MASTER OF ARTS EXAMINATION, 2025

DEPARTMENT OF ECONOMICS

1st Year, 2nd Semester

Subject Code : ECO/A/C 8.3

ECONOMETRICS AII

Time : Two Hours **Full Marks : 30**

Group – A

(Compulsory) 4×1=4

1. (a) Define structural form model.

   (b) What is the use of Hausman test in panel data regression ?

   (c) What is the implication of seemingly unrelaterd regression with identical regressors ?

   (d) What is the primary advantage of the Full Information Maximum Likelihood (FIML) method in statistical analysis ?

Group – B

(Answer any two questions) 2×5=10

2. (a) Is the following MA(2) process invertible ?

   $X_t = \epsilon_t - 0.9\epsilon_{t-1} + 0.2\epsilon_{t-2}$

   (b) Compute the auto correlation function (acf) for the following AR (2) process

   $X_t = 0.9X_{t-1} - 0.2X_{t-2} + \epsilon_t$ 2.5+2.5

3. Derive two stage least square (2 SLS) estimate in a simultaneous equation system consisting of G number of endogenous and K number of exogenous variables. Show that 2 SLS estimates are consistent. 3+2

4. Consider a simple Keynesian model with no government

   $C_t = \alpha+\beta Y_t + u_t \quad t = 1.2.....T$

   $Y_t = C_t + I_t$

   Where C_t denotes consumption, Y_t denotes disposable income, and I_t denotes autonomous investment.This is a system of two simultaneous equations, also known as structural equations with the second equation being and identity.

   Show that β_{OLS} overstates β if $0 \leq \beta \leq 1$

Group – C

(Answer any two questions) 2×8=16

5. Consider the following demand and supply equations :

   Demand : $Q = a - bP + u_1$

   Supply : $Q = c + dP + eW + fL + u_2$

   where W denotes weather conditions affecting supply, and L denotes the supply of immigrant workers available at harvest time.

   (a) Write this system in the matrix form. 1

   (b) What does the order-condition for identification say about these two equations ? 1+1+2

   (c) Suppose researcher decides to estimate the above mentioned model using two stage least square (2SLS) method. Is the 2SLS an appropriate method, why ? Write the steps to be followed to estimate the above model. Can you estimate the following parameters : a, b, c, d, e, f ? [Justify your statement]. 1+3+1

6. Consider the simple panel data regression model

   $y_{it} = \beta x_{it} + u_{it}$

   $i = 1,2,....,N$; $t = 1,2,....,T$

   Where, $u_{it} = \mu_i + v_{it}$ where $\mu_i \sim IID(0, \sigma^2_\mu)$ and $v_{it} \sim IID(0, \sigma^2_v)$.

   Discuss appropriate method of estimating the above model with proper justification. 8

7. For the MA (1) model

   $y_t = \epsilon_t + \theta \epsilon_{t-1}$

   $t = 1,2,....T$; with $\epsilon_t \sim IIN(0, \sigma^2_\epsilon)$

   (a) Show that $E(y_t) = 0$ and var $(y_t) = \sigma^2_\epsilon(1+\theta^2)$ so that the mean and variance are independent of t.

   (b) Show that cov $(y_t, y_{t-1}) = \theta \sigma^2_\epsilon$ and cov $(y_t, y_{t-s}) = 0$ for $s > 1$ which is only dependent on s, the distance between the two time periods. Conclude from parts (a) and (b) that this MA (1) model is weakly stationary.

   (c) Discuss the method of estimating the above model. 2+3+3=8

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