The Impact of the World Trade Organization (WTO) on Foreign Trade: Case Study of Vietnam

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Authors' contributions

This work was carried out in collaboration between all authors. The corresponding author HCC designed the study, adjusted gravity models and wrote the first draft of the manuscript. Author TTNT managed the literature searches, performed the initial statistical compilations and estimated the coefficients of gravity equations. Author DTN expanded the literature search and collected the panel dataset. All authors read and approved the final manuscript.

Original research Article

ABSTRACT

Previous studies of empirical surveys that focus on WTO foreign trade effects on its country members have placed less attention on individual developing countries. This contrasts with the large body of studies that exist on the foreign trade effects of WTO on its entire country members. In this paper, two gravity models have been constructed using the Hausman–Taylor (1981) estimator, and applied to recent panel data that includes 17 of Vietnam's major trade partners during the period from 1995 to 2011. This was for the purpose to examine the possible impact of the WTO regime on foreign trade (exports and imports) of Vietnam. The empirical results show that the WTO has stalwartly increased Vietnam's imports. By contrast, there is no evidence that the WTO has expanded Vietnam's exports. This is consistent with theoretical models of the WTO.

JEL Classifications: F13, F15, C33

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1. INTRODUCTION

Foreign trade improves resource allocation, lowers prices for consumers, and leads to a more efficient production. An open trade regime also encourages the integration of an economy into the global trading system and increases imports of modern technology, which results in productivity improvements. Foreign trade has played an important role in the economic development process for Vietnam since the launch of the Renovation Policy in 1986. In the context of reform, and in order to motivate exports, Vietnam has implemented legal reforms and multiplied trade agreements since the early 1990s. After carrying out the Harmonized Commodity Description and Coding System (HS) compatible tariffs (instead of quotas), introducing duty exemptions on export industry's inputs (duty drawbacks), and building industrial zones, exporting processing zones, and economic zones, it signed numerous agreements to obtain better access to world markets. The first notable agreement was signed in 1992 with the European Union (EU). After the end of the U.S. embargo in 1995, Vietnam has signed several regional free trade agreements such as the United States-Vietnam Bilateral Trade Agreement (USBTA) in 2000, the ASEAN Free Trade Area (AFTA) in 2001, the ASEAN-China Free Trade Area (ACFTA) in 2002, the ASEAN-Korea Free Trade Agreement in 2007 and the WTO in 2007, the ASEAN-Japan Comprehensive Economic Partnership Agreement (AJCEP) and the Japan–Vietnam Economic Partnership Agreement (JVEPA) in 2008. The country joined the ASEAN-India Free Trade Agreement (AIFTA) and the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) in 2009. [1] At the moment, Vietnam has implemented the negotiation process to join a Free Trade Agreement with the EU and the Republic of Korea. It finished numerous rounds of negotiations to join the Trans-Pacific Strategic Economic Partnership Agreement (TPP) with its partners either.

Since Vietnam acceded to the WTO in 2007, it has been treated fairly and equally in foreign trade by enjoying the National Treatment (NT) and the Most–Favored–Nation (MFN) principles as well as the dispute settlement mechanism within the provisions of the WTO. Thus, Vietnam has done its part in showing commitment and fulfilling its responsibilities as a WTO member by reducing tariffs for agricultural and non-agricultural products, removing non-tariff measures, abolishing the prohibited subsidies, eliminating banned measures related to investment, liberalizing the service sector, and opening the domestic market step by step for foreign investors within the framework committed to the WTO members. Those activities express the attempts of the Government of Vietnam in stimulating the development of foreign trade, attracting Foreign Direct Investment (FDI), and speeding up economic reform.

As a result, Vietnam's total foreign trade turnover (exports plus imports) has increased from USD 84,717.3 million in 2006 to USD 264,065.5 million in 2013, 8.76 times higher than that of in 2000 (USD 30,119.2 million) and a 3.11-fold increase in comparison with total trade in 2006. Its exports rose from USD 39,826.2 million in 2006 to USD 96,905.7 million in 2011 and to USD 132,032.9 million in 2013. Its imports increased from USD 44,891.1 million in 2006 to USD 106,749.9 million in 2011 and to USD 132,032.6 million in 2013 (Vietnam's GSO, 2014). Seven years after the WTO accession, the volumes of both Vietnam's exports and imports are three times higher in comparison with that of in 2006. This raises the research question of *whether the WTO accession has expanded the country's foreign trade. Our hypothesis is that trade openness under the WTO accession will expand Vietnam's foreign trade, especially on the import side*. It can be argued that this institution has had a deep impact on not only Vietnam's trade policy but also on the fundamental rule of law and governance. The WTO has provided a critical benchmark and focus for having a more transparent, predictable business environment, and stable trade policy. [2] Notably, Vietnam is committed to having tariff reduction/adjustment of around 10,600 tariff lines within the WTO agreements. This opens up a chance for domestic enterprises to import more industrial goods from abroad, especially from developed/industrial WTO members. Simultaneously, there is an expectation that its exports to other WTO members to increase either. This is because trade liberalization is expected to induce exports of merchandises that are intensive in production factors abundant in

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[1] *Adopted from Hoang et al. [1].*

[2] *Adopted from Hoang et al. [1].*

the economy. However, the expansion of Vietnam's exports depends much on the competitiveness of its goods in WTO member's markets.

From this perspective, evaluating the impacts of the WTO on Vietnam's foreign trade should be rigorously analyzed. To do this, the authors will employ gravity model and a panel data set during 1995-2011 that covers bilateral trade between Vietnam and its 17 major/stable trading partners and the Hausman–Taylor estimator. The remainder of this study is organized as followings. Section 2 will first provide a literature survey on the impact of the WTO on its member countries. Section 3 follows this by giving an analysis on Vietnam's recent foreign trade. Section 4 details the gravity models and decrypts the data set. Section 5 discusses the empirical results. The final section regards to concluding remarks and some recommendations.

2. A BRIEF LITERATURE REVIEW ON THE IMPACTS OF THE WTO ON FOREIGN TRADE OF ITS MEMBER COUNTRIES

Much of the information that exists concerns the overarching objective of the WTO-a successor of the General Agreement on Tariffs and Trade-1947 (GATT-1947) which is based on the tenets/principles of helping trade flow smoothly, freely, fairly and predictably between its member countries. Trade increasing courtesy of this institution may seem self-evident (Subramanian and Wei [2]). However, we know much less about the real impact of its accession on acceding countries themselves. Therefore, a careful analysis is necessary to evaluate the real impact of this institution on trade flows of its memberships. The question of whether the WTO has expanded foreign trade of its country members has been documented in some notable/well-known empirical studies with remarkably diverse answers. By setting out the gravity model and using data of 178 countries, Rose [3] concluded that there was no statistically significant impact of the WTO on its member's bilateral trade flows in fifty years (1948-1999). The author called his finding as an "interesting mystery". The "mystery" lies in understanding who actually participated in the GATT. Rose [3] has overlooked a large proportion of countries in which the agreement applied to, and mistakenly classified them as nonparticipants when in fact they had both rights and obligations under the agreement (treating

nonmember participants as outsiders). This causes a downward bias in his estimates of GATT's effects on foreign trade. Particularly, Rose's gravity regressions compare trade levels of formal members to trade levels of a group that includes some participants as mentioned in Tomz et al. [4]. It is undeniable that Rose has set a very important foundation for the latter empirical studies on the impacts of the WTO on its member's foreign trade. Rose's contribution is conspicuous because he has assembled a large data set and performed a myriad of analyses.

Previous study of Gowa and Kim [5] used data on bilateral trade flows both before and after World War II to examine the impact of the GATT on trade between its members and on the system of interwar trade blocs. Their results show that: (i) the distribution of the benefits the GATT produced was much more highly skewed than conventional wisdom assumes; (ii) the postwar regime increased trade between only five of its member states; (iii) the GATT regime replaced the interwar system de jure but not de facto: several interwar blocs continued to influence trade patterns after 1945.

Tomz et al. [4] used the same data and methods as Rose but reclassified countries according to their participation status in the GATT/WTO (formal membership, *colonies*, *de facto members, and provisional members*) indicating that: (i) the GATT considerably increased the trade of both formal members and nonmember participants, compared with countries outside the agreement. In addition, (ii) its effects were positive across time and geographic regions and robust to changes in methods of estimation.

Subramanian and Wei [2] re–examined Rose's findings using import data, rather than the average value of real bilateral trade estimates favored by Rose. The authors set a properly specified gravity model, used Rose's data, and differentiated the effects by subsets of the sample (*e.g.*, developed versus developing countries) and found robust evidence that: (i) the WTO had a possibly strong impact on trade; (ii) the impact has, however, been uneven. Industrial countries that participated more actively than developing countries in reciprocal trade negotiations witnessed a large increase in trade; (iii) Bilateral trade was greater when both partners undertook liberalization than when only one partner did. Moreover, (iv) sectors that did not witness liberalization did not see an increase in trade.

All of the studies mentioned above thus far took the traditional gravity model approach of focusing on non-zero trade flows. A number of recent studies have taken into account the fact that very large fractions of trade flows are frequently zero, and that so-called extensive-margin growth associated with new trade flows may be an important dimension of trade growth (Martin et al. [6]).

Felbermayr and Kohler [7] suggested that omitting cases with zero trade results in downward-biased estimators of the impact of the WTO on trade and their numerical estimates indicate this effect may be very large. Like Rose [3], these authors used average trade in both directions, formed by dividing all four potential trade flows for each bilateral pair of countries. These authors argued for this because it avoids upward bias in trade values for distant country pairs resulting from inclusion of the CIF-FOB margin in the value of reported imports. Felbermayr and Kohler [8] used a combination of a Probit model for the decision on whether to trade at all and a Tobit model to predict the level of trade found that when both countries are WTO members, their trade is 31 percent higher than it would be otherwise. A surprising finding from their results is that the effects of GATT participation are greater when one economy is a member than both are members.

Helpman et al. [9] developed a simple model of international trade with heterogeneous firms that are consistent with a number of stylized features of the data. Their model predicts positive as well as zero trade flows across pairs of countries and it allows the number of exporting firms to vary across destination countries. Importantly, their method provides estimates of the intensive and extensive-margins of trade. They found that the effect of the number of exporting firms varies across pairs according to their characteristics. This variation is large and particularly so for trade between developed and less developed countries and between pairs of less developed countries. [3] The authors included a WTO membership dummy in their widely–cited study of extensive and intensive-margin trade growth. They found that, when both partners are WTO members, trade is 35 percent higher than it otherwise would be.

Liu [10] also focused on extensive-margin of trade growth for the period from 1948 to 2003 in tandem with a dataset designed to allow tracking

of extensive-margin as well as intensive-margin of trade growth. Like Rose [3], the author used official membership of the GATT/WTO, rather than the broader concept of participation favored by Tomz et al. [4]. Following Silva and Tenreyro [11] the author estimated in levels to avoid the need to delete or arbitrarily adjust the zero trade values prior to estimation. The author used the Poisson Pseudo-Maximum Likelihood estimation technique which Silva and Tenreyro show was much more robust to problems of bias resulting from heteroscedasticity in nonlinear models such as the gravity model. The author concluded that the GATT/WTO has been very effective in promoting the world trade at both the intensive (70% of the world import) and the extensive (30% of the world import) margins.

Martin et al. [6] used the dataset of Subramanian and Wei [2] covering the period from 1950 to 2000 to investigate whether formal membership in the multilateral trading system had an effect on trade in the Asia-Pacific region. [4] The authors represent the same as the first reference (work of Subramanian, A. and Wei [2]) that: (i) GATT/WTO membership alone was not significant. After including a dummy for countries in the region, covered by/namely PAFTAD, the authors found that (ii) these countries traded much more than other countries. However, when the authors added an interaction term between GATT/WTO membership and the PAFTAD dummy, they found a strongly significant and economically large effect. This may suggest that membership in multilateral system has been particularly important in promoting the growth of trade in the Asia-Pacific region. [5]

Eicher and Henn [12] unified the Rose, Tomz et al., and Subramanian and Wei specifications in one comprehensive approach that minimized omitted variable bias. This paper is the first to combine all three controls (multilateral resistance, unobserved bilateral heterogeneity, and individual PTA trade effects) in a large bilateral trade dataset to reexamine WTO trade

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[3] *Adopted from Helpman et al. [9].*

[4] *The countries included are Australia, Canada, Cambodia, Chile, China, Indonesia, Hong Kong, Japan, the Republic of Korea/South Korea, Laos, Malaysia, Mexico, Myanmar, Papua New Guinea, Peru, the Philippines, Singapore, Thailand, the United States and Vietnam.*

[5] *More important for the development of trade in recent decades, instead of multilateral agreements were the regional trade agreements. And it would be also important to note that the trade regionalism (including bilateral agreements) can be considered a kind of new protectionism. More specifically, regionalism has become a defense mechanism against multilateralism represented by the GATT/WTO.*

effects. The authors stated that: (i) all specifications produced one consistent result: WTO effects on trade flows are not statistically significant, while PTAs produced strong but uneven trade effects. After extending the gravity model to address specific avenues in which WTO may have affected trade flows, they found that (ii) WTO membership boosts trade prior to PTA formation and increases trade among proximate developing countries. An augmented gravity model that accounts for WTO terms-of-trade theory showed that (iii) countries with greater incentives to bargain for tariff reductions before WTO accession subsequently experience positive and significant WTO trade effects. Another notable finding is that (iv) individual PTA trade effects are constrained to an average coefficient associated with one aggregate PTA dummy.[6]

Chang and Lee [13] used the data set by Rose et al. to re-examine the GATT/WTO membership effects on bilateral trade flows. The authors employed the nonparametric methods including pair-matching, permutation tests, and a sensitivity analysis mentioned in Rosenbaum [14]. Their results suggest large GATT/WTO trade–promoting effects that are robust to various restricted matching criteria, alternative GATT/WTO indicators, and non-random incidence of positive trade flows, inclusion of multilateral resistance terms, and different matching methodologies. In particular, the authors found that: (i) membership in the GATT/WTO has a significant trade-promoting effect for dyads (country pairs) that have both chosen to be members. And, (ii) the effect is larger than bilateral trade preference arrangements, Generalized System of Preferences, and (iii) larger than when only one country in a dyad has chosen to be a member.

Along with a vast amount of empirical studies that is built on gravity model that used many estimated techniques and data set for most of the GATT/WTO membership to test the effects of this institution on foreign trade flows, is the paucity of studies on the impact of its accession on a specific case of a developing member. A survey shows that only some papers assessed the impact on economic performance and social well-being of developing economies that have joined the WTO since 1995 such as China, Jordan, and Vietnam etc.

Particularly, Qin [15] concluded that: (i) China's WTO accession has made its foreign trade and investment regime far more liberalized and less opaque than a decade ago; (ii) More importantly, the accession has institutionalized the process of China's domestic reform externally through the force of WTO obligations; And, (iii) the WTO membership ensures that the course of China's economic development will be charted within the disciplines of the WTO system.

Jensen et al. [16] used a computable general equilibrium model to assess the impact of the WTO on the Kazakhstan economy. The authors estimated that Kazakhstan would gain about 6.7% of the value of Kazakhstan consumption in the medium run and up to 17.5% in the long run.

Bussea and Gröning [17] used the gravity model and the Hausman-Taylor (1981) estimator to examine the impact of the WTO and various FTAs on Jordan' exports and imports concluded that (i) the WTO accession has led to an increase in imports; And, (ii) there was no statistically significant impact of this accession on the country's exports.

Pham [18] used a panel data in the period from 1990 to 2008 of 17 country partners to assess the effects of the WTO accession on the dynamics of FDI and foreign trade in Vietnam.[7] First, the author found that the WTO accession has made significant and positive effects on both Vietnam's imports and FDI inward.[8] Second, this accession has seemed to indirectly encourage the country's exports through FDI and imports channels due to a strong existing relationship among these three. However, the author assumed that the effects of all FTAs that Vietnam has signed/joined are the same and are associated with one aggregate FTA dummy. This could inflate or deflate the impact of the WTO on foreign trade of Vietnam. Moreover, the author used widely traditional estimation techniques such as the Ordinary Least Square (OLS), Fixed–effects (FE) or the Random–effects (RE) which have their own disadvantages. Specifically, an OLS analysis only asks about cross-sectional variation: does trade vary between members that join the GATT/WTO and

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[6] *Adopted from Eicher and Henn [12].*

[7] *The countries included are: China; Hong Kong – China; Japan; the Republic of Korea; Taiwan; Canada; The United States; Australia; EU.15 (excluding the United Kingdom); the United Kingdom; Cambodia; Lao PDR; the Philippines; Malaysia; Thailand; Singapore; Indonesia.*
[8] *Adopted from Hoang et al. [1].*

countries that do not? Thus, with a panel dataset, the OLS method is not very reliable for it can lead to a significant bias. A fixed-effects analysis addresses a time-series question: what is the effect in joining the GATT/WTO on trade between members? Fixed-effects analysis avoids the problems that unobserved heterogeneity could create. However, fixed-effects model could not estimate coefficients of time invariant variables since they reveal the distance between two countries and reveal whether they share a land border. In fact, these variables are quite interesting in a gravity model. A random-effects model can give us estimates of coefficients of the time invariant variables but it cannot incorporate country fixed-effects, which are likely to be presented in a heterogeneous country sample. As a remedy, advanced studies of Hausman and Taylor [19] and Wyhowki [20] proposed a different model that could incorporate the advantages of the random-effects and the fixed-effects models. Egger [21] stated that the Hausman-Taylor estimator is consistent and the performance is at least equivalent to the random-effects and the fixed-effects estimators. From this perspective, the authors will employ the Hausman-Taylor estimator for the empirical analysis presented in this paper.[9]

Generally, a large body of surveys based on empirical studies focus on the WTO trade effects on its entire country membership, and surprisingly, there are very few studies devoted to developing/emerging country-specific cases. This inspires us to reexamine the case of Vietnam. Vietnam offers a particularly interesting case study for several reasons. First, there are plenty of previous studies focusing on the impact of the WTO on foreign trade on its entire membership, while there are a few studies concerning the impact of the WTO on a specific case of a developing country since its establishment in 1995. Second, among many developing countries, Vietnam has maintained high levels of foreign trade and economic growths since the 1990s. Third, an understanding of the impact of the WTO accession on Vietnam's foreign trade will be a very important implication for the design of supporting policies to obtain a professional development in the post-WTO accession.[10]

3. AN ANALYSIS OF VIETNAM'S FOREIGN TRADE DURING THE PERIOD 1995-2013

This item will analyze Vietnam's foreign trade in the years following WTO accession (2007-2013) in either value or percentage changes in comparison with the previous duration (1995-2006).

Fig. 1 above shows Vietnam's foreign trade values and percentage changes from 1995 to 2013. Generally, it is clear that Vietnam's foreign trade kept accelerating after accession to the WTO in either values or percentage changes. Specifically, the total value of Vietnam's foreign trade has increased from USD 84,717.3 million in 2006 to USD 264,065.5 million in 2013, 19.41 times greater than 1995 (USD 13,604.3 million), 8.76 times higher than that of in 2000 (USD 30,119.2 million) and a 3.11-fold increase in comparison with total trade in 2006. Its exports rose from USD 39,826.2 million in 2006 to USD 132,032.9 million in 2013, and its imports increased from USD 44,891.1 million to USD 132,032.6 million at the same time. 7 years following the WTO accession, the values of both exports and imports of Vietnam were 3.11 times higher than that of in 2006. The average growth rates of total trade, exports and imports in the duration from 2007 to 2013 are 18.55%, 19.46%, and 17.82% in sequence. Those are equivalent to the duration 2000-2006, 20.55%, 19.67%, and 21.46% in order.[11] Thus, the authors design the hypothesis as follows:

H1: the WTO could be an important factor inducing Vietnam's foreign trade, especially in the import side.

4. THE GRAVITY MODELS AND THE DATASET

The gravity model of trade in international economics predicts bilateral trade flows based on the economic sizes (often using the Gross Domestic Product (GDP) measurements, GDP per capita, Gross National Product (GNP), GNP per capita) and the distance between two trading partners. Tinbergen first used this model in 1962. It was given the name "gravity model" for its analogy with Newton's law of universal

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[9] *See more in Hoang et al. [1].*
[10] *Ibid.*

[11] *For more details of the sectors experiencing an increase in exports and imports, please see the results in Hoang Chi Cuong [22].*

gravitation. The basic theoretical model for trade between two countries i and j takes the form of:

$$F_{ij} = G(M_i M_j)/D_{ij} \qquad (1)$$

In which:

- F_{ij} is the bilateral trade flow between country i and country j
- M_i is the economic mass of country i (often using GDP, GNP measurements)
- M_j is the economic mass of country j (often using GDP, GNP measurements)
- D_{ij} is the distance between countries (i and j), and
- G is a constant.

In this study, the authors will decompose trade flows between Vietnam and its trade partners into export and import relations. Thus, the previous empirical studies on the case of Vietnam (e.g., Pham [18]) often assume that the effects of all FTAs are the same and are associated with one aggregate FTA dummy. This could inflate or deflate the impact of the WTO on Vietnam's trade flows. And, individual FTA trade effects might be constrained to an average coefficient associated with one aggregate FTA dummy. To avoid this issue, the authors break them down into specific cases (each FTA dummy will assess the impact of a specific FTA). Finally, the authors use the Hausman–Taylor estimator for its superior than OLS, FE, or RE estimation techniques. The Hausman–Taylor estimator is a hybrid of fixed-effects and random-effects models and takes the following form:

$$y_{it} = \beta_1 x'_{1it} + \beta_2 x'_{2it} + \alpha_1 z'_{1i} + \alpha_2 z'_{2i} + \varepsilon_{it} + u_i \qquad (2)$$

In which, y_{it} reflects the dependent variable for country i in period/time/year t; x'_{1it} denotes variables that are time varying and uncorrelated with the error term in the random-effects model (u_i); x'_{2it} refers to a set of variables that are time varying and correlated with u_i; z'_{1i} represents the time invariant variables that are uncorrelated with u_i; z'_{2i} describes the time invariant variables that are correlated with u_i; β_i and α_i are the vectors of coefficients associated with the covariates; and ε_{it} is the random error with the hope that its value is appropriate zero. Accordingly, one of the main assumptions of the Hausman-Taylor estimator is that the explanatory variables that are correlated with u_i can be identified.

Concerning the variables in equation (2), the authors use the real Vietnam's exports to and imports from country partner j at year t as the dependent variables for y_{it} (the variables are labeled EX_{jt} and IM_{jt} respectively).
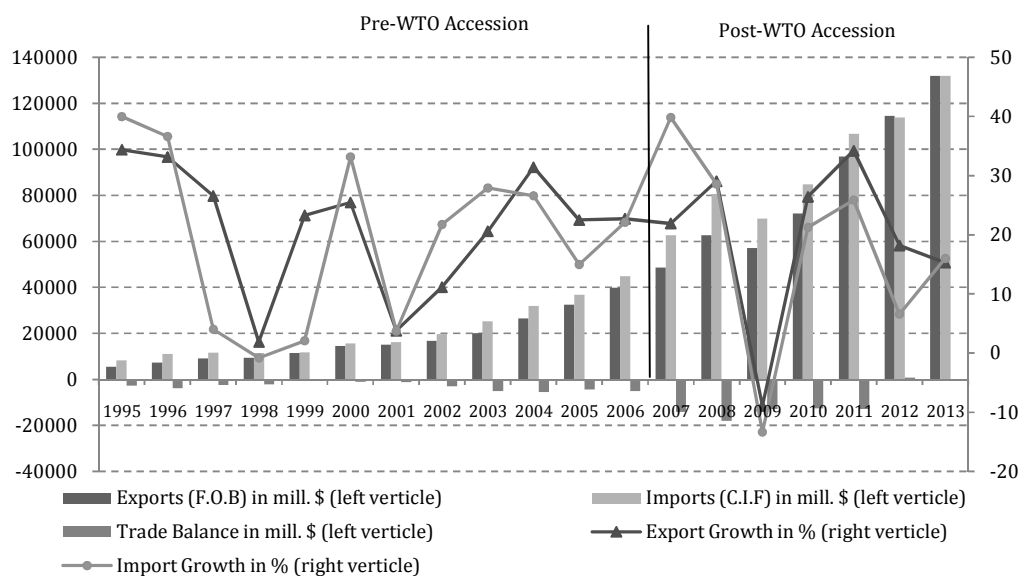

Fig. 1. Vietnam's Foreign Trade Volumes and Percentage Changes from 1995 to 2013
Source: The authors calculated from figures published by the Vietnam General Statistics Office (2014)

For x'_{1it} (*variables that are time varying and uncorrelated with u_i*), the authors construct a set of dummy variables. Particularly, the impacts of the WTO on Vietnam's exports and imports are taken in forms of the $Bothin_{VNjt}$ and $Onein_{VNjt}$ dummies. $Bothin_{VNjt}$ dummy takes the value of 1 if both Vietnam and country partner j are WTO members at year t and otherwise. $Onein_{VNjt}$ dummy takes the value of 1 if either Vietnam or country partner j is a WTO member at year t and otherwise. Other dummies, the AFTA, USBTA, ACFTA, AKFTA, JVEPA, AJCEP and the AANZFTA are added to capture the probable effects of bilateral/regional trade agreements on Vietnam's exports and imports. The authors rely on the fact that the various FTAs and the WTO involve different degrees of liberalization, and hence define them in order to isolate the impact of each, and purge them of any "contamination" from each other.[12] Each dummy takes the value of 1 after Vietnam and the country partner has signed/joined a bilateral/regional trade agreement at year t and otherwise. Four more variables *that are time varying and uncorrelated with u_i* are added. The authors employ the $RER_{CURi/VNDt}$, SIMSIZE, CRI_j^{1997}, and CRI_j^{2008} variables.

Firstly, the $RER_{CURi/VNDt}$ designates the real exchange rate between VND and currency of country j at year t. An increase/decrease of real exchange rate means the devaluation/overvaluation of VND may affect Vietnam's exports and imports. Specifically, an increase of the real exchange rate (the devaluation of VND) may stimulate the country's exports, reduce the country's imports, and vice versa. The real exchange rate takes the following formula:

$$RER_{CURi/VNDt} = e_{CURi/VNDt} \cdot (CPI_{it}/CPI_{VNt}) \qquad (3)$$

In which:

- $RER_{CURi/VNDt}$ is the Real exchange rate between VND and Currency of country j at year t
- $e_{CURi/VNDt}$ is the Nominal exchange rate between VND and Currency of country j at year t

- CPI_{jt} is the Consumer Price Index of country j at year t
- CPI_{VNt} is the Consumer Price Index of Vietnam at year t

Secondly, SIMSIZE is the *index of country similarity in size* that takes the value in the phase $(-\infty, -0.69)$. In case of perfect dissimilarity (GDP_{VN} has a huge difference with the GDP_j at year t), then $Ln[1 - (GDP_{VNt}/(GDP_{VNt} + GDP_{jt}))^2 - (GDP_{jt}/(GDP_{VNt} + GDP_{jt}))^2] \approx \ln$ (near Zero) = $-\infty$. In case of perfect similarity (GDP_{VN} has a very small difference with the GDP_j at year t, or $GDP_{VNt} \cong GDP_{jt}$), then $Ln[1 - (GDP_{VNt}/(GDP_{VNt} + GDP_{jt}))^2 - (GDP_{jt}/(GDP_{VNt} + GDP_{jt}))^2] \approx \ln(0.5) = -0.69$. The *index of country similarity in size* should have positive impact on foreign trade, especially on exports. If these predictions hold true, our empirical study will support "New trade theory" models where countries similar in size/or at similar levels of development will trade more. In other words, international trade is not only driven by differences in factor endowments (hence price) as stated in neoclassic theories (presented by David Ricardo, Eli Heckscher and Bertil Ohlin) but also by the identical factor endowments. This can explain for the occurrence of the intra-industry trade (the two-way exchange of goods within standard industrial classifications) that Ricardo's "theory of comparative advantage" and "Heckscher-Ohlin theory" cannot do.[13]

Thirdly, CRI_i^{1997} and CRI_i^{2008} dummy variables are used to separate the impact of the WTO and the relevant shocks of the 1997 Asian financial crisis and the 2008 global financial and economic crisis on the economic aspect. Each dummy will take the value of 1 if country j has suffered from the 1997 Asian financial crisis or the 2008 global financial and economic crisis respectively and otherwise.

For x'_{2it} (*variables that are time varying and correlated with u_i*), GDP of Vietnam, GDP of country partner, and implemented FDI capital of country partner are employed as it might be argued that Vietnam's exports and imports are not only influenced by the GDP of two countries and implemented FDI capital of the country partner, but also can have an influence on Vietnam's GDP growth and FDI attraction. Higher figures of GDP and implemented FDI capital are

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[12] *AFTA: ASEAN Free Trade Area; USBTA: United States–Vietnam Bilateral Trade Agreement; ACFTA: ASEAN-China Free Trade Area; AKFTA: ASEAN-Korea Free Trade Agreement; JVEPA: Japan Vietnam Economic Partnership Agreement; AJCEP: ASEAN-Japan Comprehensive Economic Partnership Agreement; AANZFTA: ASEAN-Australia-New Zealand Free Trade Agreement.*

[13] *Notably, the comparative advantage, intra-industry trade and economy of scale are not necessarily competing theories and can be analyzed in a complementary way in this research.*

expected to be positively associated with Vietnam's exports and imports. To avoid the endogenous issues such as the exits of bidirectional causality between the FDI and GDP variables in gravity models, the authors use a one time period lag for the FDI variable.

For the z'_{1i} (*variables that are time invariant and uncorrelated with u_i*), the authors employ standard gravity variables, the distance between two countries and whether they share land borders namely, the DIS_{VNj}, and the BOR_{VNj}. Wherein, the expected sign of DIS_{VNj} is negative being a proxy for transport and transaction costs. This will be adopted from the work of CEPII using the weighted distance between Vietnam and country partner. The BOR_{VNj} dummy is involved with the fact that Vietnam and country j share the land border or not-this is-highly expected to induce Vietnam's exports and imports.

For the final category of variables z'_{2i} (*variables that are time invariant and correlated with u_i*) has been omitted, as none of our indicators fit this definition. The values of the quantitative variables such as the GDP, FDI, Exports, and Imports, are converted in constant prices (2005 prices). All the variables, except the dummies, are in natural logarithm form in the gravity equations. Our benchmark specification models take the following forms:

$LnEX_{jt} = \beta_{10} + \beta_{11}LnDIS_{VNj} + \beta_{12}LnGDP_{VNt} + \beta_{13}LnGDP_{jt} + \beta_{14} Ln[1- (GDP_{VNt}/(GDP_{VNt} + GDP_{jt}))^2 - (GDP_{jt}/(GDP_{VNt} + GDP_{jt}))^2] + \beta_{15}LnFDI_{jt-1} + \beta_{16}LnRER_{CURj/VNDt} + \gamma_{11}AFTA + \gamma_{12}USBTA + \gamma_{13}ACFTA + \gamma_{14}AKFTA + \gamma_{15}JVEPA + \gamma_{16}AJCEP + \gamma_{17}AANZFTA + \gamma_{18}Bothin_{VNjt} + \gamma_{19}Onein_{VNjt} + \gamma_{110}BOR_{VNj} + \gamma_{111}CRI_j^{1997} + \gamma_{112}CRI_j^{2008} + \varepsilon_{1VNj}$ (4)

$LnIM_{it} = \beta_{20} + \beta_{21}LnDIS_{VNi} + \beta_{22}LnGDP_{VNt} + \beta_{23}LnGDP_{it} + \beta_{24} Ln[1- (GDP_{VNt}/(GDP_{VNt} + GDP_{it}))^2 - (GDP_{it}/(GDP_{VNt} + GDP_{it}))^2] + \beta_{25}LnFDI_{it-1} + \beta_{26}LnRER_{CURi/VNDt} + \gamma_{21}AFTA + \gamma_{22}USBTA + \gamma_{23}ACFTA + \gamma_{24}AKFTA + \gamma_{25}JVEPA + \gamma_{26}AJCEP + \gamma_{27}AANZFTA + \gamma_{28}Bothin_{VNit} + \gamma_{29}Onein_{VNit} + \gamma_{210}BOR_{VNi} + \gamma_{211}CRI_i^{1997} + \gamma_{212}CRI_i^{2008} + \varepsilon_{2VNi}$ (5)

For the data, the empirical analysis presented in this paper is based on a panel data set in the period from 1995 to 2011 which involves 17 Vietnam's major/stable trading partners including: Australia, Belgium, Canada, China, France, Germany, Hong Kong, Japan, Malaysia, the Netherlands, the Philippines, Singapore, the Republic of Korea, Taiwan, Thailand, the United

Kingdom, and the United States. 17 trading partners listed above amount to around 80% of Vietnam's foreign trade for the duration 1995-2011. The data is obtained from different reliable sources such as Vietnam's authorities (e.g., the General Statistics Office [GSO], the Ministry of Industry and Trade [MIT], the Ministry of Planning and Investment [MPI]), and the international organizations (e.g., the Asian Development Bank [ADB], the International Monetary Fund [IMF], the United Nations Statistics Division [UNSD], the World Bank [WB], the World Trade Organization [WTO]). In regards to the special case of Chinese Taipei (Taiwan), the figures are collected from ADB and the World Economic Outlooks October 2012, available on Knoema's website. [14] The detailed description of those sources of the data is listed in Appendix 1.

5. AN ANALYSIS OF THE EMPIRICAL RESULTS

The empirical results are summarized and reported in Table 1 and Table 2 below using the Stata 11 and the Hausman–Taylor estimator. Appendix 2 presents Summary of the Statistics. Appendix 3 and Appendix 4 express the Correlations Matrices of LnEXjt and LnIMjt gravity equations respectively. The estimated results give an overview about the potential and possible relationships between the explanatory variables and the dependent variables (Vietnam's exports and imports). The subsequent section will first analyze the impact of the WTO on Vietnam's exports, and then the second section discusses the impact of the WTO on Vietnam's imports.

5.1 An Analysis on the Impacts of the WTO on Vietnam's Exports

The estimated results of $LnEX_{jt}$ gravity equation are presented in Table 1 below. The inclusion of 5 equations is to observe the interaction between the WTO and other factors that may have an impact on Vietnam's exports. The authors respect the results of the equation EX-5. The results of the equation EX-5 indicate that a large share of the variation of Vietnam's exports recently could be explained by a considerable number of factors, namely, GDP, Distance, USBTA, FDI, 1997 Asian Financial Crisis and the WTO accession. However, within the analysis framework the authors only focus on the impact of the WTO. We, now, start by the discussion on

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[14] *Adjusted gravity models adopted partly from Hoang et al. [1].*

the possible impact of the WTO on Vietnam's exports. As previously mentioned, the $Bothin_{VNjt}$ and $Onein_{VNjt}$ dummies capture the probable impact of the WTO on Vietnam's exports. The estimated coefficient of the $Bothin_{VNjt}$ dummy is statistically insignificant. It means joining the WTO by both Vietnam and its trading partners did not increase Vietnam's exports. The explanation comes partially from the arguments of Subramanian and Wei [2] that when Vietnam liberalizes its imports under the WTO's agreements, there is reason to expect Vietnam's imports from the WTO members to increase. And, the trade effect of the WTO really relates to imports rather than exports. The coefficient of the $Onein_{VNjt}$ dummy is negatively significant at the level of 5% suggesting that there has been a "trade diversion" from Vietnam to other WTO members. Specifically, Vietnam's trading partners has diverted their imports from Vietnam to other WTO members for lower tariff rates. This is consistent with the theory of the impact of the WTO on trade flows (Vietnam's exports to trading partners reduced to an amount of around 55.17% [= EXP (0.439374) − 1] since trading partners became WTO members while Vietnam still was an outsider).

5.2 An Analysis on the Impacts of the WTO on Vietnam's Imports

Correlation coefficients of variables in the $LnIM_{jt}$ gravity equation are presented in Table 2. The authors still respect the estimated results of the equation IM-5. We now get to empirically analyze our concern about the impact of the WTO on Vietnam's imports. First, the estimated coefficients of the $Bothin_{VNjt}$ and $Onein_{VNjt}$ dummies are positive and statistically significant at the levels of 1% and 10% respectively. These results are sufficient for our Hypothesis 1 that the WTO has had a positive impact on Vietnam's imports. Joining the WTO of Vietnam's trading partners increased the country's imports by about 28.52% [= EXP (0.250974) − 1]. This consideration is also consistent with the one of Tomz et al. [4], which suggests that the benefits of the GATT/WTO extend not only to formal members but also to a wide range of non–member participants. Belonging to the WTO of both Vietnam and trading partners motivated the country to import goods by 119.85% [= EXP (0.7877818) − 1].

Table 1. Gravity model estimations using the hausman–taylor estimator

Explanatory variables	Dependent variable: $LnEX_{it}$				
	EX-1	EX-2	EX-3	EX-4	EX-5
Time varying exogenous					
LnSIMSIZE	-	1.93597**	-	-	0.9184781
$LnRER_{CURi/VNDt}$	-	0.1174159	-	-	0.1054633
FTA	-	-	0.0688519	-	-
AFTA	-	-	-	-0.1758372	-0.0270398
USBTA	-	-	-	1.504769*	1.446955*
ACFTA	-	-	-	0.0170654	0.0018743
AKFTA	-	-	-	0.1027675	0.1159645
JVEPA	-	-	-	-0.0340665	-0.0085332
AJCEP	-	-	-	-0.0390555	-0.1056205
AANZFTA	-	-	-	-0.1349732	-0.1098954
$Bothin_{VNjt}$	-0.564724*	-0.6303389*	-0.6168741*	-0.4275806	-0.3626161
$Onein_{VNjt}$	-0.5234174*	-0.566592*	-0.5690903*	-0.4421496**	-0.439374**
CRI_i^{1997}	-	-	-	0.220075*	0.2543705*
CRI_i^{2008}	-	-	-	-0.0420042	-0.0999105
Time varying endogenous					
$LnGDP_{VNt}$	2.224816*	0.6519799	2.14669*	2.211013*	1.469922**
$LnGDP_{it}$	0.7679879*	2.406568*	0.8635006*	0.8293187*	1.543947**
$LnFDI_{it-1}$	-	0.0597087**	-	-	0.0601236**
Time invariant exogenous					
$LnDIS_{VNj}$	-0.82521*	-1.035409*	-0.9386249*	-1.013851*	-1.04677*
BOR_{VNj}	-	-0.6978363	-0.7547305	-0.6832711	-0.5885475
Constant	-47.66166*	-49.50799*	-47.33826*	-47.54587*	-48.43155*

*Notes: *, **, and *** indicate significance at the levels of 1%, 5%, and 10% respectively*

This expresses the strong "trade creation effect" of the WTO-replace the higher cost domestic production by lower cost sources of supply from WTO members through importation. The question is that Why does the WTO strongly affect to member's trade flows, as specifically to the imports? As we know that the overarching/main function of the WTO is to *ensure that trade flows as smoothly, predictably and freely as possible*. To do so, the trade negotiation function of the predecessor, the General Agreement on Tariffs and Trade (GATT), was designed through which country members get the consensus in concessions not to increase protection above the agreed level (tariff bindings for the merchandise trade among members). This is to reduce tariff barriers and hindrances in foreign trade. Late country members/observer governments are also forced to increase more transparency and predictability of their trading systems and to further reduce their tariffs and nontariff barriers. Expertise was in the following important rounds of negotiation since 1947.

From Table 3, it is obvious that the Geneva I round witnessed greater tariff reduction by the United States. The later four rounds (Annecy, Torquay, Geneva II, and Dillon) offered modest tariff cuts. The next three rounds, Kennedy, Tokyo, and Uruguay, have brought about a much larger tariff reduction than ever before. It is noted that, most of the industrial economies (e.g., the U.S., Japan, and the EU) made a greater commitment in bounding tariff of industrial goods import (94%) compared to developing economies (13%). Consequently, the differences in tariff reductions between industrial and developing countries and among products under the GATT/WTO system have been considered as the causality of the significant differences in trade flows (Subramanian and Wei [2]).

Table 2. Gravity model estimations using the hausman–taylor estimator

Explanatory variables	Dependent variable: $LnIM_{it}$				
	IM-1	IM-2	IM-3	IM-4	IM-5
Time varying exogenous					
LnSIMSIZE	-	-0.3993434	-	-	0.0657589
$LnRER_{CURi/VNDt}$	-	0.1485851	-	-	0.1208685
FTA	-	-	0.2195104*	-	-
AFTA	-	-	-	-0.2050548	-0.097925
USBTA	-	-	-	0.461896*	0.4469156*
ACFTA	-	-	-	0.5107721*	0.4859765*
AKFTA	-	-	-	-0.0767694	-0.0804554
JVEPA	-	-	-	0.2577209	0.3145337
AJCEP	-	-	-	-0.1447753	-0.212482
AANZFTA	-	-	-	0.1269618	0.1671734
$Bothin_{VNit}$	0.4918023*	0.479222*	0.5311835*	0.7351007*	0.7877818 *
$Onein_{VNit}$	0.3021154**	0.2739412**	0.323587*	0.2548223***	0.250974***
CRI_i^{1997}	-	-	-	0.0948877	0.1239098**
CRI_j^{2008}	-	-	-	-0.2297479	-0.271356***
Time varying endogenous					
$LnGDP_{VNt}$	1.60222*	2.00896*	1.551853*	1.552042*	1.541878*
$LnGDP_{jt}$	1.102094*	0.6267316	0.9049076*	0.8665782*	0.8287191
$LnFDI_{it-1}$	-	0.0495253*	-	-	0.0581889*
Time invariant exogenous					
$LnDIS_{VNj}$	-1.887858*	-1.895831*	-1.65984*	-1.627061*	-1.624041*
BOR_{VNj}	-	-0.4288211	-0.3801243	-0.5176104	-0.329246
Constant	-33.66979*	-33.56223*	-29.00875*	-28.20689*	-28.83678*

*Notes: *, **, and *** indicate significance at the levels of 1%, 5%, and 10% respectively*

Vietnam as a late WTO member is not an exceptional case. The WTO accession has been accompanied by tariff reduction (see Table 4 below). This has led to an increase of imports of industrial goods from developed countries. One should be aware that Vietnam's demand of advanced technology and industrial goods (construction machines, machines and equipments for communication, electronic components, computer and accessories, chemicals and plastic, footwear accessories, garment accessories, paper, fertilizer, fabric, metals) is quite high. This has been proved in Vietnam's foreign trade structure: export primary products and import industrial goods. Moreover, on the business side, tariff reduction stimulates the "trade creation effect" due to foreign merchandises are now more competitive (cheaper). As a result, industries which tend to import input materials from abroad serving for export-oriented manufacturing (textiles, garments, footwear, electronic, etc.) and domestic consumers will experience more benefits.

Table 3. The GATT/WTO rounds of negotiation and tariff cuts

Round	Dates	Length (months)	Tariff cuts[a]	Round "productivity"[b]	Number of GATT members	
					All[c]	G-77[d]
Geneva I	1947	8	26.0	39.0	19	7
Annecy	1949	8	3.0	4.5	20	8
Torquay	1950-1951	8	4.0	6.0	33	13
Geneva II	1956-1959	16	3.0	2.3	35	14
Dillon	1960-1962	10	4.0	4.8	40	19
Kennedy	1964-1967	42	37.0	10.6	74	44
Tokyo	1973-1979	74	33.0	5.4	84	51
Uruguay	1986-1994	91	38.0	5.0	125	58

Notes: [a]Average cuts in bound tariffs (Preeg [23], Baldwin [24], WTO (1994, 2007)). Import-weighted tariff cuts of industrial countries for industrial products (petroleum excluded). The five first figures refer to the average tariff cuts of the United States; [b]Average tariff cut per year of negotiations; [c]GATT members at the end year of the negotiations (WTO website); [d]G-77 membership is taken as a proxy for defining "developing" GATT members; Source: Martin and Messerlin [25]: 347-366)

Table 4. Vietnam's commitments for tariff cuts

Commodity groups	Number of tariff lines	MFN tariffs (%)	Bound rate at the date of accession (%)	Final bound (%)
1. Agricultural products	1219	23.5	25.2	21.0
2. Industrial Products	-	16.8	16.1	12.6
3. Fish and fish Products	176	29.3	29.1	18.0
4. Petroleum	37	36	36.8	36.6
5. Wood and paper	630	15.6	14.6	10.5
6. Textiles	1159	37.3	13.7	13.7
7. Leather, rubber	341	18.6	19.1	14.6
8. Metal	1201	8.1	14.8	11.4
9. Chemicals	1579	7.1	11.1	6.9
10. Transport equipment	1026	35.3	46.9	37.4
11. Machinery and metal equipment	1436	7.1	9.2	7.3
12. Machinery and electrical equipment	766	12.4	13.9	9.5
13. Minerals	396	14.4	16.1	14.1
14. Other manufactured goods	723	14.0	12.9	10.2
Entire tariff	10,689	17.4	17.2	13.4

Source: Vietnam Ministry of Industry and Trade [26].

6. CONCLUDING REMARKS AND RECOMMENDATIONS

The Government of Vietnam has made considerable efforts to open up the economy and to enhance the integration of the country into the global economy. Over the course of the last two decades since the start of the Renovation Policy, some regional FTAs have been ratified and put into force such as the AFTA, USBTA, ACFTA, AKFTA, JVEPA, AJCEP and the AANZFTA. The country also joined the WTO in 2007. The main findings in this study show that opening up the country's economy by means of FTAs and the WTO could lead to diverse trade effects. The WTO has increased the country's imports but has not motivated the country's exports as expected. Bilateral trade was greater when both Vietnam and its partners joined the WTO than when only one partner did. However, the WTO could indirectly generate exports through FDI boom and import increase due to the reciprocal relationship between three.

The literature assessing the effects of the WTO on foreign trade flows has produced remarkably diverse results. Rose [3] found the effectiveness and hence the usefulness of the GATT/WTO. Recent studies show that the GATT/WTO has done a significant role of promoting trade. But this trade promoting role of the GATT/WTO has, however, been uneven. Industrial WTO members are likely to witness a large increase in trade. Our empirical analysis found evidence of the WTO trade effects in the case of Vietnam–a developing WTO member. The impact is clearly strong on the import side. This implies that a developing country may have benefits from WTO membership. And, economic models should be constructed to evaluate the real impact of this multilateral trading system on foreign trade flows of its members. However, the effects were robust to changes in methods of estimation and in economic models employed. Hence, the results and analyses will be more reliable and persuasive if optimal models and estimation techniques are carefully/rigorously employed.

In conclusion, our investigations can contribute to the existing literature on the impact of the WTO regime on export-import trading of a developing country after 1995 in terms of testable implications from gravity model. Moreover, modeling the impact of the WTO on specific merchandise, specific industry, or examine the effects of the WTO on attitudes of industrialists, or on effectiveness of economic development of Vietnam etc are also interesting, which merit further researches to understand how this institution effects to member countries.

ACKNOWLEDGEMENT

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Appendix 1. Variables and Data Resources

Variables	Data Resources
$LnFDI_{jt-1}$	Vietnam Ministry of Planning and Investment (MPI), Vietnam General Statistics Office (GSO)
$LnEX_{jt}$	Vietnam Ministry of Industry and Trade (MoIT), Vietnam General Statistics Office (GSO), ADB
$LnIM_{jt}$	Vietnam Ministry of Industry and Trade (MoIT), Vietnam General Statistics Office (GSO), ADB
$LnDIS_{VNj}$	CEPII (the French Institute for Research on the International Economy)
$LnGDP_{VNt}$	United Nations Statistics Division (UNSD), World Bank (WB)
$LnGDP_{jt}$	United Nations Statistics Division (UNSD), World Bank (WB)
$LnRER_{CURj/VNDt}$	United Nations Statistics Division (UNSD), World Bank (WB), Asian Development Bank (ADB)
AFTA	WTO's website page, Vietnam WTO central website page
USBTA	WTO's website page, Vietnam WTO central website page
ACFTA	WTO's website page, Vietnam WTO central website page
AKFTA	WTO's website page, Vietnam WTO central website page
JVEPA	WTO's website page, Vietnam WTO central website page, Japan Customs website page
AJCEP	WTO's website page
AANZFTA	WTO's website page, Vietnam WTO central website page
$BothinVN_{jt}$	WTO's website page
$OneinVN_{jt}$	WTO's website page
CRI_j^{1997}	Laeven and Valencia [27]
CRI_j^{2008}	Laeven and Valencia [27]; Rose and Spiegel [28]; Erkens and Matos [29]; Bartram and Bodnar [30]; Naudé [31] ; Hoang et al. [32]

Appendix 2. Summary the Statistics (Period: 1995 – 2011; Countries: 17; Observations: 289)

Variables	Observations	Mean	Standard Deviation	Min	Max
$LnFDI_{it-1}$	289	18.0012	1.8665	10.6048	21.7692
$LnEX_{it}$	289	20.5201	1.1501	16.7017	23.5033
$LnIM_{it}$	289	20.4010	1.4905	16.8974	23.8168
$LnDIS_{VNi}$	289	8.2815	0.9503	6.7140	9.5226
$LnGDP_{VNt}$	289	24.5363	0.3192	23.9940	25.0309
$LnGDP_{it}$	289	27.2646	1.3901	24.9592	30.2141
LnSIMSIZE	289	-2.2820	1.1671	-5.1491	-0.7707
$LnRER_{CURi/VNDt}$	289	7.9673	2.1171	2.2857	10.3280
AFTA	289	0.1522	0.3598	0	1
USBTA	289	0.0415	0.1998	0	1
ACFTA	289	0.1730	0.3789	0	1
AKFTA	289	0.0865	0.2815	0	1
JVEPA	289	0.0138	0.1170	0	1
AJCEP	289	0.0692	0.2542	0	1
AANZFTA	289	0.0519	0.2222	0	1
BothinVNjt	289	0.2941	0.4564	0	1
OneinVNjt	289	0.6608	0.4742	0	1
BORVNj	289	0.0588	0.2357	0	1
CRI_i^{1997}	289	0.1522	0.3598	0	1
CRI_j^{2008}	289	0.2802	0.4499	0	1

Appendix 3. Correlations Matrix (LnEX$_{jt}$ Equation)

Correlations	$LnEX_{jt}$	$LnDIS_{VNj}$	$LnGDP_{VNt}$	$LnGDP_{jt}$	LnSIMSIZE	$LnFDI_{jt-1}$	LnRER.	AFTA	USBTA	ACFTA	AKFTA	JVEPA	AANZFTA	AJCEP	$Bothin_{VNjt}$	$Onein_{VNjt}$	BOR_{VNj}	CRI_j^{1997}	CRI_j^{2008}
$LnEX_{jt}$	1.0000																		
$LnDIS_{VNj}$	-0.0305	1.0000																	
$LnGDP_{VNt}$	0.6960	0.0000	1.0000																
$LnGDP_{jt}$	0.3856	0.7167	0.1222	1.0000															
LnSIMSIZE	-0.2470	-0.6897	0.1053	-0.9694	1.0000														
$LnFDI_{jt-1}$	0.2791	-0.3043	-0.0198	0.0796	-0.0907	1.0000													
$LnRER_{CURj/VNDt}$	-0.1146	0.5559	-0.0075	0.2002	-0.1986	-0.3356	1.0000												
AFTA	0.1001	-0.5228	0.2620	-0.4857	0.4967	-0.0528	-0.1334	1.0000											
USBTA	0.3528	0.2723	0.1067	0.4320	-0.4428	0.1266	0.1605	-0.0882	1.0000										
ACFTA	0.2341	-0.5016	0.3311	-0.3207	0.3551	-0.0092	-0.1325	0.8247	-0.0952	1.0000									
AKFTA	0.2267	-0.3172	0.3696	-0.2363	0.2976	0.0848	-0.2400	0.5548	-0.0640	0.5101	1.0000								
JVEPA	0.2415	-0.0034	0.1485	0.1679	-0.1371	0.1278	-0.1772	-0.0502	-0.0247	-0.0542	-0.0365	1.0000							
AJCEP	0.2705	-0.2707	0.3418	-0.1410	0.1919	0.1022	-0.1538	0.4916	-0.0568	0.4520	0.6921	0.4345	1.0000						
AANZFTA	0.1908	-0.2049	0.2988	-0.1728	0.2254	-0.0069	-0.0308	0.4219	-0.0487	0.3878	0.5939	-0.0277	0.6737	1.0000					
$Bothin_{VNjt}$	0.5445	0.0000	0.7753	0.1027	0.0750	0.0131	-0.0169	0.1492	0.0560	0.2067	0.4767	0.1835	0.4224	0.3625	1.0000				
$Onein_{VNjt}$	-0.5090	0.0645	-0.6436	-0.0833	-0.0714	-0.0280	0.0669	-0.1033	-0.0341	-0.1555	-0.4296	-0.1654	-0.3807	-0.3266	-0.9012	1.0000			
BOR_{VNj}	0.1917	-0.1373	-0.0000	0.1887	-0.1817	-0.0238	-0.0482	-0.1059	-0.0520	0.2744	-0.0769	-0.0296	-0.0682	-0.0585	0.0000	-0.1626	1.0000		
CRI_j^{1997}	-0.1295	-0.2290	-0.3896	-0.1494	0.0513	0.1062	-0.1931	-0.1796	-0.0399	-0.1938	-0.1304	-0.0502	-0.1156	-0.0992	-0.2736	0.1408	0.0578	1.0000	
CRI_j^{2008}	0.5497	-0.0170	0.7560	0.1143	0.0587	0.0640	-0.0288	0.1430	0.0632	0.2034	0.4657	0.1898	0.4369	0.3749	0.9668	-0.8712	0.0077	-0.2645	1.0000

Appendix 4. Correlations Matrix (LnIM$_{jt}$ Equation)

Correlations	LnIM$_{jt}$	LnDIS$_{VNj}$	LnGDP$_{VNt}$	LnGDP$_{jt}$	LnSIMSIZE	LnFDI$_{it-1}$	LnRER.	AFTA	USBTA	ACFTA	AKFTA	JVEPA	AANZFTA	AJCEP	Bothin$_{VNit}$	Onein$_{VNit}$	BOR$_{VNj}$	CRI$_i^{1997}$	CRI$_i^{2008}$
LnIM$_{jt}$	1.0000																		
LnDIS$_{VNj}$	-0.4608	1.0000																	
LnGDP$_{VNt}$	0.5236	0.0000	1.0000																
LnGDP$_{jt}$	0.0912	0.7167	0.1222	1.0000															
LnSIMSIZE	0.0175	-0.6897	0.1053	-0.9694	1.0000														
LnFDI$_{it-1}$	0.5548	-0.3043	-0.0198	0.0796	-0.0907	1.0000													
LnRER$_{CURj/VNDt}$	-0.4544	0.5559	-0.0075	0.2002	-0.1986	-0.3356	1.0000												
AFTA	0.2139	-0.5228	0.2620	-0.4857	0.4967	-0.0528	-0.1334	1.0000											
USBTA	0.0809	0.2723	0.1067	0.4320	-0.4428	0.1266	0.1605	-0.0882	1.0000										
ACFTA	0.3644	-0.5016	0.3311	-0.3207	0.3551	-0.0092	-0.1325	0.8247	-0.0952	1.0000									
AKFTA	0.3167	-0.3172	0.3696	-0.2363	0.2976	0.0848	-0.2400	0.5548	-0.0640	0.5101	1.0000								
JVEPA	0.1966	-0.0034	0.1485	0.1679	-0.1371	0.1278	-0.1772	-0.0502	-0.0247	-0.0542	-0.0365	1.0000							
AJCEP	0.2877	-0.2707	0.3418	-0.1410	0.1919	0.1022	-0.1538	0.4916	-0.0568	0.4520	0.6921	0.4345	1.0000						
AANZFTA	0.1992	-0.2049	0.2988	-0.1728	0.2254	-0.0069	-0.0308	0.4219	-0.0487	0.3878	0.5939	-0.0277	0.6737	1.0000					
Bothin$_{VNit}$	0.4356	0.0000	0.7753	0.1027	0.0750	0.0131	-0.0169	0.1492	0.0560	0.2067	0.4767	0.1835	0.4224	0.3625	1.0000				
Onein$_{VNit}$	-0.4381	0.0645	-0.6436	-0.0833	-0.0714	-0.0280	0.0669	-0.1033	-0.0341	-0.1555	-0.4296	-0.1654	-0.3807	-0.3266	-0.9012	1.0000			
BOR$_{VNj}$	0.2395	-0.1373	-0.0000	0.1887	-0.1817	-0.0238	-0.0482	-0.1059	-0.0520	0.2744	-0.0769	-0.0296	-0.0682	-0.0585	0.0000	-0.1626	1.0000		
CRI$_i^{1997}$	-0.0394	-0.2290	-0.3896	-0.1494	0.0513	0.1062	-0.1931	-0.1796	-0.0399	-0.1938	-0.1304	-0.0502	-0.1156	-0.0992	-0.2736	0.1408	0.0578	1.0000	
CRI$_i^{2008}$	0.4553	-0.0170	0.7560	0.1143	0.0587	0.0640	-0.0288	0.1430	0.0632	0.2034	0.4657	0.1898	0.4369	0.3749	0.9668	-0.8712	0.0077	-0.2645	1.0000