MASTER OF ARTS EXAMINATION, 2022

(1std Year, 2nd Semester)

ECONOMICS

ECONOMETRICS AII

Time : Two hours Full Marks : 30

Answer any three questions

1. (i) Consider The ARMA model

$$X_t = 1.0X_{t-1} - 0.5X_{t-2} + \varepsilon_t - 0.9\varepsilon_{t-1} + 0.2\varepsilon_{t-2}.$$

Express ε_t as a function of X_t and lagged values of X_t by expanding $\varepsilon_t = (1-0.9L+0.2L^2)^{-1}(1-1.0L+0.5L^2)X_t$ in powers of L.

(ii) Which of the following processes are invertible?

a. $X_t = 0.8X_{t-1} + 0.4X_{t-2} + \varepsilon_t$

b. $X_t = \varepsilon_t - 1.8\varepsilon_{t-1} + 0.4\varepsilon_{t-2}$

(iii) Consider the model

$$y_t = \alpha + \beta x_t + u_t$$

$$u_t = \rho u_{t-1} + e_t, \quad 0 \le \rho \le 1$$

$e_t \sim IN(0,\sigma^2)$. By regressing Δy_t on Δx_t, is it possible to get more efficient estimates of β than by regressing y_t on x_t.

3+2+2+3=10

2. Write short note on
   a. Full information maximum likelihood method
   b. Seemingly unrelated regression estimation method

5 x 2=10

3. Consider the model

$$y_1 = \alpha y_2 + \delta x + u_1$$

$$y_2 = \beta y_1 + \gamma x + u_2$$

Where x is exogenous, and the error terms u_1 and u_2 have mean zero and are serially uncorrelated.

[Turn over

(i) Write down the reduced form model and state the equations that are related to structural and reduced-form parameters.

(ii) Show that if $\gamma = 0$, then β can be identified.

(iii) Are the parameters α *and* δ identified in this case? Why or why not?

(iv) How would you estimate the structural equations? Which method would you prefer: the system method or the single equation method? Why or why not?

2+2+2+4

4. State two main advantage of panel data over pooled data. Specify a linear static panel data model. Why is the model called static? Suppose that we want to estimate the effect of several variables on annual saving and that we have a panel data set on individuals collected on January 31, 1990, and January 31, 1992. If we include a year dummy for 1992 and use first differencing, can we also include age and gender in the original model? Explain. Consider a panel model describing annual savings and explain what estimation technique will you use to estimate the parameters of the model.

2+1+1+2+4