

Arctic Liner Shipping Routes Viability: An Economic Model of Interdependent Variables

Seiwook Chung

¹College of International Trade and Logistics ,Chung-ang University,Korea

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ABSTRACT

The economic viability of Arctic liner services has commonly been evaluated through scenario-based cost comparisons with the Suez route. Existing studies typically assess whether the Arctic corridor becomes cheaper under assumed fuel prices, ice conditions, and operating parameters. While informative, such fixed-scenario comparisons provide limited insight into the structural conditions required for sustainable market entry. This study addresses a different question: under what parameter configurations does Arctic liner service become economically viable? Rather than comparing total voyage costs under predetermined assumptions, the paper develops a structural threshold framework that identifies the minimum shipment scale required to cover fixed and variable costs. In doing so, the research shifts the analytical focus from static cost comparison to entry feasibility and parameter interaction. The central research problem is therefore not whether the Arctic route is cheaper in a given scenario, but how navigability constraints, effective lead time performance, and fixed-cost recovery interact to determine breakeven scale. This perspective enables identification of parameter leverage and clarifies why different studies reach divergent conclusions under alternative assumptions.

JEL Codes:

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