

Working Paper 2026.1.2.14
- Vol. 1 , No. 2

TÁC ĐỘNG CỦA EVFTA ĐỐI VỚI XUẤT KHẨU QUẾ VÀ HỒI CỦA VIỆT NAM SANG THỊ TRƯỜNG EU: PHÂN TÍCH THỰC CHỨNG

Nguyễn Ly Ly¹, Phạm Huyền Diệu, Nguyễn Sỹ Gia Bảo, Phạm Đức Lộc

Sinh viên K63 CLC Kinh tế đối ngoại - Viện Kinh tế và Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Dương Minh Hiếu

Sinh viên K61 CLC Kinh tế đối ngoại - Viện Kinh tế và Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Vũ Huyền Phương

Giảng viên Viện Kinh tế và Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

TÁC ĐỘNG CỦA EVFTA ĐỐI VỚI XUẤT KHẨU QUẾ VÀ HỒI CỦA VIỆT NAM SANG THỊ TRƯỜNG EU: PHÂN TÍCH THỰC CHỨNG

Tóm tắt

Nghiên cứu phân tích tác động của Hiệp định EVFTA đối với xuất khẩu quế và hoa hồi của Việt Nam sang thị trường EU bằng cách sử dụng mô hình trọng lực và phương pháp Difference-in-Differences (DiD) với dữ liệu bảng từ 30 quốc gia nhập khẩu, gồm 20 nước thành viên EU và 10 nước ngoài EU trong giai đoạn 2017-2024. Nhóm tác giả đã áp dụng các phương pháp POLS, FEM, REM và FGLS. Kết quả thực nghiệm cho thấy GDP bình quân đầu người và quy mô dân số có tác động tích cực và có ý nghĩa thống kê đến hoạt động xuất khẩu, trong khi độ mở thương mại, khoảng cách địa lý, tỷ giá hối đoái và chỉ số cảm nhận tham nhũng không cho thấy tác động có ý nghĩa thống kê. Biến dummy EVFTA

¹ Tác giả liên hệ, Email: k63.2412150185@ftu.edu.vn

cho thấy mối liên hệ tích cực trong ước lượng nhưng thiếu khả năng xác định nhân quả do tính bất biến theo quốc gia; DiD cho kết quả hiệu ứng xử lý không ý nghĩa, cho thấy tác động ngắn hạn có thể bị che lấp bởi phục hồi sau COVID-19 và độ trễ điều chỉnh. Mặc dù được hưởng lợi từ ưu đãi thuế quan, Việt Nam vẫn phải đối mặt với những thách thức từ các biện pháp vệ sinh và kiểm dịch thực vật nghiêm ngặt, yêu cầu về mức dư lượng tối đa và các tiêu chuẩn bền vững của thị trường EU. Từ đó, nghiên cứu đề xuất một số khuyến nghị chính sách nhằm tăng cường tuân thủ các tiêu chuẩn của EU và thúc đẩy sự phát triển bền vững của ngành gia vị Việt Nam trong khuôn khổ EVFTA.

Từ khóa: EVFTA, quế, hoa hồi, xuất khẩu, Việt Nam, mô hình trọng lực

THE IMPACT OF EVFTA ON VIETNAM'S CINNAMON AND STAR ANISE EXPORTS TO EU: AN EMPIRICAL ANALYSIS

Abstract

This study examines the impact of the EVFTA on Vietnam's cinnamon and star anise exports to the EU using an extended gravity model and Difference-in-Differences (DiD) approach with panel data from 30 importing countries, consisting of 20 EU member states and 10 non-EU countries over 2017-2024. The authors utilized POLS, FEM, REM, and FGLS. The empirical results indicate that GDP per capita and population size significantly promote export performance, while trade openness, geographical distance, exchange rate, and corruption perception index do not show statistically significant impacts. In addition, the EVFTA dummy shows positive association in gravity estimates but lacks causal identification due to time-invariant treatment; DiD yields insignificant treatment effects, suggesting short-term impacts may be masked by post-COVID recovery and adjustment lags. Despite tariff advantages, Vietnam's cinnamon and star anise exports continue to face challenges from stringent sanitary and phytosanitary measures, maximum residue level requirements, and sustainability standards in the EU market. Based on these findings, the research proposes policy recommendations to strengthen compliance with EU standards, and support the sustainable development of Vietnam's spice industry under the EVFTA framework.

Keywords: EVFTA, cinnamon, star anise, export, Vietnam, gravity model

1. Introduction

1.1. The EU-Vietnam Free Trade Agreement (EVFTA)

1.1.1. Overview

The EU-Vietnam Free Trade Agreement (EVFTA) represents a comprehensive free trade agreement between Vietnam and the 27 member states of the European Union. Negotiations concluded on December 1, 2015, following 14 rounds initiated in October 2012. In 2019, the EU ranked as Vietnam's fifth-largest trading partner and second-largest export market, behind the United States.

Implemented on August 1, 2020, the EVFTA comprises 17 chapters addressing tariff reductions on 99% of tariff lines. Key areas include trade in goods, rules of origin, customs and trade facilitation, technical barriers to trade, sanitary and phytosanitary measures, investment provisions, sustainable development, public procurement, and state-owned enterprises. Research by the Ministry of Industry and Trade (2020) show that the EVFTA Agreement is expected to contribute to an average increase in GDP from 2.18% to 3.25% (for the first 5 years of implementation), 4.57% to 5.30% (for the next 5-year period) and 7.07% to 7.72% (for the next 5-year period).

1.1.2. Main commitments

Tariff Elimination under the EVFTA

According to the World Bank (2020), upon implementation of the agreement, the EU will eliminate import duties on 85.6% of tariff lines for Vietnamese goods, encompassing 70.3% of Vietnam's exports to the EU. This tariff elimination will extend to 99.2% of tariff lines over the subsequent seven years, equivalent to 99.7% of Vietnam's export value to the EU. The remaining 0.3% of exports will be subject to tariff rate quotas (TRQs), with a 0% duty rate applied within the quota limits. Consequently, nearly all Vietnamese exports to the EU will gain duty-free access within seven years.

Non-Tariff Commitments

Rules of Origin (ROO), outlined in Protocol 1, determine product eligibility for zero tariffs by establishing economic nationality. For agricultural commodities, the primary criterion is wholly obtained (WO) status, requiring harvest entirely within Vietnam. This criterion mitigates trade diversion from competitors such as China or India. Unlike processed goods, WO status relies solely on harvest location, supported by verifiable evidence like land use rights and harvest records, thereby reducing discrepancies in customs verification.

Sanitary and Phytosanitary (SPS) are enforced to safeguard human, animal, and plant health. While the EVFTA aims to facilitate trade through transparency, it necessitates rigorous adherence to EU safety standards. Although regulatory frameworks are harmonized at the EU level, the administrative management and physical inspections are conducted by the competent authorities of individual member states. The stringency of these measures, particularly regarding

Maximum Residue Levels (MRLs), requires a comprehensive restructuring of Vietnamese supply chains. While this increases short-term production costs and potential waste, it compels a necessary shift toward high-quality, sustainable output to meet the sophisticated demands of the European market.

1.2. Vietnamese cinnamon and star anise exports under the EVFTA framework

1.2.1. Overview of Vietnam's cinnamon and star anise exports from the EU

Vietnam's cinnamon and star anise sectors are among the fastest-growing agricultural export segments in the region, driven by rising global demand for natural spices, favorable tropical climates, and government support for high-value crops. Until now, Vietnam has maintained its position as the world's leading cinnamon exporter, ranking 1st and representing 27.6% of global cinnamon exports (Daniel Workman, 2025). Furthermore, cinnamon and star anise play an important role in Vietnam's agricultural export structure as high-value spices that support export diversification and integration into global value chains.

Over the period from 2017 to 2024, the value of cinnamon and star anise exports from Vietnam has shown a consistent upward trend in both volume and value. In 2021, Vietnam recorded its highest export value to the EU, exceeding USD 39 million for these products combined. By 2024, the total value of cinnamon and star anise exports had reached USD 34 million, more than two times the USD 13 million recorded in 2014. The EU has consistently been a key market for Vietnam's cinnamon and star anise exports, with its share growing over time.

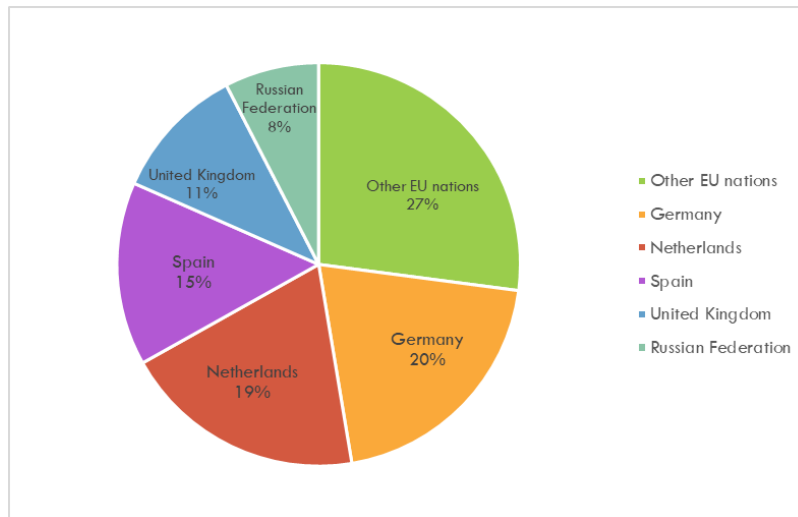


Figure 1: Proportion of Vietnam's cinnamon and star anise exports by the EU partner in 2024 (Unit: %)

Source: Author's calculation from ITC (2026)

Figure 1 shows the distribution of Vietnam's cinnamon and star anise exports to various EU countries in 2024. Germany, the Netherlands, Spain, and the United Kingdom were the leading destinations, together accounting for 65% of total shipments to the EU. Specifically, Germany was the largest importer, receiving 20% of exports, followed by the Netherlands at 19%. Spain contributed 15%, the United Kingdom 11%, and the Russian Federation 8%. Additionally, 27% of Vietnam's cinnamon and star anise exports went to other EU countries (Belgium, Poland, Italy, etc.), highlighting the bloc's diverse demand and growing market penetration within the region.

1.2.2. Pre-EVFTA situation

During the 3 years before EVFTA implementation (2017-2019), Vietnam's cinnamon and star anise exports to the EU demonstrated steady growth from USD 12.94 million to USD 18.27 million, representing approximately 7 - 8% of total global exports each year. However, the growth rate was moderate and likely constrained by tariffs that limited Vietnam's access to the EU market compared to countries with existing FTAs with the EU.

Therefore, it could be said that tax was a huge barrier for Vietnam's cinnamon and star anise to dive into the EU market, which features intense competition and stringent phytosanitary, pesticide residue (MRL), and quality certification requirements.

Table 1: Cinnamon and star anise export turnover from Vietnam to EU and global market from 2017 to 2019

Year	Total value in EU market (USD million)	Total value in global market (USD million)
2017	12.94	130.41
2018	16.28	160.74
2019	18.27	219.07

Source: Authors compiled from ITC (2026)

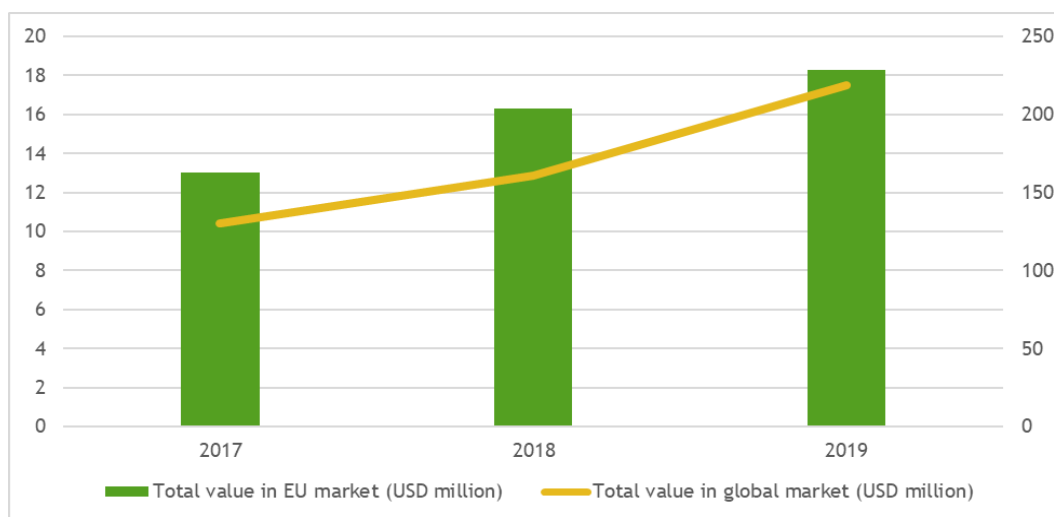


Figure 2: Comparison between EU and global market export turnover of cinnamon and star anise from Vietnam during 2017 and 2019

Source: Authors compiled from ITC (2026)

1.2.3. Post-EVFTA situation

In general, during the initial phase of EVFTA implementation, Vietnam’s exports of cinnamon and star anise to the EU showed a notable rise. In 2020, export turnover to the EU reached USD 24.76 million; however, by 2021, the impact of the EVFTA began to materialize as exports to the EU increased sharply to USD 39.07 million, representing a significant rise of approximately 57.8% compared to 2020. This upward trend reflects improved market access and tariff advantages for Vietnamese cinnamon and star anise under the EVFTA framework. In 2022 and 2023, export turnover to the EU decreased slightly to USD 38.54 and 30.61 million respectively. Although these figures were lower than in previous years, they remained above the 2020 level.

Year	Total value in EU market (USD million)	Total value in global market (USD million)
2020	24.76	284.42
2021	39.07	378.34
2022	38.54	344.73
2023	30.61	339.02
2024	34.19	338.61

Table 2: Cinnamon and star anise export turnover from Vietnam to EU and global market from 2020 to 2024

Source: Authors compiled from ITC (2026)

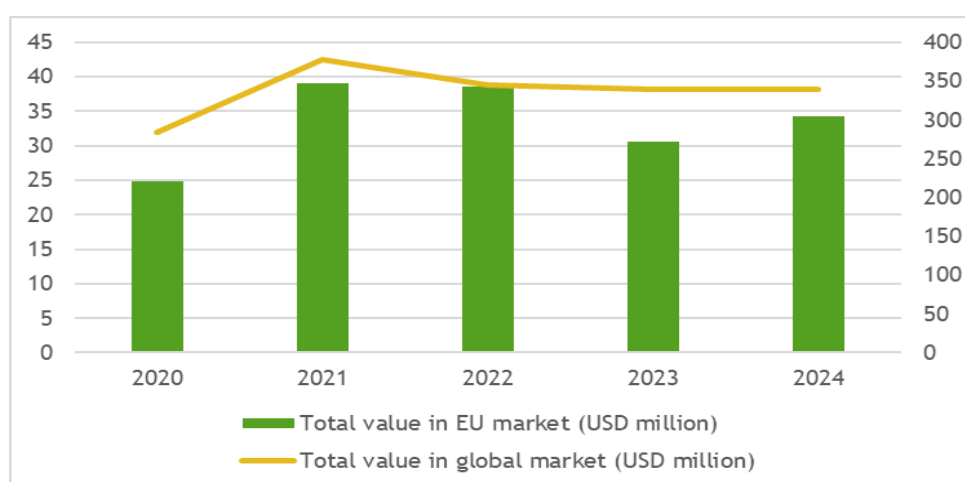


Figure 3: Comparison between EU and global market export turnover of cinnamon and star anise from Vietnam during 2020 and 2024

Source: Authors compiled from ITC (2026)

Overall, despite the preferential tariff treatment provided under the EVFTA, Vietnam's cinnamon and star anise exports to the EU have continued to face certain challenges, particularly due to fluctuations in global demand, stricter sanitary and phytosanitary standards, and increasing competition from other spice-exporting countries. These factors have contributed to the uneven export performance observed during the post-EVFTA period.

1.3. Literature Review

1.3.1. Previous studies on Vietnam's export under EVFTA

The impact of EVFTA on Vietnam's exports to the EU has been shown in several quantitative studies. These studies analyzed Vietnam-EU trade efficiency under the EVFTA across different sectors and periods. Nguyen (2016), using a gravity model with panel data from 28 European countries (1997-2013), found that a 1% tariff reduction increases Vietnam-EU trade by 0.52% for Vietnam and 0.95% for the EU. Other studies focus on trade efficiency using the Stochastic Frontier Gravity Model (SFGM). Nguyen and Doan (2017), applying a two-step SFGM to data from 30 partners (1995-2015), reported Vietnam's export efficiency to the EU at 21.21% and import efficiency at 19.78% in 2015, indicating relatively low trade efficiency, especially with EU and NAFTA countries.

EVFTA has generated significant opportunities for Vietnam-EU bilateral trade, particularly for key export products. Maryla et al. (2020) forecast a 12% increase in Vietnam's trade flows under full EVFTA implementation. Similarly, studies using the SMART model support this view. Chi et al. (2023), applying export turnover data and a 0% tariff scenario, project a 6.33% rise in Vietnam's exports from 2019 to 2029, equivalent to over USD 5.3 billion. This growth mainly results from price advantages created by EU tariff elimination. However, the study notes that if the EU reduces tariffs for competing countries, Vietnam's exports may slightly decline.

Overall, research suggests that EVFTA tariff elimination can substantially enhance Vietnam's exports to the EU. Nonetheless, gains remain modest for products already heavily exported within the EU or facing strong competition from established third-country suppliers.

1.3.2. Previous studies on Vietnam's cinnamon and star anise exports under EVFTA

Research into Vietnam's cinnamon and star anise, though limited, is also investigated as a key segment in other research on Vietnam's spices export to the EU.

The SMART model is a potential framework for evaluating the impact of EVFTA, yet its application remains quite limited, particularly for cinnamon and star anise. By using the SMART model, Nguyen et al. (2021) quantitatively estimated the impact magnitude of the EVFTA on the whole Vietnamese agricultural exports to the EU, as well as identify kinds of products that will be affected the most. Drawing on 2018 bilateral trade data across 17 two-digit HS codes encompassing key agricultural categories, from HS 01 live animals to HS 24 beverages and excluding certain fishery subcodes like 1601-1602, the study simulates a comprehensive zero-tariff scenario assuming full EVFTA implementation, incorporating elasticities for supply, demand substitution, and trade diversion effects from competing exporters. The model's outputs project a substantial overall export uplift of approximately USD 4.81 billion, with spices including HS 09 groupings like cinnamon under 0906 and star anise-related entries among the high-potential beneficiaries via progressive duty reductions from initial rates of 8-12% to 0% over phased schedules spanning 3-7 years.

1.3.3. Research gap

The review of the past literature has identified several important research gaps as follows:

Firstly, although previous studies have explored the EVFTA's overall impact on bilateral trade and specific export activities between the EU and Vietnam, particularly for commodities like seafood, textiles, electronics, and broader agriculture, there is a lack of research focusing specifically on cinnamon and star anise exports despite Vietnam's prominent position as a top global supplier of these spices.

Secondly, while most evaluations of the EVFTA's impact predominantly use the SMART model or qualitative industry reports to assess policy effects on exports, these approaches tend to overlook firm-level dynamics, regional economic spillovers, and interactions with competing FTAs, relying heavily on aggregate assumptions from prior research (Chi et al., 2023; Hoang, 2021). The gravity model and Stochastic Frontier Gravity Model (SFGM) have generally been applied to broader trade flows or sectors like services and seafood rather than niche agricultural products like cinnamon and star anise.

Thirdly, existing studies often rely on qualitative descriptions of non-tariff barriers, with a scarcity of comprehensive empirical analyses over extended periods that capture pre- and post-EVFTA dynamics, such as from 2017 to 2024.

1.4. Significance of the study

This study is important for understanding how the European Union-Vietnam Free Trade Agreement (EVFTA) influences Vietnam's cinnamon and star anise exports to the EU. By using empirical analysis, the research highlights how key determinants such as GDP per capita, trade openness, and the EVFTA dummy variable affect export performance. The results provide valuable information for policymakers and exporters in designing appropriate trade and export strategies, while offering a clear direction for enhancing the competitiveness and sustainable growth of Vietnam's cinnamon and star anise in the EU market.

1.5. Research objectives

The primary goal of this research is to examine the impact of the EVFTA on Vietnam's cinnamon and star anise exports to the EU during the period 2017 - 2024 using a gravity model approach. Specifically:

- Assess whether the implementation of the EVFTA has positively affected Vietnam's cinnamon and star anise export value to the EU
- Determine significant factors influencing these export patterns
- Provide policy recommendations that can enhance Vietnam's cinnamon and star anise export strategy

1.6. Research hypothesis

This study examines the relationship between the exporting value of cinnamon and star anise from Vietnam to European Union countries (ExValue) and seven key economic and institutional determinants, including Gross Domestic Product per capita (GDPpc), population (Pop), trade openness (TradeOpen), geographical distance (Dist), exchange rate (ExRate), the implementation of the EU-Vietnam Free Trade Agreement (EVFTA), and the Corruption Perception Index (CPI). Specifically:

- Hypothesis H1: There is a positive correlation between Gross Domestic Product per capita (GDPpc) of importing EU countries and the exporting value of cinnamon and star anise from Vietnam (ExValue).
- Hypothesis H2: There is a positive correlation between population size (Pop) of importing EU countries and the exporting value of cinnamon and star anise from Vietnam (ExValue).
- Hypothesis H3: There is a positive correlation between trade openness (TradeOpen) of importing EU countries and the exporting value of cinnamon and star anise from Vietnam (ExValue).
- Hypothesis H4: There is a negative correlation between geographical distance (Dist) between Vietnam and importing EU countries and the exporting value of cinnamon and star anise from Vietnam (ExValue).
- Hypothesis H5: There is a positive correlation between the exchange rate (ExRate) and the exporting value of cinnamon and star anise from Vietnam to EU countries (ExValue).
- Hypothesis H6: There is a positive correlation between EVFTA (EVFTA) and the exporting value of cinnamon and star anise from Vietnam to EU countries (ExValue).
- Hypothesis H7: There is a positive correlation between the Corruption Perception Index (CPI) of importing EU countries and the exporting value of cinnamon and star anise from Vietnam (ExValue).

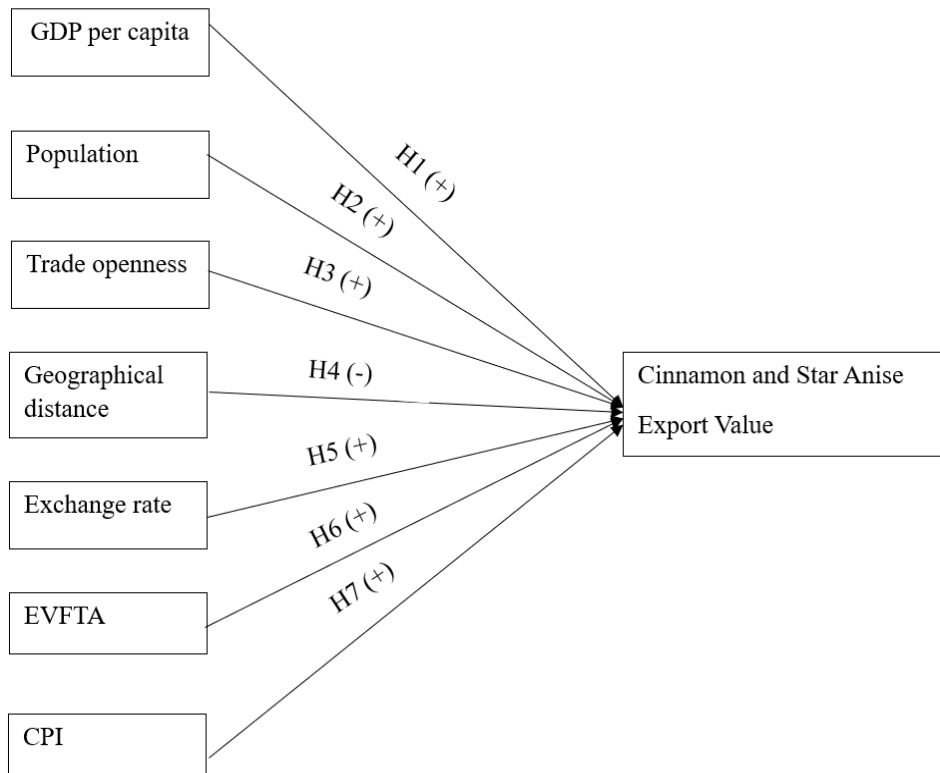


Figure 4: Proposed conceptual framework with hypotheses

2. Research methodology

2.1. Data Collection

This study uses secondary panel data to examine the determinants of Vietnam’s cinnamon and star anise exports and to evaluate the impact of the EVFTA using both the gravity model and a Difference-in-Differences (DiD) approach. The dataset includes 30 importing countries, consisting of 20 EU member states and 10 non-EU countries.

The EU countries form the treatment group because they are directly affected by the EVFTA. These include the Czech Republic, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. The control group consists of ten non-EU countries: the United States, Canada, Japan, South Korea, Switzerland, Singapore, Norway, New Zealand, the United Kingdom, and Israel. These countries are not subject to the EVFTA but have comparable economic characteristics and active participation in global trade, making them suitable benchmarks for the DiD analysis.

Data were collected from several reliable international databases. Export data for cinnamon and star anise were obtained from Trade Map (ITC), while macroeconomic variables such as GDP per capita, population, and trade openness were sourced from the World Bank. The Corruption Perception Index was retrieved from Transparency International, exchange rate data from Exchange-rates.org, and geographical distance from DistanceFromTo.

The dataset covers the period 2017-2024, capturing both the pre-EVFTA and post-implementation periods. With 30 countries observed over eight years, the panel dataset provides 240 observations, allowing the analysis to capture both cross-country differences and temporal changes in export patterns.

2.2. Proposed model

2.2.1. Gravity Model in International Trade

The gravity model of international trade, originally developed by Jan Tinbergen (1962), adapts the principle of Newton's law of gravity to explain bilateral trade flows between countries. According to this framework, trade between two economies depends positively on their economic size and negatively on the geographical distance separating them. In line with the gravitational analogy, the volume of trade increases with the product of the countries' gross domestic products (GDPs) and decreases as the distance between them grows. Owing to its strong explanatory power, the gravity model has become one of the most widely used approaches in empirical trade analysis.

The standard specification of the gravity model is expressed as follows:

$$T_{ij} = G \frac{GDP_i GDP_j}{D_{ij}}$$

Where:

- T_{ij} represents the trade flow between country i and country j;
- G is a constant term;
- GDP_i and GDP_j denote the gross domestic products of country i and country j, respectively;
- D_{ij} refers to the geographical distance between the two countries.

To facilitate econometric estimation, the model is commonly transformed into a log-linear form by applying natural logarithms, yielding the following equation:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(D_{ij}) + \varepsilon$$

Where:

- $\beta_0, \beta_1, \beta_2$ and β_3 are the parameters to be estimated;
- ε captures unobserved factors that influence trade flows between country i and country j.

2.2.2. Regression model

Building on the basic gravity model, this study adopts it as the theoretical basis for an extended gravity framework, which is specified by the following equations:

$$\ln(ExValue_{it}) = \beta_0 + \beta_1 \ln(GDP_{pcit}) + \beta_2 \ln(Pop_{it}) + \beta_3 \ln(TradeOpen_{it}) + \beta_4 \ln(Dist_i) + \beta_5 \ln(ExRate_{it}) + \beta_6 EVFTA_{it} + \beta_7 CPI_{it} + \varepsilon$$

Where:

- $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are the parameters to be estimated;
- $ExValue_{it}$: the exporting value of cinnamon and star anise from Vietnam to country i in year t;
- GDP_{pcit} : the Gross Domestic Product per capita of the country i in year t;
- Pop_{it} : the population of country i in year t;
- $TradeOpen_{it}$: the percentage of trade to GDP of the country i in year t;
- $Dist_i$: the distance between Vietnam and country i;
- $ExRate_{it}$: the exchange rate between VND and country i in year t;
- $EVFTA_{it}$: whether country i in year t had EVFTA come into effect or not;
- CPI_{it} : Corruption perception index of country i at year t;

ε : unexplained variables that impact the export value.

2.2.3 *Difference-in-Differences (DiD) Approach*

To better identify the causal impact of the EVFTA on Vietnam's cinnamon and star anise exports, this study applies a Difference-in-Differences (DiD) approach. The DiD framework compares the change in export performance between countries affected by the EVFTA and those not affected before and after the agreement's implementation.

In this study, EU countries constitute the treatment group, as they are directly covered by the EVFTA. In contrast, selected non-EU countries serve as the control group, since they are not subject to the same trade agreement but are exposed to similar global trade conditions. By comparing the export trends of these two groups over time, the DiD approach helps isolate the policy effect of the EVFTA from other macroeconomic shocks such as post-COVID trade recovery or fluctuations in global commodity prices. The DiD model used in this study is specified as follows:

$$\ln(ExValue_{it}) = \beta_0 + \beta_1(Treat_i \times Post_t) + \beta_2X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

$\ln(\text{ExValue}_{it})$ represents the natural logarithm of Vietnam's export value of cinnamon and star anise to country i in year t

Treat_i is a dummy variable equal to 1 for EU countries and 0 for non-EU countries

Post_t is a time dummy equal to 1 for the post-EVFTA period (2021 onward) and 0 otherwise

$\text{Treat}_i \times \text{Post}_t$ is the interaction term representing the DiD estimator and captures the causal impact of EVFTA

X_{it} denotes control variables including GDP per capita, population, trade openness, distance, and exchange rate

μ_i represents country fixed effects that control for time-invariant country characteristics

λ_t represents year fixed effects capturing global shocks affecting all countries

ε_{it} is the error term

2.3. Variables description

Table 3: Description of variables

Variables	Description	Measurement	Source
Dependent variable			
$ExValue_{it}$	Export value of cinnamon and star anise from Vietnam to importing country i in year t	Thousand USD	Trademap
Independent variables			
GDP_{pcit}	Gross Domestic Product per capita of importing country i in year t	USD	World Bank
Pop_{it}	Population of importing country i in year t	People	World Bank
$TradeOpen_{it}$	Trade openness of importing country i in year t	%	World Bank
$Dist_i$	Geographical distance between Vietnam and importing country i	Km	Distancefromto
$ExRate_{it}$	Exchange rate between VND and the currency of importing country i in year t	VND/USD	Exchange-rates
CPI_{it}	Corruption Perception Index of importing country i in year t	Index Score	Transparency
$EVFTA_{it}$	Dummy variable indicating whether the EVFTA is in effect in year t	Dummy variable: = 1 in 2021, 2022, 2023, and 2024; = 0 otherwise	Authors
$Treat_i$	Dummy variable equal to 1 for EU countries and 0 for non-EU countries	Dummy	Authors
$Post_t$	Dummy variable equal to 1 for years after EVFTA implementation (2021 onward)	Dummy	Authors
DiD_{it}	Interaction term between $Treat$ and $Post$ capturing the EVFTA effect	Dummy	Authors

Source: Authors compiled (2024)

2.4. Empirical Analysis and Conclusion

To conduct the empirical analysis, multiple approaches are employed, including Pooled Ordinary Least Squares (POLS), the Fixed Effect Model (FEM), and the Random Effect Model (REM). All three specifications are estimated using STATA 15 software. Subsequently, the F-test and Hausman test are applied to identify the most appropriate model for the dataset. To diagnose potential multicollinearity, the Variance Inflation Factor (VIF) test is performed. The model is further examined for heteroskedasticity using the Modified Wald test and for autocorrelation using the Wooldridge test. Based on the diagnostic results, Feasible Generalized Least Squares (FGLS) is adopted to correct for any remaining econometric issues, thereby enhancing the efficiency and reliability of the estimated coefficients.

The gravity model estimated using FGLS provides baseline evidence on the determinants of Vietnam's cinnamon and star anise exports. However, to more rigorously identify the causal impact of EVFTA, the study employs a Difference-in-Differences approach.

2.4.1. Model diagnostics and specification tests

Testing for multicollinearity

After estimating the OLS regressions, the authors use VIF to check for multicollinearity among the independent variables. Below is the result:

Variable	VIF	1/VIF
ln_GDPpc	4.23	0.236508
CPI	3.46	0.289208
ln_ExRate	2.81	0.355971
EVFTA	2.73	0.366055
ln_Pop	2.43	0.412178
ln_TradeOpen	2.34	0.426949
ln_Dist	1.36	0.736014
Mean VIF	2.76	

Figure 5: Multi-collinearity test result

Source: Authors' calculation using Stata15

As shown in the results, the mean VIF = 2.76 < 10. Hence, there is not enough evidence to suggest that the model has multicollinearity and the estimated coefficients are reliable.

Model selection tests: F-test and Hausman test

The F-test is applied to determine whether POLS or FEM is more appropriate for this research. The result is presented below:

F test that all u _i =0: F(19, 119) = 26.65	Prob > F = 0.0000
---	-------------------

Figure 6: F-test result

Source: Authors' calculation using Stata15

The p-value is 0.0000, so the null hypothesis is rejected. This means that FEM is more appropriate than POLS.

Next, the Hausman test is used to choose between FEM and REM for the research data. The result is shown in Figure 5.

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
ln_GDPpc	-.77087	.2805071	-1.051377	.782574
ln_Pop	-12.24757	.7010683	-12.94864	3.861053
ln_TradeOpen	-1.062939	-.1162946	-.9466442	.5995872
ln_ExRate	-3.72602	.0654383	-3.791458	1.15499
CPI	.0095893	.0098864	-.0002971	.
EVFTA	.8959608	.6901942	.2057667	.1093377

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 13.53
 Prob>chi2 = 0.0353

Figure 7: Hausman test result

Source: Authors' calculation using Stata15

Since Prob > chi2 = 0.0353 < 0.05, the null hypothesis is rejected, indicating that REM is not suitable. Therefore, FEM is selected.

Testing for Heteroskedasticity and Autocorrelation

Having determined that FEM is selected, the Modified Wald test is conducted to detect Heteroskedasticity. The result is reported in Figure 6.

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model	
H0: $\sigma(i)^2 = \sigma^2$ for all i	
chi2 (20) =	727.52
Prob > chi2 =	0.0000

Figure 8: Modified Wald test result

Source: Authors' calculation using Stata15

The p-value is 0.000 < 0.05, confirming that heteroskedasticity exists in the data. Next, the authors employ the Wooldridge test to check for autocorrelation. The result is shown in Figure 9:

Figure 9: Wooldridge test result

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation

(1) **L.uhat = 0**

F(1, 118) = **67.87**
Prob > F = **0.0000**

Source: Authors' calculation using Stata15

The p-value is 0.0000 < 0.05, there is autocorrelation in the panel data.

2.4.2. Gravity model results

Given the existence of both heteroskedasticity and autocorrelation, the FGLS method is employed to address these problems, the final regression results are presented and discussed in

Cross-sectional time-series FGLS regression						
Coefficients: generalized least squares						
Panels: heteroskedastic						
Correlation: common AR(1) coefficient for all panels (0.7680)						
Estimated covariances	=	20	Number of obs	=	145	
Estimated autocorrelations	=	1	Number of groups	=	20	
Estimated coefficients	=	8	Obs per group:			
			min	=	2	
			avg	=	7.25	
			max	=	8	
			Wald chi2(7)	=	80.01	
			Prob > chi2	=	0.0000	
ln_ExValue	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
ln_GDPpc	.7263792	.3560657	2.04	0.041	.0285032	1.424255
ln_Pop	.8000768	.1672043	4.79	0.000	.4723624	1.127791
ln_TradeOpen	.1293722	.4072726	0.32	0.751	-.6688673	.9276117
ln_Dist	.3507455	1.51602	0.23	0.817	-2.620599	3.32209
ln_ExRate	-.0110708	2.243962	-0.00	0.996	-4.409155	4.387014
CPI	.0036747	.0092993	0.40	0.693	-.0145515	.0219009
EVFTA	.3669547	.1374444	2.67	0.008	.0975685	.6363408
_cons	-18.90446	25.45017	-0.74	0.458	-68.78588	30.97695

the following section:

Source: Authors' calculation using Stata15

The model fit is evaluated using the Wald chi-square test. The Wald chi2(7) statistic is 80.01, with a corresponding p-value of 0.0000, indicating that the independent variables jointly have a statistical impact on Vietnam's cinnamon and star anise export value to the EU.

Figure 10: Gravity model regression result

Consequently, the null hypothesis that all coefficients are equal to zero is rejected, confirming the overall statistical significance and robustness of the model.

GDP per capita: has a positive and statistically significant effect on export value ($B = 0.7264$, $p = 0.041$). This suggests that higher income levels in EU importing countries lead to increased demand for cinnamon and star anise imports from Vietnam. As consumer purchasing power rises, spending on higher-quality food products, spices, and natural ingredients tends to increase, thereby boosting import values. This result supports Hypothesis H1 and is consistent with economic theory regarding income-driven consumption growth.

Population: exhibits a positive and highly significant effect on export value ($B = 0.8001$, $p = 0.0000$). This finding indicates that countries with larger populations tend to import greater quantities of cinnamon and star anise, reflecting higher aggregate consumption demand. Given the widespread use of these spices in food processing, pharmaceuticals, and cosmetics industries across the EU, larger markets naturally generate stronger import demand. This result strongly supports Hypothesis H2.

Trade Openness: shows a positive but statistically insignificant relationship with export value ($B = 0.1294$, $p = 0.751$). While the positive coefficient aligns with theoretical expectations that trade liberalization facilitates export flows, the lack of statistical significance suggests that openness alone does not significantly drive Vietnam's spice exports to the EU. This may be attributed to the presence of stringent non-tariff barriers, including food safety regulations, traceability requirements, and sustainability standards, which limit the effectiveness of general trade liberalization policies. Therefore, Hypothesis H3 is not empirically supported.

Geographical distance: shows a positive but statistically insignificant relationship with export value ($B = 0.3507$, $p = 0.817$), contradicting conventional gravity model predictions. This outcome implies that transportation distance does not constitute a major constraint on Vietnam's cinnamon and star anise exports. A plausible explanation is that these products have a high value-to-weight ratio, long shelf life, and low perishability, making them less sensitive to shipping costs. Moreover, exports are concentrated in major EU logistics hubs such as Germany, the Netherlands, and France, which possess advanced port infrastructure and efficient distribution networks. Consequently, Hypothesis H4 is not supported.

Exchange rate: shows a negative but statistically insignificant impact on export value ($B = -0.0111$, $p = 0.996$). This suggests that exchange rate fluctuations do not significantly influence Vietnam's spice exports to the EU. Although currency depreciation is typically expected to enhance export competitiveness, the results indicate that contractual pricing practices, long-term trade relationships, and compliance costs related to EU technical standards may offset potential exchange rate advantages. Hence, Hypothesis H5 is not supported.

Corruption Perception Index: has a positive but statistically insignificant impact on export value ($B = 0.0037$, $p = 0.693$). This result supports Hypothesis H7. However, it indicates that perceived institutional transparency and governance quality in importing EU countries do not significantly affect Vietnam's cinnamon and star anise export flows. Given the relatively homogeneous institutional quality and high governance standards across EU member states, variations in CPI scores may be insufficient to generate measurable differences in bilateral trade volumes.

EVFTA: appears positive and statistically significant in the estimation. However, since this dummy does not vary across EU countries, the result may capture general time effects rather

than the causal impact of the agreement. Therefore, to more rigorously evaluate the EVFTA effect, this study further applies DiD approach in the next section.

2.4.3 Difference-in-Differences results

a. Parallel trend assumption

A key assumption of the DiD approach is the parallel trend assumption, which requires that the treatment and control groups exhibit similar trends in the outcome variable before the policy intervention. To assess this condition, the study compares the average export trends between EU and non-EU countries during the pre-EVFTA period.

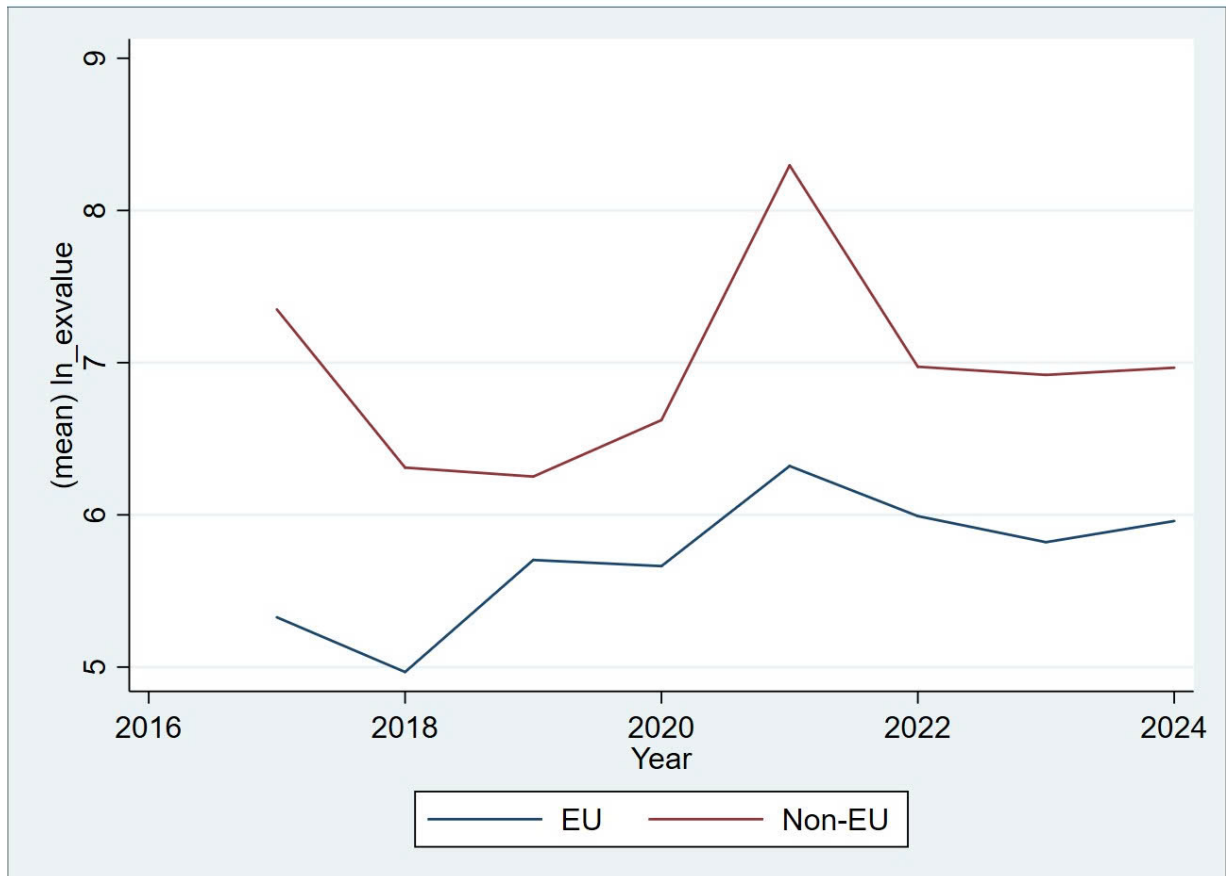


Figure 11: Parallel trend graph

Source: Authors' calculation using Stata15

The graphical analysis suggests that export trends for the two groups move broadly in parallel prior to the implementation of EVFTA, indicating that the assumption is reasonably satisfied. This supports the validity of the DiD framework in identifying the causal impact of the agreement.

b. Estimation results

note: 2024.Year omitted because of collinearity						
Fixed-effects (within) regression			Number of obs	=	221	
Group variable: country_id			Number of groups	=	30	
R-sq:			Obs per group:			
within	=	0.3723	min	=	2	
between	=	0.4652	avg	=	7.4	
overall	=	0.4107	max	=	8	
corr(u_i, Xb) = -0.9872			F(11, 29)	=	7.61	
			Prob > F	=	0.0000	
(Std. Err. adjusted for 30 clusters in country_id)						
ln_ExValue	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
did	-.0201109	.2463311	-0.08	0.935	-.5239146	.4836929
ln_GDPpc	.2522169	.9586046	0.26	0.794	-1.70835	2.212783
ln_Pop	-6.356445	4.379522	-1.45	0.157	-15.31357	2.600684
ln_TradeOpen	-.709339	1.634427	-0.43	0.668	-4.052117	2.633439
ln_ExRate	-12.75126	4.106228	-3.11	0.004	-21.14944	-4.353083
Year						
2018	.1685232	.1738966	0.97	0.341	-.1871353	.5241818
2019	.392087	.179029	2.19	0.037	.0259315	.7582425
2020	.3734477	.1615186	2.31	0.028	.043105	.7037904
2021	.7908196	.2035576	3.88	0.001	.3744976	1.207142
2022	.7111541	.2701261	2.63	0.013	.1586843	1.263624
2023	.0822181	.104343	0.79	0.437	-.1311874	.2956235
2024	0	(omitted)				
_cons	238.9712	110.6055	2.16	0.039	12.75758	465.1849
sigma_u	10.080716					
sigma_e	.57609285					
rho	.99674474	(fraction of variance due to u_i)				

Figure 12: DiD regression result

Source: Authors' calculation using Stata15

The estimation shows that the coefficient of the interaction term (Treat \times Post), representing the EVFTA effect, is statistically insignificant. The estimated coefficient is approximately -0.020, with a p-value of 0.935, indicating that the EVFTA has not generated a statistically significant increase in Vietnam's cinnamon and star anise exports relative to the control group during the sample period. Therefore, H6 is not supported.

Several explanations may account for this finding. First, the EVFTA is a relatively recent agreement, and its trade effects may require more time to materialize as firms gradually adjust their supply chains and establish new trade relationships. Second, agricultural exports to the The EU must comply with stringent sanitary and phytosanitary (SPS) standards, which may slow the immediate expansion of exports. Finally, global disruptions during the post-COVID period may have affected trade flows, partially masking the short-term impact of the agreement.

Despite the lack of statistically significant effects in the short run, the EVFTA may still generate long-term benefits through tariff reductions, improved market access, and stronger institutional cooperation between Vietnam and EU member states.

2.5. Conclusion

The empirical results from the gravity model indicate that GDP per capita and population size are the primary drivers of Vietnam's cinnamon and star anise exports to the EU during the 2017-2024 period. Meanwhile, trade openness, geographical distance, exchange rate, and corruption perceptions do not exhibit statistically significant effects. Furthermore, the DiD estimation does not detect statistically significant evidence that the EVFTA has increased Vietnam's spice export value over the sample period. Overall, the findings highlight the importance of market size and economic capacity of trading partners in shaping Vietnam's spice export performance to the EU market.

2.6. Limitations

The findings of this study should be interpreted with several limitations. Although the Difference-in-Differences estimation does not provide statistically significant impact of the EVFTA on Vietnam's cinnamon and star anise export value within the sample period, this outcome may reflect structural constraints rather than the absence of policy effects. The trade impacts of the agreement may take longer to materialize as firms gradually adjust production processes, restructure supply chains, and comply with stringent EU regulatory standards. In addition, the research faced limitations in accessing detailed export data for cinnamon and star anise disaggregated by EU member states and specific HS product codes. Furthermore, several gravity model estimation techniques could not be considered due to data and time constraints. Finally, the relatively short post-2021 period (only four years) may be insufficient to fully capture lagged adjustment effects following EVFTA implementation.

3. Recommendations to Enhance Cinnamon and Star Anise Exports to the EU

3.1. Prioritize large major markets within the EU

Government agencies and exporting firms should concentrate trade promotion and distribution efforts on EU countries with large populations and strong purchasing power, such as Germany, the Netherlands, and Spain. These markets represent the most important destinations for spices within the EU. Their large population base creates strong direct consumption demand, while their advanced trade and logistics systems allow them to function as distribution hubs that re-export products to other EU member states. As a result, strengthening market presence in these leading economies can help Vietnamese cinnamon and star anise reach a broader regional market.

3.2. Develop premium and organic product segments

Higher income levels in EU countries encourage consumers to spend more on high-quality food products, natural spices, and sustainably produced ingredients. Therefore, Vietnamese exporters should invest in internationally recognized certifications such as EU Organic or Rainforest Alliance in order to meet the expectations of high-income consumer groups in Europe. Moving beyond the export of raw spices and focusing on higher value-added products, such as processed cinnamon oil or refined spice products, can significantly increase export value. This strategy allows firms to take advantage of the positive relationship between GDP per capita and the value of spice exports observed in the empirical results.

3.3. Adopt an industry-oriented market access strategy

The large population of the EU creates strong aggregate demand not only in the food sector, but also in related industries such as pharmaceuticals, cosmetics, and natural flavoring products, where cinnamon and star anise are widely used as raw materials. Marketing strategies should therefore focus on supplying large volumes of spice ingredients to multinational manufacturing companies, particularly in industrialized economies such as Germany and the Netherlands. These countries combine high purchasing power with well-developed processing industries, which increases the likelihood of establishing stable and long-term supply contracts.

3.4. Prioritize trade promotion budgets based on economic potential

Government support programs should allocate trade promotion resources more strategically by prioritizing EU countries with large populations and stable income growth. Public funding can be directed toward supporting Vietnamese companies' participation in major international trade fairs such as Anuga in Germany and SIAL Paris in France, as well as initiatives aimed at building a stronger national brand for Vietnamese spices. Focusing on markets with consistently growing GDP per capita and large consumer bases can improve the effectiveness of public investment in export promotion.

3.5. Align cultivation areas with premium market standards

At the production level, farmers and local authorities should develop traceable cultivation zones that meet strict food safety standards required by EU markets. This includes compliance with limits on heavy metal residues such as Cadmium, which are strictly regulated in high-income EU markets. Establishing certified production zones and implementing quality monitoring systems can help ensure that Vietnamese cinnamon and star anise meet the health and safety expectations of consumers in countries such as Germany and the Netherlands, where product safety and quality are often prioritized over low prices.

REFERENCES

- Bui, D.L. (2025). EU - Vietnam free trade agreement (EVFTA): Impact on exporting agricultural products from Vietnam to EU and some policy recommendations. *Journal of Finance & Accounting Research*, pp.115–118. doi:<https://doi.org/10.71374/jfar.v25.i1.22>.
- CHI, N.T.K. (2023). IMPACT OF THE EVFTA AGREEMENT: A STUDY ON VIETNAM'S EXPORTED GOODS. [online] www.bing.com. Available at: [10.5281/ZENODO.8375151](https://zenodo.org/record/8375151).
- Fiolhais, M. (2025). Herbs and Spices Program: Joint Rainforest Alliance and UEBT Certification. [online] Rainforest Alliance. Available at: <https://www.rainforest-alliance.org/business/certification/herbs-and-spices-program> [Accessed 10 Mar. 2026].
- Hoan, P.T., My, D.T.D. and Huong, N.T.L. (2024). YẾU TỐ ẢNH HƯỞNG ĐẾN XUẤT KHẨU CỦA VIỆT NAM SANG LIÊN MINH CHÂU ÂU TRONG BỐI CẢNH EVFTA. *Hue University Journal of Science: Economics and Development*, [online] 133(5A), pp.19–32. doi:<https://doi.org/10.26459/hueunijed.v133i5A.7310>.
- Long, T.T. and Vuong, V.M. (2022). Analysis of the factors affecting Vietnam's exports to the EU market. *Science & Technology Development Journal: Economics- Law & Management*, [online] 6(3), pp.3008–3014. doi:<https://doi.org/10.32508/stdjelm.v6i3.782>.

- MINH, P.D. (2019). Documents & Reports - Temporary Redirects. [online] World Bank. Available at: <http://documents.worldbank.org/curated/en/866871589557725251>. [Accessed 10 Mar. 2026].
- Nguyen Tien, H. and Trinh Thuy, N. (2021). Impacts of EVFTA on the exportation of Vietnamese agricultural products to the EU market. *Journal of International Economics and Management*, 21(1). doi:<https://doi.org/10.38203/jiem.021.1.0020>.
- Nguyen, H.T.H. and Doan, T.N. (2017). The ASEAN Free Trade Agreement and Vietnam's Trade Efficiency. *Asian Social Science*, 13(4), p.192. doi:<https://doi.org/10.5539/ass.v13n4p192>.
- Nguyen, T.-H. (2023). Impact of EVFTA on Attracting Investment into Vietnam. *Global academic journal of economics and business*, 5(06), pp.157–163. doi:<https://doi.org/10.36348/gajeb.2023.v05i06.003>.
- Quang Huy Nguyễn (2023). Evaluation of CPTTP and EVFTA on Vietnam. *Vietnam social sciences*, 215(3), pp.30–44. doi:[https://doi.org/10.56794/vssr.3\(215\).30-44](https://doi.org/10.56794/vssr.3(215).30-44).
- Wtocommerce.vn. (2026a). TTWTO VCCI - EVFTA commitments on Sanitary and Phytosanitary Measures (SPS)? [online] Available at: <https://wtocommerce.vn/german-market/19027-evfta-commitments-on-sanitary-and-phytosanitary-measures-sps>. [Accessed 10 Mar. 2026].
- Wtocommerce.vn. (2026b). TTWTO VCCI - Types of Rules of Origin specified in the EVFTA? [online] Available at: <https://wtocommerce.vn/german-market/19023-types-of-rules-of-origin-specified-in-the-evfta>. [Accessed 10 Mar. 2026].