

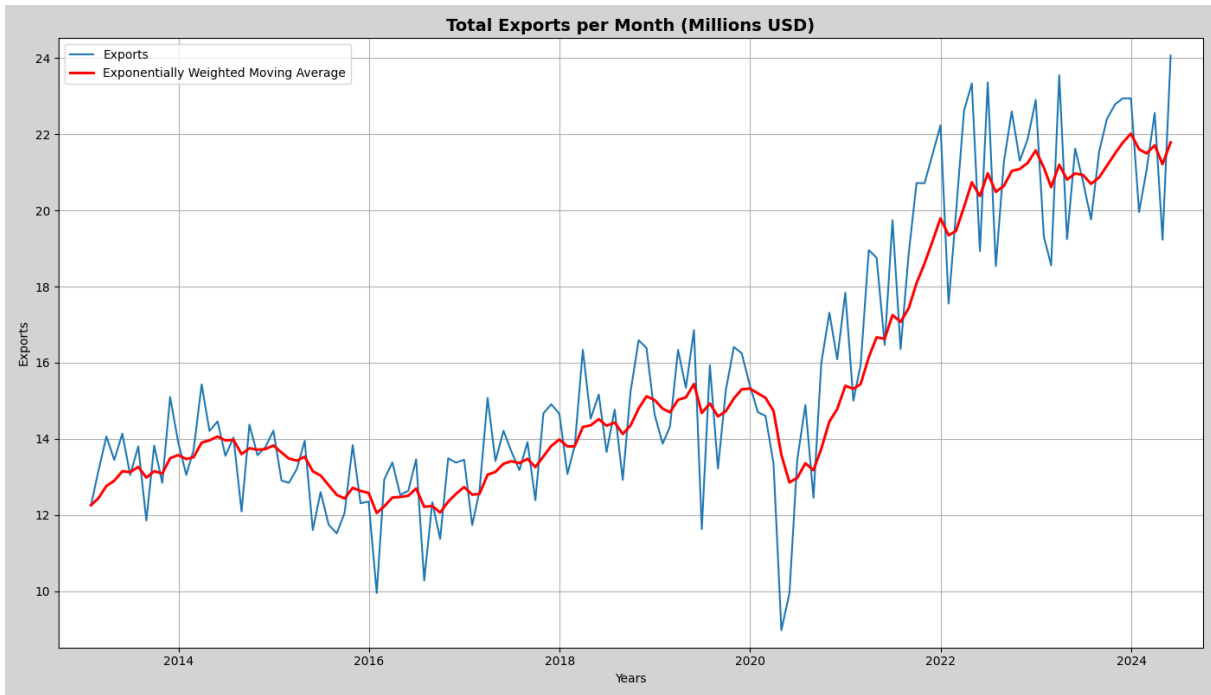
Basic Analysis of Exports of Türkiye

Summary

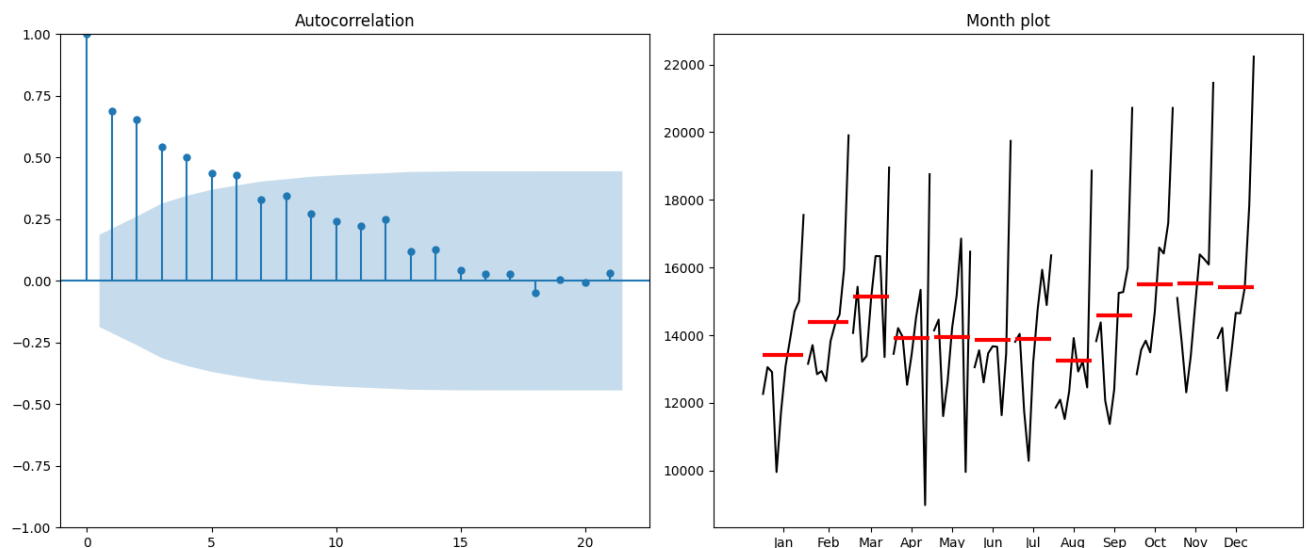
In this report, the data of exports of Türkiye is analysed. The data provided by EVDS system. The data contains total exports per month from 2013-01 to 2024-05 (137 months). Basic models such as ARIMA, SARIMA, Holt and Holt Winters are used in the analysis. At the end, a 12 month forecast was made

Overview

Below, the data has plotted with Exponentially Weighted Moving Average (EWMA) to see clearly without noise.



We see an increasing trend on the graph. ADF and KPSS tests also support the existence of a trend. Mann-Kendall test indicates an increasing trend. Even if we look at the Auto-Correlation graph, it decreases. It means that the trend exists:



On the other hand, month plot gives us an understanding of the seasonality in the data. It is not very clear, but we determined the duration of the seasonal cycle according to the AIC and BIC criteria in seasonal forecast models such as SARIMA.

Below, the models are evaluated according to AIC and BIC criteria:

ARIMA(0,1,1) → AIC=3437.7, BIC=3443.0

SARIMA(0,1,1)(0,0,2,6) → AIC=3431.5, BIC=3442.3

Holt → AIC=3154.3, BIC=3165.1

Holt Winters → AIC=3138.5, BIC=3165.5

The best model is Holt Winters according to AIC and BIC criteria. However, we used other common metrics to measure the accuracy of models such as mean squared error (mse), mean absolute error(mae), root mean squared error(rmse).

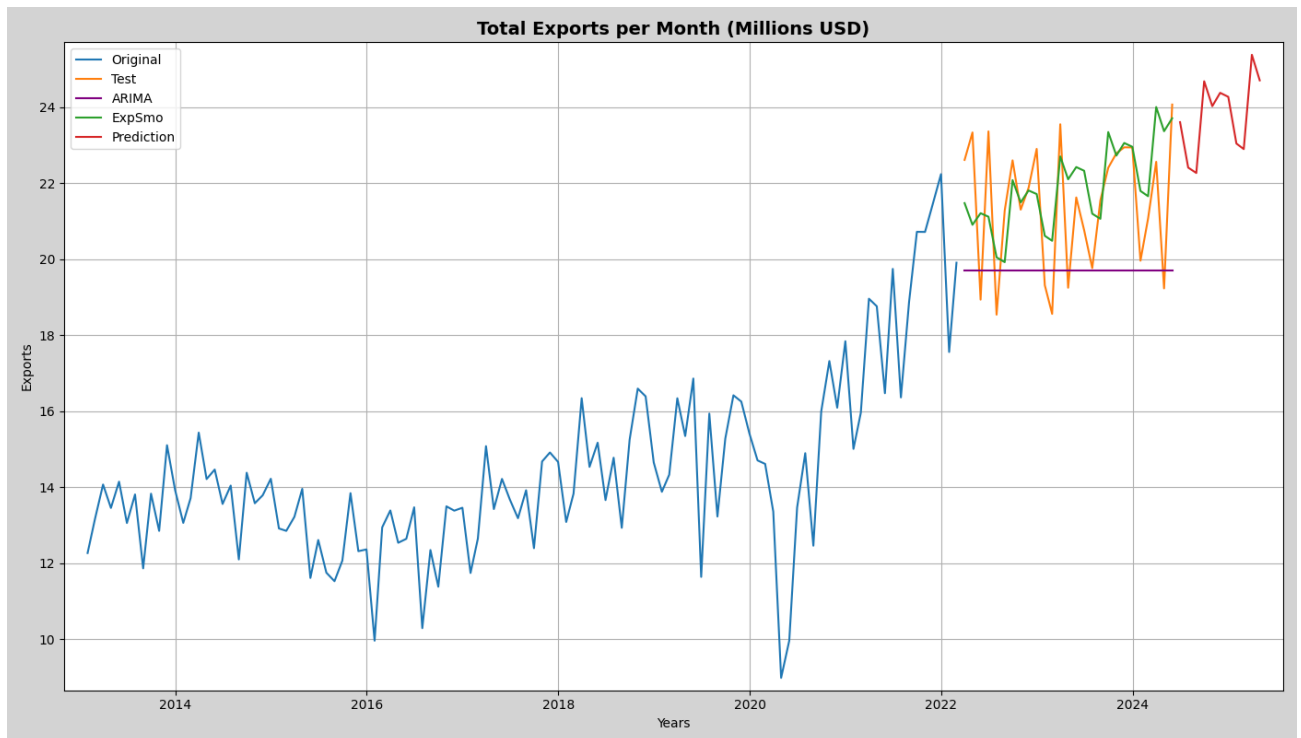
ARIMA Model → MSE: 7561536.7 RMSE: 2341.4 MAE: 1992.5

SARIMA Model → MSE: 13499893.9 RMSE: 2774.1 MAE: 2404.3

Holt Model → MSE: 16832035.1 RMSE: 3149.8 MAE: 2777.3

Holt Winters → MSE: 16704024.7 RMSE: 3217.1 MAE: 2809.7

On these metrics, the best model is ARIMA model. Furthermore, we used ARIMA and Holt Winters for predictions. The result is given below:



As seen in the graph above, the total exports will continue to increase according to our prediction. Although this is possible, it should be taken into consideration that this analysis is very basic and simple and may not give accurate results.

The graphs and code are provided:
<https://github.com/okkesd/Export-Data-Analysis>

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