

M.A. Examination, 2023
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 three dummy variables.
 - (b) In a Tobit Model, Tobit coefficient of a regressor gives the marginal impact of that regressor on the mean value of the observed regressand.
 - (c) The problem of simultaneity does not arise in a recursive simultaneous equation model.
 - (d) The OLS method can be applied for estimation of an autoregressive model.

4 X 4 =16

Answer question 2 OR question 3

2. (a) Suppose a researcher have data on medical expenditure, income and family size of a sample of 500 individuals. Some of them who did not have any ailments or did not bother to go to the doctor even if they had ailments, had no medical expenditures. Suggest a suitable econometric model to identify the determinants of medical expenditure. How do you estimate such a model?
(b) Can you use the conventionally computed R^2 to measure the goodness of fit in case of qualitative response regression models? Justify your answer.
3. (a) Consider data on 1000 individuals on their choice of occupation – self-employment, casual labour and industrial worker and individuals' income, location of stay, level of education, and gender. Suggest a suitable econometric model for determination of occupational choices? How do you estimate such a model?
(b) How do you compute the marginal effects in a Logit regression model?

2+7+3=12

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Answer question 4 OR question 5

4. (a) Consider the following equations:

$$Y_{1t} = 3Y_{2t} - 2X_{1t} + X_{2t} + u_{1t}$$

$$Y_{2t} = Y_{3t} + X_{3t} + u_{2t}$$

$$Y_{3t} = Y_{1t} - Y_{2t} - 2X_{3t} + u_{3t}$$

Check the identification status of these equations.

- (b) Consider the following SKM of income determination:

$$C_t = \beta_0 + \beta_1 Y_t + U_t$$

$$Y_t = C_t + I_t$$

Can you apply OLS method to estimate β_1 ? Justify your answer.

$$7.5 + 4.5 = 12$$

5. (a) Consider the following equations:

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

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

Given the data matrices,

$$X'X = \begin{pmatrix} 10 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 10 \end{pmatrix}$$

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

Find out the 2SLS estimates of the parameters of the second equation.

- (b) Consider a simultaneous equation system of G endogenous and K exogenous variables. Derive the 3SLS estimates of the parameters of the system.

$$6 + 6 = 12$$