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FACTORS INFLUENCING THE VALUE OF VIETNAM'S AGRICULTURAL EXPORTS TO THE MARKETS OF MEMBER COUNTRIES OF THE REGIONAL COMPREHENSIVE ECONOMIC PARTNERSHIP (RCEP)

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Abstract:
This study aims to investigate the determinants of Vietnam's agricultural export values to the Regional Comprehensive Economic Partnership (RCEP) member countries. Employing a quantitative analysis methodology within the post-RCEP effectuation landscape, the gravity model scrutinises the factors influencing export performance. The research encompasses an assessment of five key determinants: Vietnam's Gross Domestic Product (GDP), the GDP of RCEP member states, the proportion of agricultural land, geographical proximity, and bilateral exchange rates. Based on the empirical findings derived from the model, the author proposes a series of policy implications aimed at enhancing trade engagement with the RCEP market, catering to the government and business enterprises.

JEL: F13, F15

Keywords: agricultural exports, RCEP, gravity model, policy implications

1. Introduction

Within the broader landscape of international economic integration and trade liberalization, Vietnam has proactively pursued the negotiation and signing of free trade agreements (FTAs) as a strategic imperative to deepen its integration into the global economy. By capitalizing on the advantages and preferences conferred by these agreements, Vietnam seeks to stimulate robust national economic development. Since the ASEAN Free Trade Area (AFTA) - Vietnam's inaugural FTA - entered into force in 1993, the country has concluded an impressive total of 19 FTAs. Alongside the landmark Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the

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Regional Comprehensive Economic Partnership (RCEP) constitutes the world's largest free trade accord, assuming a pivotal role in catalyzing international trade growth and facilitating global economic recovery.

The Regional Comprehensive Economic Partnership (RCEP), signed on November 15, 2020, and entering into force on January 1, 2022, aims to foster regional economic integration by reducing tariffs, streamlining customs procedures, and promoting investment flows among its member states. This presents a significant opportunity for Vietnam to expand its export markets, particularly for agricultural products, which constitute a substantial share of the country's export structure. Vietnamese agricultural commodities, ranging from rice, cashews, and pepper to coffee and tea, are poised to benefit from the tariff reduction commitments under RCEP, thereby enhancing their competitiveness and facilitating access to new markets.

Prior to acceding to the RCEP, Vietnam's agricultural sector had already achieved notable successes, with total export value reaching approximately USD 22.64 billion in 2021, representing 6.7% of the nation's overall export value. Key commodities such as rice, coffee, seafood, and cashews had established a presence in numerous international markets. However, a significant transformation occurred following the official implementation of the RCEP, marking a substantial leap forward for Vietnam's agricultural industry. The participating countries within the agreement committed to reducing export tariffs for 65% of all agricultural products within 10 years of the agreement's entry into force. This measure not only facilitates the expansion of consumer markets but also significantly enhances trade conditions for key products like rice, cashews, and coffee. By the end of 2022, after one year of RCEP implementation, the total value of Vietnam's agricultural exports to RCEP member countries had increased by 6.8% to USD 12.65 billion, despite a complex and volatile domestic and global landscape, underscoring the positive impact of RCEP participation. The signing of the RCEP has opened up promising opportunities for Vietnam's agricultural sector, accelerating exports to member countries' markets, particularly in the context of Vietnam being one of the top 15 global exporters of agricultural, forestry, and fishery products.

As a nation with a strong comparative advantage in agriculture, forestry, and fishery exports, Vietnam's participation in the RCEP presents a multitude of opportunities for its agricultural exports. The simplification of customs procedures, harmonization of rules of origin, and reduction of tariffs have collectively opened up a vast market, facilitated trade, and attracted foreign direct investment into Vietnam's agricultural sector. However, while the RCEP has unlocked doors of opportunity, it also poses formidable challenges in terms of export competition with partner countries possessing greater competitive capabilities. Furthermore, the stringent requirements imposed by foreign markets necessitate that Vietnamese agricultural products meet even higher standards of productivity and quality to remain competitive on the international stage.

2. Literature Review

2.1. Studies on Agricultural Exports

Dao Dinh Nguyen (2022) conducted an empirical analysis of Vietnam's rice and coffee exports, focusing on a 19-year period from 2000 to 2018. The study encompassed 40 major trading partners for rice and 35 for coffee. Employing the total export value as the dependent variable, the author estimated the determinants of Vietnam's exports for these two commodities. The findings revealed a positive and statistically significant relationship between the partner country's GDP and coffee exports across all dimensions. In contrast, a significant negative association was observed between GDP and rice exports. ASEAN membership was found to exert a positive influence on both rice and coffee exports. While the impact of the CPTPP was statistically insignificant for rice exports, it demonstrated a significant negative effect on coffee exports.

By employing a stochastic gravity model to investigate the determinants of Vietnam's agricultural exports to markets within the Asia-Pacific Economic Cooperation (APEC) forum, Helian Xu *et al.* (2023) elucidated the positive impact of the importer's GDP on Vietnam's agricultural export value. Moreover, the study revealed that membership in the World Trade Organization (WTO) positively correlates with increased agricultural exports from Vietnam. Conversely, geographical distance between the two countries was found to exert a negative influence on the value of Vietnam's agricultural exports. The research further identified several markets, notably China, the United States, Japan, South Korea, and Thailand, as possessing substantial untapped potential for increased agricultural export value from Vietnam. In contrast, Singapore, Papua New Guinea, Peru, and Brunei were identified as exhibiting lower potential profit margins for Vietnamese agricultural exports. These findings underscore the multifaceted nature of factors influencing Vietnam's agricultural export performance within the APEC region. While macroeconomic indicators such as GDP and WTO membership play a pivotal role, geographical proximity and market-specific dynamics also significantly impact export potential. The identification of high-potential and low-margin markets offers valuable insights for Vietnamese policymakers and exporters, enabling them to strategically prioritize and tailor their export strategies to maximize returns and optimize market penetration.

With the objective of quantifying the determinants of Vietnam's agricultural export potential to the EU, Pham Hoang Linh *et al.* (2019) employed stochastic frontier analysis to estimate Vietnam's agricultural export potential and a system GMM approach to analyze the determinants of this estimated potential. The results indicated that Vietnam's agricultural export potential to the EU is substantial and exhibits an upward trajectory. Furthermore, factors such as financial market development, trade freedom, technological readiness, and labor freedom were found to exert a positive influence on Vietnam's agricultural export potential to the EU. The countries identified as having the greatest potential for Vietnamese agricultural exports include Germany, the United

Kingdom, Spain, Italy, France, and the Netherlands. In terms of value, it is estimated that agricultural exports to these markets could be increased by 30-40%.

Honglu Fan *et al.* (2022) conducted an insightful analysis of the impact of trade facilitation indicators on China's agricultural exports to ASEAN countries. The study incorporated key indicators, such as economic freedom (EF), trade across borders (TAB), and infrastructure quality (Infra), as independent variables within the classic gravity model framework. The population variable was thoughtfully excluded due to concerns regarding multicollinearity. The empirical findings underscored the significant positive impact of these three trade facilitation indicators on the scale of China's agricultural exports to the ASEAN market, highlighting the instrumental role of trade facilitation in bolstering these exports. Notably, trade across borders emerged as the most influential factor, emphasizing the imperative for enhanced customs cooperation and streamlined customs procedures specifically tailored to the unique characteristics of agricultural products to further stimulate China's agricultural exports to ASEAN nations. The impact of economic freedom, trailing closely behind trade across borders, underscores the mutual benefit for both sides in continuing to strengthen investment cooperation and trade liberalization. Among the control variables examined, trade-related factors, distance, net exchange rate, and the landlocked status of a country were observed to have a progressively diminishing impact on China's agricultural exports to ASEAN countries, arranged in descending order of significance. These findings offer valuable policy implications for both China and ASEAN countries, highlighting the critical importance of prioritizing trade facilitation measures, particularly those related to customs cooperation and border procedures, to unlock the full potential of agricultural trade within the region. Furthermore, the study's emphasis on the positive role of economic freedom and trade liberalization underscores the need for continued efforts to deepen economic integration and reduce barriers to trade to foster a more conducive environment for agricultural exports.

2.2. Studies in the Context of RCEP Implementation

In a study on trade between Vietnam and RCEP countries, Nguyen Tien Dzung (2016) highlighted both growth and structural shifts in trade patterns. While trade with Japan, Australia, and Singapore showed a relative decline, bilateral trade between Vietnam and China, South Korea, India, and several middle-income ASEAN countries exhibited an upward trajectory. Trade complementarity between Vietnam and many RCEP members, including China and middle-income ASEAN nations, tends to increase, suggesting greater potential for trade expansion as tariffs and non-tariff barriers are dismantled under the RCEP framework. Vietnam's exports to the RCEP market, including agricultural products, have experienced rapid growth.

Do Minh Thu's (2017) research employed the SMART partial equilibrium model to forecast the changes in the total export value of four key agricultural products from Vietnam, namely vegetables and fruits, seafood, tea and coffee, and livestock, to the RCEP bloc. The results indicated that after tariff rates were reduced to 0%, the total

import value of these four agricultural products within the bloc would increase by USD 1.025 million. India was projected to experience the largest increase, at USD 657 million, followed by South Korea at USD 182 million and China at USD 149 million. However, it is important to note that RCEP primarily focuses on harmonizing existing FTAs between ASEAN and its external partners. Consequently, the practical implications of tariff reductions have already been realized under these pre-existing FTAs. Therefore, expectations for a dramatic surge in agricultural export values may be tempered.

Le Manh Hung *et al.* (2022) conducted a study examining the current state of Vietnam's agricultural exports to the Chinese market within the context of RCEP implementation. The research aimed to assess the impact of China's tariff and non-tariff measures on Vietnam's agricultural exports, utilizing a gravity model and the PPML (Poisson pseudo maximum likelihood) estimation method. Given the focus on bilateral agricultural trade between Vietnam and China, conventional variables representing costs, such as distance, language, and borders, were excluded from the model. The study's findings revealed a significant influence of the economic size of both Vietnam and China (GDP) on agricultural exports between the two countries. As the Chinese market expands, Vietnam's agricultural exports to this market also increase. This research provides valuable insights into the dynamics of Vietnam-China agricultural trade within the RCEP framework, highlighting the positive correlation between market size and export performance. Additionally, it underscores the importance of considering both tariff and non-tariff measures when analyzing the impact of trade agreements on agricultural exports.

2.3. Research Gap

Recognized as the world's largest FTA, the RCEP has attracted considerable scholarly interest, prompting researchers to delve into its economic implications and broader impacts. However, due to the relatively recent implementation of the agreement[ii], there remains a dearth of ex-post empirical studies examining the actual economic effects of the RCEP. In the absence of sufficient data for comprehensive post-implementation analysis, numerous scholars have focused on policy evaluations or ex-ante impact assessments, employing quantitative models such as Computable General Equilibrium (CGE) models, Global Trade Analysis Project (GTAP) models, and SMART models. While some studies have utilized gravity models to assess Vietnam's agricultural exports to specific markets like China or Japan within the RCEP context, there is a notable scarcity of research comprehensively examining all RCEP partner markets.

[ii] The Regional Comprehensive Economic Partnership (RCEP) is a free trade agreement among the 10 ASEAN member states and five of its dialogue partners: China, Japan, South Korea, Australia, and New Zealand. The agreement officially entered into force on January 1, 2022, for Vietnam, New Zealand, and eight other members. Subsequently, RCEP became effective for South Korea on February 1, 2022, for Malaysia on March 18, 2022, for Indonesia on January 2, 2023, and finally for the Philippines on June 2, 2023.

Given these considerations, further research into the trade relationships among RCEP members and the agreement's post-implementation impact on Vietnam's agricultural exports is warranted. This approach would enable a more precise and nuanced evaluation of the RCEP's influence on Vietnam's agricultural exports, particularly as businesses have had time to familiarize themselves with and adapt to the agreement's rules and regulations.

3. Research Methodology

3.1. Quantitative Approach

In the context of the RCEP's implementation, the author employs a gravity model to empirically examine the factors influencing exports. To estimate the coefficients for the gravity model's variables, previous researchers have typically utilized the following regression techniques: Ordinary Least Squares (OLS), Fixed Effects Method (FEM), or Random Effects Method (REM).

This study conducts several diagnostic tests, including the Breusch-Pagan Lagrangian multiplier test, the White test, and the Hausman test, to guide the selection among Pooled OLS, REM, or FEM. In the presence of model misspecifications, such as heteroscedasticity or autocorrelation, the Generalized Least Squares (GLS) method will be applied to address these issues. Finally, if endogeneity is detected in any of the variables, the Generalized Method of Moments (GMM) will be employed to mitigate this concern.

3.2. Gravity Model

The gravity model is frequently employed for ex-post assessments, specifically after countries have entered into free trade agreements (FTAs). This model, originally introduced by Tinbergen (1962), is rooted in Newton's law of gravitation and is designed to predict the value of trade between two countries in the context of international economics. The classic gravity model is expressed by the following equation:

$$Y_{ij} = \varphi \frac{Xi * Xj}{Dij}$$

Where:
Yij represents the value of trade between country i and country j,
Xi and Xj denote the economic size of countries i and j, respectively,
Dij signifies the distance between countries i and j.

The model posits that exports from one country to another are primarily explained by their economic size (measured by GNP or GDP) and the geographical distance between them. Tinbergen (1962) and Pöyhönen (1963) concluded that the volume of bilateral trade between two countries is directly proportional to their GDPs and inversely proportional to the distance separating them. Subsequent research has expanded upon the traditional gravity model by incorporating additional variables that potentially

influence trade flows between countries, such as trade policies, foreign direct investment, and exchange rates (Anderson, 1979; Bergstrand, 1985; Deardorff, 1998). Sawyer (1966) introduced the population variable into the gravity model, asserting that the bilateral trade volume between two countries is directly proportional to their respective populations. McCallum's (1995) study further highlighted the significant impact of transportation costs and shared borders on predicting trade flows between two regions.

Collectively, these studies demonstrate the gravity model's efficacy in facilitating the study of trade facilitation in the agricultural sector. Consequently, this research adopts an extended gravity model to examine the impact of trade facilitation on Vietnam's agricultural exports.

Building upon prior research findings, this study adopts a meticulously tailored approach to evaluate the impact of the RCEP agreement on Vietnam's export value with its RCEP partner countries. The selection of explanatory variables for the gravity model has been guided by a rigorous assessment of their relevance and suitability for the research context. By leveraging the gravity model, a well-established tool in international economics, to analyze the RCEP's influence on Vietnam's exports to its 14 RCEP partners, we anticipate generating precise and scientifically grounded results that will serve as a robust foundation for further analysis and evaluation. All variables, with the exception of dummy variables, are expressed in natural logarithms within the gravity equation. Notably, the population variable has been excluded due to its tendency to induce multicollinearity during data processing. The research model is presented in the form of a regression equation as follows.

$$\mathbf{Ln(EX_{ijt}) = \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(GDP_{jt}) + \beta_3 ln(AGR_{jt}) + \beta_4 ln(DIS_{ij}) + \beta_5 ln(ER_{ijt}) + \beta_6 Ct + \varepsilon_t}$$

Where:
EX_{it} represents the export value of each commodity from Vietnam to each trading partner in year t (in thousands of USD),
GDP_{it} and GDP_{jt} denote the Gross Domestic Product of Vietnam and the partner country, respectively, in year t (in thousands of USD),
AGR_{jt} signifies the proportion of agricultural land in the partner country at time t,
DIS_{ij} represents the geographical distance between Vietnam and each partner country,
ER_{ij} denotes the exchange rate between Vietnam and the partner country,
C encompasses other factors that may influence Vietnam's agricultural exports,
εt is the error term.

3.3 Data Collection

Table 1: Scope of Agricultural Products Included in the Study

Product Code	Product Label	Product Code	Product Label
01	Live animals	14	Vegetable plaiting materials; vegetable products not elsewhere specified or included
02	Meat and edible meat offal	15	Animal, vegetable or microbial fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	16	Preparations of meat, of fish, of crustaceans, molluscs or other aquatic invertebrates, or of insects (except HS 1604, HS 1605)
05	Products of animal origin, not elsewhere specified or included	17	Sugars and sugar confectionery
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	18	Cocoa and cocoa preparations
07	Edible vegetables and certain roots and tubers	19	Preparations of cereals, flour, starch or milk; pastrycooks' products
08	Edible fruit and nuts; peel of citrus fruit or melons	20	Preparations of vegetables, fruit, nuts or other parts of plants
09	Coffee, tea, maté and spices	21	Miscellaneous edible preparations
10	Cereals	22	Beverages, spirits and vinegar
11	Products of the milling industry; malt; starches; inulin; wheat gluten	23	Residues and waste from the food industries; prepared animal fodder
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	24	Tobacco and manufactured tobacco substitutes; products, whether or not containing nicotine, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body
13	Lac; gums, resins and other vegetable saps and extracts		

Source: Harmonized Commodity and Coding System

The data was collected from 15 RCEP member countries, spanning the period from 2013 to 2022. Trade data on Vietnam's agricultural exports to RCEP countries was sourced from the Trademap database established by the International Trade Centre (ITC), and classified according to the Harmonized Commodity Description and Coding System (HS), among other sources. In this study, the author defines agricultural products in accordance with the FAO classification, encompassing all products listed from Chapter I to Chapter XXIV (HS01 to HS24, excluding fishery products in HS03, HS1604, and HS1605)

Table 2: Data Sources of Variables in the Model

Variable	Definition	Data source
EX	Value of Vietnam's agricultural exports (thousand USD)	TRADE MAP
GDP	Gross Domestic Product (thousand USD)	World Bank WDI
AGR	Proportion of agricultural land (%)	World Bank WDI
DIS	Geographical distance (km)	CEPII
ER	Exchange rates	IMF

Source: Author's compilation.

Data on Gross Domestic Product (GDP) for both partner countries and Vietnam is sourced from the World Bank, which also serves as the basis for the author's compilation of agricultural land ratios in RCEP partner countries. Geographical distance data, measured from Vietnam's capital to the capitals of partner countries, is derived from research and expertise pertaining to the Centre d'Études Prospectives et d'Informations Internationales (CEPII) database on the world economy. Lastly, exchange rates are calculated by the authors based on International Monetary Fund (IMF) data, utilizing the listed exchange rates of the 15 RCEP countries' currencies against the US dollar.

Table 3: Expected Impact of Independent Variables on the Dependent Variable

Variable	Relationship between independent variables and the dependent variable	Expected Impact
GDP_{it}	When a partner country's GDP increases, it implies a corresponding rise in the income of its citizens. Consequently, the demand for products that the country lacks or has insufficient supply compared to demand will lead to the importation of those goods from other countries. This, in turn, will boost the export volume of the country supplying those products to this particular nation.	+
GDP_{jt}	When Vietnam's GDP increases, it signifies an expansion of the economy's scale, consequently leading to a rise in the demand for exports.	+
AGR_{jt}	When the proportion of agricultural land in a partner country decreases, agricultural output in that country diminishes, leading to a greater need to import agricultural products from other nations to meet domestic consumption demands. However, a decrease in the agricultural land ratio can be influenced by various factors, such as a decline in population pressure, which might, in turn, reduce the country's import demand.	+/-
DIS_{ij}	As the geographical distance (in kilometers) between Vietnam and its partner countries increases, difficulties in exporting goods are expected to arise, consequently impacting the volume of exports to those countries.	-
ER_{ij}	When the exchange rate of partner countries' currencies against the Vietnamese Dong (VND) increases, signifying an appreciation of their currencies, it incentivizes domestic businesses to export in order to earn foreign currency. However, in the short run, the J-curve effect might come into play, where a depreciation of the domestic currency leads to a temporary decrease in exports.	+/-

Source: Author's compilation.

4. Current Situation of Vietnam's Agricultural Exports to RCEP Countries

4.1. The Regional Comprehensive Economic Partnership (RCEP)

The Regional Comprehensive Economic Partnership (RCEP) negotiations were officially launched in November 2012, building upon the framework endorsed at the ASEAN Summit in November 2011. The agreement evolved from discussions surrounding the East Asia Free Trade Agreement (EAFTA) and the Comprehensive Economic Partnership for East Asia (CEPEA), operating within the ASEAN+3 and ASEAN+6 membership structures. RCEP was ultimately signed on November 15, 2020, marking a significant milestone as the 10 ASEAN member states and five partners – China, Japan, South Korea, Australia, and New Zealand – agreed to collaborate under a unified economic cooperation framework. India, initially a participant in the negotiations, withdrew from the agreement in 2019. The overarching goal of RCEP is to establish a comprehensive and mutually beneficial economic partnership that fosters deeper integration than existing ASEAN FTAs.

According to the Asian Development Bank (ADB), as of 2020, RCEP member countries accounted for approximately 31% of global GDP ($26.1 trillion), 29.7% of the world's total population (2.3 billion), and 29% of global trade ($10 trillion). These figures underscore the immense growth potential of RCEP, fueled by its trade liberalization and facilitation measures.

The agreement is anticipated to serve as a new catalyst for international trade growth, propelling the economies and supply chains of member countries towards greater prosperity.

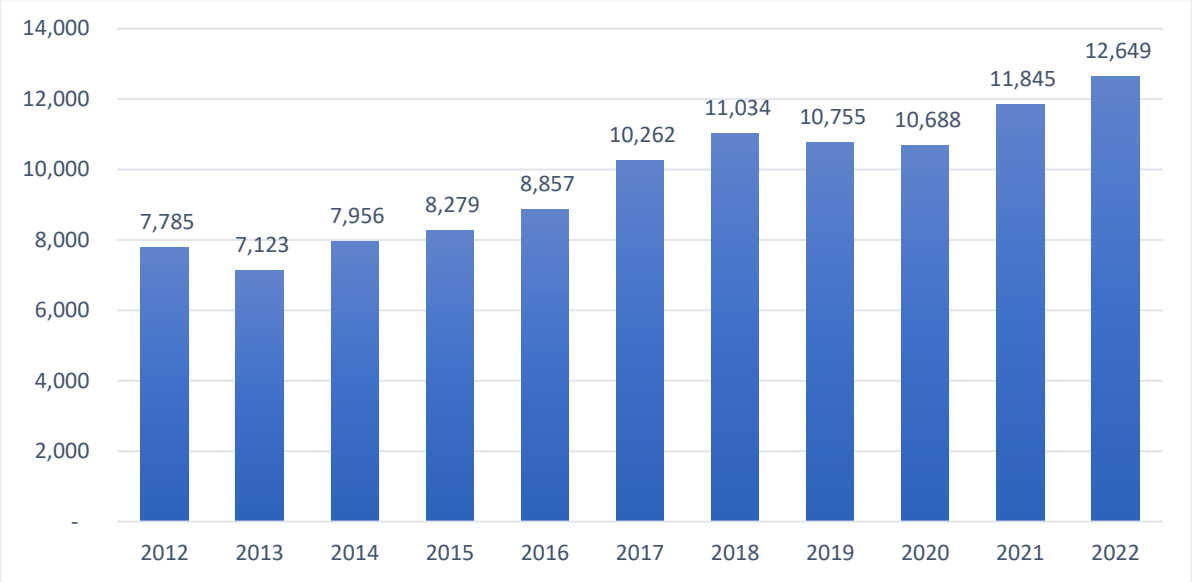
The establishment of RCEP is considered a significant milestone for ASEAN. Not only does it solidify ASEAN's central role in leading economic cooperation structures in the Asia-Pacific region, but it also signals a concerted effort to address the overlapping FTAs that have proliferated in the region over the past two decades. In 2021, RCEP was recognized as a trade agreement capable of revitalizing international trade and economic development, particularly in the wake of the COVID-19 pandemic, which exposed the vulnerabilities and shortcomings of globalization and supply chains.

4.2. Vietnam's Agricultural Export Value to RCEP Member Countries

In the period preceding the RCEP's implementation, specifically from 2013 to late 2020, Vietnam's agricultural exports to RCEP countries exhibited robust growth, facilitated by the ASEAN+1 Free Trade Agreements. However, these agreements lacked uniformity in rules of origin, customs procedures, technical standards, conformity assessment procedures, and trade remedies. The enactment of the RCEP, with its unified rules of origin applicable to all 15 member countries, is anticipated to generate significant opportunities for Vietnamese businesses to develop new supply chains. It also promises to create a shared production space and a stable, long-term "super" export market within the region. This is particularly noteworthy given that several RCEP members are major global suppliers of strategic raw materials and components (such as China, South Korea,

and ASEAN countries) and are among Vietnam's top trading partners (including China, South Korea, and Japan), accounting for over half of Vietnam's total trade volume. The RCEP, by establishing a harmonized set of rules, is poised to foster the development and expansion of regional supply chains among its member states.

Figure 1: Total Value of Vietnam's Agricultural Exports to the RCEP Market from 2012 to 2022 (Unit: Million USD)

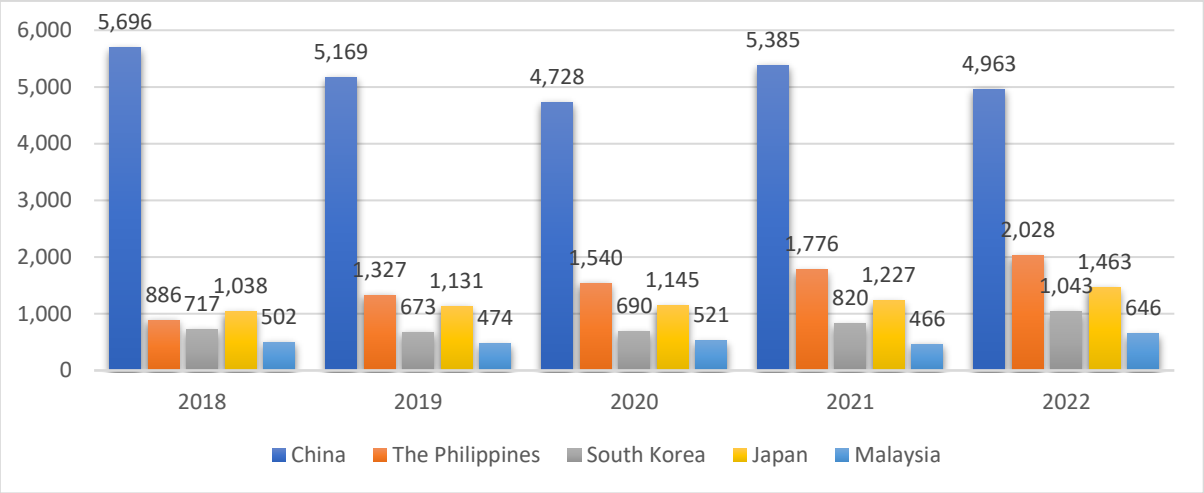


Source: Author's compilation from ITC Trademap

As illustrated in Figure 1, Vietnam's agricultural exports to RCEP countries experienced consistent growth from 2013, when the RCEP negotiations commenced, with a value exceeding 7.1 billion USD. This upward trajectory continued until 2018, reaching 11.03 billion USD. However, from 2019 to 2022, export activities were adversely affected by global political events and the COVID-19 pandemic, causing a slight decline in export value in 2019 and 2020 compared to 2018, although still surpassing 10 billion USD (according to the International Trade Center).

Through this challenging period, Vietnam managed to rebound, surpassing its pre-pandemic export value to reach 11.84 billion USD. Overall, both before and after the signing of the RCEP, Vietnam's total agricultural export value to member countries has steadily increased, with a remarkable 1.61-fold growth observed. Notably, key export commodities to top markets like China, the Philippines, Japan, and South Korea have maintained high growth rates, showcasing the resilience and potential of Vietnam's agricultural sector within the RCEP framework.

Figure 2: Top 5 Import Markets for Vietnam's Agricultural Products from 2018 to 2022 (Unit: Million USD)



Source: Author's compilation from ITC Trademap

China, the Philippines, South Korea, Japan, and Malaysia emerge as the leading importers of Vietnamese agricultural products within the RCEP bloc. As depicted in Figure 3.2, Vietnam's agricultural exports to these countries exhibit a clear upward trajectory throughout the period from 2018 to 2022. During this timeframe, these five countries collectively accounted for a substantial share of Vietnam's agricultural export value to the Asia-Pacific region. Conversely, other RCEP members, such as New Zealand, Laos, Myanmar, and Brunei, currently represent a relatively small percentage of Vietnam's agricultural exports. This disparity can be attributed to various factors, including tariff barriers, customs procedures, and stringent food safety regulations. These challenges underscore the need for continued efforts to enhance trade facilitation and regulatory harmonization within the RCEP framework to unlock the full potential of agricultural trade with these countries.

5. Assessing the Impact of Factors Influencing Vietnam's Agricultural Exports to RCEP

Figure 3: Descriptive Statistics of Model Variables

Variable	Obs	Mean	Std. dev.	Min	Max
lnEX	140	12.30077	1.638445	7.120444	15.57322
lnGDP	140	19.61971	2.011945	16.24916	23.61159
lnGDPVN	140	19.49529	.2057899	19.18012	19.82874
lnDIS	140	7.499291	.7831468	5.972256	9.122975
lnER	140	6.029319	3.515927	.3506569	14.09964
lnAGR	140	2.917977	1.150841	-.0842297	4.02434

Source: Calculated by the author using Stata 17

The study comprises 140 observations (n = 14, t = 10). The relatively low standard deviation indicates limited variability in the data around the mean, suggesting a low degree of dispersion within the dataset.

Figure 4: Correlation Matrix of Model Variables

	lnEX	lnGDP	lnGDPVN	lnDIS	lnER	lnAGR
lnEX	1.0000					
lnGDP	0.7186 0.0000	1.0000				
lnGDPVN	0.0667 0.4338	0.0446 0.6010	1.0000			
lnDIS	-0.0107 0.9003	0.5529 0.0000	0.0000 1.0000	1.0000		
lnER	-0.0477 0.5760	0.1916 0.0234	0.0330 0.6984	0.3934 0.0000	1.0000	
lnAGR	0.4371 0.0000	0.3538 0.0000	-0.0019 0.9824	0.1669 0.0488	-0.1843 0.0293	1.0000

Source: Calculated by the author using Stata 17

Considering the significance level of the Pearson correlation test, we have:

- H0: The correlation coefficient is 0 (no linear relationship between the two variables).
- H1: The correlation coefficient is not 0 (a linear relationship exists between the two variables).

If the sig value (p-value) is less than 5%, we reject the null hypothesis (H0), concluding that there is a linear correlation between the two variables. Conversely, if the sig value is greater than 5%, we fail to reject the null hypothesis, suggesting no linear relationship between the variables.

Upon examining the correlations between the independent variables and the dependent variable, the results indicate that the variable $lnGDP_j$ exhibits a correlation coefficient approaching 1, demonstrating a very strong correlation with the dependent variable. A relatively strong correlation with the dependent variable is also observed for lnAGR, while the remaining independent variables show weaker correlations.

5.1 Pooled OLS Model

Several studies have argued that the direct application of OLS to the gravity model can lead to biased and inconsistent estimates (Kalirajan, 2008). Pooled OLS, being a simplistic estimation approach that disregards the panel data structure, may result in

misrepresentation of the relationships between the dependent variable and the independent variables. Consequently, when the model incorporates multiple explanatory variables, issues such as autocorrelation or multicollinearity among the variables can arise. Due to these potential pitfalls, Pooled OLS is prone to violations of statistical assumptions, rendering it inefficient.

Figure 5: Results of Multicollinearity Diagnostic Tests

Variable	VIF	1/VIF
lnDIS	1.65	0.604912
lnGDP	1.61	0.619914
lnER	1.29	0.777421
lnAGR	1.24	0.805266
lnGDPVN	1.00	0.995616
Mean VIF	1.36	

Source: Calculated by the author using Stata 17

The study employs the Variance Inflation Factor (VIF) test to conduct a more in-depth assessment of multicollinearity. The results indicate that the model does not exhibit severe multicollinearity among the independent variables, as all VIF values are less than 2. Consequently, the variables in the model can be deemed suitable for regression analysis.

Figure 6: Results of Heteroscedasticity Diagnostic Tests

```
White's test
H0: Homoskedasticity
Ha: Unrestricted heteroskedasticity

   chi2(20) =  76.22
Prob > chi2 = 0.0000

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	76.22	20	0.0000
Skewness	23.85	5	0.0002
Kurtosis	0.70	1	0.4042
Total	100.76	26	0.0000

Source: Calculated by the author using Stata 17

The study employs the White test to diagnose the presence of heteroscedasticity (unequal variance of errors). With a P-value of p = 0.000, we reject the null hypothesis of homoscedasticity and accept the alternative hypothesis (H1). Therefore, the Pooled OLS model exhibits heteroscedasticity.

Figure 7: Results of Autocorrelation Diagnostic Tests

```
. xtserial lnEX lnGDP lnGDPVN lnDIS lnER lnAGR

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      13) =      2.601
           Prob > F =      0.1308
```

Source: Calculated by the author using Stata 17

At a Prob value of 0.1308, which is greater than 5%, we fail to reject the null hypothesis of no autocorrelation. Thus, the model does not exhibit autocorrelation.

5.2 FEM and REM Models

The OLS method, while the simplest estimation approach, is often unsuitable for pooled panel data due to potential bias in its estimates. To address the issue of heteroscedasticity observed in the Pooled OLS model, the Fixed Effects (FE) or Random Effects (RE) models are considered as potential alternatives.

The FE method excels at estimating the impact of explanatory variables on the dependent variable. However, it encounters limitations in estimating coefficients for time-invariant variables, such as geographical distance or shared borders, which are crucial components of the gravity model. On the other hand, the RE method can estimate coefficients for time-invariant variables but may not be efficient when the samples selected in the model are heterogeneous.

To determine the most suitable estimation method for the extended gravity model, the Hausman-Taylor test, developed by Hausman & Taylor (1981), is employed. This test is widely recognized as the most appropriate method for comparing and choosing between FE and RE approaches (Egger, 2005). In this study, the author also adopts the Hausman-Taylor test to analyze and evaluate the results of the research model.

Figure 8: Hausman Test for Model Selection (FEM vs. REM)

```
. hausman fe re

Note: the rank of the differenced variance matrix (1) does not equal the number of coefficients being tested (5);
      be sure this is what you expect, or there may be problems computing the test.  Examine the output of your
      estimators for anything unexpected and possibly consider scaling your variables so that the coefficients
      are on a similar scale.

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              |       fe           re         Difference          Std. err.
--------------+----------------------------------------------------------------
        lnGDP |    .9984377     .8157357       .182702        .2852283
      lnGDPVN |    .0856755     .1756121      -.0899365       .1234364
        lnDIS |   -15953.94    -1.21933      -15952.72        38372.44
         lnER |    -.017279     .0021035      -.0193825       .0106437
        lnAGR |   -3.533824     .1412735      -3.675098        1.090236
------------------------------------------------------------------------------
                           b = Consistent under H0 and Ha; obtained from xtreg.
            B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =   0.17
Prob > chi2 = 0.6776
(V_b-V_B is not positive definite)
```

Source: Calculated by the author using Stata 17

Null Hypothesis (H0): The Random Effects (RE) model is more appropriate. (P-value > 0.05) Alternative Hypothesis (H1): The Fixed Effects (FE) model is more appropriate. (P-value < 0.05)

Given the result: p = 0.6767, where the P-value is greater than 0.05, we fail to reject the null hypothesis (H0). Therefore, the RE model is deemed the more suitable choice for analyzing the impact of the independent variable

Figure 9: Results of Heteroscedasticity Diagnostic Tests for the REM

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lnEX[Nation,t] = Xb + u[Nation] + e[Nation,t]

        Estimated results:
                         |       Var     SD = sqrt(Var)
-------------------------+------------------------------
                    lnEX |   2.684503       1.638445
                       e |   .1226969       .3502812
                       u |   .6795004       .8243182

        Test: Var(u) = 0
                                  chibar2(01) =   372.22
                               Prob > chibar2 =   0.0000
```

Source: Calculated by the author using Stata 17

Further diagnostic tests were conducted to examine the presence of heteroscedasticity in the REM. The results indicated that heteroscedasticity persists in this model. To address this issue, the authors opted for the Generalized Least Squares (GLS) model.

5.3 GLS Model

The GLS model is employed to address the limitations of the gravity model that other models have not been able to overcome. After analyzing the correlation coefficients to identify the relationships between the variables in the model, the study proceeds with regression analysis. The objective is to measure the direction and magnitude of the impact of independent variables on the dependent variable using methods such as Pooled OLS, FEM, REM, and GLS. Diagnostic tests are then performed to select the most appropriate regression method.

Figure 10: Results of Determinants of Vietnam's Agricultural Exports to RCEP

```
. esttab pool fe re gls,r2 star(* 0.1 ** 0.05 *** 0.01)

------------------------------------------------------------------------------
                      (1)             (2)             (3)             (4)
                     lnEX            lnEX            lnEX            lnEX
------------------------------------------------------------------------------
lnGDP             0.788***        0.998***        0.816***        0.749***
                 (19.22)          (3.18)          (6.17)         (39.69)

lnGDPVN           0.181           0.0857          0.176           0.374***
                 (0.57)          (0.42)          (1.10)          (2.86)

lnDIS            -1.242***       -15953.9        -1.219***       -1.312***
                (-11.64)         (-0.42)         (-3.52)        (-28.40)

lnER              0.0171          -0.0173         0.00210         0.0230**
                 (0.81)          (-0.56)         (0.07)          (1.99)

lnAGR             0.285***        -3.534***       0.141           0.315***
                 (4.54)          (-3.18)         (0.67)          (6.68)

_cons             1.693           119644.7        1.592           -0.775
                 (0.27)          (0.42)          (0.43)         (-0.30)
------------------------------------------------------------------------------
N                   140             140             140             140
R-sq              0.789           0.203
------------------------------------------------------------------------------
t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01
```

Source: Calculated by the author using Stata 17

The study employs the GLS model to affirm the robustness of the empirical research model. The regression results using the GLS method are as follows:

Among all the independent variables, only the geographical distance between countries exhibits a negative (inverse) impact on agricultural exports. The regression coefficient of the lnDIS variable is -1.312. This implies that when the distance between the two countries increases by 1%, Vietnam's agricultural exports decrease by 1.312%. This finding aligns with the established understanding in numerous studies evaluating international trade flows between countries. Furthermore, agricultural products,

characterized by their low value and high transportation/export volume, are particularly sensitive to geographical distance, as it leads to increased logistics costs, thereby affecting Vietnam's trade activities.

The regression coefficient of the lnGDPj variable is 0.749, indicating that the GDP of partner countries has a positive impact on Vietnam's export value, with a significance level of 1%. As the economic scale of the importing country expands, so does its import demand, consequently leading to an increase in the value of exported agricultural products.

With a regression coefficient of 0.374 for the lnGDPVN variable, Vietnam's GDP demonstrates a positive relationship with its agricultural export value. At a 99% confidence level, if other factors remain constant, a 1% increase in Vietnam's GDP will result in a 0.374% increase in export value. Thus, as the economies of countries develop, the demand for Vietnamese agricultural products and market access strengthens. This observation is consistent with the conclusions drawn from the classic gravity model.

The exchange rate is calculated by the authors based on the formula: E (VND/unit of partner country currency), signifying how many Vietnamese Dong (VND) can be exchanged for one unit of the partner country's currency. According to economic theory, an increase in the exchange rate implies an appreciation of the partner country's currency and a depreciation of the VND, making the domestic currency relatively cheaper compared to the foreign currency. This, in turn, tends to stimulate exports.

The model analysis reveals a regression coefficient of 0.023 for the lnER variable, with a 95% confidence level. This indicates that a 1% appreciation of the foreign currency (the currency of the partner countries) leads to a 0.023% increase in the value of exports to RCEP countries. This impact of the exchange rate aligns with both the model's expectations and established economic theory.

Similarly, exhibiting a positive influence on Vietnam's agricultural exports, a 1% increase in the proportion of agricultural land in partner countries results in a 0.315% increase in the value of Vietnam's agricultural exports. This finding diverges from the research conducted by Pham Hoang Linh *et al.* (2019), which examined the factors influencing Vietnam's agricultural exports to the EU market and observed an inverse relationship between the proportion of agricultural land in the EU and Vietnam's export value.

This discrepancy can be attributed to several factors. The RCEP encompasses a diverse group of economies with varying levels of development, but the majority are developing countries. In these countries, the proportion of agricultural land tends to increase over time due to population growth and the high demand for agricultural products. Consequently, the need to import agricultural goods from other countries also rises to meet domestic consumption requirements. Moreover, crop and livestock yields may not keep pace with the expansion of agricultural land, further increasing the likelihood of these countries requiring imported agricultural products.

6. Policy Implications for Trade with the RCEP Market

6.1. Implications for the Government

A. Maintain Macroeconomic Stability and Promote Sustainable Growth

The research model highlights a positive correlation between Vietnam's GDP growth and the value of its agricultural exports. Therefore, the government should prioritize maintaining macroeconomic stability through sound fiscal and monetary policies, while simultaneously promoting sustainable economic growth, particularly in the agricultural sector. It is essential to create a favorable business environment that encourages investment and production development. Additionally, streamlining administrative procedures and reducing transaction costs will empower businesses to fully capitalize on the opportunities presented by the RCEP market.

B. Strengthen International Economic Integration and Expand Export Markets

The study also reveals that the GDP of RCEP countries has a positive impact on Vietnam's agricultural exports. This underscores the immense potential of the RCEP market and the importance of enhancing international economic integration. The government should proactively participate in trade promotion activities, establish strategic partnerships, and negotiate and sign bilateral or multilateral free trade agreements to expand agricultural export markets while minimizing trade barriers.

C. Invest in Sustainable Agricultural Development and Enhance Product Quality

The proportion of agricultural land in partner countries can influence their demand for agricultural imports. To meet the increasingly stringent market requirements, the government should prioritize investments in sustainable agricultural development, adopting advanced technologies to enhance productivity and product quality while ensuring food safety and compliance with international standards. Additionally, policies are needed to support farmers in accessing capital, technology, and market information, encouraging production within value chains, and establishing smart agriculture models.

D. Improve Logistics Infrastructure and Enhance Competitiveness

Geographical distance can pose a challenge to agricultural exports. The government should intensify investments in developing transportation infrastructure, particularly road, rail, and port systems, to reduce transportation costs and shorten delivery times. Simultaneously, it's crucial to improve the efficiency of logistics services, simplify customs procedures, and apply information technology in supply chain management to bolster the competitiveness of Vietnamese agricultural products in the global market.

E. Stabilize the Macroeconomy and Create a Favorable Business Environment

Exchange rates can significantly impact the value of agricultural exports. The government should implement prudent monetary policies to stabilize exchange rates, mitigating risks for exporting enterprises. Furthermore, it is essential to continue

improving the business environment, reducing administrative barriers, and facilitating business operations and growth. Simultaneously, enhancing transparency and improving the efficiency of state management are crucial steps.

F. Develop and Implement Policies to Support Agricultural Export Enterprises

The government should establish comprehensive support programs for agricultural export enterprises, encompassing the provision of market information, assistance in accessing capital, human resource training, and the development of a national brand for Vietnamese agricultural products. Concurrently, it is necessary to facilitate the participation of businesses in international trade fairs and exhibitions, enabling them to connect with potential partners and expand their export markets. Additionally, encouraging enterprises to adopt sustainable production and business standards is vital for long-term success.

6.2. Implications for Enterprises

A. Enhance Product Quality and Meet International Standards

In the context of deepening economic integration and fierce competition within the RCEP market, businesses must prioritize enhancing product quality, ensuring food safety, and complying with international standards. It is crucial to invest in research and development, apply advanced technologies in production and processing, and establish quality management systems that adhere to international standards such as ISO, HACCP, and GlobalGAP. Simultaneously, strengthening quality control from production to distribution is essential to ensure product consistency and meet the increasingly high demands of consumers both regionally and globally.

B. Diversify Export Markets and Products

Businesses should avoid relying on a single market or product and instead diversify their export markets and product offerings. They need to proactively explore and tap into potential markets within the RCEP region while developing new products, diversifying product ranges, designs, and packaging to cater to the diverse needs of consumers. Additionally, focusing on developing high-value-added, processed products is crucial for enhancing economic efficiency and competitiveness.

C. Build Brands and Strengthen Marketing Efforts

Building a strong brand is key to increasing the value and competitiveness of Vietnamese agricultural products in the international market. Businesses should invest in brand building, product promotion, and intensify marketing activities, particularly through online channels and social media. At the same time, it is essential to develop a compelling brand story, linking products to cultural, traditional, and local values to create differentiation and attract consumers.

D. Apply Technology and Enhance Management Capacity

Embracing technology is an inevitable trend for improving production, business, and management efficiency. Businesses should proactively invest in information technology, automation, and other technological solutions to increase productivity, reduce costs, and improve product quality. Simultaneously, it is necessary to enhance management capabilities, adopt modern management methods, and train high-quality human resources to adapt to the increasingly competitive and dynamic business environment.

E. Collaborate and Partner with Stakeholders in the Value Chain

To enhance business efficiency and mitigate risks, businesses need to strengthen cooperation and partnerships with stakeholders across the value chain, from production to consumption. Establishing strategic partnerships with suppliers, distributors, and other relevant parties is vital to ensure a stable supply chain, effective market access, and the sharing of information, knowledge, and experience. Additionally, participating in industry associations and trade promotion organizations can help businesses expand their networks and elevate their market position.\

7. Conclusion

Building upon the foundation of the classic gravity model in international trade research, this study employs the GLS model to examine the determinants of Vietnam's agricultural export potential to its RCEP partner countries over the period from 2013 to 2022. Among the control variables, the GDP of both partner countries and Vietnam, the proportion of agricultural land, and the exchange rate exert a positive impact on Vietnam's agricultural exports, in descending order of magnitude. In contrast, geographical distance exhibits a negative impact on Vietnam's trade with its 14 RCEP member countries.

As with any research endeavor, certain limitations persist in this study's exploration of factors influencing Vietnam's agricultural exports. While the model incorporates various independent variables, it does not include cultural distance, a factor that can potentially affect bilateral trade, as highlighted by Kogut & Singh (1988). The authors initially considered including cultural distance (Hofstede) as an independent variable to assess its impact on Vietnam's exports, evaluating it at the national trade flow level rather than the enterprise level. However, during data collection, a lack of data for 4 out of 14 countries would have resulted in the loss of crucial information for model construction.

Beyond cultural distance, other factors such as trade-related variables, infrastructure quality, and technical efficiency also warrant further investigation to understand their potential influence on Vietnam's agricultural export capabilities. Future research could delve deeper into these aspects, employing more comprehensive datasets and advanced econometric techniques to provide a more holistic understanding of the complex interplay of factors shaping Vietnam's agricultural trade performance within the RCEP framework.

Conflict of Interest Statement

I would like to declare that I have no conflicts of interest to declare on all financial and non-financial interests and relationships, direct employment with a private sector entity, and service on private sector and non-profit Boards and advisory panels,whether paid or unpaid or in-kind help in support of the research or the preparation of the manuscript. I too did not have association or financial involvement (i.e. consultancies/advisory board, stock ownerships/options, equity interest, patents receivedor pending, royalties/honorary) with any organization or commercial entity having a financial interest in or financial conflict with the subject matter or research presented in the manuscript.

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References

Anderson, J. E. (1979). A Theoretical Foundation for Gravity Equation. *The American Economic Review*, 106-116.

Bergstrand, J. H. (1985). The Gravity Equation In International Trade: Some Microeconomic Foundations And Empirical Evidence. *The Review of Economics and Statistics*, 474-481.

Dao Dinh Nguyen. (2022). Các yếu tố quyết định xuất khẩu gạo và cà phê của Việt Nam: sử dụng mô hình trọng lực biên ngẫu nhiên. *Tạp chí Nghiên cứu Kinh tế và Kinh doanh châu Á*, 19-34.

Deardorff, A. (1998). Determinants of Bilateral Trade: Does Gravity Work in a Neo-Classic World? In J. A. Frankel, *The Regionalization of the World Economy* (pp. 7-32). Chicago: University of Chicago Press.

Do Minh Thu (2017). Nông sản Việt Nam và cơ hội đến từ Hiệp định đối tác toàn diện khu vực RCEP. *Năng lực cạnh tranh các mặt hàng xuất khẩu Việt Nam - Thực trạng và giải pháp*, (pp. 61-70). Hanoi.

Fan, H., Trinh Thi Viet Ha, Zhang, W., & Li, S. (2022). The influence of trade facilitation on agricultural product exports of China: empirical evidence from ASEAN countries. *Economic Research-Ekonomska Istraživanja*, 1-23. doi:10.1080/1331677X.2022.2143845

Kogut, B., & Singh, H. (1988). The effect of national culture on the choice of the entry mode. *Journal of International Business Studies*, 411-432.

Le Manh Hung, Le Thi Viet Nga, & Doan Nguyen Minh. (2022). Thúc đẩy xuất khẩu nông sản của Việt Nam sang thị trường Trung Quốc trong bối cảnh thực thi hiệp định RCEP. *Tạp chí khoa học thương mại*, 3-11.

McCallum, J. (1995). National Borders Matter: Canada-U.S. Regional Trade Patterns. *The American Economic Review*, 615-623.

Nguyen Tien Dzung. (2016). Thương mại Việt Nam và các nước RCEP: Tăng trưởng và thay đổi cơ cấu thương mại. *Tạp chí Kinh tế và Kinh doanh*, 1-9.

Pham Hoang Linh, Nguyen Khanh Doanh, & Nguyen Ngoc Quynh. (2019). Determinants of Vietnam's Potential Trade: A Case Study of Agricultural Exports to the European Union. *Asian Journal of Agriculture and Rural Development*, 33-46. doi: https://doi.org/10.18488/journal.1005/2019.9.1/1005.1.1.33.46

Pöyhönen, P. (1963). A Tentative Model for the Volume of Trade between Countries. *Weltwirtschaftliches Archiv*, 933-100.

Sawyer, J. A. (1966). An Econometric Study of International Trade Flows. By Hans Linnemann. *Canadian Journal of Economics and Political Science, 33*(4), 633-634. doi:10.2307/140051

Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: The Twentieth Century Fund.

Xu, H., Do Trong Nghia, & Nguyen Hoang Nam. (2023). Determinants of Vietnam's potential for agricultural export trade to Asia-Pacific Economic Cooperation (APEC) members. *Heliyon*, 1-14.