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Modeling open market monthly average retail price of potatoes in Colombo

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Potato is a vastly consumed commodity, which is both exported and imported in Sri Lanka in the form of a fresh vegetable or as an ingredient in several processed food products. The availability of potatoes in the market is mainly affected by the quantity supplied to the local market, trade agreements and government policies. A considerable impact is also made by uncontrollable factors such as weather conditions, diseases, and catastrophes. The resulting demand and supply imbalances cause fluctuations in the price levels of potatoes in the market. Hence, capturing such fluctuations onto a suitable time series model for forecasting the potato price levels was considered as the main objective of the study where the findings of the study will benefit to the farmers, retail & wholesale markets, the government and many other stakeholders. The scope of the study was built upon the open market monthly average retail price (per kilogram) of potatoes, centring Colombo. The Central Bank archives, published under the Economic & Social Statistics discipline from January 2006 to December 2018 were used to obtain data. The trend component observed in the original data set was removed using the differencing technique. The cutoff lags at intervals of 12 in the Autocorrelation Function (ACF) plot of the stationary series, limited the candidate models to Seasonal Autoregressive Integrated Moving Average (SARIMA) models as the series exhibits seasonality. Since the SARIMA model with the minimum Akaike's Information Criterion (AIC), hinted the presence of autocorrelation in the residuals, it was replaced by (ARIMA) (4, 1, 3) (0, 1, 3)_[12] model which was recognized as a better model of fit. The model validation was done using Root Mean Squared Error (RMSE), Mean Absolute Percentage Error (MAPE) and Mean Absolute Error (MAE) and the corresponding values were 14.74, 8.13% and 12.24 respectively. Since forecasting the retail price of potatoes concerns various interested parties, this analysis would be helpful in decision making and in determining optimal settings for the demand and supply criteria.

Keywords: AIC, ACF, Potato Retail Price, SARIMA