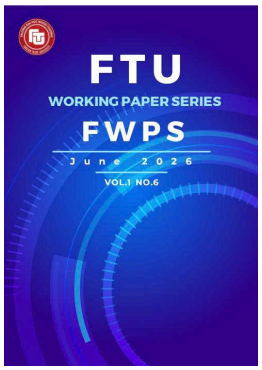

Working Paper 2026. 6

- Vol.1 , No. 6

LIỆU CPTPP CÓ THÚC ĐẨY XUẤT KHẨU GẠO CỦA VIỆT NAM? BẰNG CHỨNG TỪ HIỆU ỨNG TẠO LẬP THƯƠNG MẠI VÀ CHUYỂN HƯỚNG THƯƠNG MẠI

Nguyễn Đinh Diễm Thư[1], Phùng Minh Khánh, Hoàng Tuấn Minh, Nguyễn Quốc Vượng

Sinh viên K63 CLC Kinh tế đối ngoại – Viện Kinh tế & Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Vũ Huyền Phương

Giảng viên Viện Kinh tế & Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Tóm tắt

Nghiên cứu này đánh giá tác động của Hiệp định Đối tác Toàn diện và Tiến bộ Xuyên Thái Bình Dương (CPTPP) đối với xuất khẩu gạo của Việt Nam sang 33 đối tác thương mại trong giai đoạn 2010–2024. Trong khi các nghiên cứu trước đây chủ yếu xem xét tác động tổng thể của CPTPP hoặc tập trung vào dòng thương mại chung, số lượng nghiên cứu phân tích cụ thể ngành gạo của

[1] Tác giả liên hệ, Email: k63.2412150291@ftu.edu.vn

Việt Nam và phân biệt giữa hiệu ứng tạo lập thương mại và chuyển hướng thương mại vẫn còn hạn chế. Nghiên cứu sử dụng mô hình trọng lực mở rộng và dữ liệu bảng, áp dụng các phương pháp ước lượng như Fixed Effects, Random Effects, Hausman-Taylor và Poisson Pseudo Maximum Likelihood (PPML), nhằm đánh giá tác động của việc tham gia CPTPP cùng với các yếu tố khác như GDP, quy mô dân số, khoảng cách địa lý và đặc điểm quốc gia không giáp biển. Kết quả cho thấy CPTPP có tác động tích cực và có ý nghĩa thống kê đến xuất khẩu gạo của Việt Nam sang các nước thành viên, qua đó khẳng định hiệu ứng tạo lập thương mại, trong khi bằng chứng về hiệu ứng chuyển hướng thương mại sang các nước không phải thành viên còn hạn chế và chưa thực sự vững qua các phương pháp ước lượng khác nhau.

Từ khóa: CPTPP, gạo, xuất khẩu, Việt Nam, mô hình trọng lực

DOES THE CPTPP PROMOTE VIETNAMESE RICE EXPORTS? EVIDENCE FROM TRADE CREATION AND TRADE DIVERSION

This study assesses the impact of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) on Vietnam's rice exports to 33 trading partners over the period 2010-2024. While previous studies have primarily examined the general effects of CPTPP or focused on aggregate trade flows, limited research has specifically analyzed its implications for Vietnam's rice sector and the distinction between trade creation and trade diversion. Using an augmented gravity model and panel data estimation methods, including Fixed Effects, Random Effects, the Hausman-Taylor Model, and Poisson Pseudo Maximum Likelihood (PPML), the study evaluates the impact of CPTPP membership alongside other determinants such as GDP, population size, geographical distance, and landlocked status. The results indicate that CPTPP has a significant positive effect on Vietnam's rice exports to member countries, confirming a trade-creation effect, while evidence of trade diversion toward non-member countries is limited and not robust across specifications.

Keywords: CPTPP, rice, export, Vietnam, gravity model

1. Introduction

Global trade is increasingly driven by international trade agreements, particularly as developing economies seek deeper integration into global markets. As one of the world's leading rice exporters, Vietnam has actively pursued trade liberalization to enhance its export performance and agricultural competitiveness. A defining milestone in Vietnam's trade policy trajectory was its accession to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), a "new-generation" agreement which came into force for Vietnam in 2019 (Nguyen et al., 2023).

As a high-quality regional free trade agreement, the CPTPP aims to eliminate tariffs, mitigate non-tariff barriers, and harmonize regulatory frameworks among member nations. Theoretically, the pact promotes export expansion and deepens economic integration by reducing trade costs and improving market access (Tran et al., 2019). However, according to Viner's Customs Union theory, while preferential trade agreements stimulate trade creation by augmenting intra-bloc trade, they also risk causing trade diversion by shifting trade away from more efficient non-member economies (Tran et al., 2019). Consequently, evaluating the net welfare effect - balancing trade creation against trade diversion - is essential to determining the true impact of the agreement.

Within this context, rice (HS Code 1006) stands as a highly strategic export commodity for Vietnam, playing a vital role in agricultural production, rural employment, and foreign exchange earnings. Because Vietnam's agricultural sector relies heavily on rice exports, analyzing the impact of CPTPP membership on bilateral rice trade flows provides crucial insights into the broader implications of regional economic integration.

This paper evaluates the effects of the CPTPP on Vietnam's rice exports across 33 trading partners from 2010 to 2024. The analysis employs an augmented structural gravity model framework to empirically isolate and quantify the trade creation and trade diversion effects generated by the agreement. To ensure robust and unbiased estimation - particularly to address issues like heteroscedasticity and zero-trade flows common in agricultural trade data - the research utilizes multiple advanced econometric approaches, including Fixed Effects, Random Effects, the Hausman-Taylor Model, and the Poisson Pseudo Maximum Likelihood (PPML) estimator.

2. Vietnamese Rice exports under CPTPP

2.1. Overview of Vietnam's Rice Exports

Rice is important to Vietnam's agricultural exports; it makes sure people in the country have enough food to eat and exports to other countries in trade. Vietnam produces around 26-28 million tons of rice annually, exporting approximately 6-6.5 million tons, which is close to 15 per cent of all the rice sold worldwide (VIOIT, 2021). Rice also plays a crucial role in the life of people in rural areas and the national economy, because money from exporting rice is a big part of agricultural export earnings, and supports millions of families in the Mekong and Red River Delta areas.

According to Vietnam Agriculture, the Mekong Delta contributes roughly 50% of Vietnam's total rice output and over 90% of its rice exports thanks to the favourable soil, climate, and an extensive irrigation system. This shows how rice grows and getting it out of the country are both mainly in the south.

In recent years, Vietnam has become one of the three biggest rice exporters in the world; in 2024, Vietnam's rice exports reached a record high of over 9.18 million tons, valued at roughly $5.7 billion (about $18 per person in the US) (Việt Nam Nông nghiệp & Môi trường, 2024). Better kinds of rice such as fragrant and high-quality grains are getting a bigger part of export value, so the business is moving from selling loads of rice to selling rice that is worth more, to other countries. Major traditional importers have included the Philippines, Indonesia, and Malaysia, and Vietnam still has a good amount of the market in southern and southeast Asia.

2.2. CPTPP Background Information

The CPTPP is a high-quality free trade agreement which was signed in Chile on March 8, 2018, and it began working for the first six nations who joined on December 30th, 2018. By 2024, twelve countries were in the CPTPP: Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam, and the United Kingdom. Those twelve economies make up 15.6% of global GDP with 580 million consumers, so CPTPP is one of the biggest free trade areas in the world (Global Affairs Canada, 2023). In CPTPP, most tariffs will be eliminated after 3-7 years, and barriers are reduced for 98% of exports to CPTPP members.

According to the Vietnamese National Trade Repository, the agreement came into effect for Vietnam on 14 January 2019 and CPTPP members will eliminate import duties of 97%-100% tariff lines for goods originating from Vietnam. Moreover, most Vietnamese goods when imported into CPTPP members will be subject to import duties of 0% immediately when the

Agreement enters into force (Vietnamese National Trade Repository). Therefore, Vietnam's products will have more access to the markets that did not have any bilateral FTA previously such as Canada and Mexico.

2.3. CPTPP Commitments Relevant to the Rice Industry

The CPTPP introduces many tariff reductions, and this is especially suitable for countries that export agricultural products like Vietnam with rice. As the Vietnamese National Trade Repository, CPTPP countries are going to do away with charges on imports for 97 to 100 per cent of the items Vietnam makes, many of these being got rid of right away when the deal started, or after 3 to 7 years.

Non-Tariff Measures such as Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) are also included in CPTPP chapters to boost transparency, science-based standards, and regulatory cooperation. This impacts what's allowed for things like chemical remains on food, proving plants are healthy, and what information must be on labels, all of which is important to rice being sold to other countries. Moreover, the Rules of Origin (ROO) mean that goods must be fully grown or built there or fulfil requirements unique to what they are. The Vietnamese National Trade Repository also points out that the CPTPP lets importers declare origin themselves, once a set time has passed; this could change where Vietnamese companies get materials and how they work with it.

3. Literature Review

3.1. Theoretical Framework

For over a decade, Vietnam has actively participated in various new-generation FTAs, such as the CPTPP, EVFTA, and UKVFTA, firmly integrating into the global economy. This proliferation of FTAs has provided more substantial support for Vietnam trade activities than ever before, leading to a surge in academic studies on the impacts of these agreements on Vietnam import-export performance. For example, using the SMART model, Ha & Nguyen (2024) found that the impact of the UKVFTA on Vietnam's agricultural exports to the UK was insignificant. In contrast, Nguyen et al. (2025) utilized the Gravity model and Poisson Pseudo-Maximum Likelihood (PPML) estimator to examine bilateral trade flows and concluded that it profoundly promotes trade among members. To interpret these different outcomes, empirical studies usually employed the Custom Union Theory developed by Jacob Viner (1950) (Yang & Martinez-Zarzoso, 2014; Pham et al., 2024). Viner's theory provides the foundational

criteria for assessing the welfare and trade effects of FTAs by categorizing their potential impacts into two distinct phenomena: trade creation and trade diversion (Xu, 2025).

Trade creation refers to the increased domestic demand for an imported good from a specific trading partner that results from a decrease in its price. This price drop occurs when tariff or non-tariff barriers are reduced or eliminated, assuming the resulting cost savings are fully passed on to consumers. As established in Viner's Customs Union Theory, this effect improves resource allocation and national welfare by shifting consumption away from high-cost domestic production toward lower-cost production from a partner country (Laird and Yeats, 1986).

Trade diversion occurs when an importing country substitutes goods from one group of foreign suppliers for another. This substitution is driven by changes in relative import prices that result from differential tariff rates, rather than changes in the actual base export price of the goods. For example, if a preferential tariff rate is introduced for one group of countries while another group continues to face higher Most Favored Nation (MFN) rates, trade is diverted. This results in "positive" trade diversion for the countries receiving the preference and "negative" trade diversion for the excluded countries. Theoretically, this represents a shift of imports away from a highly efficient, low-cost non-member country to a less efficient member country simply because of the preferential tariff, which can result in a welfare loss (Laird and Yeats, 1986).

3.2. Empirical Studies

1.1.1. Studies on impacts of the CPTPP on Vietnam export

Since joining the CPTPP in 2018, Vietnam has profoundly transformed its global trade trajectory (Lin, 2025). CPTPP is described as a new generation FTA that is “more comprehensive in all areas” than Vietnam’s earlier FTAs, with high levels of liberalization and wide coverage beyond trade in goods (Ha & Le, 2019).

Lin (2025) noted that after CPTPP entered into force, exports to CPTPP members surged to USD 102 billion by 2024, led by machinery, electronics and textiles 1. Foreign direct investment in highvalue sectors such as electronics rose to 47% of total inflows by 2024, while compliance with CPTPP environmental and labor standards in textiles increased by 23%, indicating investors’ willingness to operate- under stricter rules in exchange for improved, preferential access.

According to Le (2022), CPTPP offers Vietnam major export opportunities for textiles, footwear, and wooden products, but creates challenges for agricultural, seafood and electronics due to competition and standards. Current empirical studies partially align with this assessment.

Tran et al. (2024) found that tariff reductions and improved market access under CPTPP led to a significant increase in Vietnam's total export volume. However, several sectors with modest expectations are found to observe increases in export volume. For example, Vu et al. (2020) show that under CPTPP, all fisheries sub-sectors experience higher export values, yet welfare declines due to reduced import tax revenues. As for the agricultural sector, new-generation FTAs have provided immense and immediate tariff relief (Nguyen et al., 2025). Despite these tariff eliminations, the agricultural sector is heavily restricted by stringent Non-Tariff Barriers, specifically Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT).

1.1.2. Research on Vietnamese rice export

As Nguyen et al. (2023) stated, in 2022, Vietnam imported and exported large volumes of rice globally, ranking third in the world in volume and representing 10.6% in total value; however, the CPTPPP market only represented 8 15 rd of that total volume. Similarly, Vu (2024) discovered that despite the critical market that the EU represents, the Sanitary and Phytosanitary (SPS) measures are extremely restrictive, with 253 SPS warnings being given to Vietnamese agricultural goods by the EU since 2020. However, general studies tend to rule out the actual internal or "behind-the-border" determinants that prevent the Vietnam rice industry from exporting to its full potential (Tran et al., 2019).

Studies focusing on Vietnam rice and agricultural exports on new-generation FTAs generally tend to use the gravity model and the SMART model. Tran et al. (2019) used a structural gravity model, with the Poisson pseudo-maximum likelihood (PPML) estimator, to estimate the impact of various trade agreements on the exports of rice in Vietnam, and discovered that the total effect of trade agreements on the exports of rice in Vietnam is not a significant one and not all trade agreements have a positive effect. The authors concluded that NTMs under the CPTPP are very restrictive in trade, with every new SPS measure (Chapter A) and Technical Barrier to Trade (Chapter B) decreasing the value of Vietnam exporting rice and coffee by 0.021 and 0.014 per cent, respectively (Nguyen et al., 2023). On the other hand, the application of the SMART model in ex-ante assessment, Bui (2025) estimates that the reduction of tariffs by 100 per cent within the framework of the EVFTA will bring about an increase of US $4.81 million in the total agricultural exports of Vietnam to the EU, but the estimated export value of the cereals and rice (HS10) will not be promoted.

According to existing studies, tariff policies based on new-generation FTAs are associated with a complicated trade creation and trade diversion effects of balance. The SMART model

applied by Bui (2025) recommends that in case of overall agriculture in the context of the EVFTA, the trade diversion effect (US$ 2.64 million) a little outweighs the trade creation effect (US$ 2.06 million), and thus the EU sources of imports shift to Vietnam and the overall turnover of exports improves. Nevertheless, a more reserved version of the effect is supported by Tran et al. (2019) in the case of the rice sector, since the absence of standardization and competitiveness in high-end markets hamper the creation of the so-called trade effect. These newer models suggest that although FTAs will enable the required integration in the market, the resulting benefits of the welfare and creation of trade in Vietnam to the rice industry will attain growth in the long term and not at present through export booms.

3.3. Research gaps

The review of past literature has identified some important research gaps. First, while existing literature has conducted an extensive examination of the aggregate effect of CPTPP on Vietnam's aggregate bilateral trade and agricultural sector as a whole, there is a lack of disaggregated product analysis. Previous studies primarily focused on the impact of the CPTPP on Vietnam trade in general, but few have examined its impact on the rice sector (HS Code 1006). Second, there is a distinct lack of ex-post assessments (evaluating actual impacts after implementation) on the new-generation FTAs CPTPP, as it has only been effective since 2019. Most existing evaluations rely heavily on ex-ante (analyze potential impacts before the agreement takes effect) tools, such as the SMART model or Computable General Equilibrium (CGE), to simulate potential tariff reduction scenarios. As a result, the existing literature is mostly restricted to the predictions of possible policy implications but not the ex-post analysis based on the post-2019 data. Third, although the gravity models are widely applied in the evaluation of trade, they often use Ordinary Least Squares (OLS) estimation. OLS also implicitly excludes zero-trade flows - common in bilateral agricultural trade - and gives biased estimates under heteroscedasticity. Hence, more powerful and sophisticated estimators, especially the Poisson Pseudo Maximum Likelihood (PPML), which maintain the zero value observations and address non-linearity of variance, have to be used to estimate agricultural sectors appropriately.

To fill these gaps, this research will utilize an augmented structural gravity model and employ the Poisson Pseudo Maximum Likelihood (PPML) estimator to conduct a quantitative evaluation of the CPTPP's actual impact on Vietnam's rice export using comprehensive panel data.

4. Research Methodology

In this section, we discuss the model architecture used in the study. The gravity model is adopted as the main regression technique, before the Poisson Pseudo Maximum Likelihood (PPML) estimator and Hausman-Taylor Model (HTM) work as robust alternatives to OLS.

4.1. Data Collection and Preprocessing

The dataset includes Vietnam's rice exports to 33 partner countries, consisting of 11 other members of the CPTPP agreement, namely Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and the United Kingdom, and other top 22 importing countries including Philippines, Indonesia, Ghana, Côte d'Ivoire, China, Mozambique, United Arab Emirates, Cambodia, Hong Kong, United States of America, Saudi Arabia, Korea, Togo, Germany, Qatar, Turkey, Netherlands, Poland, Lao People's Democratic Republic, Russian Federation, Ukraine, and South Africa. Our panel data was synthesized by merging trade values from the ITC Trade Map with macroeconomic indicators sourced from the World Bank and Centre d'Études Prospectives et d'Informations Internationales (CEPII) for the 2010 - 2024 period. The study's econometric model is built upon 495 observations, integrating five continuous independent variables and a categorical dummy variable to evaluate trade flows. Utilizing this multi-dimensional panel allows the research to isolate the specific effects of the CPTPP while controlling for broader temporal shifts and country-specific characteristics.

4.2. Model Architecture

1.1.3. Gravity model

Bergstrand et al. (2024) stated that "the gravity model of international trade in international economics is a model that, in its traditional form, predicts bilateral trade flows based on the economic sizes and distance between two units". To analyze the determinants of Vietnamese rice trade, this study employs a structural gravity framework. This approach allows us to quantify how economic mass (GDP) and geographical constraints (distance) specifically influence the flow of HS Code 1006 across our 33 selected partners.

The time-dimension version of the basic gravity model is expressed as:

$$X_{it} = \alpha \frac{GPD_{it} \times GDP_{jt}}{DIST_{ij}}$$

The expression becomes a linear function after the application of natural logarithms:

$$lnX_{it} = ln\alpha + \beta_1 lnGPD_{it} + \beta_2 lnDIST_{ij} + \epsilon_{it}$$

Following previous studies on the assessment of Trade Creation (TC) and Trade Diversion (TD) effects (e.g., Singh, 2021; Yang & Martinez-Zarzoso, 2014), the basic augmented gravity model, as presented in Equation (1), was employed to quantify the TC and TD effects of the CPTPP:

$$lnEX_{it} = ln\alpha + \beta_1 lnGPD_{it} + \beta_2 lnPOP_{VNt} + \beta_3 lnPOP_{it} + \beta_4 lnDIST_i + \beta_5 LANDLOCKED_i + \beta_6 \quad (1)$$

where 'ln' represents the natural logarithm, EXit denotes the rice export value from Vietnam to country i in period t at the current US dollar; GDP_{it} represents the product of the nominal Gross Domestic Products (GDPs) of Vietnam and country i in US dollars during period t. This product is intended to reflect the consumption and demand levels of the respective countries. It is anticipated that the GDP coefficients and trade flows will be positively correlated. POP_{VNt} shows the resident size of Vietnam in year t, while POP_{it} is the population of country i. The variable $DIST_i$ quantifies the average weighted distance from Vietnam's capital to the capital of country i. This serves as an indicator for estimating transportation expenses and the necessary delivery duration. A dummy variable namely $LANDLOCKED_i$ works as a regressor showing the status of country i being a landlocked country. The error term, ϵ_{it} follows a log-normal distribution.

The specific trade effects of the CPTPP agreement are measured by the two dummy variables, $CPTPP_{1it}$ and $CPTPP_{2it}$.

$CPTPP_{1it}$ takes a value of 1 where both Vietnam and the destination market have ratified the agreement within the specific year t and zero otherwise. A positive and statistically significant coefficient of $CPTPP_{1it}$ demonstrates TD effects and shows that the agreement has more actively promoted intra-regional trade, which is higher than average levels of trade.

$CPTPP_{2it}$ takes a value of one if Vietnam belongs to the CPTPP in year t and destination country i does not and zero otherwise. An export trade diversion (TD) effect is indicated by a positive and statistically significant coefficient for $CPTPP_{2it}$. This finding suggests that regional integration prompts a shift in export activities away from CPTPP member countries and toward non-CPTPP member countries. Conversely, a negative and statistically significant coefficient for $CPTPP_{2it}$ signals an export diversion effect, meaning there is a decrease in exports from member countries to non-member countries.

1.1.4. PPML model

As it is favored as a valuable instrument for structural gravity equations that incorporate multilateral resistance terms (MRTs) (Anderson & Yotov, 2016; Yang & Martinez-Zarzoso,

2014), given that rice trade between Vietnam and certain partners may be intermittent or zero in specific years, the Poisson Pseudo Maximum Likelihood (PPML) estimator by Santos Silva and Tenreyro (2006) is prioritized. This ensures that the zero-value observations in our 495-point dataset are not biased or excluded, as they would be under standard OLS.

For instance, consider the following PPML regression as a representative application:

$$EX_{it} = exp[lnT_{it} + lnG_{it} + lnD_{it} + \gamma CPTPP_{it}] + \epsilon_{it}$$

The objective is to consistently estimate the average impact of the CPTPP (denoted by the dummy variable $CPTPP_{it}$) on trade flows, using a 'structural gravity' model. Trade flows are represented by EX_{it}, where i and t are indices for the importing country and time, respectively. This specification includes origin-time fixed effects (T_{it}) and destination-time fixed effects (G_{jt}) to satisfy the theoretical constraints of structural gravity. Furthermore, the inclusion of a pair fixed effect (D_{ij}) accounts for all time-invariant characteristics specific to the country pair that might be correlated with the probability of establishing an FTA.

1.1.5. Hausman-Taylor Model

The application of a standard gravity model is subject to certain limitations. Firstly, the long-term viability of its economic functional form is questionable. Secondly, there is a risk of endogeneity, where the formation of a trade agreement might be a result of increasing trade flows rather than the cause. This endogeneity issue, however, can be addressed using established econometric techniques such as a causality test or the Hausman-Taylor (1981) Instrumental Variables (IV) estimator.

Because the fixed effects model cannot estimate the coefficients for time-variant variables like distance, we will now use the following, more conventional, double index panel data model instead:

$$y_{it} = \beta^{'x_{it}} + \gamma^{'z_i} + \varepsilon_{it}\,;\; i = 1,\ldots,N;\; t = 1,2,\ldots,T$$

$$\varepsilon_{it} = \alpha_i + \theta_t + u_{it}$$

Where $x = (x_{1,it},\ldots,x_{k,it})'$ is a k×1 vector of variables that vary across individuals and time periods, $z = (z_{1,i},\ldots,z_{g,i})'$ is a g×1 vector of time- invariant variables. The error term ε_{it} comprises three components: α_i represents the effects of all unobserved time-invariant determinants, which may be correlated with some of the explanatory variables x_{it} and z_i; θ_t denotes the time-specific

effects common to all cross-sectional units, intended to control for the impact of all individual-invariant determinants such as potential trend and business cycle fluctuations; and u_{it} is an idiosyncratic random disturbance with a zero mean, uncorrelated across cross-sectional units and over time periods. We assume that these three components are mutually independent.

Based on the research model, HT has designated the following as attractive models:

$$lnEX_{it} = ln\alpha + \beta_1 lnGPD_{it}^{R} + \beta_2 lnPOP_{VNt}^{R} + \beta_3 lnPOP_{it}^{R} + \beta_4 lnDIST_i + \beta_5 LANDLOCKED_i + \beta_6 CPT$$

5. Results and Discussion

5.1. Main Results

Table 1 summarizes the main findings. In Column (1), the model is estimated using fixed effects (FE) and random effects (RE) with country and time effects, as shown in Column (1) and (2) respectively.

The coefficient of lnGDPit is positive and statistically significant at the 1% level in the FE and HTM specifications, indicating that economic expansion strongly promotes bilateral exports. However, the coefficient becomes insignificant under the RE model, suggesting that the RE assumption of no correlation between regressors and unobserved heterogeneity may not hold. The consistent significance in FE and HTM confirms that market size remains a key determinant of trade flows.

The population variables show mixed results. The population coefficient of Vietnam is positive and statistically significant in the RE model in Column (2) but negative and significant in the FE model (1). Meanwhile, the population of the importing partner is positive and significant. This finding indicates that a larger population of importing countries promotes exports and gives more leverage to imported goods.

The coefficient of distance is negative and statistically significant at 1%, confirming that higher transportation costs reduce bilateral trade flows. In addition, the landlocked dummy variable is positive and statistically significant at the 1% level in columns (1) and (3), consistent with earlier study of the gravity model.

According to Column (1), the coefficients of CPTPP1it and CPTPP2it are positive and statistically significant. While the coefficient of CPTPP1it is significant at 5% level, CPTPP2it is significant at 1% level. The results indicate that CPTPP not only causes intra-bloc trade creation but also expands trade with non-member countries. The findings are aligned with previous study

of Yang & Martinez-Zarzoso (2014). However, the results of FE may be biased as bilateral time-invariant variables are not properly controlled.

In Column (2) and (3), the coefficients of CPTPP1it and CPTPP2it remain positive and statistically significant at 5% and 1% respectively although the magnitude of coefficients differ slightly from the FE results. The consistent positive results confirm the role of CPTPP in promoting both intra-bloc and extra-bloc trade creation. The differences in coefficients of Column (3) and Column (1) and (2) indicate that the intensity of bilateral trade is driven by unobserved heterogeneity and reduced with the inclusion of time and country effect. HTM provides closer results with FE rather than RE, suggesting a correlation between regressors and unobserved time and country effect, and HTM offers more reliable estimation. This suggests that the agreement has effectively promoted intra-regional trade above average levels. This reflects the aggregate impact of the CPTPP, which aims to eliminate tariffs and harmonize regulatory frameworks, such as SPS and TBT measures, among member nations.

The reduction in observations in the log-linear specifications is driven by the mathematical restriction that ln(0) is undefined. Consequently, zero trade flows are dropped in the FE and RE estimations. The PPML estimator, however, accommodates zero-valued trade flows without transformation, preserving the full sample and avoiding potential selection bias associated with log-linearization.

Table 1. Panel data gravity estimation

VARIABLES	(1)	(2)	(3)
	FE	RE	HTM
$lnGDP_{it}$	1.330***	0.187	0.971***
	-0.317	-0.173	-0.282
$lnPOP_{VNt}$	-16.990***	-2.519	-10.691***
	-3.871	-2.569	-3.308
VARIABLES	(1)	(2)	(3)
	FE	RE	HTM
$lnPOP_{it}$	2.851***	0.436*	0.733
	-1.013	-0.239	-0.589

$lnDIST_i$		-1.107***	-1.362
		-0.336	-1.153
$LANDLOCKED_i$		-2.889**	-1.382
		-1.277	-4.364
$CPTPP_{1it}$	0.658**	0.639**	0.646**
	-0.282	-0.29	-0.277
$CPTPP_{2it}$	0.611***	0.646***	0.611***
	-0.19	-0.195	-0.187
Constant	201.753***	47.475	153.132***
	-54.877	-43.35	-51.625
Observations	484	484	484
R-squared	0.130	0.252	
Number of Country	33	33	33
Country FE	Yes	No	No
Year	No	No	No

*Robust standard errors are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.*

5.2. Robustness Analysis

To ensure robustness, this paper employs PPML techniques to control multilateral resistance terms (MRTs).

Distance consistently shows a negative and statistically significant effect, confirming that greater geographical separation reduces trade flows. The landlocked dummy variable remains negative and highly significant, emphasizing the structural disadvantages faced by countries without open access by seaway. In contrast, $lnPOP_j$ maintains a positive and strongly significant coefficient, indicating that larger destination markets tend to attract higher export volumes.

Regarding the key variables of interest, $CPTPP_{1it}$ remains positive and statistically significant at the 5% level, indicating a trade-creation effect. However, $CPTPP_{2it}$ becomes statistically insignificant under PPML estimation. This suggests that the effect of $CPTPP_{1ijt}$ on

enhancing export is more robust across estimation techniques, whereas the effect of $CPTPP_{2it}$ appears less stable.

Table 2. Panel data gravity estimation by using PPML

Variables	PPML
$lnGDP_{it}$	-0.454***
	-0.055
$lnPOP_{it}$	5.78
	-3.708
$lnPOP_{j}$	0.945***
	-0.068
lnDIST	-0.935***
	-0.106
LANDLOCKED	-4.210***
	-0.402
$CPTPP_{1it}$	0.682**
	-0.325
$CPTPP_{2it}$	0.236
	-0.25
Observation	495
R-squared	0.4

*Robust standard errors are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.*

5.3. Discussion

The significant positive $CPTPP_{1it}$ coupled with a non-significant $CPTPP_{2it}$ indicates that the CPTPP has generated a pure trade creation effect for Vietnam's rice sector. Instead of diverting existing rice supplies away from traditional non-member partners, the agreement has facilitated a net expansion of Vietnam's export capacity. Specifically, from an export perspective, if a country has a finite supply capacity, gaining preferential access to a new FTA market typically incentivizes exporters to redirect their existing supply away from traditional, non-member

markets facing higher MFN tariffs. In our empirical model, this export diversion effect would logically manifest as a negative and statistically significant coefficient for the $CPTPP_{2it}$ dummy variable.

It is essential to contextualize these findings within the methodological boundaries of the gravity model. The inclusion of FTA dummy variables in a gravity equation captures a range of contemporaneous dyadic fixed effects and the aggregate impact of the regional trade agreement. Because the model utilizes categorical variables ($CPTPP_{1it}$ and $CPTPP_{2it}$) rather than directly quantifying specific policy instruments, such as the exact reduction of applied tariff lines or the measurable stringency of Non-Tariff Measures (SPS and TBT), the results reflect the average treatment effect of CPTPP membership rather than isolated causal mechanisms. Nevertheless, the empirical evidence robustly confirms that the agreement yields a positive net welfare effect for the Vietnamese rice industry by expanding the overall export frontier without cannibalizing existing trade flows.

2. Conclusion

This research utilizes an augmented structural gravity model, incorporating the robust PPML estimator, to evaluate the Vinerian impacts of the CPTPP on Vietnam's rice exports across 33 trading partners from 2010 to 2024. The empirical results indicate that there is a close relation between basic macroeconomic determinants and trade flows. In particular, the growth of the economy (GDP) and the increased populations of destination countries act as critical catalysts for rice exports. Conversely, geographical distance and landlocked status represent severe logistical frictions that significantly reduce bilateral trade volumes.

Regarding the core research objective, the model's outputs provide concrete evidence of an intra-bloc trade creation effect, as indicated by the positive and statistically significant CPTPP1 coefficient. Meanwhile, the extra-bloc export effect (CPTPP2) is observed to be statistically insignificant under robust PPML testing. This demonstrates that the CPTPP has facilitated a net expansion of Vietnam’s export capacity without causing a detrimental trade diversion away from the traditional, non-member partners of Vietnam.

This study is not without limitations. Due to the reliance on categorical dummy variables to capture CPTPP membership, the precise causal impacts of specific policy instruments remain difficult to evaluate. Furthermore, the lack of continuous data on exact tariff reduction schedules and Non-Tariff Measures (NTMs) constrain the scope of explicit trade frictions analysis. Future research may benefit from access to more detailed datasets that include specific NTM indices

and tariff equivalents, and from comparative analyses of agricultural exports between Vietnam and other CPTPP member countries. Another promising direction is the investigation into the interaction of complementary policies like investment in logistics infrastructure and optimization of the supply-chain with the mechanisms of free trade agreement in determining agricultural export flows.

Based on the empirical findings, several policy implications can be suggested for Vietnam's rice sector. Firstly, due to the vast limitations of trade imposed by geographical distance and landlocked status, the government and enterprises must prioritize investments in logistics, cold-chain infrastructure, and supply-chain optimization to overcome these spatial frictions. Secondly, as market size (GDP and population) strongly dictates export volumes, exporters should strategically target highly populated and high-income CPTPP member nations. Lastly, given that CPTPP membership aggregately promotes trade creation, policymakers should continue to leverage this institutional framework, supporting local farmers to meet the bloc's general regulatory standards to further penetrate this high-demand regional market.

REFERENCES

Bergstrand, J., Egger, P. & Toubal, F. (2024), Introduction to the special issue on: Gravity at sixty, European Economic Review, Vol. 166, Article 104749.

Bui, D. L. (2025), EU-Vietnam Free Trade Agreement (EVFTA): Impact on exporting agricultural products from Vietnam to EU and some policy recommendations, *Corporate Finance*, No. 01 (32), pp. 115–118.

Global Affairs Canada (2023), Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) explained, Available at: https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/cptpp-ptpgp/cptpp_explained-ptpgp_apercu.aspx?lang=eng (Accessed: 3 March 2026).

Ha, H. V. & Nguyen, N. T. (2025), The impact of the UK-Vietnam Free Trade Agreement (UKVFTA) on Vietnam's agricultural exports to the UK, *Multidisciplinary Science Journal*, Vol. 7, No. 5, Article e2025224.

Ha, V. S. & Le, H. Q. (2019), The impact of participation in the Comprehensive and Progressive Trans-Pacific Partnership Agreement on exports: The case of Vietnam, *Management Science Letters*, Vol. 9, pp. 1269–1280.

Kwon, O., Yoon, J. & Yotov, Y. V. (2025), A generalized Poisson-Pseudo Maximum Likelihood estimator, *Journal of Business & Economic Statistics*, pp. 1–14.

Laird, S., & Yeats, A. (1990), *The UNCTAD Trade Policy Simulation Model: A Note on the Methodology, Data and Uses*, United Nations Conference on Trade and Development.

Le, T. A. T. (2022), Opportunities and challenges for Vietnam's trade in CPTPP, *Journal of University of Shanghai for Science and Technology*, Vol. 24, No. 2, pp. 352–371.

Lin, R. (2025), Research on the impact of Vietnam's accession to CPTPP on the international trade of Vietnam and other countries in CPTPP, *Academic Journal of Business & Management*, Vol. 7, No. 3, pp. 125–133.

Ministry of Industry and Trade of Vietnam, Commitments on tariff and tariff rate quotas, Available at: https://vntr.moit.gov.vn/fta/29/1 (Accessed: 3 March 2026).

Nguyen, G., Vu, M. & Cao, V. (2025), Unpacking the EU–Vietnam Free Trade Agreement: Phased impacts on trade creation and trade diversion, *Global Business & Finance Review*, Vol. 30, No. 12, pp. 213–225.

Nguyen, L. D. X., Nguyen, T. N. B. & Tran, V. B. P. (2025), Measuring the impact of non-tariff measures on Vietnam's agricultural and fruit exports in the context of implementing new generation FTAs: Applying the gravity model, *International Journal of Leadership and Management*, Vol. 2, No. 1.

Nguyen, T. V. H., Bui, T. P. A., Nguyen, H. G., Le, P. L., Pham, M. N. & Nguyen, T. A. T. (2023), Unleashing Vietnam's rice and coffee exports: Decoding the power of non-tariff measures in the CPTPP market, *VNU Journal of Economics and Business*, Vol. 3, No. 6, pp. 101–112.

Pham, U., Vo, U., Trinh, Q. & Le, H. (2024), Impact of Hong Kong-ASEAN Free Trade Agreement: An assessment from the trade creation and trade diversion perspectives, *Cogent Social Sciences*, Vol. 10, No. 1, Article 2338501.

Phung, D. Q., Pham, A. T. & Nguyen, T. X. T. (2018), Intra-ASEAN trade – Gravity model and spatial Hausman–Taylor approach, *Journal of International Economics and Management*, No. 101, pp. 68–82.

Santos Silva, J. & Tenreyro, S. (2006), The log of gravity, *Review of Economics and Statistics*, Vol. 88, No. 4, pp. 641–658.

Tran, T. M. T., Vu, B. D., Luong, M. N., Nguyen, T. T. & Duong, T. T. (2024), Comparative analysis of the impacts of CPTPP and EVFTA on Vietnam's textile export activities, *VNU Journal of Economics and Business*, Vol. 4, No. 2, pp. 23–34.

Tran, T. V. H., Hoang, V. H., Tran, M. D., Nguyen, T. T. H. (2019), Impact of Trade Agreement on Rice Export: The Case of Vietnam, *Uncertain Supply Chain Management*, Vol. 7, No. 4, pp. 727–740.

Việt Nam Nông nghiệp & Môi trường (2024), "Transforming the rice value chain: The key to unlocking global markets", Available at: https://van.nongnghiepmoitruong.vn/transforming-the-rice-value-chain-the-key-to-unlocking-global-markets-d748780.html (Accessed: 3 March 2026).

Vietnam Institute of International Trade – VIOIT, Vietnam's rice exports: Opportunities and challenges", Available at: https://vioit.org.vn/en/strategy-policy/vietnam-s-rice-exports--opportunities-and-challenges-4404.4144.html (Accessed: 3 March 2026).

VietnamPlus (2025), High logistics costs a headache to Vietnam's agricultural export, Available at: https://en.vietnamplus.vn/high-logistics-costs-a-headache-to-vietnams-agricultural-export-post279993.vnp (Accessed: 3 March 2026).

Vu, T. D., Le, T. H. and Masciarelli, F. (2020), *The economic impact of CPTPP on Vietnam's fisheries exports to CPTPP region*, Journal of International Economics and Management, Vol. 20, No. 2, pp. 1–15.

Xu, K. (2025), Analysis of trade creation and trade diversion effects in regional economic integration: A case study of the North American Free Trade Area, *Lecture Notes in Education Psychology and Public Media*, Vol. 97, pp. 47–54.

Yang, S. & Martínez-Zarzoso, I. (2014), A panel data analysis of trade creation and trade diversion effects: The case of ASEAN–China Free Trade Area, *China Economic Review*, Vol. 29, No. C, pp. 138–151.