Does Vietnam's Entry into WTO Accelerate Its Trade Liberalization?

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This paper tries to empirically investigate how Vietnam's entry into World Trade Organization (WTO) in 2007 affects its trade with partners around the world. Making use of this quasi-experiment setting and applying a gravity framework, this research differentiates countries with free trade agreement (FTA) from those without FTA at the time of entry, and shows that the accession leads to a larger trade volume from the countries without FTAs, thus indicating the positive impact of this epoch-making event on Vietnam's overall trade liberalization. The findings have been verified even after the endogeneity issue and other economic shocks are taken into account.
Key words: preferential trade agreement, WTO, Vietnam, trade liberalization.
JEL classification: F13, F14

1. Introduction

Ever since the *Doi Moi* economic reform launched by the government, Vietnam has witnessed a record high economic growth. In addition, Vietnam joined the World Trade Organization (WTO) in 2007 in search of its integration into the world's economy. The entry into WTO has earned Vietnam the access to the global markets and initiated the need to promote further domestic reforms on external commitments. However, the entry does not guarantee the surge in total trade volume (bilateral trade, including both export and import). In accordance with the entry, Vietnam has to comply with many agriculture-related regulations (e.g. to remove the subsidy on agriculture exports), which might negatively affect its own export to the rest of the world. On the other hand, the overall import duties will be cut from average 17.4% to 13.4%, and one-third of the total 10,600 tariffs will be reduced or removed within 5 to 7 years after the entry,[1] resulting in a huge increase in imports. Thus the influence of the WTO accession on Vietnam's overall trade will become hard to predict.

In this study, I will embed the evaluation of this economic shock into a gravity framework, which has been widely used in the context of international trade. Since the negotiation before the accession has gone through a lengthy process and makes the timing for Vietnam to join WTO uncertain, it provides an ideal quasi-experiment setting for the identification. I use the ex ante free trade agreement as a benchmark and divided Vietnam's trade partners into those with FTA (control) and without FTA (treated) before Vietnam's entry, since countries without FTA are more likely to be affected by the tariff cut associated with joining WTO. A difference-in-difference (DID) model will be estimated while

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[1] The statistics are drawn from the WTO official site. https://www.wto.org/

controlling for the bilateral economic characteristics that might affect the trade volume between Vietnam and its partners. By so doing, the sole impact of Vietnam's accession on international trade can be pinned down. For robustness check, a Poisson Pseudo Maximum Likelihood (PPML) is applied to account for the possible truncation bias incurred by the zero-trade observations. Furthermore, an instrumental variable (IV) approach is employed to alleviate the potential endogeneity of FTA, and several other placebo tests are conducted to confirm the results. These efforts combined allow us to reach a unanimous conclusion that Vietnam's entry into WTO does have a positive impact on increasing its overall trade with the partners around the world.

The contribution of this paper can be threefold. First, although there are many studies that investigate the impact of Vietnam's entry into WTO, the quantitative research to explore the relationship between Vietnam's accession and trade volume is surprisingly rare. This paper will thus fill in the blank. Second, this paper combines the DID methodology with a gravity framework, which serves as the pioneer in this field. Third, the endogeneity issue has been carefully dealt with to ensure the robustness of the findings, which provides solid evidence to supplement the existing qualitative studies. The rest of the paper is organized as follows: Section 2 briefly reviews the process of Vietnam's entry into WTO. Section 3 introduces relevant previous literature. Section 4 describes the estimation strategy and data. Section 5 presents the results and some robustness checks. Finally section 6 concludes.

2.　Vietnam's entry into WTO and its trade situation

Vietnam's recent economic development is thought to be attributable to two major events. As previously mentioned, Vietnam's fast growth (nearly 8% per year on average over the last two decades) has been initiated by the implementation of *Doi Moi* in 1986. Afterwards, the export-oriented growth strategy brought the need to open up the domestic market, which led to Vietnam's incentive to seek
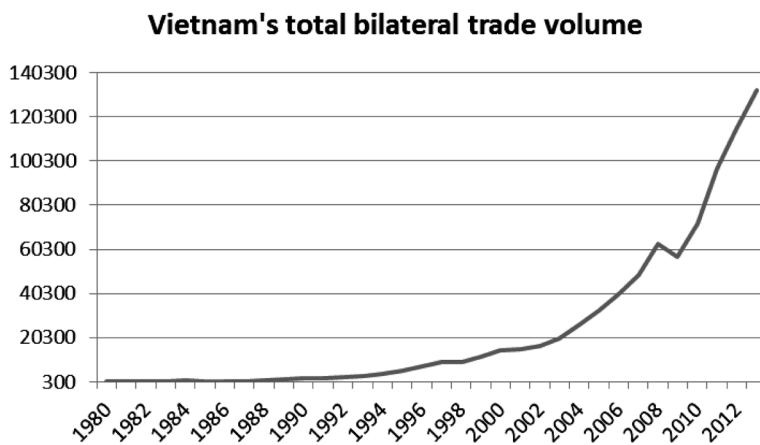

Figure 1　Vietnam's total bilateral trade (million US dollars)

Source: UNCTADStat.

the possibility of joining the WTO. In early 2007, Vietnam finally gained access to WTO, thus becoming the first emerging Asian country to join the WTO since China in the new century, however, the accession negotiation process took nearly twelve years (Cling et al. 2008).

As can be seen from Figure 1, there has been a surge of bilateral international trade in Vietnam after 2004. Though there was a drop in between 2008–2009, it is quite likely that this phenomenon was caused by the global economic crisis. Excluding the exception noted above, a consistent increase in trade volume can be observed.

Nevertheless, it is known that the WTO accession can bring both opportunities and challenges. According to the study conducted by the Ministry of Agriculture and Rural Development's IPSARD, the integration brings about more opportunities for Vietnam's agriculture, since the agricultural products will become easier to enter the foreign market. On the other hand, the openness means that the Vietnamese producers and traders are facing more risks and competition from the world market.[2] Under such circumstances, it is difficult to predict whether the accession will have an effective impact on enhancing Vietnam's total trade turnover, as the government has expected. In other words, it should not be taken for granted that the increase in trade volume shown in Figure 1 is due to Vietnam's entry into WTO. As such, the WTO's sole impact on trade becomes intriguing, especially for the decision makers of the Vietnamese government. In this paper, I will attempt to unveil the fact using an empirical approach.

3. Literature review

There has been a sea of studies that investigates how trade liberalization affects the economy in the host country ever since the creation of WTO in 1995. They can be divided into two major groups: i) the impact on economic growth, and ii) the impact on inequalities and poverty. For the former, Frankel and Rose (2002), Subramanian and Wei (2003) all used gravity model, but came up with quite opposite conclusions. Another approach is to apply computable general equilibrium (CGE) models to simulate the influence after a certain country gains membership of WTO, e.g. Bchir et al. (2002), Cling et al. (2009). The second group of studies consists of Bourguignon (2003), Goldberg and Pavcnik (2007), etc., which also indicate mixed results.

When it comes to the case of Vietnam, most studies have found positive impact of Vietnam's entry into WTO,[3] such as Dimaranan et al. (2005), Roland-Holst et al. (2002), Tarp Jensen and Tarp (2005). All of them use simulation methodology to show that trade liberalization of Vietnam can increase its GDP by 5–10%, however, the actual GDP growth after the WTO accession is way beyond that figure. The same trend can be found when the focus is on post-WTO export and import. One thing in common

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[2] For example, according to the WTO, Vietnam has committed to remove subsidy on agricultural exports and set ceilings on duties ranging between 0–35% for the majority of goods. Meanwhile, quotas, bans, and other restrictions will be abolished, including import bans on cigarette, cigars, and used vehicles, or only applied according to WTO rules. Governmental interference will become less frequent since commercial business are to be conducted on commercial terms only.

[3] Nguyen and Ezaki (2005) use the GTAP CGE model to simulate the impact of Vietnam's membership, but indicate negative result.

for these studies is that they all use simulation methodology to estimate the influence, but they suffer from obvious shortcomings (Cling et al. 2008): they use unrealistic model specifications and the simulations are based on reduction in tariffs, but assuming that all the other factors are kept unchanged.

Thus this paper will employ a different approach by evaluating the impact of Vietnam's accession into WTO based on real data. The detailed estimation strategy will be described in the next section.

4. Estimation and data

Gravity equation

The estimation model is derived from a gravity framework, as pioneered by Tinbergen (1962):

$$T_{ij}=\alpha_0 Y_i Y_j D_{ij}\eta_{ij} \tag{1}$$

In analogous to Newton's law of gravitation, T_{ij}, the bilateral trade flow between country i and country j, is proportional to the product of each country's GDP, denoted by Y, and their economic distance D_{ij}, which covers all the factors that "contribute" to the trade resistance. η_{ij} is an error term, which is assumed to be independent of all the other control variables, thus $E(T_{ij}|Y_i, Y_j, D_{ij})=\alpha_0 Y_i Y_j D_{ij}$.

After applying log transformation, equation (1) becomes:

$$\ln T_{ij}=\ln\alpha_{0+}\ln Y_i+\ln Y_j+\ln D_{ij}+\ln\eta_{ij} \tag{2}$$

Identification strategy

Based on the definition of Vietnam Trade Promotion Agency, there are essentially three kinds of tax rates for imported goods: normal rate, the most favored nation rate, and special preferential tax rate. The most favored nation rates are applicable to import goods originating from countries that apply the most favored nation treatment in their trade relations with Vietnam. Since almost all the trade partners of Vietnam fall into this category, there is not much variation among countries. In the meantime, the special preferential tax rates, referring to the lowest level of import tax, are applicable to import goods originating from countries that apply special preferences on import tax to Vietnam, i.e. the countries that have signed free trade agreement (FTA) with Vietnam. At present Vietnam has signed 16 FTAs in total, however, by the time Vietnam became an official member of WTO in 2007, only two FTAs came into effect—ASEAN Free Trade Area (AFTA) with Common Effective Preferential Trading Tariff and ASEAN-China Free Trade Area with the ASEAN-China Free Trade Agreement.[4]

Since Vietnam has committed to a tariff cut in imported goods upon its entry into WTO, the countries that originally did not receive the special preferential tax rates are expected to benefit the most from this practice and change their trade pattern with Vietnam. The variation in trade liberalization and timing of tariff reduction provides an ideal setting to conduct a difference-in-difference analysis, to compare the countries that benefited the most (treated group) before and after 2007 with those that

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[4] The statistics are obtained from Asia Regional Integration Center of Asian Development Bank.

have previously enjoyed the preferential tax rate (control group). The same methodology can be seen in Lu and Yu (2015), Guadalupe and Wulf (2010). The specification for the DID estimation thus becomes:

$$\ln T_{ij} = \ln\alpha_0 + \beta Tariff_{i*treated} \cdot Post07_t + \ln Y_i + \ln Y_j + \ln D_{ij} + \ln\eta_{ij} \qquad (3)$$

The baseline estimation in this study will be using equation (3). Because the focus is on the trade volume between Vietnam and its partners, it is only necessary to control the tariff heterogeneity among the other countries, as denoted by j. The dependent variable will be the logarithm of the sum of export and import between Vietnam and country j. $Tariff_{i*treated}$ is a dummy variable that takes a value of one if country j is the beneficiary of the special preferential tax rate.[5] $Post07_t$ denotes a post-WTO period, taking a value of 1 if it is year 2007 and onwards, and 0 otherwise. I use the interaction term as the main regressor of interest, because it can capture both the real and expected effects of WTO entry, as argued by Liu and Trefler (2011). As for other control variables that contribute to the economic distance D_{ij}, I include the real geographical distance between the country pairs, two dummy variables that show whether two countries share the border and common political regime.[6] In addition, country pair and year fixed effects will be included to control for the economic shock across time and location.

Data

The data used in this paper comes from several sources. The information for GDP and GDP per capita (measured in current USD) in each country is drawn from the World Development Indicator of World Bank, ranging from 1995 to 2014.

The information for imports and exports of goods by country and Year are extracted from General Statistics Office, Vietnam, which covers 75 trade partners. The amounts are denominated in million USD.

The distance is the real geographical measurement of the distance between the capital city of each trading country (kilometer). For detailed statistical summary, see Table 1.

Table 1 Statistical summary

Stats	Bilateral trade (million USD)	Distance (km)	gdp_rest country (USD)	gdp per ca_rest country (USD)	gdp_vietnam (USD)	gdp per ca_vietnam (USD)	Border	Common political
N	1122	4140	4032	4032	4320	4320	4320	4320
mean	1715.499	9509.985	2.58E+11	11315.6	7.49E+10	881.0769	0.0138889	0.0092593
sd	4535.601	4486.681	1.08E+12	18824.94	5.20E+10	559.9741	0.1170434	0.0957896
min	0.9	392.1	1.10E+07	64.81015	2.07E+10	288.0203	0	0
max	58641.5	19366	1.74E+13	193648.1	1.86E+11	2052.319	1	1

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[5] The countries include China and the rest nine members of ASEAN: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore and Thailand.

[6] Only three countries share the border with Vietnam: China, Laos and Cambodia. As for political regime, China and Laos are of the same communist government as Vietnam.

5.   Estimation results and robustness check

Baseline results

   The results for applying equation (3) are presented in Table 2. The first two columns show the results when random effects and fixed effects model are estimated respectively. In both columns, the interaction term $Tariff_{i*treated}$ · $Post07$ is always positive and significant, showing that the group of countries that previously do not enjoy the special preferential tax rate tend to increase the trade with Vietnam after Vietnam joined WTO. Meanwhile $tariff_{treated}$ shows negative sign, though not significant, indicating that in the long run, regardless of Vietnam's status in WTO, the special preferential tax rate still has a strong promoting effect on enhancing the trade partners' transaction with Vietnam.

   To mitigate the potential bias incurred by applying the log-linearized OLS estimations, especially when there are many zeros for trade volume, as pointed out by Silva and Tenreyro (2006), a PPML method is applied. The method has the advantage of not relying on normality or homoskedasticity assumptions for the country pairs, whereas biases will be caused by log-linearization in the presence of heteroskedasticity. As an alternative, I use the level of bilateral trade volume, instead of its log form, as the dependent variable. In practice, the variable will be divided by 1000 due to the scale. Column (3) in Table 2 shows the result of PPML. $Tariff_{i*treated}$ · $Post07$ is still positively significant, which is consistent

Table 2   Results for baseline estimation and PPML.

Dependent variable	(1) lnbilateral_trade	(2) lnbilateral_trade	(3) bilateral_trade/1000
lngdp_ restcountry	0.739***	1.871***	−0.0958
	(0.0925)	(0.508)	(0.571)
lngdpperca_restcountry	−0.160	−1.625***	0.618
	(0.139)	(0.497)	(0.572)
lngdp_Vietnam	46.84	1.280***	−4.546
	(35.81)	(0.139)	(102.8)
lngdpperca_Vietnam	−51.64		6.716
	(40.60)		(116.8)
lndistance	−0.765**		
	(0.307)		
common_politics	0.0464		
	(0.478)		
shared border	0.294		
	(0.589)		
tariff_{treated}	−0.951		
	(0.809)		
tariff_{treated} ×Post07	0.385**	0.361*	0.281*
	(0.181)	(0.198)	(0.153)
Observations	1,089	1,089	1,089
Model used	Random effects	Fixed effects	PPML
R-squared	0.851	0.860	
Number of newid	61	61	61

Robust standard errors in parentheses, clustered by country-pair distance.

Year dummies are included, but not shown in the results.

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

with the OLS estimations. Compared to the originally FTA-signed countries, the group of countries that previously did not enjoy the special preferential tax rate tend to increase the trade with Vietnam by 28% after Vietnam gain accession into WTO.

Robustness checks

There are several issues that require extra care. First, because of the uncertain timing of Vietnam's entry into WTO, the event itself can be considered random. Nevertheless, one might argue that a country is likely to change its trade pattern when Vietnam's accession is expected. Thus the trade volume might already be adjusted before 2007. As a robustness check and following Lu and Yu (2015), I include an additional term, *tariff$_{treated}$×1 year before WTO entry*, to control the possible adjustment by the trade partners of Vietnam. Columns (1) and (2) show the estimation results. The added term is not significant, however, the variable of interest—*Tariff$_{i*treated}$ · Post07* is still robust to the test.

Second, concerning the countries that are subject to FTA and special preferential tax rate, they might not be randomly selected. Despite the proliferation of FTAs over the past several decades, the formation does not happen on a regular basis. According to Bergstrand et al. (2016), among 10,585

Table 3　Take into account the adjustment behavior.

Dependent variable	(1) lnbilateral_trade	(2) lnbilateral_trade
lngdp_restcountry	0.739***	1.873***
	(0.0923)	(0.509)
lngdpperca_restcountry	−0.160	−1.627***
	(0.139)	(0.499)
lngdp_Vietnam	46.85	1.278***
	(35.83)	(0.142)
lngdpperca_Vietnam	−51.65	
	(40.62)	
lndistance	−0.765**	
	(0.307)	
common_politics	0.0468	
	(0.478)	
shared border	0.294	
	(0.589)	
tariff$_{treated}$	−0.949	
	(0.811)	
tariff$_{treated}$ ×Post07	0.383**	0.364*
	(0.190)	(0.208)
tariff$_{treated}$×1 year before	−0.0263	0.0293
	(0.123)	(0.126)
Observations	1,089	1,089
Model used	RE	FE
R-squared	0.851	0.860
Number of newid	61	61

Robust standard errors in parentheses, clustered by country-pair distance.
Year dummies are included, but not shown in the results.
*** p<0.01, ** p<0.05, * p<0.1

Table 4 Take into account the endogeneity of FTA.

Dependent variable	(1) First Stage		(2) Second Stage	
	FTA dummy		lnbilateral_trade	
lngdp_ restcountry	−0.222***	−0.439***	0.736***	1.906***
	(0.0815)	(0.145)	(0.0942)	(0.498)
lngdpperca_restcountry			−0.155	−1.656***
			(0.138)	(0.481)
lngdp_Vietnam	0.275	0.514	47.49	1.315***
	(4.065)	(7.216)	(36.13)	(0.147)
lngdpperca_Vietnam			−52.36	
			(40.95)	
lndistance	2.385***	4.426***	−0.769**	
	(0.271)	(0.481)	(0.305)	
common_politics			0.0464	
			(0.474)	
shared border			0.256	
			(0.600)	
tariff$_{treated}$			−0.962	
			(0.801)	
tariff$_{treated}$ ×Post07			0.391**	0.370*
			(0.177)	(0.193)
tariff$_{treated}$×1 year before				
similarity	−5.540**	−9.249**		
	(2.207)	(3.851)		
similarity×Post07			−0.612	−0.606
			(0.935)	(0.976)
Observations	2,331	2,331	1,089	1,089
Model used	Probit	Logit	RE	FE
R-squared			0.851	0.861
Number of newid			61	61

Robust standard errors in parentheses, clustered by country-pair distance.
Year dummies are included in both stages, but not shown in the results.
*** p<0.01, ** p<0.05, * p<0.1

pairings of 146 countries from 1950 through 2006, there are only 1,560 such events. Thus only countries that meet certain requirements form the alliance. To alleviate the possibility that pre-existing differences between treated and control groups might also affect their respective trade pattern even after the WTO accession, it is necessary to carefully model this self-selection process by identifying the FTA determinants in the pre-WTO period. Studies such as Baier and Bergstrand (2004), Egger and Larch (2008), Baldwin and Jaimovich (2009) investigate the factors that might contribute to the formation of a free trade agreement. The typical determinants includes: two countries' economic sizes and their economic similarity (defined as the product of $gdp_i/(gdp_i+gdp_j)$ and $gdp_j/(gdp_i+gdp_j)$), bilateral distance, and relative factor endowments.[7] Following their findings, I apply an instrumental variable model to take into account the endogeneity of FTAs. To be specific, in the first step I run a logit/probit

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[7] Other determinants include distance of a country-pair to the nearest FTA, number of members in the nearest FTA (and its square), degree of competitive liberalization. Due to data availability, I do not include them in this paper.

Table 5   Results when the economic crisis factor is included.

Dependent variable	(1) lnbilateral_trade	(2) lnbilateral_trade
lngdp_ restcountry	0.743***	1.883***
	(0.0919)	(0.508)
lngdpperca_restcountry	−0.157	−1.627***
	(0.140)	(0.499)
lngdp_Vietnam	47.83	1.254***
	(35.91)	(0.147)
lngdpperca_Vietnam	−52.76	
	(40.71)	
lndistance	−0.767**	
	(0.306)	
common_politics	0.0386	
	(0.481)	
shared border	0.299	
	(0.581)	
tariff$_{treated}$	−0.962	
	(0.804)	
tariff$_{treated}$ ×Post07	0.452**	0.414*
	(0.201)	(0.219)
tariff$_{treated}$×crisis_dummy	−0.259**	−0.196*
	(0.113)	(0.112)
crisis_dummy		0.0935
		(0.0770)
Observations	1,089	1,089
Model used	RE	FE
R-squared	0.851	0.861
Number of newid	61	61

Robust standard errors in parentheses, clustered by country-pair distance.
Year dummies are included, but not shown in the results.
*** p<0.01, ** p<0.05, * p<0.1

model to decide on the extra FTA determinants. Column (1) of Table 4 shows that GDP, country-pair distance and economic similarity are all important factors to determine the formation of FTAs. In the second step I use them as instruments for the special preferential tax rate and explore the impact. The results are shown in columns (2) of Table 4. Even after I include the interaction term between economic similarity and *Post07*, *tarifftreated×Post07* remains positive and significant, which confirms the robustness of the previous finding.

Finally, one might be concerned about the influence that 2008–2009 economic crisis will have on each country's trade behavior. To control this external shock, I create a crisis dummy only if it is in between 2008 and 2009, otherwise it takes the value of 0. The results are presented in Table 5. Regardless of whether it is a random effects or fixed effects model, the inclusion of the additional term does not change the prediction.

6.   Conclusions

In this paper, I empirically investigate how Vietnam's accession into WTO in 2007 affects its trade with the partners around the world. A DID econometric method is applied to evaluate the influence of

this event. The results show that the accession does have a positive impact on increasing the trade volume between Vietnam and other countries, especially for the countries that previously did not receive the special preferential tax rate. The finding is robust even if the possible self-selection of FTAs and macro shocks such as the 2008–2009 global economic crisis is taken into consideration.

This research acts as the first study to rigorously investigate the quantitative impact of Vietnam's entry into WTO on its international trade. Further analysis will be performed on how the accession affects the economic development (e.g. employment, innovation, environment) in Vietnam, and what lessons Vietnam can learn to further enhance its integration with the world economy. I will leave these to future studies.

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