

M.A. Examination, 2022

Semester-III

Economics

Course: OP- 5 (Optional)
(Advanced Econometrics-I)

Time: 3 Hours

Full marks: 40

Questions are of value as indicated in the margin

Answer question 1

1. State whether the following statements are true (T), False (F) or uncertain (U). Give reasons for the same:
 - (a) In regression models, a trichotomous explanatory variable can be represented by a dummy variable with three different values.
 - (b) Parameter estimates of Logit Model and Probit model are always identical.
 - (c) In small samples, the 2SLS procedure may lead to biased estimation.
 - (d) In the distributed lag model, the OLS procedure produces asymptotically biased estimates.

4 X 4 =16

Answer question 2 OR question 3

2. (a) What is the fundamental problem associated with the Linear probability Model?
(b) Consider data on a sample of 750 loan applications in an Indian Bank. Out of these 500 loan applications were accepted and 250 loan applications were rejected. Considering, applicants' income, sex, marital status, education as explanatory variables, suggest a suitable econometric model to identify the factors determining the chance of applicants receiving the loan. How do you estimate such a model? How do you measure the goodness of fit of such a model?

2+2+6 +2=12

3. (a) Distinguish between multinomial regression models and ordinal regression models.
(b) Consider data on 550 individuals on their choice of three modes of travel – air, train and bus and individuals' income, location of stay, level of education, gender and location of stay. How does an individual decide among these choices? How do you estimate such a model?

4+8=12

Answer question 4 OR question 5

4. (a) State the rank and order condition for identification of a simultaneous equation system.

(b) In a model of the money market, the demand for money depends on the interest rate and the population while interest rate depends on the quantity of money, the discount rate and the excess reserves. Assume the money market is in equilibrium, where the demand for money equals the quantity of money. Assume the quantity of money and the interest rate are endogenous while the population, the discount rate and the excess reserve are exogenous. Each equation of the model is linear and stochastic but contains no intercept.

- (i) Construct a simultaneous equation model for this problem and express the structural form equations and reduced form equations.
- (ii) Examine the identification status of each of the equations.

$$2+4+6=12$$

5. Consider the following equations:

$$Y_{1t} = \beta_{12} Y_{2t} + \gamma_{11} X_{1t} + U_{1t}$$

$$Y_{2t} = \beta_{21} Y_{1t} + \gamma_{22} X_{2t} + \gamma_{23} X_{3t} + U_{2t}$$

Given the data matrices,

$$X'X = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 20 & 0 \\ 0 & 0 & 10 \end{pmatrix}$$

$$X'Y = \begin{pmatrix} 5 & 10 \\ 40 & 20 \\ 20 & 30 \end{pmatrix}$$

Show that for the second equation ILS estimates and 2SLS estimates are identical.