



Register Number:

DATE: 21-11-2020

ST JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE - 27

SEMESTER EXAMINATION- NOVEMBER 2020

M.Sc. BIG DATA ANALYTICS III SEMESTER

BDADE3418: INTRODUCTION TO ECONOMETRICS AND FINANCE

Duration: 2 1/2 Hrs

Max Marks: 70

THIS QUESTION PAPER HAS TWO PRINTED PAGES AND ONE PART

ANSWER ANY SEVEN OF THE FOLLOWING

7x10=70

1. Explain the difference between structural form equations and reduced form equations with examples. How will you test presence of endogeneity? Discuss the instrumental variable technique of estimation.
2. State the rank and order condition for identification. Consider a four equation model

$$\begin{aligned}C_t &= -\gamma_{11} - \alpha_{11}Y_t + u_{1t} \\I_t &= -\gamma_{21} - \alpha_{23}R_t - \alpha_{24}Y_t + u_{2t} \\R_t &= -\alpha_{34}Y_t - \gamma_{32}M_t + u_{3t} \\Y_t &= C_t + I_t + Z_t\end{aligned}$$

where  $C_t$  is consumption,  $I_t$  is investment,  $R_t$  is the rate of interest,  $Y_t$  is income,  $M_t$  is the money stock and  $Z_t$  is autonomous expenditure. Check for rank and order condition for each one of the equations.

3. Show that the random walk model and the random walk with drift are non-stationary model. Also explain the difference between trend non stationary and difference non stationary?
4. What is autocorrelation? Explain a test that can be used to detect the presence of autocorrelation in the following contexts
  - (a) When there is absence of lagged dependent variable in the explanatory part of the regression model
  - (b) When there is lagged dependent variable is present as a regressor
5. Write a note on Box Jenkins methodology.
6. A researcher has time series data for aggregate consumption,  $C$ , and aggregate disposable personal income,  $Y$ , for a certain country. She establishes that the logarithms of both series are  $I(1)$  and she correctly hypothesizes that the long-run relationship between them may be represented as

$$C = \lambda Y v \dots (1)$$

where  $\lambda$  is a constant and  $v$  is a multiplicative disturbance term. It may be assumed that  $\log v$  is normally distributed with zero mean and constant variance. The researcher believes that  $\log C$  and  $\log Y$  are cointegrated. How should she demonstrate this? The relationship implies that the long-run growth rate of

consumption is equal to that of income. Explain whether it is correct to describe the growth rates as being cointegrated.

The researcher is also interested in the short-run dynamics of the relationship and correctly hypothesizes that they may be represented by the relationship

$$\log C_t = \beta_1 + \beta_2 \log C_{t-1} + \beta_3 \log Y_t + \beta_4 \log Y_{t-1} + \varepsilon_t, \quad (2)$$

where  $\varepsilon_t$  is iid and drawn from a normal distribution with zero mean. State the restriction that has to be satisfied by the parameters if the short-run relationship (2) is to be compatible with the long-run relationship (1).

Show how the restricted version of (2) may be reparameterized as an error-correction model. Explain why fitting the error-correction model, rather than (2) directly, avoids a potentially important problem.

7. What is the difference between an ARCH and a GARCH model? Write down the steps required to estimate the ARCH and GARCH models.
8. Explain the differences between cross sectional, time series and panel data. Discuss the advantages of panel data over other types of data.
9. Write a note on fixed effect and random effects model. How will you choose between a fixed effect and a random effect model? Discuss in detail.

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