

A Comparison of Univariate Time Series Methods for Forecasting Cocoa Bean Prices

ABSTRACT

The purpose of this study was to compare the forecasting performances of different time series methods for forecasting cocoa bean prices. The monthly average data of Tawau cocoa bean prices graded SMC 1B for the period of January 1992-December 2006 was used. Tawau is one of the top cocoa producers in the world along with the Ivory Coast, Ghana and Indonesia. Four different types of univariate time series methods or models were compared, namely the exponential smoothing, autoregressive integrated moving average (ARIMA), generalized autoregressive conditional heteroskedasticity (GARCH) and the mixed ARIMA/GARCH models. Root mean squared error (RMSE), mean absolute percentage error (MAPE), mean absolute error (MAE) and Theil's inequality coefficient (U-STATISTICS) were used as the selection criteria to determine the best forecasting model. This study revealed that the time series data were influenced by a positive linear trend factor while a regression test result showed the non-existence of seasonal factors. Moreover, the Autocorrelation function (ACF) and the Augmented Dickey-Fuller (ADF) tests have shown that the time series data was not stationary but became stationary after the first order of the differentiating process was carried out. Based on the results of the ex-post forecasting (starting from January until December 2006), the mixed ARIMA/GARCH model outperformed the exponential smoothing, ARIMA and GARCH models.