THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF SOCIAL STUDIES
BA DEGREE PROGRAMME IN SOCIAL SCIENCES – LEVEL 5
FINAL EXAMINATION– 2024/2025 (SEMESTER 1)
DSU5337 – PRINCIPLES OF ECONOMETRICS

DURATION: THREE HOURS (03 HOURS) ONLY

Date: 26.04.2025 **Time: 09.30 a.m. – 12.30 p.m.**

Instructions:

- **Answer any FIVE (05) questions.**
- **Each question carries twenty (20) marks.**
- **Non-Programmable calculators are allowed .**
- **Please write clearly.**

1. State whether the following statements are true, false, or uncertain, and justify your answers.

(a) An estimator of a parameter is a random variable, but the parameter is non random or fixed.

(b) The assumptions made by the classical linear regression model (CLRM) are not necessary to compute OLS estimator.

(c) The theoretical justification for OLS is provided by the Gauss-Markov theorem.

(d) If two variables are independent, their correlation coefficient will always be zero.

(e) The stochastic error term U_i and residual term ε_i mean the same thing.

(f) The population regression function gives the expected value of the dependent variables corresponding to each value of the independent variable.

(g) A linear regression model means a model that is linear in the parameters.

(h) In the linear regression model the explanatory variable is the cause and the dependent variables is the effect.

(i) In practice , the two –variables regression model is useless because the behavior of a dependent variable can never be explained by a single explanatory variable.

(j) When autocorrelation is present OLS estimators are biased as well as inefficient.

(2 x 10= 20 marks)

2. (a) What is the difference between the population and sample regression functions? Is this a distinction without difference?

(b) Why do we need regression analysis?

(20 marks)

3. Consider the following estimated consumption function

$\hat{C}_t = 200 + 0.8Y_t$ **,Where: C= Consumption Expenditure , Y =income**

(a) Evaluate the above estimated function on the basis of the available Economic Theory.

(b) Estimate the savings function

(c) Estimate the MPC and MPS

(d) Interpret the constant intercepts of the consumption and saving functions

(e) Interpret the slope estimated coefficient of the consumption and saving functions

(f) Predict the level of consumption and the level of Savings for the year 2024, if in that year income is LKR.60 000.00

(20 marks)

4. (a) What do we mean by a linear regression model?

(b) Determine whether the following models are linear in the parameters, or the variables or both, and which of these models are liner regression models?

(*i*) $Y_i = \beta_0 + \beta_1 X + \varepsilon$

(*ii*) $Y_i = \beta_0 + \beta_1 X^2 + \varepsilon$

(*iii*) $Y_i = \beta_0 + \beta_1^2 X + \varepsilon$

(*iv*) $Y_i = \beta_0 + \beta_1 (\frac{1}{X}) + \varepsilon$

(v) $\ln Y_i = \beta_0 + \beta_1 \ln X + \varepsilon$

(vi) $Y = \beta_1 + \beta_2 X + \beta_3 XZ + \varepsilon$

(vii) $\ln\left[\frac{Y}{1-Y}\right] = \beta_1 + \beta_2 X + \varepsilon$

(20 marks)

5. Consider the following estimated demand function for domestically produced automobile.

$$\bar{D}_X = 1500 - 10P_x + 15P_f + 0.5Y$$

Where $\bar{D}_x$ = *demand* for domestically produced cars

P_x = *price* of domestically produced cars

P_f = *Price* of imported cars

Y = disposable income

Estimated Savings functions

$$\bar{S} = -1000 + 0.3Y$$

Where S = Savings, Y income

(a) Interpret and evaluate the above estimated functions on the basis of available information from economic theory.

(b) Estimate the MPC and MPS.

(c) Estimate the level of savings for the year 2024 if in that year income is LKR.100000.00

(d) Estimate the demand for domestically produced cars if $P_x = 2000, P_f = 2500, Y = 15000$

(e) Estimate the average price elasticity, cross price elasticity, and income elasticity given $\bar{D}_x = 60000, \bar{P}_x = 4000, \bar{P}_f = 3000, \bar{Y} = 12000.$

(20 marks)

6. The Mc Night company is a major producer of steel. Its management estimates that the Demand for the company's steel is given by the estimated equation:

$$QD_s = 5{,}000 - 1{,}000P_s + 0.1Y + 100P_a$$

Where QD_s is steel demanded in thousand of tons per year, P_s is the price of steel in dollars per pound, Y is per capita income, and P_a is the price of aluminium in

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dollars per pound , Initially the price of steel is $1 per pound , per capita income is $20,000, and the price of aluminium is $0.80 per pound.

(a) How much steel will be demanded at the initial prices and income ?

(b) What is the point income elasticity at the initial values?

(c) What is the point cross elasticity between steel and aluminium ?

(d) Are steel and aluminium substitutes or complements?

(e) If the objective is to maintain the quantity of steel demanded as computed in part (a) , what reduction in steel prices will be necessary to compensate for a $0.20 reduction in the price of aluminium?

(20 marks)

7. (a) What is heteroscedasticity?
   (b) Briefly explain five reasons for heteroscedaticity.
   (c) What are the consequences of heteroscedasticity?
   (d) Explain how to detect hetoroscedasticity.

(20 marks)

8. (a) What is multicollinearity ?
   (b) Briefly explain the causes for multicollinearity.
   (c) Explain how to detect multicollinearity and how to correct this issue.
   (d) What are the consequences of multicollinearity?

(20 marks)

9. Write explanatory notes on any **FOUR (04)** of the following.

   (a) Scales of Variables
   (b) Different categories of data
   (c) Gauss –Markov Theorem
   (d) Autocorrelation
   (e) OLS assumptions
   (f) Specification errors
   (g) Measurement errors

(20 marks)