

Evaluation of forecasts

Forecasts are evaluated using different measures based on the difference between the actual and the predicted value (the residual). Among these measures, the following are the most frequently used.

- (a) MAPE: mean absolute percentage error

$$MAPE = \frac{\sum_{t=1}^n |(e_t/Y_t)| 100}{n}$$

This method is useful when the units of measure of Y_t are relatively large.

- (b) MSE: mean squared error

$$MSE = \frac{\sum_{t=1}^n e_t^2}{n}$$

This measure is useful when the managers are interested in minimizing the occurrence of a major error. This measure magnifies large errors. However one might tend to select a model with an error pattern of 10,1,1,1,1, rather than one with an error pattern of 5,5,5,5,5 (one with a few large errors versus one with a smaller systematic error). This method does not indicate whether the model is systematically underestimating or overestimating the actual values.

- (c) RMSE: root mean squared error

$$RMSE = \sqrt{\frac{\sum_{t=1}^n e_t^2}{n}}$$

- (d) MAD: mean absolute deviation

$$MAD = \frac{\sum_{t=1}^n |e_t|}{n}$$

Validation

The goal of the forecast exercise is to obtain accurate predictions. In measuring the accuracy of the prediction the forecaster usually relies on the performance of the model using past information. This is basically the assumption adopted in the previous section.

A better approximation to measure how accurate a model predicts is to use only part of the sample and validate the model using the hold out sample. In this case the ratios based on forecast errors are calculated using the number of data points predicted for the hold out sample points. This provides a more reliable measure of the quality of the forecast for each model.