

Impact of trade agreement on rice export: The case of Vietnam

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ABSTRACT

This study focuses on measuring the impact of trade agreements on Vietnam's rice exports based on secondary data sources produced by the General Statistics Office, the World Bank, and International Monetary Fund. Structural gravity model was employed for analyzing and quantifying the impact of trade agreements on rice export of Vietnam. The results show the impact of Trade Agreements on Vietnam's rice exports is relatively low and not all Agreements bring positive effects. Based on the findings, we give some recommendations for Vietnam's rice export to adapt more to the contents and standards of the Trade Agreements and will be participating in the future.

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1. Introduction

Economists have affirmed that the development of a country can begin only when the agricultural sector has been able to create surpluses and kept expanding while the industry sector is developing (Meijerink and Roza, 2007). However, in practice, surpluses will not be useful and can never be expanded without trading between countries, which is especially true for Asian countries when it comes to exporting agricultural products, in which rice always is accounted for a significant proportion of both quantity and value.

In recent years, Vietnam's rice exports in particular and Asian countries in general such as Thailand, India, etc. have played a crucial role for the development of the agricultural sector and the national economy. It can be seen that there are many determinants affecting exports which can bring either positive or negative impacts to the national exports in general and rice export in particular. In addition, there are also certain interactions among these determinants that create resonant effects or inhibit the export of commodity. Visually, some interaction possibilities can be seen as follows: (i) population size increases while the area of national territory remains unchanged, which makes agricultural land including rice area reduced which might reduce the scale of rice production if there is no additional

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method to increase productivity by applying science and technology in combination with intensive farming; (ii) the increase in population size does not increase the demand for rice imports from a certain country when people do not have the habit of enjoying rice consumption in general or do not like the type of rice that such country export; (iii) inflation and exchange rate are closely related, when inflation increases, the value of domestic currency decreases, the domestic currency depreciates against the foreign currency, causing export turnover tend to increase, which means that although both inflation and exchange rates have negative correlations, they are resonant when promoting exports; (iv) participating in international organizations as well as the signing off trade agreements will facilitate the commercial activities of nations, increase the size of the economy (GDP), from which the impact of participating in economic relations and the scale of the economy has a resonant impact on the export performance of a country.

However, the impact of determinants on export activity in general and rice exports in particular in Asia is different depending on the level of participation in each country's economy. In recent years, the process of exporting rice products of Vietnam and other Asian countries has been in the process of creating and diverting rice trade through trade agreements from familiar customers such as China, Philippines, Indonesia, and Malaysia to new customers in Europe and America to generate more commercial benefits. This process has put Vietnam ahead of the challenges of national quality standards and rice brands to create a competitive advantage over other rice exporting countries. These forced Asian rice exporting countries to meet strict regulations of trade agreements when they want to export to “difficult” markets such as Japan, the US and Europe.

When participating in trade agreements, Vietnam in particular and Asian countries in general are keen to take advantage of this opportunity to improve the quality and choose the direction of rice export in the future to be suitable and effective with international practice and affirm the country's image of export in general and rice exports in particular in the international market. Therefore, pointing out the impact of trade agreements on rice export of Asian countries through the case study of Vietnam drawn the attention of both researchers, managers and regulators.

2. Literature Review

2017 FAO's global forecast of rice exports in 2018 and 2019 states that India, Thailand, Vietnam, Pakistan and the US are still the top five rice exporters in the world and these countries are selected as a spatial scope for carrying out research on rice exports in different periods. A number of qualitative studies highlight the factors associated with supply and demand and some contents promoting or hindering rice exports as research by Poramacom (2014) indicated that wholesale rice prices and rice prices at the farm, the price of rice at the farm and the FOB price or the problem of managing rice reserve too much leading to an increase in the price of rice for export, which may lose the world's leading rice export position to Thailand. Ramakrishna. Degaonkar (2016) explored the limitations influencing Indian rice exports such as tariffs, input costs, infrastructure, science and technology, rice quality and also rice export subsidies and recommended on improving science and technology, agricultural extension, post-harvest activities to promote Indian rice exports. Memon (2017) revealed that Pakistan's rice exports are considered as an industry as it is the country's second largest export commodity (after textile products) but is facing with many difficulties when its main type of rice – Basmati – is under severe competition from Indian Basmati rice with better processing, polishing and packaging technology.

In addition to the above qualitative studies, several foreign studies have used empirical analysis methods to quantify the impacts on rice export activities of countries. Warr and Wollmer (1995) applied export demand model with Thai rice export data showing that the demand for rice export elasticity is higher than expected and Thai rice can be seen as a typical alternative choice compared with other countries. Research of Dechachete (2011) with composite index of market access (CIMA) show the level of barriers to market access of the three countries for rice imports from Thailand in order from low to high is South Africa, USA, Philippines. The gravity model employed by Anup et al. (2016)

studied the factors influencing Indian rice exports in which Basmati rice is taken as a reference indicates that the rice sector contributes significantly to national income, although Basmati rice and Non-Basmati are subject to severe competition from Pakistan.

Studies on Vietnamese rice exports mainly use qualitative research to assess objective and subjective determinants influencing Vietnam's rice exports. Nguyen (1998) emphasized that rice is not only a strategic commodity and the policy of rice export is politically sensitive but also it is affected by many limitation determinants such as natural disaster, people, domestic and foreign determinants. The supply, demand and price determinants affect the rice export market, in which price is the determining factor of the competitiveness of rice in the international market, cultivated rice varieties, and the cultivation process are all significant components that affect quantity and quality of exported rice (Import-export development strategy for the 2001-2010 period - Ministry of Trade). In addition, Le (2015) also mentioned several essential determinants such as selecting the form of rice exports (through the government contract, through trade agreements or long-term contracts), selecting reasonable marketing strategies and long-term trade promotion plans for national rice exports. Besides, applying technology in the stages of production - collection - processing - export that constituting a competitive advantage (Dinh, 2010), meeting the requirements of packaging, origin, pesticide content, additives, and complying with environmental standards (Le, 2004) are also important determinants to be considered for rice export of Vietnam.

Trade agreements also have an impact on rice and other commodities under a static perspective through the process of “trade creation” and “trade diversion” (Viner, 1950). The impact of “trade creation” is creating a “new” in trade relations, meanwhile a “trade diversion” is only a change of trading partners. In terms of dynamic impact, trade agreements not only have a direct impact but also can create long-term dynamic impacts on welfare, economic restructure, or industry restructure. With long-term visions, the study of Hertel et al. (2001) focused on evaluating a free trade agreement that led to changes in government management principles on foreign investment and regulations, rules in e-commerce, trade in services, harmonization of technical standards, hygiene rules, and rationalization of customs procedures. Itakura and Lee (2012), Lee and Itakura (2014) studies the influence of ASEAN +3 agreements, TPP, RCEP on welfare changes, cross-sectoral adjustments, resources and industrial structure's reallocation and among member countries. The above studies show that most of the participation in trade agreements had positive effects on welfare and also depended on the country in different periods of time, stages of development, and bilateral, multilateral or regional integration aspects.

Several studies assessed the impact of trade agreements on exports of commodity in general and agricultural products in particular of a certain country or group of countries. They focused on listing tariff reductions for preferential imports and rice (e.g. Dinh, 2010; Pham, 2013; Bui, 2016). They all showed that the creation of WTO and other bilateral, regional and multilateral trade agreements all aim to make trade in the world more favorable by reducing trade barriers and increased application of non-discriminatory principles to trade commodity between countries, from which all related countries could generate benefit. However, in case of considering the impact of trade agreements on individual industries, this is not necessarily true. In terms of rice, the fact shows that WTO and other trade agreements often require member countries to apply preferential import tariffs on most commodities in general, agricultural products in particular, including rice, but not every member country gains the benefits of rice export when participating in a trade agreement. Tran (2013) argued that the commitments of some WTO members most likely benefit Vietnam's rice dependent economy and South Korea and Japan will open and increase the domestic rice demand market from 3% to 5% and quota tariffs for rice are at 0% - 5%, nevertheless the US and Thailand are the most enjoyed countries because their rice maintains a high quality, meeting the needs of the two importers. The study also showed that China also increased imports from 20% to 30% for rice and reduced the quota tax by 10% for milled rice but focus on high quality rice, due to that member countries that export lower quality rice than other member countries will be negatively affected. Becoming a WTO member also made

Philippines import more agricultural products because imported agricultural products including rice became cheaper and prevailed over domestic rice, which would be more beneficial for countries that had already exported rice to Philippines with lower prices like Vietnam.

However, price competition is no longer a wise solution. In order to take advantage of the positive effects of trade agreements, quality is important (Vu & Tran, 2010). After Vietnam entered the WTO, more than 200 bilateral and regional trade agreements were signed, the first adjustment of trade policy was to gradually eliminate tariff barriers on rice products. However, developed countries are often more likely to restrict preferential tariff commitments than developing countries (Bui, 2008; Bui, 2016). In addition to the impact of the tariff content, the content of the technical standards, the rice industry should pay attention to the quality of rice and need to change in the form of rice export to meet the commitments of trade agreements which are mentioned by United States, India, Pakistan and Myanmar. In order to make export rice more attractive in the international market, emphasis should be placed on research and development activities in each stage of the production process as well as market selection (David, 2010; Broadbent et al., 2015; Ramakrishna & Degaonkar, 2016).

3. Research Methodology

3.1. Data Collection

The study employs secondary panel data collected from 1998 to 2015 including Vietnam and 60 countries which are Vietnam's rice import markets with a total proportion of over 90% Vietnam's rice export turnover. Specific data is sourced and presented in Table 1 as follows:

Table 1

Source of Research Data

No.	Data	Sources
1	Total volume and value of Vietnam's rice exports - Gross domestic product at current prices of Vietnam (GDPvn) and of countries (GDPim)	Vietnam Food Association (VFA) https://www.vietfood.org.vn/
2	- Consumer price index (CPI) - Final expenditure of countries (EXP) - The value of agricultural production in Vietnam and other countries in the world	World Bank Organization (WB) http://www.worldbank.org/
3	- Area and output of rice in Vietnam over the years (1998 to 2015) - Vietnam's export volume and value to each country over the years (1998 - 2015)	General Statistics Office (GSO) https://www.gso.gov.vn/xnkhk/
4	Bilateral real exchange rate data (BilRER)	International Monetary Fund (IMF). http://data.imf.org/
5	- Area and production of rice in Vietnam before 1998 - Vietnam's rice export volume and value before 1998	Published research articles
6	The distance between Hanoi capital and the capital of countries (DIST), the geographical position (adjacent to the landlock, common border with Vietnam - contig) of the countries, the colonial history of the countries (colony)	http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp
7	The trade agreement dummy variable (1 if the country enters into a trade agreement from the effective date)	(http://www.trungtamwto.vn/fta)

3.2. Research Model and Data Analysis

The impact of trade agreements can be studied by various methods, but their effects are more beneficial rather than risks. In addition to the general equilibrium model (CGE) and partial equilibrium model (CPE), gravity model has been employed to measure the impact of trade agreements on exports. Gravity model not only assesses the impact of trade agreements on a specific commodity export activity but also allows assessment and measurement of the level of impact of bilateral, area, mix and multilateral trade agreements to rice export activities in the past, with assessments at the level of synthesizing new rice export criteria, thereby orienting production and export for the whole rice industry.

From Tinbergen's research (1962), with the solid theoretical basis of Anderson and Wincoop (2003), we then used this model, combining the gravity variables such as growth domestic product (GDP), population, geographical distance between countries, adding several related variables such as exchange rates, prices and value taxes, binary variables of content such as sharing borders, language differences, geography, membership of agreements and the use of dummy variables (trade agreements) to study the impact on welfare, "trade creation" and "trade diversion" (Baier & Bergstrand, 2004; Carrere, 2006; Do, 2006; Magee, 2008; Okabe, 2015). As a result, this model incorporates the unique characteristics of each country, the size of the countries outside and shows the impact of trade agreements to create a significant increase in trade. Within the Vietnamese context, a number of studies by Nguyen (2011) assessed the impact of ASEAN-Korea free trade area, Nguyen (2012), Nguyen and Do (2014) pointed out that AKFTA and AJCEP had a positive impact on Vietnam's exports, especially trade with Korea had a positive effect, meanwhile the new agreements such as the ASEAN - Australia - New Zealand Free Trade Agreement and ASEAN - Japan Comprehensive Economic Partnership Agreement had unclear impacts on Vietnam's trade. However, the gravity model is less likely to predict the welfare effects of priority regional trade agreements, and lack of the synthesis to analyze the effects of trade agreements on specific commodity.

Traditional gravity modeling with the first ideas of Tinbergen (1962), Poyhonen (1963) and Linnerman (1966), built on the idea of Newton's Law of Attraction implies that trade between the two countries affected by the size and distance between them and it is a function of the characteristics of the exporting country, the importing country and the barriers between the two countries. The original model was described by Anderson (1979) and Kepaptsoglou et al. (2010) as follows,

$$X_{ij} = G \cdot O_i \cdot D_j \cdot \Phi_{ij}, \quad (1)$$

where X_{ij} is the trade scale between the two economies i and j , O_i are the characteristics of the exporting economy, D_j is the characteristic of the target economy, G is a constant representing the elements that are independent from i and j , for example, the level of liberalization of the world economy, and Φ_{ij} are variables that reflect trade forces between the two economies. Along with the contributions of Anderson and Wincoop (2003) on the importance of relative trade costs, the multilateral trade resistance (MTR) is included in the model and is expressed as follows:

$$X_{ij} = \frac{Y_i Y_j}{Y} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma}. \quad (2)$$

Next, the traditional gravity model was gradually improved. Anderson (1979) was the first to build the foundation of economic theory for the gravity equation under assumptions about distinguishing products by original source and constant elasticity of substitution (CES) on expenditure; Anderson and Wincoop (2003) discussed the dissemination of the Armington-CES model and emphasized on the importance of the impact of trade costs on overall equilibrium; Arkolakis et al. (2012) demonstrated that most theoretical model that produce isomorphic gravity equations would preserve the benefits of trade. Since then, the gravity model has been developed based on a strong theoretical basis, especially the Structural Gravity Model with the constant replacement elasticity of Armington theoretically represented for commercial models and provided unified theoretical foundation for experimental

gravity models. One of the main advantages of this model is that it allows trade policy analysis in a multinational environment (Piermartini & Yotov, 2016).

Specifically, it is a combination:

(1) functions of Anderson and Wincoop (2003):

$$(\alpha_i p_i)^{1-\sigma} = \frac{Y_i}{\Pi_i^{1-\sigma}} \text{ in which } \Pi_i^{1-\sigma} = \sum_{j=1}^N \left(\frac{t_{ij}}{p_j} \right)^{(1-\sigma)} \times \frac{E_j}{Y};$$

(2) CES benefit function for the country j :

$$U^j(c_{ij}) = \sum_{i=1}^N \left\{ \alpha_j^{\frac{1-\sigma}{\sigma}} c_{ij}^{\frac{\sigma-1}{\sigma}} \right\}^{\frac{\sigma}{\sigma-1}};$$

(3) consumer commodity function is transported from exporting country i to importing country j :

$$X_{ij} = \left\{ \frac{x_i p_i t_{ij}}{p_j} \right\}^{(1-\sigma)} E_j$$

and (4) define the total expenditure in country j , E_j , which is equal to the total expenditure for the sets of commodity from all countries, including j , at distribution prices $p_{ij} = p_i t_{ij}$, as a function of prices accessing sets of commodity from importing countries and bilateral trade costs between the two countries. We obtain the system of gravity equations structured as follows:

$$X_{ij} = \frac{Y_i E_j}{Y} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma}, \quad (3)$$

$$\Pi_i^{1-\sigma} = \sum_{j=1}^N \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \frac{E_j}{Y}, \quad (4)$$

$$P_j = \sum_{i=1}^N \left(\frac{t_{ij}}{\Pi_i} \right)^{1-\sigma} \frac{Y_i}{Y}, \quad (5)$$

In which $\sigma > 1$ is the elasticity of substitution in different sets of commodity, which is commodity sets from different countries; $\alpha_i > 0$ is the CES preference parameter that is considered exogenous; c_{ij} denotes consumption of commodity sets from countries i in country j ; Q_i is the fixed supply of each type of commodity; p_i is “factor-gate price” for each “commodity set”; accordingly, the production value of a representative economy is defined as $Y_i = p_i \cdot Q_i$, where Y_i is also the income of country i . Set $Y = \sum_{i=1}^N Y_i$ as the total consumption of commodity sets of this country in countries j , including the country i itself.

The above structural gravity models can be estimated by traditional OLS method. However, the PPML (Poisson Pseudo Maximum Likelihood) estimation technique has advantages that are used to compare with the results from the traditional estimation method, which (i) can handle any problem subject to variance and heteroskedasticity of trade data (Silva & Tenreyro, 2006); (ii) can take advantage of information contained zero commercial flow; (iii) consistent with fixed effects in gravity model with structural parameters (Arvis & Shepherd, 2013; Fally, 2015); (iv) can be used to calculate the effects of trade policies in the overall equilibrium model (Anderson et al., 2015). For robustness testing, gravity models can be estimated by applying the maximum exposure of Gamma Pseudo (GPML) and OLS estimates (Head & Mayer, 2014).

From Eq. (3), by taking the natural logarithm, we can rewrite it as follows:

$$\ln X_{ijt} = \ln E_{jt} + \ln Y_{i,t} - \ln Y_t + (1 - \sigma) \ln \tau_{ij,t} - (1 - \sigma) \ln P_{j,t} - (1 - \sigma) \ln \pi_{i,t} + u_{ij,t}. \quad (6)$$

In which represents bilateral trade costs and is presented as:

$$(1 - \sigma) \ln \tau_{ij,t} = \beta_1 \ln DIST_{ij} + \beta_2 CNTG_{ij} + \beta_3 CLNY_{ij} + \beta_4 LLOCK_j + \beta_5 RTA_{ij,t} + \beta_6 BTA_{ij,t} + \beta_7 \tau_{ij,t}. \quad (7)$$

In terms of experimentation, due to data limitations, the paper uses a compact structure of gravity model below:

$$\ln X_{ij,t} = a_0 + a_1 \ln GDP_{vn_{i,t}} + a_2 \ln EXP_{j,t} + \alpha_3 \ln RER_{ij,t} + b_1 \ln DIST_{ij} + b_2 CNTG_{ij} + b_3 CLNY_{ij} + b_4 LLOCK_j + c_1 RTA_{ij,t} + c_2 E_{j,t} Agree_{ij,t} + c_3 BTA_{ij,t} + e_{ij,t}, \quad (8)$$

where a_0 is the intercept, and $a_j, b_j, c_j \in N^{++}$ are the parameters to be estimated in the gravity model;

$X_{ij,t}$: Vietnam's bilateral rice export value to the economy j;

$GDP_{vn_{i,t}}$: Vietnam's gross domestic product;

$EXP_{j,t}$: Total final consumption expenditure of the economy j

$RER_{ij,t}$: Actual bilateral exchange rate between Vietnam and the country j

$DIST_{ij}$: The geographical distance between Vietnam and the economy j measured by the distance between Hanoi and the capital of partner countries;

$CNTG_{ij}$: Dummy variable takes value 1 if Vietnam and the economy j share border lines and zero in other cases;

$CLNY_{ij}$: Dummy variable takes value 1 if Vietnam and the economy j share the same colonial system before and zero in other cases;

$LLOCK_j$: Dummy variables receive value 1 if the economy j is not adjacent to the sea and zero in other cases;

$RTA_{ij,t}$ and $BTA_{ij,t}$: Dummy variables of multilateral and bilateral integration receive value 1 if Vietnam and the economy participate in Regional Trade Agreements and take effect at time t and zero in other cases;

$E_{j,t} Agree_{ij,t}$: Interactive variable between trade agreement dummy with the total final consumption expenditure of the importing country;

$e_{ij,t}$: Random errors in the model are assumed to follow normal distribution rules with zero mean and constant variance.

4. Results and Discussion

The results from the gravity model estimation are shown in Table 2, in which column (1) presents the results obtained using traditional OLS estimation method; column (2) presents the results obtained using traditional OLS estimation and fixed effect control over time; and column (3) shows the estimated results obtained from the PPML method. Results are reported after the heteroskedasticity test.

The estimation results show that most of the estimated coefficients are significant at traditional levels of significance except for the estimated coefficient of Vietnam's gross domestic product (in PPML). Variables showing border sharing and institutional linkages are also not statistically significant in all

methods. The estimated coefficient derived from the PPML method is smaller and more accurate than the traditional OLS estimation method.

4.1. The overall impact of trade agreements

For the estimated coefficient of the final expenditure variable of Vietnam's rice importers in the model, it shows positive and very small values in Table 2, which is consistent with the characteristics of the rice industry in the current period. At the time when income increased, the demand for food commodity tended to increase but at a low level. The estimated coefficient of dummy variables for landlocked countries maintains a negative sign at 1% significance level in all models and implies that landlocked nations hinder rice export transactions between Vietnam and other countries. In addition, the exchange rate policy seems to be ineffective in promoting Vietnam's rice exports as the estimated results indicate that the sign of the estimated coefficient of the bilateral real exchange rate is negative and statistically significant at 1%.

Table 2

Estimated results of structural gravity model (considering bilateral and mixed agreements)

VARIABLES	(1)	(2)	(3)
	OLS	OLS FE	PPML
	Ln_BilRice	Ln_BilRice	Ln_BilRice
ln_GDPvn	4.876*** (1.176)	-15.97 (13.90)	
ln_EXPim	0.238** (0.0935)	0.239*** (0.0917)	0.0194*** (0.00702)
ln_BilRER	-0.258*** (0.0785)	-0.257*** (0.0776)	-0.0201*** (0.00578)
ln_DIST	-1.010*** (0.374)	-1.018*** (0.378)	-0.0828*** (0.0271)
contig	-1.461 (1.294)	-1.425 (1.258)	-0.0773 (0.0997)
landlock	-6.749*** (0.756)	-6.755*** (0.743)	-0.614*** (0.0840)
colony	-1.244 (0.816)	-1.244 (0.760)	-0.104 (0.0681)
WTO	0.696 (0.712)	23.03* (13.95)	0.165** (0.0828)
GSTP	-1.940*** (0.527)	-1.939*** (0.519)	-0.155*** (0.0415)
AFTA	3.740*** (0.959)	3.833*** (0.972)	0.293*** (0.0697)
ASEANplus	-1.290* (0.780)	-1.487* (0.785)	-0.144** (0.0576)
BTAs	-2.678 (1.795)	-2.264 (1.943)	-0.150 (0.142)
Constant	-105.0*** (29.57)	408.1 (343.4)	-12.09*** (3.429)
Observations	1,080	1,080	1,080
R-squared	0.189	0.223	0.205
Year FE	No	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The use of dummy variable (trade agreements) and interactive variable (ln_EXP*agreement) between the dummy variable of trade agreement and the final expenditure of the importing country in the model clarifies the difference in the impact of international economic integration in general and trade

agreement to Vietnam rice export. WTO dummy variables are included to control changes in Vietnam's rice exports before and after WTO accession. The estimated results show that entering WTO promotes Vietnam's rice export activity as the estimated coefficient is positive and statistically significant at 5%, but this effect is not strong. However, this effect is not recorded when interactive variables appear.

Table 3

Estimated results of structural gravity model including interactive variable (considering bilateral and mixed agreements)

VARIABLES	(1)	(2)	(3)
	OLS_interaction Ln_BilRice	OLS_interaction_FE Ln_BilRice	PPML_interacionc Ln_BilRice
ln_GDPvn	4.932*** (1.177)	-15.60 (13.93)	
ln_EXPim	0.214** (0.0949)	0.212** (0.0932)	0.0168** (0.00713)
ln_EXP*agreement	0.0807 (0.0562)	0.0900 (0.0565)	0.00745* (0.00390)
ln_BilRER	-0.256*** (0.0785)	-0.255*** (0.0776)	-0.0198*** (0.00576)
ln_DIST	-0.962*** (0.369)	-0.965*** (0.374)	-0.0779*** (0.0269)
Contig	-1.610 (1.299)	-1.588 (1.261)	-0.0893 (0.0992)
landlock	-6.676*** (0.757)	-6.676*** (0.744)	-0.607*** (0.0841)
colony	-1.244 (0.814)	-1.244 (0.759)	-0.105 (0.0679)
WTO	0.711 (0.710)	22.72 (13.98)	0.0487 (0.0680)
GSTP	-1.980*** (0.530)	-1.985*** (0.522)	-0.159*** (0.0419)
AFTA	2.576** (1.240)	2.545** (1.234)	0.190** (0.0820)
ASEAN+	-2.353** (1.055)	-2.691** (1.074)	-0.244*** (0.0778)
BTAs	-3.996* (2.047)	-3.700* (2.172)	-0.266* (0.154)
Constant	-106.3*** (29.58)	399.1 (344.3)	3.070*** (0.303)
Observations	1,080	1,080	1,080
R-squared	0.191	0.226	0.207
Year FE	No	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.2. Comparison of impacts between ASEAN +6 trade agreements

When extracting the marginal impact of each free trade agreement with partner countries (ASEAN +6) on the scale of Vietnam's rice exports by including corresponding dummy variables in the AIFTA estimation model, ACFTA, AKFTA, AJCEP, AANZFTA, the results of the five agreements recorded have a strong impact on Vietnamese rice exports.

Table 4

Estimated results of structural gravity model including interactive variable (considering mixed agreements)

VARIABLES	(1)	(2)	(3)
	OLS_ASEAN6+	OLS_ASEAN6+ FE	PPML_ASEAN6++
	Ln_BilRice	Ln_BilRice	Ln_BilRice
ln_GDPvn	4.854*** (1.194)	-16.68 (12.66)	
ln_EXPim	0.273*** (0.0974)	0.270*** (0.0959)	0.0218*** (0.00740)
ln_EXP_ASEAN+	-0.119*** (0.0330)	-0.134*** (0.0319)	-0.0113*** (0.00307)
ln_BilRER	-0.285*** (0.0832)	-0.281*** (0.0826)	-0.0218*** (0.00629)
ln_DIST	-1.208*** (0.378)	-1.243*** (0.381)	-0.0971*** (0.0271)
Contig	-2.330* (1.287)	-2.297* (1.248)	-0.133 (0.0992)
Landlock	-6.884*** (0.766)	-6.873*** (0.753)	-0.622*** (0.0847)
Colony	-1.148 (0.816)	-1.132 (0.761)	-0.0967 (0.0680)
WTO	0.693 (0.720)	23.70* (12.68)	0.0781 (0.0691)
AFTA	2.998*** (1.068)	3.008*** (1.085)	0.240*** (0.0800)
AIFTA	-7.463*** (1.485)	-7.065*** (1.422)	-0.545*** (0.150)
ACFTA	3.931*** (1.302)	4.257*** (1.312)	0.295*** (0.109)
AKFTA	3.337*** (1.117)	3.199*** (1.121)	0.222** (0.0973)
AJCEP	-1.221 (0.962)	-2.020** (0.988)	-0.130* (0.0705)
AANZFTA	3.165*** (0.998)	3.633*** (0.979)	0.284*** (0.0894)
Constant	-103.3*** (30.08)	427.4 (312.7)	3.106*** (0.301)
Observations	1,080	1,080	1,080
R-squared	0.207	0.241	0.217
Year FE	No	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The estimated coefficient of dummy variable AFTA has a positive value at high statistical significance, reflecting the positive impact of AFTA on Vietnam's rice exports of about 0.2% compared to the remaining countries. However, Vietnam does not actively exploit the advantages of rice exports as signing the ASEAN +6 trade agreements when the coefficients of this dummy variable (ASEAN+) bring negative values at 0.24%. The exploitation of benefits from signing bilateral free trade agreements (BTAs) is unclear when the effects of these agreements are not recorded in the estimation methods in Table 2 and record negative effects at the 10% significance level in Table 3.

The Global System of Trade Preference (GSTP), which offers Vietnam many incentives, but the coefficient of this dummy variable has negative value, reflecting the negative impact on Vietnam's rice exports, which is 0.15% lower than the of Vietnam's rice export value compared to other countries.

The coefficient of the interactive variable between the trade agreement and the final expenditure is statistically significant with small positive value of relation, indicating that when there are impacts of trade agreements, the spending of importing countries for imported rice increased but not significantly.

Data in Table 4 show that (i) The potential impact of trade agreements on Vietnamese rice exports is less dependent on the number of signed trade agreements and the degree of diversity and "depth" of the field of negotiation and association of trade agreements. Although from 2007 onwards, the number

and integration content of trade agreements are at a greater level than the previous period but the level of positive effects of trade agreements in the previous period (Regression coefficients of dummy variables AFTA, positive ACFTA and greater than coefficients of other agreement dummy variables) are more positive and clearer. Since then, it is significant to say that any trade agreement that gives Vietnam new partners with socio-economic characteristics relevant to rice products has a clear positive impact on rice export activities of Vietnam.

(ii) *The extent and direction of trade agreements on Vietnam rice exports depends on the advantages of economic distance, geography and complementarity in rice trade.* Countries with the advantages of exporting rice to Vietnam: *the economic scale is not too different, the habit of consuming rice is quite similar, the geographical distance is favorable and there is historic economic relationship with Vietnam*, the volume and value of Vietnamese rice exports received positive impacts when these countries became partners with Vietnam in trade agreements. This is not only true of regional trade agreements such as AFTA but also with some ASEAN +6 mixed trade agreements. In particular, although the total volume and value of Vietnamese rice exported to ASEAN countries in recent years has decreased, the market share of exported rice to 9 countries regularly has accounted between 35% and 45% of the total Vietnamese rice exports to the whole world. Mainly, four big importers, Philippines, Indonesia, Malaysia and Singapore, always are accounted for over 95% of Vietnam's rice market share in ASEAN. While the aggregate impact of the ASEAN +6 agreements studied is considered negative for Vietnam's rice exports (Table 3), but separately for each agreement (Table 4), ACFTA has a positive impact because China is economically similar, along with its borders, the demand for large food due to overpopulation has spurred demand for rice imports from Vietnam despite the rice production of China is very high. In terms of other member countries with ASEAN such as Korea, Australia and New Zealand, although there is no similarity with ASEAN countries or China, they have *additional characteristics in trade for Vietnam's rice products* (suitable between Vietnam's rice export structure and imported countries' rice consumption), the demand for imported agricultural products including rice from these countries increased and partly boosted Vietnam's rice exports more into these markets.

(iii) *Trade agreements influencing Vietnam's rice exports through trade barriers that member states apply.* With incentives in trade agreements that member states such as China, South Korea, Australia, and New Zealand offer (tariffs, technical standards) to Vietnamese rice, it often brings a positive impact on Vietnam rice export. Meanwhile, Japan and India are partners of Vietnam in the AJCEP, AIFTA, VJEPA agreements but exclude Vietnamese rice from export tariffs, so the opposite effect is noted. In addition, member countries require that Vietnamese rice for export must have clear rules of origin and meet the technical barriers of the product, pushing discrimination among countries that create large barriers for Vietnamese rice when penetrating markets, Japan is such a typical partner.

(iv) *The impact of trade agreements on Vietnam's rice export through geographical distance and exchange rate is consistent with the theory.* The impact of geographical distance changes on Vietnamese rice exports is unclear because countries with geographical distance from Vietnam, though far away and have not signed trade agreements with Vietnam still import Vietnamese rice in large quantities (some African countries: Ghana, Ivory Coast). The real exchange rate coefficient has negative signs, indicating that the Vietnamese currency is becoming more and more devalued compared to other currencies, but Vietnam's rice exports are still mostly increasing (there are also years of decline due to other reasons).

Some problems arisen

Firstly, the type and quality of Vietnamese exported rice has little innovation and has not been standardized. Vietnam's rice has not been actually produced, processed, preserved according to the agricultural product value chain process consistently before exporting; failing to meet the technical standards for export rice that importing countries have set, and decentralized at medium level, which make the competitiveness of Vietnamese rice is still low, the price of Vietnamese rice is falling to the

lowest level. Compared to other types of rice in the world, the “trade creation” effect on rice export between Vietnam and partner countries is not high. Therefore, Vietnam rice export is often suitable for the current markets of Vietnam (Asia, Africa), it is difficult to expand to high-end markets such as the US, Japan and Europe.

Secondly, Vietnam has not yet considered for the investigation and collection of information on fluctuations in rice supply and demand markets in the world, attaching importance to quantity and neglecting the quality of the exported rice, making Vietnam a large rice producer and exporter in the world with low value, which results in rice exports inefficiency and the average exporting price of rice tends to decrease recently and is always lower than Thailand.

Thirdly, the inaccurate and incomplete contents and regulations given to rice products in Vietnamese trade agreements that have been signed or made by each market but not being considered in the negotiation process showed a lack of interest in the export benefits of rice in the negotiation process of trade agreements, which made it impossible for rice to take advantage of Vietnam's trade agreements.

5. Conclusion

This research shows that Vietnam's participation in trade agreements has an impact on Vietnam's rice exports. This effect is more evident in case that member countries have consistent characteristics with Vietnam. Therefore, in order to export rice to receive these impacts in a positive, proactive and significant way, rice industry should increasingly adapt well to the contents negotiation of trade agreements and other regulations on specific standards for rice of each market. The study has provided some recommendations to help Vietnam's rice industry export more effectively: (i) adapt to the content of rules of origin, technical and phytosanitary barriers of trade agreements by standardizing the techniques from the production to the export of rice, there is a need to build a link between the stages and between the stakeholders involved in rice export; (ii) adapt to competitive content, tariff commitments, anti-dumping and dispute settlement mechanisms of trade agreements by actively adjusting rice export policies such as product policies, tax policies, trade promotion, exchange rate policies in line with international practices and with each individual import market as well as the specific characteristics of the industry; (iii) adapt to the sustainable development content of trade agreements by gradually restructuring the rice industry to produce and export rice in accordance with environmental protection criteria, increase employment and collection import for agriculture and rural areas and harmonize with the development trend of international economic integration.

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