

University of Colombo – Sri Lanka

Faculty of Arts

Fourth Year Examination in Arts (Economics) – 2021/22

(End of the First Semester)

ECN 4190/94: Time Series Econometrics/Financial Sector Econometrics Models

Time Allowed: Two (02) Hours only

Answer any THREE (03) questions

1.

- a. What is non-stationarity? Explain it with appropriate examples.

(05 marks)

- b. Is the following time series process a non-stationarity series? Prove your answer mathematically.

$$y_t = \beta_1 + \beta_2 y_{t-1} + \varepsilon_t \quad \text{where } \beta_2 = 1$$

(10 marks)

- c. Sketch a correlogram for the time series discussed under (b) above.

(05 marks)

2. Consider the following two time series variables

$$y_t = \beta_2 y_{t-1} + \varepsilon_t \quad \text{where } \beta_2 = 1$$

$$x_t = \beta_2 x_{t-1} + \varepsilon_t \quad \text{where } \beta_2 < 1$$

- a. Sketch a line graph and correlogram graphs representing above two variables.

(05 marks)

- b. Assume a researcher regress y on x . What econometric issues the researcher may encounter? Explain your answer with examples.

(05 marks)

- c. Propose a regression specification or an estimation procedure to avoid the issues identified in (b) above.

(10 marks)

3. Assume the following time series process

$$y_t = \beta_2 y_{t-1} + \varepsilon_t$$

a. Derive a test in detecting non-stationarity for the above time series process.

(10 marks)

b. A researcher conducted the Augmented Dicky-Fuller (ADF) test for the above time series variable and obtained following statistics for the *intercept only* model.

ADF test statistics		-2.01
MacKinnon critical values		
	1%	-3.25
	5%	-2.13
	10%	-1.96

State the null and alternative hypotheses and conduct the test. Do you reject the null hypothesis? Rationalize your answer.

(05 marks)

c. Briefly discuss different types of non-stationary time series processes which are considered under time series econometrics.

(05 marks)

4.

a. What is cointegration? Why do researchers refer cointegrated relationships as long-run equilibrium relationships?

(05 marks)

b. Discuss the key steps in a two-step cointegration method.

(05 marks)

c. Discuss the major differences in Johansen multivariate and Autoregressive Distributed Lag Model cointegration methods.

(05 marks)

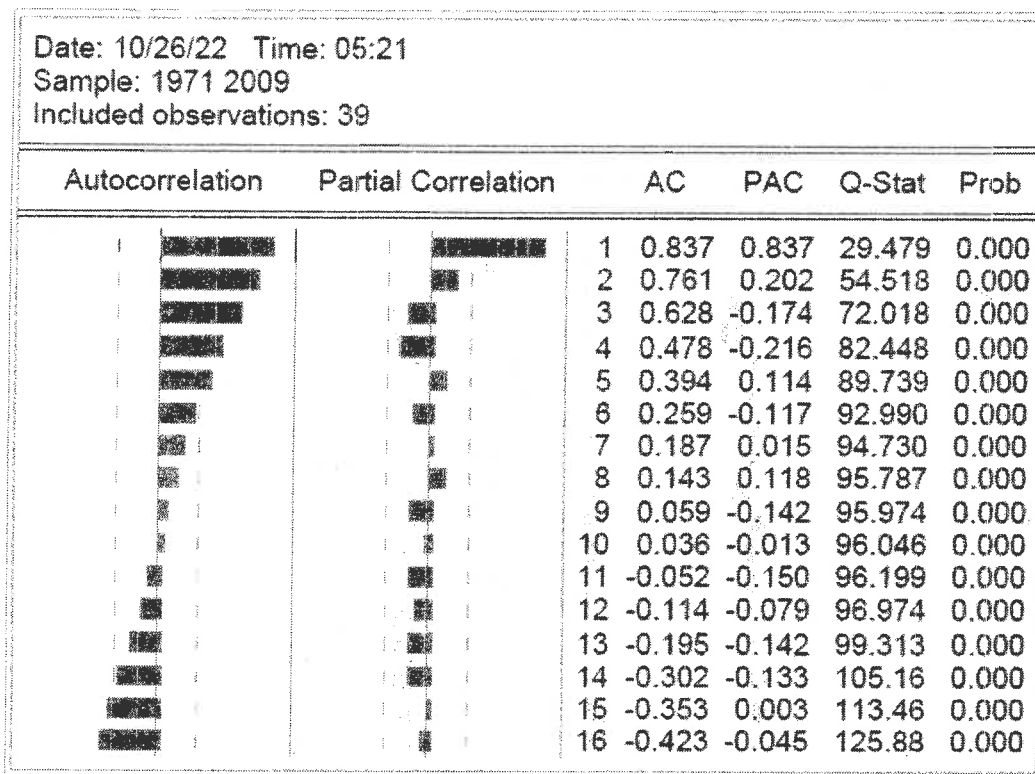
d. Discuss the role of the Error Correction Model in cointegration analysis.

(05 marks)

5. A researcher constructed a correlogram for the Official Development Assistance (ODA) received by Sri Lanka during 1971-2009. Figure 1 depicts the constructed correlogram.

Figure 1

Correlogram of ODA



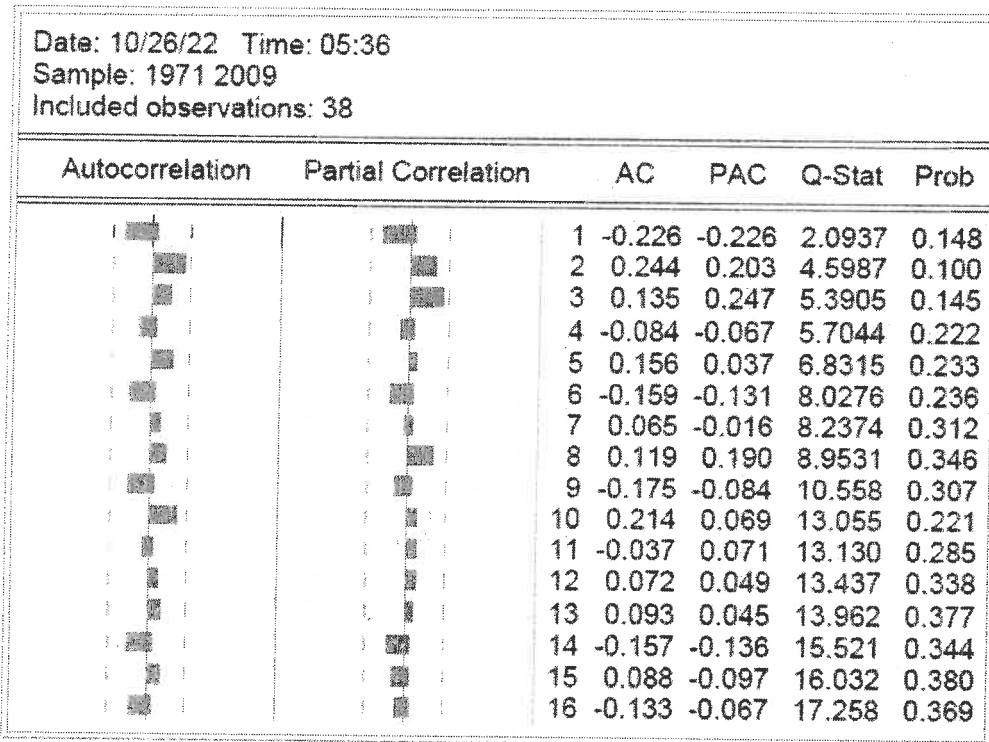
Assume the researcher wants to construct a univariate forecasting model for the ODA variable.

- a. Specify the univariate forecasting model. (05 marks)
- b. Discuss the steps in univariate forecasting approach. (05 marks)

After estimating the univariate forecasting model specified above (a), the researcher obtained the following correlogram for the residual series.

Figure 2

Correlogram of RESID02



c. Discuss the next step the researcher must carry out.

(05 marks)

d. Instead, assume the researcher wants to construct a multivariate forecasting model. Specify the model the researcher may consider in adopting.

(05 marks)
