + U_i$$

I. Derive the standard formulas to estimate the econometric model of which $\hat{\beta}_0$ and $\hat{\beta}_1$ parameters. (Using the OLS)

(04 marks)

II. Estimate above econometric model using the following data.

Y	X
200	55
240	65
270	85
250	70
270	85
200	55
230	60
190	40
210	60
240	65

(04 marks)

III. Calculate the coefficients of determination. (R^2)

(03 marks)

IV. Interpret the result.

(04 marks)

ge 2 of 2

03. Consider the following econometric model

$$Y_i = \beta_0 + \beta_1 X_i + U_i$$

I. Derive the estimate and prove the followings

(a). Mean (unbiased)

$E(\hat{\beta}_0) = \beta_0$ and $E(\hat{\beta}_1) = \beta_1$

(b). variance

$$Var\,(\hat{\beta}_0) = \sigma_U^2 \left(\frac{\sum X^2}{n\sum x^2}\right) \text{ and } Var\,(\hat{\beta}_1) = \sigma_U^2 \left(\frac{1}{\sum x^2}\right)$$

of the $\hat{\beta}_0$ and $\hat{\beta}_1$ (obtained by OLS) State the assumptions used.

(12 mark

II. Explain the importance of calculation mean and variance of the parameters.

(03 mark

04. The following information is provided to you

Price of X Rs:	Qantity of X Kg
30	200
35	180
40	150
20	240
35	180
45	150
35	170
30	200
40	150
30	200

The equation explaining the OLS estimates of the above data is,

$$\widehat{Qd} = 319.55 - 4.05\ P$$

I. Write Hypotheses need to be tested using above estimates.

(02 marks)

II. Calculate the "t" value

(05 marks)

III. Test the Hypotheses

(02 marks)

IV. Calculate the confidence intervals.

(03 marks)

V. Analyze the result.

(03 marks)

Used the following formulas

$$t = \frac{\widehat{\beta}_i}{\widehat{S(\beta)}_i} \qquad \sigma_U^2 = \frac{\sum e^2}{n-k}$$

$$Var\left(\hat{\beta}_0\right) = \sigma_U^2 \left(\frac{\sum X^2}{n\sum x^2}\right) \qquad Var\left(\hat{\beta}_1\right) = \sigma_U^2 \left(\frac{1}{\sum x^2}\right)$$

ed.

(12 marks)

the

(03 marks)

05. Consider the following econometric model

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + U_i$$

I. Using the above econometric model derive the standard equations for the partial correlation coefficients given below.

(a). $r_{yx_1.x_2}$

(b). $r_{yx_2.x_1}$

(10 marks)

II. Discuss the importance of partial correlation coefficients.

(05 marks)

06. Paying your attention on problem identification , its implications and corrective measures,Write short note on the following topics.

I. multicollinearity

(05 marks)

II. heteroscadasticity

(05 marks)

III. autocorrelation

(05 marks)

02 marks)

05 marks)

02 marks)

03 marks)

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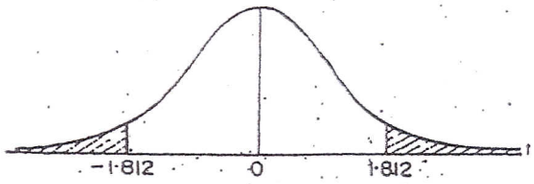
Table 2. Percentage Points of the t Distribution



Example

For $\nu = 10$ degrees of freedom:

$P(t > 1{\cdot}812) = 0{\cdot}05$

$P(t < -1{\cdot}812) = 0{\cdot}05$

ν \ α	·25	·20	·15	·10	·05	·025	·01	·005	·0005
1	1·000	1·376	1·963	3·078	6·314	12·706	31·821	63·657	636·619
2	·816	1·061	1·386	1·886	2·920	4·303	6·965	9·925	31·598
3	·765	·978	1·250	1·638	2·353	3·182	4·541	5·841	12·941
4	·741	·941	1·190	1·533	2·132	2·776	3·747	4·604	8·610
5	·727	·920	1·156	1·476	2·015	2·571	3·365	4·032	6·859
6	·718	·906	1·134	1·440	1·943	2·447	3·143	3·707	5·959
7	·711	·896	1·119	1·415	1·895	2·365	2·998	3·499	5·405
8	·706	·889	1·108	1·397	1·860	2·306	2·896	3·355	5·041
9	·703	·883	1·100	1·383	1·833	2·262	2·821	3·250	4·781
10	·700	·879	1·093	1·372	1·812	2·228	2·764	3·169	4·587
11	·697	·876	1·088	1·363	1·796	2·201	2·718	3·106	4·437
12	·695	·873	1·083	1·356	1·782	2·179	2·681	3·055	4·318
13	·694	·870	1·079	1·350	1·771	2·160	2·650	3·012	4·221
14	·692	·868	1·076	1·345	1·761	2·145	2·624	2·977	4·140
15	·691	·866	1·074	1·341	1·753	2·131	2·602	2·947	4·073
16	·690	·865	1·071	1·337	1·746	2·120	2·583	2·921	4·015
17	·689	·863	1·069	1·333	1·740	2·110	2·567	2·898	3·965
18	·688	·862	1·067	1·330	1·734	2·101	2·552	2·878	3·922
19	·688	·861	1·066	1·328	1·729	2·093	2·539	2·861	3·883
20	·687	·860	1·064	1·325	1·725	2·086	2·528	2·845	3·850
21	·686	·859	1·063	1·323	1·721	2·080	2·518	2·831	3·819
22	·686	·858	1·061	1·321	1·717	2·074	2·508	2·819	3·792
23	·685	·858	1·060	1·319	1·714	2·069	2·500	2·807	3·767
24	·685	·857	1·059	1·318	1·711	2·064	2·492	2·797	3·745
25	·684	·856	1·058	1·316	1·708	2·060	2·485	2·787	3·726
26	·684	·856	1·058	1·315	1·706	2·056	2·479	2·779	3·707
27	·684	·855	1·057	1·314	1·703	2·052	2·473	2·771	3·690
28	·683	·855	1·056	1·313	1·701	2·048	2·467	2·763	3·674
29	·683	·854	1·055	1·311	1·699	2·045	2·462	2·756	3·659
30	·683	·854	1·055	1·310	1·697	2·042	2·457	2·750	3·646
40	·681	·851	1·050	1·303	1·684	2·021	2·423	2·704	3·551
60	·679	·848	1·046	1·296	1·671	2·000	2·390	2·660	3·460
120	·677	·845	1·041	1·289	1·658	1·980	2·358	2·617	3·373
∞	·674	·842	1·036	1·282	1·645	1·960	2·326	2·576	3·291

Source: This table is abridged from Table III of Fisher & Yates: *Statistical Tables for Biological, Agricultural and Medical Research* published by Oliver & Boyd Ltd., Edinburgh, and by permission of the authors and publishers.