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TIME SERIES ANALYSIS FOR MODELING AND FORECASTING TEA EXPORTS IN SRI LANKA

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Tea is the most popular and low-cost beverage in the world, next only to water and the most consumed manufactured drink in the world made from the young leaves and unopened leaf buds of the evergreen shrub *Camellia sinensis*. There are many tea-growing countries worldwide, and Sri Lanka is the fourth largest tea-growing country and the third largest tea exporter to the world market. The tea industry plays a significant role in the Sri Lankan economy regarding foreign exchange earnings, providing employment opportunities and being the main source of government revenue. Therefore, it is vital to predict future fluctuations in tea exports, which affect the country's economy. This study attempted to identify appropriate ARIMA models to forecast tea exports in Sri Lanka by export quantity and export value. Twelve variables namely, Bulk Quantity, Packet Quantity, Bags Quantity, Instant Quantity, Green Tea Quantity, Total Quantity, Bulk Value, Packet Value, Bags Value, Instant Value, Green Tea Value and Total Value were accounted for the study. Initially, it was found that all the data were non-stationary by using the Kwiatkowski Phillips Schmidt Shin (KPSS) test. Therefore, the first differencing was applied, and the stationarity of the data was confirmed. The univariate time series analysis was applied for each variable, and models with the lowest Akaike Information Criterion (AIC) and Bayesian information criterion (BIC) values were used to select the best-fitted models. The Seasonal ARIMA (SARIMA) models were fitted to forecast Bulk Quantity, Packet Quantity, Bags Quantity, Green Tea Quantity and Total Quantity. The ARIMA models were fitted to forecast Instant Quantity, Bulk Value, Packet Value, Bags Value, Instant Value, Green Tea Value and Total Value. It was found that the models fitted to forecast Instant Quantity and Instant Value have Mean Absolute Percentage Error (MAPE) higher than 50%, which indicates the lower predictive ability of the models, while all the other fitted models showed MAPE below 25%, which were relatively better suited to predict the variables.

Keywords: ARIMA Models, Forecasting, Kwiatkowski Phillips Schmidt Shin test, Mean Absolute Percentage Error, SARIMA models