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# **Viability of the Northern Sea Route for oil product tankers: The role of commodity prices, in-transit inventory, and alternative operational modes**

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## **Purpose**

The purpose of this study is to assess quantitatively the competitiveness of the Northern Sea Route (NSR) against the Suez Canal and Cape of Good Hope routes for oil product tankers. The analysis establishes the Required Freight Rate of single voyages by using unique up-to-date secondary and primary data related to operational and cost factors. It reflects real practices and historic voyage flows amongst competing routes.

## **Research Approach**

The model considers distance, commodity and fuel prices, and the time value of cargo drawing from historic market conditions between 2011 and 2020. Alternative operational modes are included to consider emissions reductions policies, including the use of low sulphur oil fuels and dual fuel Oil/Liquefied Natural Gas (LNG) set-ups.

## **Findings and Originality**

The results show that Cape is a competitive alternative under low fuel/commodity prices. The NSR is more competitive when moving from long to short-hauls, under high fuel/commodity prices, and discounted or zero icebreaking fees. The LNG/Oil mileage ratio and LNG tank capacity determine route competitiveness, with big capacity increasing the competitiveness of longer routes. Lower speeds favour shorter routes since transit times for longer routes increase more than those for shorter routes and result in comparatively higher fuel and fixed costs.

## **Research Impact**

The methodological approach consists of two objectives, namely, cost minimisation based on speed optimisation, and cost assessments based on constant speeds drawing from AIS data for LR2 tankers operating between east and west. The NSR is assessed in the wider context of route choice for product tankers by addressing market structure and real practices drawing from AIS data and commodity price movements from historic periods.

## **Practical Impact**

On the one hand, the exploration of the NSR occurred on the back of high fuel and commodity prices, coupled with backwardated futures markets, discounted NSRA fees during 2012-2013 and increased piracy insurance premiums for SCR voyages. On the other hand, a steep contango curve in middle distillate futures prices led to an extensive use of the Cape route between east and west along with voyages via the SCR during 2015-2016 and 2020.

## **Keywords**

northern sea route; fuel types; AIS data; speed optimization; in-transit inventory