Forecasting Container Throughput: Using Aggregate or Terminal-Specific Data?

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Abstract : We forecast the demand of total container throughput at the Indonesia's largest seaport, Tanjung Priok Port. We propose four univariate forecasting models, including SARIMA, the additive Seasonal Holt-Winters, the multiplicative Seasonal Holt-Winters and the Vector Error Correction Model. Our aim is to provide insights into whether forecasting the total container throughput obtained by historical aggregated port throughput time series is superior to the forecasts of the total throughput obtained by summing up the best individual terminal forecasts. We test the monthly port/individual terminal container throughput time series between 2003 and 2013. The performance of forecasting models is evaluated based on Mean Absolute Error and Root Mean Squared Error. Our results show that the multiplicative Seasonal Holt-Winters model produces the most accurate forecasts of total container throughput, whereas SARIMA generates the worst in-sample model fit. The Vector Error Correction Model provides the best model fits and forecasts for individual terminals. Our results report that the total container throughput forecasts based on modelling the total throughput time series are consistently better than those obtained by combining those forecasts generated by terminal-specific models. The forecasts of total throughput until the end of 2018 provide an essential insight into the strategic decision-making on the expansion of port's capacity and construction of new container terminals at Tanjung Priok Port.

Keywords : SARIMA, Seasonal Holt-Winters, Vector Error Correction Model, container throughput

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