

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 $\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 x$ 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.

$$\widehat{CM}_i^* = 0.40 PGNP_i^* - 0.04 FLR_i^*$$

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?

Please Turn Over

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 $V(\varepsilon) = \Sigma$, 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 $\hat{\beta}_n$ as that for multivariate regression of Y on X_1 and X_2 ?
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