

Time Series

Chapter 8 (learn the basics from chapter 8)

- 1 What is autocorrelation?
- 2 Write down the first order serial autocorrelation model with assumptions.
- 3 What is the null hypothesis of Durbin-Watson test?
- 4 What is the commonly used alternative hypothesis of Durbin-Watson test?
- 5 When the DW test is inconclusive, what do you do?
- 6 Explain how you attempt to fix autocorrelation problems.
- 7 What is the Cochrane-Orcutt procedure?
http://economistsview.typepad.com/economics421/2006/02/the_cochraneorc.html

8 $N=12, \sum_{t=2}^{12} (e_t - e_{t-1})^2 = 130.61, \sum_{t=2}^{12} e_t^2 = 171.529, e_1 = 5.50842, e_2 = 4.99826, \dots, e_{12} = 0.68650.$ Find the DW statistic.

- 9 Consider the following seasonal regression model using the seasonal dummy variables. $\hat{Y}_t = 968 + 0.938t - 342S_2 - 472S_3 - 230S_4$, where

$$S_2 = \begin{cases} 1 & \text{for second quarter} \\ 0 & \text{otherwise} \end{cases} \quad S_3 = \begin{cases} 1 & \text{for third quarter} \\ 0 & \text{otherwise} \end{cases}$$

$$S_4 = \begin{cases} 1 & \text{for fourth quarter} \\ 0 & \text{otherwise} \end{cases}$$

Assuming $t=1$ as a first quarter, find \hat{Y}_{67} .

- 10 When n is large, find DW statistic if $r_1(e) = 0.673$.

Chapter 9

- 1 Write down the following ARIMA models
 - (i) ARIMA(1,0,0).
 - (ii) ARIMA(0,1,0).
 - (iii) ARIAM(1,1,0)
 - (iv) ARIMA(1,1,1)
 - (v) ARIMA(1,2,1)
 - (vi) ARIMA(1,1,0)(0,1,2,)₄

- 2 Draw expected autocorrelation graphs and partial autocorrelation graphs for the following models according to the theory.
 - (i) AR(1) 2 possibilities
 - (ii) AR(2) 2 possibilities
 - (iii) MA(1) 2 possibilities
 - (iv) MA(2) 2 possibilities
 - (v) ARMA(1,1) 4 possibilities

- 3 What is an invertible ARIMA model? Google!

- 4 How do you figure out a time series is stationary or not?

- 5 How do you transform a non-stationary time series to a stationary time series.

- 6 How do you check whether a model is good?

- 7 How do you compare competing models?

- 8 What do you expect from the residuals?

- 9 Name two model selection criteria.

- 10 What are the advantages and disadvantages of the ARIMA models?