

# Abstract

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## **The role of leading economic indicators in forecasting container demand : a dynamic econometric approach**

Containerised cargo is a growing market segment accounting for 16% by volume loaded, and more than 50% in value, of international seaborne trade in 2013 \cite{rmt2013}. The services arising from container shipping are complex and require short- and long-term operational planning and financial decisions. Therefore, forecasting future container flows contribute as a tool to make decisions based on profound information and to reduce uncertainty. The objective of this research is to develop a forecasting model for the container demand at the port level based on the leading indicators of the economic activity. The long-term relationship guide the efficient allocation and economic sustainability of investment decisions, whether the infrastructure needed is financed by public private sector.\\ \noindent The dataset is based on a monthly time series from January 1995 to July 2014. The variables are at aggregate level, encompassing the total throughput, loading, and unloading of containers at the Port of Antwerp, three economic indicators and four confidence indicators for Belgium, and one confidence indicator for the European Union.\\ The methodology conducted is based on the hypothesis that economic activity indicators can be used as leading the container throughput. Two dynamic time series modelling approaches are adopted in this paper. First, an autoregressive integrated moving average with an exogenous variable (ARIMAX) model is estimated based on the Box and Jenkins methodology. Second, an error correction model is estimated using the Engle-Granger two-step procedure to evaluate the short- and long-term effect of the explanatory variable on the dependent variable. The research is of interest to financial and organisational planning for port authorities, terminal operators, and stakeholders by providing short-term forecasts and long-term relationship development. Moreover, the empirical analysis contributes to provide insight about the data generating mechanism that enables to answer the following policy issues: 1. Which economic indicators might be identified as leading indicators for the container demand? and 2. Is the relation between container demand and economic activity stable in the long-run? Based on the analysis in this research, the relationship between container throughput and economic activity is changing, but is still coupled. Moreover, the financial crisis had an impact on changing the long-run equilibrium relationship.