0171

THE OPEN UNIVERSITY OF SRI LANKA

DEPARTMENT OF SOCIAL STUDIES

BA DEGREE IN SOCIAL SCIENCES – LEVEL 5

FINAL EXAMINATION– 2021/2022 (1st Semester)

DSU5337: PRINCIPLES OF ECONOMETRICS

DURATION: THREE HOURS (03 HOURS) ONLY

Date: 23/07/2022 **Time: 1.30 p.m. – 4.30 p.m.**

Instructions:

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

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

a) An estimator of a parameter is a random variable, but the parameter is nonrandom 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 value of the dependent variables corresponding to each value of the independent variable.

g) A linear regression models means a model linear in the variables.

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 x10=20 marks)

02.

a) Define term of Econometrics.

b) Explain each and every step of the Econometrics methodology.

(20 marks)

03. Consider the following equations.

a. $Y_t = \beta_0 + \beta_1 X_t + u_t$

b. $Y_t = \hat{\beta}_0 + \hat{\beta}_1 X_t + \hat{u}_t$

c. $Y_t = \hat{\beta}_0 + \_\hat{\beta}_1 X_t + u_t$

d. $\hat{Y}_t = \beta_0 + \beta_1 X_t$

e $\hat{Y}_t = \beta_0 + \beta_1 X_t + \hat{u}_t$

f. $\hat{Y}_t = \hat{\beta}_0 + \beta_1 \hat{X}_t + \hat{u}_t$

Carefully explain why equations (a) and (b) are correct but (c), (d), (e), and (f) are incorrect.

(20 marks)

04. Consider the following estimated consumption function

$\hat{C}_t = 100 + 0.7Y_t$, 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 2021, if in that year income is LKR.50 000.00

(20 marks)

05. Economic theory postulates exact relationship between economic variables between economic variables. Consider the following economic relationships.

Demand function $\rightarrow D = \beta_0 + \beta_1 P + \beta_2 Y$

Where : D = quantity demand : P = Price , Y = Income

Supply function $\rightarrow S_x = \beta_0 + \beta_1 P_x + \beta_2 T + \beta_3 P_f$

Where S_x = quantity supplied , P_x = Price, T = technology, P_f = Price of factor inputs

Consumption function $\rightarrow C = \beta_0 + \beta_1 Y$

Where C = Consumption Expenditure, Y = disposable income

a) What is the meaning of exact relationship?

b) What is the economic meaning of the coefficients ($(\beta_0, \beta_1, \beta_2, \beta_3, etc)$ in each one of the above relationships?

c) What would you expect the sign (and magnitude) of the coefficients $(\beta's)$ to be in each of the above cases?

(20 marks)

06.

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)

07. Consider the following estimated demand function for domestically produced automobiles.

$$D_X = 1584 - 12P_x + 18P_f + 0.6Y$$

Where 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

$$\bar{S} = -5000 + 0.2Y$$

Where S = Savings, Y income

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

b) Estimate the MPC and MPS

c) Estimate the level of savings for 2021 if in that year income is LKR.200000.00

d) Estimate the demand for domestically produced cars if $P_x = 3000, P_f = 2500, Y = 250000$

e) Estimate the average price elasticity, cross price elasticity, and income elasticity given $\bar{D}_x = 60000, \bar{P}_x = 4000, \bar{P}_f = 3000, \bar{Y} = 150000.$

(20 marks)

08. 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 aluminum in dollars per pound, Initially the price of steel is \$1 per pound, per capita income is \$20,000, and the price of aluminum 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 aluminum?

d) Are steel and aluminum 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 aluminum?

(20 marks)

09. Write explanatory notes on any four of the following.

a) Scales of Variables

b) Different categories of data

c) Gauss –Markov Theorem

d) Hetroscedasticity

e) Autocorrelation

f) Multicollinearity

g) Dummy Variables

h) OLS assumptions

(20 marks)