2021

STATISTICS— GENERAL

Paper : DSE-A-1

(Econometrics)

Full Marks : 50

The questions are of equal value.

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions: 2×5

(a) What is BLUE?

(b) State the assumption required to show the consistency of an OLSE.

(c) What is the meaning of the term "heteroscedasticity"?

(d) When does near multicollinearity occur?

(e) What is the indication of negative residual autocorrelation?

(f) What will be the impact on standard errors of the regression co-efficients in a regression model if multicollinearity is perfect?

(g) Suppose Z is an instrument for a regressor X. X is stochastic. To be a valid instrument, what criteria Z must satisfy?

(h) What does the equation $\hat{Y} = \widehat{\beta_0} + \widehat{\beta_1}$ x denote if the regression equation is $Y = \beta_0 + \beta_1 X_1 + U$?

2. Answer ***any two*** questions. 5×2

(a) Let the regression results for the impact of per capita GNP (PGNP) and female literacy rate (FLR) on child mortality (CM) be as given below.

$$\widehat{CM}_i^* = 0 \cdot 40\, PGNP_i^* - 0 \cdot 04\, FLR_i^*$$

where starred variable indicates standardized variable.

(i) What are the implications of parameter values?

(ii) Which regressor has more impact on CM?

(b) Clearly outline and explain the assumptions of Gaussian Classical Linear Regression models.

(c) How to deal with the problem of multicollinearity?

3. Answer ***any three*** questions. 10×3

(a) Having derived a model for the exchange rate S_t as a function of the interest rate differential r_t and performed the following regression

$$S_t = a + br_t + e_t,$$

where e_t is an error term. How would you check for the presence of serial correlation in the error term and how would you deal with it?

(b) What is an instrument variable? Briefly discuss the Instrumental variable method (single equation model with one explanatory variable)

(c) In presence of heteroscedasticity in the data, why OLSE of parameters is inappropriate. Give the variance estimator $\hat{\Sigma}$, where $V(\varepsilon) = \Sigma$ and $Y = X\beta + \varepsilon$.

(d) (i) How do you overcome the consequences due to errors in variables?

(ii) If $V\left(\underset{\sim}{\varepsilon}\right) = \Sigma$, a non-singular, non-diagonal matrix, where $Y = x\beta + \varepsilon$ is a CLRM and all of the model assumptions hold apart from assumption about $V(\varepsilon)$, give the GLSE of β.

(e) Suppose the model of interest is $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \mu_i$, where $E(\mu/X) = 0$ and $E(\mu^2|X) = \sigma^2$ and X_1 and X_2 are uncorrelated in your sample. Will the bivariate regression of Y on X_1 have the same estimate of co-efficient and standard error for $\widehat{\beta_n}$ as that for multivariate regression of Y on X_1 and X_2?

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