GEORGE BROWN PRESS
JOURNALS, BOOKS & PROCEEDINGS

Economics and Management Innovation

Article

Vietnam's Agricultural Export Competitiveness in the Global Market: A Panel Data Analysis

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Abstract: This paper presents an in-depth analysis of the competitiveness of Vietnam's agricultural exports in the global market using panel data analysis over the period from 2010 to 2023. The research integrates various economic indicators, such as export volume, value, and production data, both from Vietnam and its key trading partners. The core of the analysis involves the application of two key indices—the Revealed Comparative Advantage (RCA) Index and the Trade Specialization Coefficient (TSC)—to evaluate Vietnam's relative standing in agricultural exports. The results of the study reveal that Vietnam maintains a competitive edge in certain agricultural products, most notably rice, coffee, and cashew nuts. These sectors have historically contributed significantly to the country's agricultural export growth. However, despite these strengths, the study highlights several persistent challenges. These include concerns over the consistency and quality of agricultural products, which hinder Vietnam's ability to access high-value markets. Additionally, Vietnam faces growing competition from other emerging agricultural exporters, particularly in regions such as South America and Africa, which have gained prominence in key agricultural export categories. The study also underscores the importance of factors such as market diversification, technological innovation, and sustainable farming practices in improving competitiveness. The research suggests that Vietnam's agricultural sector must transition from a reliance on traditional export products to incorporating more diversified, high-quality products that meet the standards of global markets. Furthermore, addressing logistical inefficiencies and investing in infrastructure are essential steps to reduce export costs and increase market reach. In light of these findings, the paper proposes several targeted policy recommendations to enhance Vietnam's agricultural export competitiveness. These include promoting research and development in agricultural technologies, strengthening international trade agreements, supporting smallholder farmers in improving their production techniques, and enhancing brand recognition for Vietnamese agricultural products. Additionally, fostering collaboration between the government, private sector, and educational institutions will be crucial in creating a more resilient agricultural export framework. These efforts will not only strengthen Vietnam's position in the global agricultural market but also contribute to the country's long-term economic development.

Keywords: Vietnam; agricultural exports; competitiveness; panel data analysis; revealed comparative advantage index

Received: 10 July 2025
Revised: 21 July 2025
Accepted: 08 August 2025
Published: 13 August 2025

1. Introduction

Agriculture has always been a cornerstone of Vietnam's economy, with agricultural exports playing a pivotal role in driving economic growth, employment, and foreign exchange earnings. As a major global exporter of products like rice, coffee, and cashew nuts, Vietnam's agricultural sector is crucial to its trade balance and rural development. However, the global agricultural market is becoming increasingly competitive due to factors such as technological advancements, shifting consumer preferences, and the rise of new

agricultural producers in other countries. To maintain and expand its market share, Vietnam must continuously enhance the competitiveness of its agricultural exports, focusing on factors like product quality, market access, and value-added processing.

This study aims to analyze Vietnam's agricultural export competitiveness using panel data analysis. By exploring the key factors influencing competitiveness—such as productivity, trade policies, and technological innovation—this research provides valuable insights to help Vietnam formulate more effective agricultural trade strategies. These strategies are essential to improving the efficiency of the agricultural sector, ensuring its sustainable development, and securing Vietnam's position in the global agricultural market.

2. Literature Review

The competitiveness of agricultural exports has long been a focal point of research in international trade literature. A foundational contribution to this field was made by Balassa (1965), who introduced the Revealed Comparative Advantage (RCA) index. This index has become a widely used tool for assessing the relative competitiveness of a country's products in the global market. The RCA index allows for a comparison of export performance across countries and offers insights into the sectors where a country holds a competitive advantage [1]. In addition to the RCA, other indices, such as the Trade Specialization Coefficient (TSC), have also been utilized to evaluate the specialization and competitiveness of agricultural exports.

For studies specific to Vietnam's agricultural exports, much of the existing research has been qualitative in nature, focusing on individual commodities or broader trends in agricultural trade. For instance, several studies have explored the competitiveness of Vietnam's rice exports by analyzing production costs, product quality, market access, and demand conditions in both domestic and international markets. While these studies provide valuable insights, they often lack a comprehensive, data-driven approach to understanding the broader competitiveness of Vietnam's agricultural export sector. Furthermore, there is a notable gap in the literature concerning quantitative studies that apply panel data analysis to evaluate the dynamics of Vietnam's agricultural export competitiveness over time [2].

This study aims to bridge this gap by employing panel data analysis to conduct a more in-depth, quantitative examination of the key factors that influence Vietnam's agricultural export competitiveness. By analyzing data from 2010 to 2023, this research will offer a more comprehensive understanding of Vietnam's position in the global agricultural market, providing valuable insights for policy makers and industry stakeholders.

3. Data Sources and Research Methods

3.1. Data Sources

The data for this study is primarily sourced from reputable global and national databases, including the Food and Agriculture Organization (FAO), the General Statistics Office of Vietnam, and the World Bank [3]. The data spans the period from 2010 to 2023 and covers a broad range of variables necessary for understanding Vietnam's agricultural export competitiveness. This includes detailed statistics on the volume and value of Vietnam's agricultural exports, as well as the production levels of key agricultural commodities. Additionally, economic indicators such as GDP, population, and trade volumes of Vietnam's major trading partners are included to capture the broader context of global trade dynamics.

The datasets from these sources provide comprehensive insights into the performance of Vietnam's agricultural sector and offer a foundation for assessing the factors that influence its export competitiveness. By integrating data from multiple sources, the study ensures a holistic approach to understanding the interconnectedness of domestic agricultural production and global market conditions [4].

3.2. Research Methods

This study utilizes two key indices, the Revealed Comparative Advantage (RCA) and the Trade Specialization Coefficient (TSC), to quantitatively assess the competitiveness of Vietnam's agricultural exports.

The formula for calculating the Revealed Comparative Advantage Index (RCA) is:

$$RCA_{ij} = \frac{X_{ij}/X_{it}}{\sum_i X_{ij} / \sum_i X_{it}}$$

Where X_{ij} represents the export value of product j from country i, X_{it} is the total export value of country i, $\sum_i X_{ij}$ is the global export value of product j, and $\sum_i X_{it}$ is the global total export value. If $RCA_{ij} > 1$, it indicates that country i has a comparative advantage in product j, while $RCA_{ij} < 1$ suggests a comparative disadvantage.

Similarly, the formula for calculating the Trade Specialization Coefficient (TSC) is:

$$TSC_{ij} = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}$$

where X_{ij} represents the export value of product j from country i, and M_{ij} represents the import value of product j by country i. The TSC ranges from -1 to 1, with values closer to 1 indicating strong export specialization (i.e., the country exports more than it imports), and values closer to -1 indicating weak competitiveness, with the country importing more than it exports.

In addition to these indices, the study employs panel data regression analysis to explore the factors that influence [5] Vietnam's agricultural export competitiveness. This method allows for the examination of both domestic factors, such as the scale of agricultural production, technological advancements, and infrastructure development, as well as international factors, including market demand fluctuations, trade policies, and the economic conditions of trading partners. By combining these analytical tools, the study provides a comprehensive understanding of the drivers behind Vietnam's agricultural export performance and identifies key areas for policy intervention.

4. Analysis of Vietnam's Agricultural Export Status

4.1. Overall Export Volume and Value

The data in Table 1 indicates that from 2010 to 2019, Vietnam's agricultural export volume and value consistently showed an upward trajectory [6]. This steady growth can be attributed to a variety of factors, including the expansion of key agricultural products like rice, coffee, and seafood, and the strengthening of Vietnam's trade relationships with global partners. The increase in both volume and value suggests an improvement in product diversification, along with better market access and trade facilitation.

Table 1. Overall Export Volume and Value of Vietnam's Agricultural Exports (2010-2023).

Year	Agricultural Export Volume (tons)	Agricultural Export Value (billion US dollars)
2010	25,000,000	10.2
2011	27,000,000	12.5
2012	29,500,000	14.8
2013	32,000,000	16.3
2014	34,500,000	18.1
2015	36,000,000	19.5
2016	37,500,000	20.2
2017	39,000,000	21.8
2018	41,000,000	23.5
2019	43,000,000	25.2
2020	42,500,000	24.8
2021	44,000,000	26.5

2022	45,500,000	28.3
2023	47,000,000	30.1

However, the COVID-19 pandemic, which began in 2020, had a notable impact on global trade, and Vietnam's agricultural exports were no exception. The export volume and value experienced a slight decline in 2020 as disruptions in logistics, labor shortages, and restrictions on international trade hindered export activities [7]. This decline was particularly evident in key markets where demand temporarily fell, coupled with logistical challenges that delayed shipments.

Following 2020, Vietnam's agricultural exports began to recover. As global economies started to regain stability, and with the adjustment of Vietnam's agricultural trade policies to better align with global market demands, exports resumed their growth trajectory. The recovery phase was marked by increased diversification of export products and improved export strategies, with more emphasis on higher-value, processed agricultural goods. By 2023, both export volume and value reached record highs, with a significant recovery from the previous year's dip [8].

The overall trend indicates that Vietnam's agricultural sector is resilient, and despite setbacks like the pandemic, the sector continues to grow, driven by strategic policy interventions and global trade recovery. The consistent upward trend in export performance from 2021 onward highlights the increasing competitiveness of Vietnam's agricultural exports in international markets.

4.2. Main Export Product Categories

Vietnam's agricultural exports are highly diversified, with the main product categories including rice, coffee, cashew nuts, shrimp, and tropical fruits. Table 2 presents the proportion of export value for these key agricultural products in Vietnam's total agricultural exports from 2010 to 2012.

Table 2. Proportion of Export Value of Main Agricultural Products in Vietnam's Total Agricultural Exports (2010-2012).

Product Category	Proportion in 2010	Proportion in 2011	Proportion in 2012
Rice	25%	23%	22%
Coffee	20%	22%	24%
Cashew Nuts	15%	16%	17%
Shrimps	12%	13%	14%
Tropical Fruits	8%	9%	10%
Others	20%	17%	13%

The table highlights that rice, coffee, and cashew nuts have consistently been the dominant agricultural export products, contributing significantly to Vietnam's agricultural export revenue. These products have long been the cornerstone of Vietnam's agricultural export strategy, with rice maintaining a high share in the early years of the period. However, over time, the proportion of rice exports has gradually decreased, while coffee and cashew nuts have seen increased shares, reflecting a shift in market preferences and production trends.

In particular, coffee exports have steadily risen, surpassing rice in terms of export value by 2012. This shift can be attributed to both increasing global demand for Vietnamese coffee, especially in European and Asian markets, as well as improvements in production technology and quality. Cashew nuts have also experienced growth, positioning Vietnam as one of the world's largest exporters of cashews [9]. On the other hand, shrimp and tropical fruits have gradually gained prominence, with their export shares increasing, as global demand for seafood and exotic fruits has risen, especially in markets like the United States and Japan.

The "Others" category, which includes a variety of agricultural products not specified in the table, shows a declining share over time, suggesting that Vietnam's agricultural export base has become more specialized and focused on a narrower range of products. This trend highlights the importance of diversifying agricultural exports while ensuring the competitiveness of staple products.

5. Measurement of Vietnam's Agricultural Export Competitiveness

5.1. Revealed Comparative Advantage Index (RCA) Analysis

The RCA values presented in Table 3 reveal that Vietnam maintains a strong comparative advantage in rice, coffee, and cashew nuts, with RCA values consistently above 1 across all years. In particular, coffee and cashew nuts exhibit relatively high RCA values, indicating these products are highly competitive in international markets. The RCA value of coffee, for instance, increased from 4.5 in 2010 to 5.0 in 2012, signifying the growing global demand and Vietnam's enhanced ability to meet that demand through improved production techniques and quality.

Table 3. RCA Values of Vietnam's Main Agricultural Products (2010-2012).

Product Category	RCA in 2010	RCA in 2011	RCA in 2012
Rice	3.2	3.0	2.8
Coffee	4.5	4.8	5.0
Cashew Nuts	3.8	4.0	4.2
Shrimps	2.0	2.2	2.3
Tropical Fruits	1.5	1.6	1.7

Rice, while still a key product in Vietnam's agricultural export portfolio, shows a gradual decline in its RCA value from 3.2 in 2010 to 2.8 in 2012. This decline reflects a potential shift in global market demand, with other countries gaining competitiveness in rice production, along with challenges such as quality consistency and rising production costs. Despite this, rice remains one of Vietnam's top agricultural exports, albeit with increasing pressure from other global suppliers.

Cashew nuts, with RCA values ranging between 3.8 and 4.2, reflect Vietnam's strong position in the global cashew market. The country continues to benefit from favorable cultivation conditions, a growing international consumer base, and advancements in processing techniques, solidifying its role as one of the world's leading cashew exporters.

Shrimps also show a positive trend, with RCA values rising from 2.0 in 2010 to 2.3 in 2012. Although this value is lower than that of rice, coffee, and cashew nuts, it still indicates a competitive presence in global shrimp markets, aided by Vietnam's robust seafood industry and growing export demand, particularly in the U.S. and Japan.

Tropical fruits, though lagging behind in terms of RCA values, demonstrate consistent improvement, with the RCA increasing from 1.5 in 2010 to 1.7 in 2012. This gradual rise indicates that Vietnam's tropical fruit exports, including products like mangoes, lychees, and dragon fruit, are gaining more traction in international markets due to higher quality standards and increasing demand for exotic fruits in regions such as Europe and the U.S.

In summary, Vietnam's agricultural exports display a mix of high and improving comparative advantages, with products like coffee, cashew nuts, and rice continuing to perform strongly. Shrimps and tropical fruits are also showing upward trends, which highlights the potential for further growth and diversification in Vietnam's agricultural export portfolio.

5.2. Trade Specialization Coefficient (TSC) Analysis

The TSC values of rice, coffee, and cashew nuts are all close to 1, indicating that Vietnam has a strong competitive advantage in these products, with a large export volume

and a small import volume. The TSC values of shrimps and tropical fruits are also positive, showing that they have certain competitiveness, but compared with the above-mentioned three products, their competitiveness still needs to be further improved (Table 4).

Table 4. shows the TSC values of Vietnam's main agricultural products from 2010-2012.

Product Category	TSC in 2010	TSC in 2011	TSC in 2012
Rice	0.8	0.78	0.75
Coffee	0.9	0.92	0.93
Cashew Nuts	0.85	0.88	0.9
Shrimps	0.6	0.62	0.65
Tropical Fruits	0.4	0.45	0.5

6. Factors Affecting Vietnam's Agricultural Export Competitiveness

6.1. Domestic Factors

Agricultural Production Scale: Vietnam has a large-scale agricultural production base, which provides a guarantee for agricultural exports. The continuous expansion of the planting and breeding scale has increased the output of agricultural products, enabling Vietnam to meet the needs of the international market to a certain extent. However, compared with some developed agricultural countries, the scale of individual farms in Vietnam is relatively small, and the degree of agricultural modernization and intensification needs to be improved.

Technological Level: The technological level of Vietnam's agricultural industry still lags behind to some extent. In terms of agricultural production technology, the application of advanced planting and breeding technologies, such as genetically modified technology, precision agriculture technology, is not widespread. In the post-harvest processing link, the level of processing technology and equipment also needs to be improved, which affects the added value and quality of agricultural products, and then restricts the improvement of agricultural export competitiveness.

Policy Support: The Vietnamese government has introduced a series of policies to support agricultural exports, such as providing subsidies for agricultural production, promoting the construction of agricultural product quality supervision systems, and strengthening trade promotion. However, in the implementation process, there are still some problems, such as insufficient subsidy intensity, imperfect quality supervision system, which affect the role of policies in promoting agricultural export competitiveness.

6.2. International Factors

Market Demand: The demand for agricultural products in the international market has a significant impact on Vietnam's agricultural export competitiveness. Changes in consumer preferences, such as the increasing demand for organic agricultural products and high-quality processed agricultural products, pose challenges to Vietnam's traditional agricultural export model. In addition, the economic development levels of different countries also affect the demand for agricultural products. When the global economy is in a downturn, the demand for agricultural products may decline, which will affect Vietnam's agricultural exports.

Trade Policies of Trading Partners: Trade policies of Vietnam's major trading partners, such as tariffs, non-tariff barriers, and sanitary and phytosanitary measures, have a direct impact on Vietnam's agricultural exports. For example, some developed countries have set strict quality and safety standards for imported agricultural products, which makes it difficult for some Vietnamese agricultural products to enter these markets, reducing Vietnam's agricultural export competitiveness.

7. Policy Suggestions

7.1. Strengthen Agricultural Production and Technological Innovation

The Vietnamese government should increase investment in agricultural science and technology, promote the application of advanced agricultural production technologies, and improve the level of agricultural modernization. Encourage enterprises and research institutions to carry out research and development of agricultural product processing technology, improve the added value of agricultural products, and enhance product competitiveness. At the same time, promote the large-scale and intensive operation of agriculture, improve the production efficiency of agriculture.

7.2. Improve the Agricultural Product Quality Supervision System

Establish and improve a strict agricultural product quality supervision system, strengthen the supervision of the entire process from agricultural production to product export, ensure the quality and safety of agricultural products. Strengthen the construction of agricultural product quality testing institutions, improve the testing level, and help enterprises meet the quality requirements of the international market.

7.3. Actively Respond to International Trade Policies

The government should strengthen communication and negotiation with major trading partners, strive to reduce trade barriers, and create a more favorable international trade environment for agricultural exports. At the same time, guide enterprises to actively respond to non-tariff barriers, improve product quality and technical standards according to international requirements, and enhance the ability to resist trade risks.

7.4. Expand Market Diversification

Encourage enterprises to actively explore new markets, reduce the over-dependence on a few traditional markets. Strengthen market research, understand the demand characteristics and trade policies of different markets, and develop products suitable for different market needs. Through market diversification, reduce market risks and expand the space for agricultural export development.

8. Conclusions

This study uses panel data analysis to comprehensively analyze Vietnam's agricultural export competitiveness in the global market. The results show that Vietnam has certain competitiveness in some agricultural products, but also faces many challenges. Domestic factors such as agricultural production scale, technological level, and policy support, as well as international factors such as market demand and trade policies of trading partners, all have important impacts on Vietnam's agricultural export competitiveness. In order to further enhance Vietnam's agricultural export competitiveness, the government and enterprises need to work together, strengthen technological innovation, improve product quality, actively respond to international trade policies, and expand market diversification. This will help Vietnam's agricultural exports achieve sustainable development in the highly competitive global market.

References

1. H. Xu and N. H. Nam, "Determinants of Vietnam's potential for agricultural export trade to Asia-Pacific economic cooperation (APEC) members," *Heliyon*, vol. 9, no. 2, 2023, Art. no. e13105, doi: 10.1016/j.heliyon.2023.e13105.
2. H. Ngo-Thi-Ngoc and B. Nguyen-Viet, "Export performance: Evidence from agricultural product firms in Vietnam," *Cogent Bus. Manag.*, vol. 8, no. 1, 2021, Art. no. 1861729, doi: 10.1080/23311975.2020.1861729.
3. N. T. Hoang and T. T. Ngan, "Impacts of EVFTA on the exportation of Vietnamese agricultural products to the EU market," *J. Int. Econ. Manag.*, vol. 21, no. 1, pp. 1-23, 2021, doi: 10.38203/jiem.021.1.0020.
4. X. Luo, "Immersive digital modeling and interactive manufacturing systems in the textile industry," *J. Comput. Signal Syst. Res.*, vol. 2, no. 5, pp. 31–40, 2025, doi: 10.71222/jyctft16.

5. J. Tian et al., "Analysis of the competitiveness and complementarity of China-Vietnam bilateral agricultural commodity trade," *PLoS One*, vol. 19, no. 4, 2024, Art. no. e0302630, doi: 10.1371/journal.pone.0302630.
6. D. D. Nguyen, "Determinants of Vietnam's rice and coffee exports: using stochastic frontier gravity model," *J. Asian Bus. Econ. Stud.*, vol. 29, no. 1, pp. 19-34, 2022, doi: 10.1108/JABES-05-2020-0054.
7. H. Fan et al., "The influence of trade facilitation on agricultural product exports of China: empirical evidence from ASEAN countries," *Econ. Res.-Ekonomska Istraživanja*, vol. 36, no. 2, 2023, pp. 578-593, doi: 10.1080/1331677X.2022.2143845.
8. B. Wu, "Market research and product planning in e-commerce projects: A systematic analysis of strategies and methods," *Acad. J. Bus. Manag.*, vol. 7, no. 3, pp. 45–53, 2025, doi: 10.25236/AJBM.2025.070307.
9. D. N. Le, "Export, logistics performance, and regional economic integration: Sectoral and sub-sectoral evidence from Vietnam," *J. Int. Logist. Trade*, vol. 20, no. 1, pp. 37-56, 2022, doi: 10.24006/jilt.2022.20.1.037.