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1st SEM. 2017/2018

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: B.Sc. in Agricultural Economics and Agribusiness Management Year 3

COURSE CODE: AEM 302 / 307

TITLE OF PAPER: INTRODUCTION TO ECONOMETRICS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTION:
1. ANSWER ALL QUESTIONS
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS

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QUESTION 1

Consider the following regression output:

$$\hat{Y} = 0.2033 + 0.6560X_t$$

se = (0.0976) (0.1961)

$r^2 = 0.397$ RSS = 0.0544 ESS = 0.0358

Where Y = labor force participation rate (LFPR) of women in 1972 and X = LFPR of women in 1968. The regression results were obtained from a sample of 19 cities in the Republic of South Africa.

i. How do you interpret this regression? **[8 Marks]**

ii. Test the hypothesis: H0: $\beta_2 = 1$ against H1: $\beta_2 > 1$. Which test do you use? And why? What are the underlying assumptions of the test(s) you use? **[10 MARKS]**

iii. Set up an ANOVA table for the above regression output. **[7 MARKS]**

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QUESTION 2

Consider the following models.

$$\text{Model A: } Y_t = \alpha_1 + \alpha_2 X_{2t} + \alpha_3 X_{3t} + \mu_t$$

$$\text{Model B: } (Y_t - X_{2t} = \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + \mu_t$$

i. Will OLS estimates of α_1 and β_1 be the same? Why? **[4 MARKS]**

ii. Will OLS estimates of α_3 and β_3 be the same? Why? **[4 MARKS]**

iii. What is the relationship between α_2 and β_2? **[7 MARKS]**

iv. Can you compare the R^2 terms of the two models? Why or why not? **[10 MARKS]**

QUESTION 3

Consider the following model

$$Y_i = \alpha_1 + \alpha_2 D_i + \beta X_i + \mu_i$$

Where Y = annual salary of a university professor

X = years of teaching experience

D = dummy for gender

Consider three ways of defining the dummy variable.

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i. D = 1 for male, 0 for female.

ii. D = 1 for female, 2 for male.

iii. D = 1 for female, −1 for male.

Interpret the preceding regression model for each dummy assignment. Is one method preferable to another? Justify your answer. **[25 MARKS]**

QUESTION 4

i. Why do we need regression analysis? Why not simply use the mean value of the regressand as its best value? **[5 MARKS]**

ii. Briefly explain the purpose of including an error term in a regression equation. **[4 MARKS]**

iii. Say true or false or uncertain and explain: Even though the disturbance term in the CLRM is not normally distributed, the OLS estimators are still unbiased. **[4 MARKS]**

iv. What is the difference between the population and sample regression functions? Is this a distinction without difference? **[6 MARKS]**

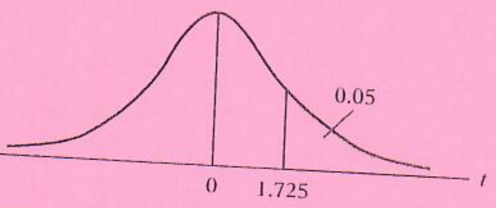
TABLE D.2 PERCENTAGE POINTS OF THE t DISTRIBUTION

Example

$\Pr(t > 2.086) = 0.025$

$\Pr(t > 1.725) = 0.05$ for df = 20

$\Pr(|t| > 1.725) = 0.10$



df \ Pr	0.25 0.50	0.10 0.20	0.05 0.10	0.025 0.05	0.01 0.02	0.005 0.010	0.001 0.002
1	1.000	3.078	6.314	12.706	31.821	63.657	318.31
2	0.816	1.886	2.920	4.303	6.965	9.925	22.327
3	0.765	1.638	2.353	3.182	4.541	5.841	10.214
4	0.741	1.533	2.132	2.776	3.747	4.604	7.173
5	0.727	1.476	2.015	2.571	3.365	4.032	5.893
6	0.718	1.440	1.943	2.447	3.143	3.707	5.208
7	0.711	1.415	1.895	2.365	2.998	3.499	4.785
8	0.706	1.397	1.860	2.306	2.896	3.355	4.501
9	0.703	1.383	1.833	2.262	2.821	3.250	4.297
10	0.700	1.372	1.812	2.228	2.764	3.169	4.144
11	0.697	1.363	1.796	2.201	2.718	3.106	4.025
12	0.695	1.356	1.782	2.179	2.681	3.055	3.930
13	0.694	1.350	1.771	2.160	2.650	3.012	3.852
14	0.692	1.345	1.761	2.145	2.624	2.977	3.787
15	0.691	1.341	1.753	2.131	2.602	2.947	3.733
16	0.690	1.337	1.746	2.120	2.583	2.921	3.686
17	0.689	1.333	1.740	2.110	2.567	2.898	3.646
18	0.688	1.330	1.734	2.101	2.552	2.878	3.610
19	0.688	1.328	1.729	2.093	2.539	2.861	3.579
20	0.687	1.325	1.725	2.086	2.528	2.845	3.552
21	0.686	1.323	1.721	2.080	2.518	2.831	3.527
22	0.686	1.321	1.717	2.074	2.508	2.819	3.505
23	0.685	1.319	1.714	2.069	2.500	2.807	3.485
24	0.685	1.318	1.711	2.064	2.492	2.797	3.467
25	0.684	1.316	1.708	2.060	2.485	2.787	3.450
26	0.684	1.315	1.706	2.056	2.479	2.779	3.435
27	0.684	1.314	1.703	2.052	2.473	2.771	3.421
28	0.683	1.313	1.701	2.048	2.467	2.763	3.408
29	0.683	1.311	1.699	2.045	2.462	2.756	3.396
30	0.683	1.310	1.697	2.042	2.457	2.750	3.385
40	0.681	1.303	1.684	2.021	2.423	2.704	3.307
60	0.679	1.296	1.671	2.000	2.390	2.660	3.232
120	0.677	1.289	1.658	1.980	2.358	2.617	3.160
∞	0.674	1.282	1.645	1.960	2.326	2.576	3.090

Note: The smaller probability shown at the head of each column is the area in one tail; the larger probability is the area in both tails.

Source: From E. S. Pearson and H. O. Hartley, eds., *Biometrika Tables for Statisticians*, vol. 1, 3d ed., table 12, Cambridge University Press, New York, 1966. Reproduced by permission of the editors and trustees of *Biometrika*.