

Assignment 6

PART I: Crest's Unit Price

In this assignment we will be interested in modeling Crest's price. You have weekly time-series of 276 observations starting first week of January 1958. The weekly time series data is available in file "CrestPrice.TXT".

(a) Obtain the plot of the time-series CRESTPR=Crest's price and its sample autocorrelation function. Discuss why the CRESTPR series is nonstationary.

(b) Obtain the sample autocorrelation function of the first difference of CRESTPR series. Discuss why the first difference of the series seems to be stationary. By studying the autocorrelation, inverse autocorrelation and the partial autocorrelation functions of the first difference of the series identify a moving average (MA) process to model the first difference of CRESTPR series.

(c) Estimate the MA process whose order you have identified in part (b), write down the estimated model and discuss whether the residuals of the estimated MA model are white noise.

(d) Instead of using an MA process, estimate a first order AR process for the first difference of CRESTPR series. Based on the analysis would you say that AR(1) is an appropriate model for the first difference of CRESTPR series ? Please explain your reasoning.

PART II: A stationary time-series Y can be modeled almost perfectly by a first-order moving average, MA(1), process. Part of the SAS PROC ARIMA output associated with estimation of the MA(1) process is given below.

Unconditional Least Squares Estimation									
	Parameter	Estimate	Standard Error	t Value	Approx Pr > t	Lag			
	MU	24.97770	0.06070	411.52	<.0001	0			
	MA1,1	0.80214	0.02827	28.38	<.0001	1			

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	-----Autocorrelations-----					
6	5.41	5	0.3683	0.066	-0.030	0.003	-0.057	-0.017	-0.055
12	7.46	11	0.7607	0.001	0.043	-0.001	0.039	0.009	0.031
18	16.08	17	0.5183	0.048	-0.006	-0.023	-0.018	-0.094	-0.080
24	24.67	23	0.3675	-0.058	0.003	-0.062	-0.023	0.094	0.039

(a) Discuss the behavior of the autocorrelation and inverse autocorrelation functions that justify the use of MA(1) process to model time-series Y.

(b) Write down the estimated moving average process for Y using back-shift operator notation.

(c) What can you conclude about the the residuals from the estimated MA(1) process for series Y ? Please justify your answer.

(d) Based on the given information, will the two-step ahead forecast for Y be equal to the mean ? Explain why or why not.

(e) Obtain the estimate of autocorrelation function at lag 1 for Y series. Please show your work.

(f) Obtain partial autocorrelations at lags 1 and 2 for the Y series. Please show your work.

(g) Assume that an analyst incorrectly decides to model the Y series using a second order autoregressive process, that is, by an AR(2) process. What will be the analyst's Yule-Walker estimates of the coefficients ϕ_1 and ϕ_2 ?

PLEASE SUBMIT YOUR TYPED REPORT (NO MORE THAN 6 PAGES INCLUDING ONLY THE RELEVANT SAS OUTPUT)