

The Impact of Logistics Performance on Agricultural Export Values Among ASEAN Countries: A Gravity Model Approach

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ABSTRACT

This study applies an extended gravity model to assess how logistics (LOGS) performance and its components shape agricultural export values among Association of Southeast Asian Nations (ASEAN) countries. Using panel data from 2010 to 2018 and the feasible generalized least squares method, it examined the effects of LOGS capabilities and other determinants on intra-ASEAN trade. The results show that gross domestic product, population, and LOGS performance increase export values, while distance reduces them. Contiguity and colonial ties enhance trade, whereas a shared language is linked to lower flows, likely due to similar production structures. Among LOGS dimensions, customs efficiency has the strongest impact, followed by infrastructure (INFR), timeliness, and other components. The study highlights the central role of LOGS performance in strengthening ASEAN agricultural trade and identifies customs efficiency, INFR development, and timely delivery as key drivers. It recommends increased INFR investment, wider adoption of digital technologies, and deeper regional cooperation to support sustainable development.

KEYWORDS

Agricultural Export Value, ASEAN, Gravity Model, Logistics Performance Index

INTRODUCTION

Agriculture is a key sector for Southeast Asian countries, accounting for about 11% of ASEAN's gross domestic product (GDP) in 2020 (Ministry of Science and Technology, 2022). With favorable climatic conditions and extensive agricultural expertise, ASEAN has emerged as a leading exporter of

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diverse agricultural products to global markets. The region has increasingly viewed the intraregional agricultural market as an extension of its domestic markets (Ministry of Industry and Trade, 2020), driven by geographical proximity, a substantial consumer base, cultural similarities, zero tariffs, and simplified customs (CUST) procedures under the ASEAN Trade in Goods Agreement (Ministry of Industry and Trade, 2020).

Despite these advantages, intraregional trade remains underutilized, presenting substantial growth potential. This gap between potential and reality forms the core of the research problem. Maximizing this potential requires highly efficient, integrated cross-border logistics (LOGS) systems. However, ASEAN countries' LOGS systems are in a significant transitional phase, having faced disruptions due to the COVID-19 pandemic and other external factors. In response, several ASEAN nations, including Vietnam, are actively working to enhance infrastructure (INFR), improve information technology (IT) connectivity, and streamline complex LOGS services to boost trade efficiency. This context highlights the critical and time-sensitive need to understand the specific role of LOGS in facilitating agricultural exports.

Furthermore, there are considerable disparities in LOGS performance among the countries in the region, as quantified by the Logistics Performance Index (LPI) (World Bank, 2023). For example, Singapore consistently ranks as a top global performer, while countries, like Laos and Cambodia, register significantly lower LPI scores. This regional disparity in LOGS quality and efficiency directly impacts the cost, time, and reliability of cross-border trade, particularly for perishable agricultural goods. Given the rising LOGS costs associated with exports to distant markets, prioritizing efficient intraregional LOGS has become a strategic imperative for the bloc.

This confluence of factors—the imperative to unlock unfulfilled intraregional agricultural trade potential and the need to strategically address regional LOGS disparities in a transitional and post-disruption environment—motivates this study. The issue is intrinsically linked to the key variables: agricultural export value (the dependent variable) and the LPI and its dimensions (the key independent variables). Empirical evidence is urgently required to identify which specific LOGS factors yield the greatest return on investment for agricultural exports.

Therefore, this study aims to evaluate the precise impact of overall LOGS performance and its six dimensions on the value of agricultural exports among ASEAN countries, utilizing the robust gravity model framework. By offering a comprehensive, timely analysis of the role of LOGS, this research holds significant value. It will not only provide essential empirical evidence to validate and refine existing international trade theory but also generate concrete, evidence-based recommendations for ASEAN policymakers. These recommendations are designed to guide strategic investments in LOGS INFR and efficiency, thereby enhancing the region's agricultural export performance, strengthening economic integration, and securing food supply chains.

Finally, the remainder of the paper is structured as follows. The next section presents the theoretical framework and a review of the related literature. This is followed by the section that describes the data and research methodology. Next is a section that reports and discusses the empirical results. Finally, the last section concludes the paper with policy implications and suggestions for future research.

LITERATURE REVIEWS

Measuring LOGS Performance

There are several methods to assess LOGS efficiency and its constituent indicators (Hausman et al., 2012). However, the LPI developed by the World Bank is widely recognized and analyzed by countries, policymakers, and trade experts to evaluate and compare LOGS efficiency (Arvis et al., 2018; Puertas et al., 2013). This index is also commonly used in published studies to evaluate the competitive capabilities and performance of the LOGS sector in various countries (Puertas et al., 2013).

Since 2007, the LPI, published by the World Bank, has been widely used as an important measure for assessing and ranking the efficiency and operational capabilities of LOGS systems

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