Case study on forecasting in business and economics

Law, Evidence

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Question 1

a). Using the ACF graph, a trend is identified, which shows seasonality. The first trough shows the high season whereas the second trough represents the slack. After the ninth period, the graph shifts to the negative side, which may signify a low season. The PACF graph shows that a majority of periods of high are followed by a low period. This, however, is different for some periods where a period of high is followed by two consequent lows. This is a non-linear trend for the Mobile Home Shipment.

b). From the autocorrelation analysis, there is an evident time series. A time series is when there is a pattern in the data over given period. The graphs for the ACF and PACF shows an alternating series between highs and lows. A polynomial trend line of both the ACF and PACF shows the curve has smooth dips and rises at alternating points. The polynomial trend line of the two also shows the existence of a time series evident in the seasonality of the MHS. The two trendlines intersect at points where a season is starting (Zhang 87); the high season begun around period 1 and the low season begun at period 10.

Figure 1: ACF and PACF Polynomial Trend lines

c). An analysis of the ACF and PACF shows that the MHS has a negative autocorrelation. This is because periods of negative departures are followed by those of positive ones. If the autocorrelation was positive, periods of positive departures would be followed by similar ones while negative ones are followed by negative departures.

Figure 2: Moving Average Trend Line for the MHS

d). The best forecasting method for the MHS is the moving average. This is because using the method; one can determine the expected trend line based on previous data. The moving average trend line shows that the MHS has two troughs, which is similar to the inference made from the ACF. The trend line also shows that a low one follows each period of high, which was the case for the PACF. The moving average trend line can hence forecast for the MHS for both PACF and ACF in one graphical representation.

Question 2

- The mean monthly population of the United States is 160345. 18 and the standard error is 1492. 42. The standard error shows that the population deviates from the mean by 1492. 42 units. The standard deviation for the population is 40156. 80 and shows the dispersion of values from the average. This population, therefore, is widely dispersed from the mean. This population assumes a flat distribution; this is attributed to the negative kurtosis value. The monthly population of the United States is positively skewed; it extends more towards the positive values than the negative.

Figure 3: Descriptive Statistics

Figure 4: Original time series

b) The components identified in this series are title, the intercept, the vertical and horizontal axis, R2 and a linear trend line. The title reads population; it indicates that the number of people in the United States is the basis of the forecast. The intercept represents a factor that can be used to forecast future population. The vertical axis represents the population while the horizontal axis the date. The R2 shows by how much the trend line is linear, representing a pattern.

c) A time series is the best forecasting technique for this series. This is because this technique accommodates a trend, cyclical and seasonal pattern. This series has a linear trend line without seasonality. The time series technique can forecast business operations for up to two peaks and trough in a cycle. This series contains 724 sources of historic data. This technique is suitable because it is used to predict an existing business model.

d)

Figure 5: forecasted series

e) The regression based trend is useful for the evaluation of the forecasted series. The value of the R2 (0. 9689) is the basis for the criteria for evaluation. This value is a good measure of the goodness of fit for this forecast. A value of 0. 8 to 1 shows that the variable used for prediction explains the series to a significant extent. A value less than 0. 7 indicates that the technique used for prediction does not explain the data sufficiently.

Works Cited

Zhang, G P. Neural Networks in Business Forecasting. Hershey, Pa: Idea Group Pub, 2004. Internet resource.