

## The Impact of Shifting Trading Pattern from Long-Haul to Short-Sea to the Car Carriers' Freight Revenues

**Authors :** Tianyu Wang, Nikita Karandikar

**Abstract :** The uncertainty around cost, safety, and feasibility of the decarbonized shipping fuels has made it increasingly complex for the shipping companies to set pricing strategies and forecast their freight revenues going forward. The increase in the green fuel surcharges will ultimately influence the automobile's consumer prices. The auto shipping demand (ton-miles) has been gradually shifting from long-haul to short-sea trade over the past years following the relocation of the original equipment manufacturer (OEM) manufacturing to regions such as South America and Southeast Asia. The objective of this paper is twofold: 1) to investigate the car-carriers freight revenue development over the years when the trade pattern is gradually shifting towards short-sea exports 2) to empirically identify the quantitative impact of such trade pattern shifting to mainly freight rate, but also vessel size, fleet size as well as Green House Gas (GHG) emission in Roll on-Roll Off (Ro-Ro) shipping. In this paper, a model of analyzing and forecasting ton-miles and freight revenues for the trade routes of AS-NA (Asia to North America), EU-NA (Europe to North America), and SA-NA (South America to North America) is established by deploying Automatic Identification System (AIS) data and the financial results of a selected car carrier company. More specifically, Wallenius Wilhelmsen Logistics (WALWIL), the Norwegian Ro-Ro carrier listed on Oslo Stock Exchange, is selected as the case study company in this paper. AIS-based ton-mile datasets of WALWIL vessels that are sailing into North America region from three different origins (Asia, Europe, and South America), together with WALWIL's quarterly freight revenues as reported in trade segments, will be investigated and compared for the past five years (2018-2022). Furthermore, ordinary-least-square (OLS) regression is utilized to construct the ton-mile demand and freight revenue forecasting. The determinants of trade pattern shifting, such as import tariffs following the China-US trade war and fuel prices following the 0.1% Emission Control Areas (ECA) zone requirement after IMO2020 will be set as key variable inputs to the machine learning model. The model will be tested on another newly listed Norwegian Car Carrier, Hoegh Autoliner, to forecast its 2022 financial results and to validate the accuracy based on its actual results. GHG emissions on the three routes will be compared and discussed based on a constant emission per mile assumption and voyage distances. Our findings will provide important insights about 1) the trade-off evaluation between revenue reduction and energy saving with the new ton-mile pattern and 2) how the trade flow shifting would influence the future need for the vessel and fleet size.

**Keywords :** AIS, automobile exports, maritime big data, trade flows

**Conference Title :** ICMFT 2023 : International Conference on Maritime Freight Transport

**Conference Location :** Singapore, Singapore

**Conference Dates :** March 27-28, 2023