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14 (ECO-4) 4046

2022

ECONOMICS

Paper : ECO-4046

(Econometrics Methods)

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 5×4=20

(a) What are Robust Standard Errors?
How are they estimated? 2+3=5

(b) Estimate the total effect and mean lag
of the following model : 2+3=5

$$Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \dots + \mu_t$$

(c) Show that $Y_t = pY_{t-1} + U_t$ is weakly
dependent when $|p| < 1$ but not at $p=1$

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Contd.

- (d) What is econometric simulation? What are its uses? 3+2=5

2. Answer **any three** from the following: 10×3=30

- (a) Explain the Idea of Likelihood ratio and its use for test of overall significance of a regression model estimated by using Maximum Likelihood method. 10

- (b) Using Taylor's expansion obtain the estimable form of an inherently non-linear regression model. 3+7=10

- (c) What is the use of Koyck transformation in a dynamic econometric model? Explain how one can sort out the problems that appear in a distributed lag model with the help of Koyck transformation. Can we use directly OLS method in the transformed model? State the reason. 2+6+2=10

- (d) In a panel data model:

$$Y_{it} = \alpha + \beta X_{it} + \chi_i + \delta_t + \mu_{it}$$
, where χ_i and δ_t , are individual specific and time specific effects respectively, explain the use of Fixed Effects and Random Effects model to estimate the model.

5+5=10

- (e) Outline the procedure of the 3SLS method of estimating simultaneous equation models. State the properties of these estimators. $8+2=10$

3. Answer **any two** from the following :

$15 \times 2 = 30$

- (a) Show that under non-spherical disturbances, GLS rather than OLS gives the best linear unbiased estimators of regression coefficients. Illustrate the application of GLS technology for a linear model with auto-correlated disturbance with first order auto-regression. Lay out a method for making the GLS estimation feasible.

$7+6+2=15$

- (b) Explain why a linear specification is unsuitable for regression of a qualitative binary dependent variable. Use a suitable transformation function to derive the LOGIT or the PROBIT model for the variable. Obtain the likelihood function for obtaining ML estimates of the parameters.

$5+5+5=15$

- (c) Show how the characteristics of AR and MA help to know whether a time series X_t is either AR (1) or MA (1). 15