Trade Facilitation in Vietnam: Estimating The Effects on Trade Flows

Ngo Thi Tuyet Mai
National Economics University, Vietnam
Email: ngothituyetmai@neu.edu.vn

Nguyen Bich Ngoc
National Economics University, Vietnam
Email: bichngocktqt@neu.edu.vn

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Abstract

Vietnam has experienced remarkably from the deep regional integration and ratified Trade facilitation agreement of the World Trade Organization (WTO) since 2015. Trade-facilitation, with regard to administrative or custom procedures and logistic infrastructure has become increasingly crucial to boost international trade and reform the internal mechanism. The paper explores the effects of trade-facilitation factors and logistics performance on trade flows between Vietnam and its trade partners. The authors also develop the geometric average of these indicators to measure the bilateral efforts in country pairs. The paper uses the structural gravity model to assess the correlation between these factors and trade value with the estimation approach of Poisson Pseudo maximum likelihood. The dataset observes the trade flow between Vietnam and 22 strategic partners at a disaggregated product level. The result shows that the trade facilitation and logistics infrastructure have impacted directly on trade flows across partners and is varied for agricultural and non-agricultural products.

Keywords: Gravity model; trade facilitation; Vietnam.

JEL code: F13.

1. Introduction

Since the reform of 1986, Vietnam has pursued an export-led policy and has strongly linked with the world market to foster economic development. To gain more from international trade, Vietnam has been aware of the need for reduction in trade costs. Over the period 2006-2014, Vietnam has significantly decreased trade costs, mainly from tariff reduction followed by free trade agreements. Together with the slow process of tariff reduction in multilateral negotiations, tariff preferences are not the main source of cutting off trade costs. Instead of tariffs, trade facilitation has become increasingly important to development prospects by reducing the wedge of trade costs between exporters and importers. The trade facilitation agreement (TFA) of the World Trade Organization (WTO) entered into force on February 22nd, 2017 with the acceptance of 136 out of a total of 164 members. Vietnam domestically ratified the Protocol of Amendment and notified the WTO of its agreement on December 15th 2015. It means that trade facilitation is the indispensable trend and brings about trade gains for all countries. According to the world trade report of WTO (2015), full implementation of the TFA has the ability to reduce trade costs by an average of 14.3% and boost growth for exports annually by 3.5%, for an annual economic output of 0.9%. Furthermore, the implementation of TFA has been different from countries. According to the trade facilitation indicators of Organisation for Economic Co-operation and Development - OECD (2017), the disparity of the trade facilitation indicator between Vietnam and high-income countries is around 5 points, while the indicators for Vietnam are higher than some countries in the region, such as Laos, Cambodia, Indonesia, India and the Philippines. However, Vietnam has met a variety of challenges to fulfil the WTO trade facilitation agreement. These challenges are concentrated in the field of internal and external-border agency cooperation and in automating the custom process. The improvement in automating the border process has a strong correlation with trade performance, with less advanced economies progressing slower than more advanced ones. In the case of Vietnam, the authors realized that trade facilitation is both a necessary internal force for Vietnam to reform the mechanism relating to customs' procedures or institutional infrastructure. Thus, it is necessary to figure out the effects of implementing a trade facilitation agreement on trade flow in Vietnam to adjust trade policy appropriately. Therefore, the study examines the impact of trade facilitation in two dimensions: as institutional aspects and as the physical infrastructure effect on trade performance in Vietnam.

Furthermore, industries have responded differently to the adjustment of trade policy, as well as the process of trade facilitation. This means that trade effects from trade facilitation can vary widely between product categories. The implementation of a TFA decreases the trade costs of manufactured goods by a maximum of 18% and of agricultural products by 10.4% (WTO, 2015). Among these, agriculture has played a vital role in fostering the economic development in Vietnam since 1986. Based on the development-in-scale in the industry, agriculture has remained as the trade surplus in the trade balance. The total export and import value of agriculture has increased from 2001 to 2017 with an average trade surplus of 2.5 billion United States dollar (USD). In fact, while

the rate of exports has continuously increased, agricultural imports have also experienced a gradual growth rate of 11.2% per year. The main agricultural import products are categorised by purpose including: consumption (such as edible fruits and nuts from 450 million USD in 2010 to 3.3 billion USD in 2017) and input for manufacturing and exporting (such as corn and soya, at around 2.5 billion USD in 2017). Besides, agriculture still reflects the protectionism issue, so which differences effects of trade facilitation do between agricultural and non-agricultural sectors.

In sum, the objective of this paper is to estimate the effects of trade facilitation on trade flow when Vietnam implemented the Trade facilitation agreement across trade partners and industries. The empirical study applies a structural gravity model augmented with trade facilitation indicators relating to institutional infrastructure and physical infrastructure. The authors expect that countries moving forward with trade facilitation can reap the benefits to the maximum possible extent from any multilateral liberalization. The paper includes 5 parts: the first part is an overview of the recent progress in trade facilitation in world trade; the second part is a literature view on trade facilitation and its potential economic impacts; the third part discusses the research methodology used to estimate the impact of trade facilitation; the fourth part shows the results of estimation and some further discussion and lastly, we mention some suggestions for policymakers.

2. Literature review on trade facilitation

With the rapid development of international trade, most countries have made much effort to reduce costs to boost trade flows. The effort has concentrated on removing trade-impeding measures over many years, such as tariff and non-tariff measures. However, trade costs stem not only from trade policy measures but also from cost of transportation and inefficient trade procedures, which all are costs apart from the cost of production, incurred to get goods from producers to final consumers. In 1996, the WTO started to carry out exploratory and analytical work relating to the simplification of trade administrative procedures and standardization of custom formalities. Until 2004, the issue of "trade facilitation" launched WTO negotiations for "the simplification and harmonization of international trade procedures". Theoretically, trade facilitation aims to reduce trade costs in international trade. In a classical trade model, inefficient trade procedures drive a price wedge between producers and consumers (Samuelson, 1954). Furthermore, lower trade costs in small developing countries lead to diversification of economies (Krugman, 1980). In the new trade theory, a reduction in variable and fixed costs can increase exports in two dimensions, including extensive and intensive margins (Chaney, 2008). The costs to learn and adapt trade procedures whether to enter a particular market are considered as fixed trade costs, while variable trade costs have to be paid on every unit of export. Trade facilitation will decrease both types of costs, then impact on trade expansion along both margins. The improvement in trade facilitation has benefits for both the exporting and importing country, while importers gain from lower prices, exporters receive higher prices for traded goods.

The definition of trade facilitation is complex and multi-dimensional. Sohn and Yoon (2001) indicated the definition of trade facilitation as

"all activities or policies, which reduce transaction costs arising from eliminating or simplifying excessive and complex procedures, practices and processes and increases efficiency and results in increased trade". Trade facilitation means that providing an environment for trade and transport reduces the cost of international trade transactions. The OECD emphasizes that trade facilitation is the simplification and standardization of customs' formalities and administrative procedures related to international trade (Perez and Wilson, 2012), while United Nations Economic Commission for Europe (UNECE) defines it as "the comprehensive and integrated approach to reduce costs and increase efficiency, transparency and predictability". In the paper, we use the definition of trade facilitation as a part of trade policy, including at-the-border and beyond-the-border issues, which deal with good governance, the quality of infrastructure, institutional transparency and domestic regulation to cut costs associated with international trade.

Many empirical studies show the relationship between trade facilitation and trade flows. In the first study of Wilson, Mann and Otsuki (2003), the authors used 4 indicators to demonstrate trade facilitation, namely: port infrastructure, customs environment, regulatory environment and e-business infrastructure, and estimate the effect of trade facilitation on trade flows. Using gravity model estimates, the result shows a 21% increase in the intra-APEC trade flow coming from half of the improvement in port efficiencies. In terms of estimating the effects of trade facilitation reform, the primary factors in reforming are port efficiency and service infrastructures (Wilson et al., 2008). Another study of Moïsé and Sorescu (2013) used sixteen trade facilitation indicators (TFIs) to address the impact of some specific areas related to border procedures in a given country. The availability of information, the simplification and harmonization of documents, the streamlining of procedures and the use of automated processes have promoted the trade flows through a 14.5% reduction of total trade costs for low-income countries, 15.5% for lower middle-income countries and 13.2% for upper middle-income countries. Focusing on the process of trade facilitation reform in Association of Southeast Asian Nations (ASEAN), Shepherd and Wilson (2009) analysed that the effect of trade facilitation, including transport infrastructure, information and communication technology, expanded trade up to 7.5% among Southeast Asian Nations. Recent studies find that domestic institutions and infrastructure impact trade volumes across countries (Limao and Venables, 2001; Wilson, Mann and Otsuki, 2003; Anderson and Marcouiller, 2002; Francois and Manchin, 2007). Francois and Manchin (2007) categorized these factors as "hard" and "soft" infrastructure, which can impact on trade performance through the cost channel. According to the literature, the hypothesis is that domestic trade costs related to institutions, infrastructure, regulations and the economic environment are significant determinants of the volume of trade between countries. To sum up, the main findings made by the previous studies can be described as: First, there is a positive link between trade facilitation and trade flows. Secondly, countries with different incomes also gain from trade facilitation but the amount of trade gains is varied. Developing nations have higher trade gains than developed nations.

Regarding the measuring of trade facilitation

indicators, a wide range of trade facilitation indicators has been developed by international organizations and the literature. The simplest approach is the average of primary variables. For example, Perez and Wilson (2012) developed aggregate trade facilitation indicators by using factor analysis. Some others pay attention to the specific dimensions of trade facilitation such as Djankov et al. (2006). In terms of international organizations, trade facilitation indicators are designated by three categories, including the World Bank Group's "Doing business" indicators, The World Bank's logistics performance index (LPI), OECD trade facilitation indicators (TFI), and the World Economic Forum's Enabling Trade Index (ETI). The two well-suited measurements of trade facilitation in two dimensions (hard and soft infrastructure) are LPI and TFI.

Firstly, the LPI refers to the supply chain such as customs, physical infrastructure and logistics service quality, or the outcomes as time, shipment and tracking and tracing. The LPI index reflects the on-the-border measures and goes from 1 to 5 (worst to best). Secondly, according to OECD statistics, trade facilitation indicators (TFI) are developed as 12 indicators: a) information availability, b) appeal procedures, c) formality automation, d) external border agency cooperation, e) involvement of trade community, f) fee and charges, g) formality procedures, h) governance and impartiality, i) advance rulings, k) formalities documents and l) internal border agency co-operation. The indicators indicate the issue related to the 'soft' dimension or the regulatory framework in a country through questionnaires applied to governments and private sectors. The twelve indicators contain a total of 98 variables. In evaluation, the average scores follow a multiple binary scheme where a score of 2 correspond to the best performance, 0 corresponds to the worst performance and 1 lies in between. The OECD TFIs correspond strongly with the Trade facilitation agreement. Thus, among these, OECD Trade facilitation indicators (TFIs) are appropriate to analyse the trade and economic effects of implementing the TFA.

The empirical study has examined the effects of implementing trade facilitation on trade flows since Vietnam ratified the Trade facilitation agreement. Although many empirical studies prove the positive correlation between trade facilitation and trade flow, there is a lack of papers analysing the specific case of Vietnam. In its case, Vietnam has depended strongly on international trade, but has also been reforming the institutional aspects strongly since 2015. Hence, the study has been constructed at a disaggregated level and shows the differentiated impacts of trade facilitation on trade flows across countries and across industries, especially the differences between agricultural and non-agricultural goods because the diversification of product groups reacts differently to trade facilitation.

3. Research methodology

With the aim of estimating the correlation between trade facilitation indicators and trade flow, the paper applied the structural gravity model of Anderson and Van Wincoop (2004). The theoretical economic foundation for the gravity equation is under the assumptions of product differentiation by origin and constant elasticity of substitution (CES) expenditures. The Armington-CES model of Anderson emphasized the importance of the general equilib-

rium effects of trade costs.

According to the literature, the hypothesis is that trade facilitation with regard to domestic institutions and physical infrastructure is the significant determinant of the trade volume between countries. Therefor the empirical study will test the link between trade facilitation indicators and trade flows with a series of controlled variables for bilateral costs (such as distance, common border, colonial status). The three main independent variables are: i) soft infrastructure including transparency, customs management, business environment and other institutional aspects (Moïsé and Sorescu, 2013); ii) hard infrastructure relating to logistics performance (Perez and Wilson, 2012); iii) trade barriers such as differences in distance, cultural and historical factors. Therefore, the baseline specifications include traditional variables in gravity models (distance), economics factor (GDP), trade facilitation indicators (TFI) and the logistic performance index (LPI).

$$LnX_{ijk} = \beta_0 + \beta_1 LnGDP^* + \beta_2 contig + \beta_3 comcol + \beta_4 colony + \beta_5 Lndist_{ij} + \beta_6 TFI_{ij} + \beta_7 LPI_{ij} + u_{ijk} \quad (1)$$

Furthermore, an important observation is that the effects of trade facilitation on specific sectors such as agricultural goods and non-agricultural goods are due to the distinction between perishable and non-perishable goods under the hypotheses below:

H_0: Different product groups react differently to implement trade facilitation.

H_1: Different product groups do not react differently to implement trade facilitation.

Based on the assumption of cross-sectoral heterogeneity, to address this issue, the augmented gravity model is used to estimates at the disaggregated product level in Vietnam. Besides, the empirical specification includes two interaction terms between an indicator of trade facilitation and product categories; logistics performance and income level of partner. The interaction terms test the response of the different products by the disparity of trade facilitation between the trade partner and Vietnam (followed Perez and Wilson's (2012) idea).

$$LnX_{ijk} = \beta_0 + \beta_1 LnGDP^* + \beta_2 comcol + \beta_3 colony + \beta_4 Lndist_{ij} + \beta_5 TFI_{ij} *agri + \beta_6 LPI_{ij} *income + u_{ijk} \quad (2)$$

$$LnX_{ijk} = \beta_0 + \beta_1 LnGDP^* + \beta_2 comcol + \beta_3 colony + \beta_4 Lndist_{ij} + \beta_5 TFI_{ij} *non\_agri + \beta_6 LPI_{ij} *income + u_{ijk} \quad (3)$$

Where X_{ijk} is two-way trade flow of country pairs (total export and import value), in which *j* denotes 22 strategic partners of Vietnam in international trade (Appendix 1) and *i* is Viet Nam, *k* denotes the product at the HS 2 digit (*k* cover from Chapter 01 to 24 categorized agricultural products following the definition of WTO[1]). A set of variables for the gravity model include $Dist_{ij}$ is distance between *i* and *j*, GDP* is the absolute value of the wedge between GDPi and *j*, comcol and colony are proxies of historical factors if two countries have a colonial relationship or were colonized by the same power. The main explanatory variables are Trade Facilitation Indicators (TFI), which represents the trade facilitation performance based on a cross-country survey to represent the institutional, administrative and custom procedures. Otherwise, the logistic performance considered as "hard" infrastructure denotes the LPI variable.

In our analysis, the paper examines the possibility of differentiated impacts of trade fa-

cilitation measures on trade flows across the selected countries. However, the issue lies in the asymmetric effects of TFIs on exporters and importers so that the paper observes TFI performance on both sides (exporter and importer) under the assumption of the equal importance of trade facilitation performance from exporters and importers for bilateral trade. Thus, the authors introduce the geometric average of the TFI (as well as the LPI) to account for both importer and exporter dimensions (Moisé et al., 2011) with the purpose of determining the importance of simultaneous actions on two sides regarding the exporter and importer. The formula is as below:

$$TFI^* = \sqrt{TFIi * TFIj}$$

The dataset covers bilateral trade value at a 2-digit product level categorised by Harmonized System of World Custom Organization in the given year of 2016. The trade flows were compiled from the Commodity and Trade Database (COMTRADE) on the website *http://trademap.org*, whereas core gravity variables such as distances, and some dummy variables (colonial relationship, shared borders), GDP and trade openness were obtained from the website *http://www.cepii.fr* and the World Bank's World Development Indicators (WDI) respectively. Besides, trade facilitation indicators and logistics performance are extracted from the database of the OECD Trade Facilitation Simulator and the World Bank "Doing business" in 2016. Trade facilitation indicators are the total score of 16 indicators collected from questionnaires submitted to governments and enterprises. The score of each indicator ranges from 0 to 2 (with 2 corresponding to the best performance and 0 corresponding to the worst performance). OECD TFIs identify the strengths and weaknesses of each country in trade facilitation. Otherwise, the LPI (Logistics Performance Index) is summarized from six indicators by using Principal Component Analysis (PCA) and a weighted average score which ranges from (1) worst score to (5) best score).

The aim of the study was to estimate the effect of trade facilitation implementation on trade performance in Vietnam across the different income levels of countries and across the two main sectors (agricultural and non-agricultural). Thus, the paper used cross-sectional dataset in the given year of 2016. Vietnam officially ratified the Trade Facilitation Agreement in 2015 and implemented some reforms in trade facilitation in 2016 such as electronic customs' procedures and harmonizing some standards and procedures in the ASEAN region toward a single window ASEAN. Besides, trade facilitation indicators remain fairly consistent in the cross-sectional database over time. In addition, the period of 3 years from 2016 to 2018 also reflects the minimal improvement on trade facilitation. This is the reason why the paper uses a cross-sectional database to examine the correlation of trade facilitation implementation and trade flows and the different effects following the two main sectors (agricultural and non-agricultural).

4. Results and discussion

With the challenges of zero value, the issue is addressed by estimating the model using the Poisson Pseudo Maximum likelihood estimator (PPML) (Santos Sliva and Tenreyro, 2006). The method uses a multiplicative form to deal with the zero value, the problems in logarithm transformation and the heteroscedasticity of

Table 1: Estimation results of trade facilitation on trade performance, the case of Vietnam

Trade value	(1)	(2)	(3)
Log GDP*	0.654***	0.655***	0.650***
	(0.087)	(0.083)	(0.083)
Log Dist	- 0.931***	- 0.912***	- 0.907***
	(0.162)	(0.181)	(0.182)
Colony	- 1.091**	- 0.949**	- 0.947**
	(0.355)	(0.350)	(0.350)
Comcol	- 1.845***	- 1.538**	- 1.437**
	(0.577)	(0.499)	(0.499)
Contig	0.668	- 0.390	- 0.331
	(0.417)	(0.462)	(0.463)
TFI_{ij}	0.743**		
	(0.261)		
LPI_{ij}	- 3.571*		
	(1.723)		
TFI*agri		- 0.067***	
		(0.011)	
TFI*nonagri			0.316***
			(0.053)
LPI*income		0.187**	0.155**
		(0.074)	(0.073)
Constant	1.080	0.840	- 0.042
	(2.521)	(2.216)	(2.222)
R_square	0.054	0.057	0.057
Number of observations	2134	2134	2134

Notes: Estimation is by PPML (significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors, clustered by country pairs, are in square brackets. The dependent variable is trade value with no logarithm. TFI and LPI enter the function of the PPML linearly, not a logarithm. An average effect of TFI and LPI is computed from its mean by using the sample standard deviation given. The effect of TFI and LPI become: $(e^{0.743} – 1) * 100\%$.*

trade data. Besides, the empirical specification control for the multilateral resistance terms by accounting remoteness indexes follows the study of Baier and Bergstrand (2007). Table 1 presents the results of the gravity model for specifications using PPML estimation. The dependent variable is trade value with no logarithm. The gravity variables are shown as statistically significant.

As the specification, the result is stable for the classical variables of the gravity model as GDP and distance, which bear the expected signs and are statistically significant. The most statistically meaningful result is the GDP of exporters as trade partners of Vietnam. In the models, the coefficients of the income elasticity of the GDP between exporting and importing countries are 0.650 at the high significance level of 1%. The coefficient of GDP has the minimal change among the specifications. The important determinant of trade barriers is distance with a negative sign and close to the value of 1 as in the literature. Meanwhile, the closer historical and cultural ties denoted by colony and comcol have negative effects.

In terms of trade-facilitation, the estimated coefficients in Table 1 column 1 provide us with some useful information as to the determinants

of trade flows between Vietnam and its trade partners. The result shows that trade-facilitation indicators have a significantly positive correlation with trade flows as in the literature. The geometric average implies that Vietnam will trade more with countries with a high-level of trade facilitation. If the disparity between two countries increases one-point, trade flow will increase by 110.2%. In contrast, the coefficient estimate for LPIij is a negative sign. It reflects that a one-point reduction in the LPI score would increase trade value by about 97%. As a result, we realize that trade facilitation and logistics performance can directly change trade performance. However, Vietnam has traded more with partners that have a significant improvement in trade facilitation. Conversely, a large gap in logistics infrastructure between country pairs will impede trade flow. In fact, logistics infrastructure will involve transportation costs. The larger disparity of logistics performance leads to a higher wedge in transportation costs, thus preventing trade flows.

The specifications (2) and (3) show the effect of trade facilitation and logistics performance on trade flow at the product levels, including agricultural and non-agricultural. Interestingly, the coefficient estimations of agricultural and non-agricultural products are opposite. While trade facilitation boosts the trade flow of non-agricultural products about 37.1%[2] for each 1-point increase in trade facilitation indicators, it has diminished agricultural trade around 6.4%. As a result, this could be largely explained by the specific characteristics of agricultural goods as perishable products. Vietnam has a strong comparative advantage of exporting agricultural products for years but depends on import inputs for manufacturing. Thus, trade-facilitation has stimulated importing, and has promoted the export of agricultural processing products by using intermediate imported products. In other words, trade-facilitation indicators related to simplifying customs and administrative procedures do not show government willingness to facilitate agricultural trade.

One interesting finding is that the coefficient for the LPI – high-income countries interaction is positive and statistically significant. When the logistics performance of a high-income country decreases 1-point, the trade flow with Vietnam will decline by 20.5%; which means the group has diminished more than a medium-low income country with logistics upgrading by 76.5% (- 0.97 + 0.205). The most important thing is that the improvement in logistics performance and trade facilitation should be required concurrently from both sides of the exporting and importing country. It means that all countries have narrowed the gap between the capacity and institutional infrastructure. But physical infrastructure upgrading has become the challenge for developing countries and has negative effects on the trade flow due to the needs of high investment in the sector.

Consequently, as a developing country, Vietnam is strongly dependent on international trade and strongly committed to trade-facilitation since joining the WTO. Through testing the relationship trade-facilitation factors and trade performance at the cross-sectional level, the results show that the soft determinants relating to institutional factors have more powerful and strong effects on the trade flow, than hard factors such as infrastructure and logistics. Besides, the bilateral comprehensive factors stimulate trade flow significantly more than a one-sided effort from one country. At the sec-

toral level, while non-agricultural products have a positive response with the improvement in trade facilitation and logistics performance, agricultural products have an opposite trend. In the case of Vietnam, the response of agricultural products is appropriate with the orientation of transforming the process of the development of the food-processing industry and discourages the export of wholly originating agricultural products. Lastly, in the trade relation between Vietnam and one high-income country, when the disparity in the logistics capacity is larger, the growth of the trade flow is slower, more than the transactions with a country at nearly the same level of logistics performance.

5. Conclusions and recommendations

The study provides an estimate of trade-facilitation effects from the perspective of lower-middle income economies such as Vietnam, while most previous studies have been much more concerned with the exporting side as the driving force of development in trade performance. As a result of estimation, the progress of trade-facilitation as institutional factors and logistics capacity has strongly stimulated trade flow, especially for non-agricultural products. Based on the results, the study suggests some implications:

Our results indicate that focusing attention on improving logistics and trade facilitation indices, especially narrowing the disparity in these indices between trade partners, will bring a greater outcome in trade flow.

In the new trend of liberalization, progress in the on-going Doha round of WTO negotiations has been slower and the protectionism in some powers has been raised. While trade facilitation and logistics upgrading are domestic reforms, they can be done by the mechanism of internal force in each country. However, bilateral actions will lead to a greater impact on trade flows. Especially Vietnam as an exporter should promote trade with countries that have high transparency and simplification of customs procedures.

Agricultural products are considered the most primary of products due to the reasons relating to public health and the environment so they are listed as high-protectionism products in most countries. Although trade-facilitation can reduce transaction costs, it responds negatively with the growth of agricultural trade, because the issue in trade-liberalization has not been solved. The main factors that constrain agricultural trade are perishability (time and temperature), strict product and process standards (technical regulations), logistics (warehousing) and infrastructure, difficulty in financing and the higher transaction costs than manufactured goods. Thus, trade facilitation in agriculture has much concentrated on some issues such as facilitating the development of product standards and safety, improving certification procedures and improving storage facilities.

Consequently, the results suggest that policymakers and stakeholders should prioritize efforts in trade facilitation as an inside-out transformation, instead of seeking trade preferences in international and regional trade agreements. Vietnam will obtain maximum total trade gains from implementing the trade facilitation agreement of the WTO as well as building a business environment to enhance the competitiveness of domestic enterprises in the long term. The measures included in the national reform program should focus on infrastructure, customs services, regulatory reforms, efficiency of

trade-related services, and governance. Therefore, policymakers should prioritize reforms in trade facilitation to keep up with trade partners or narrow the disparity between the trade facilitation improvement of other countries.

This paper has some limitations due to the limited dataset on the trade relations between Vietnam and 22 trade partners, which only reflect a partial picture. Additionally, the impacts of trade facilitation at the cross-sectional level in a given year do not show the progress of trade facilitation over time. Further work, we hope, should provide more comprehensive quantitative details on these issues and explore the specific areas of trade facilitation to help the Vietnamese government prioritize reform and achieve greater international integration.

Appendix 1: Vietnam's trade partners in the sample (22 countries)

1	Argentina (ARG)	9	United Kingdom (GBR)	17	Philippines (PHL)
2	Australia (AUS)	10	Hong Kong (HKG)	18	Poland (POL)
3	Canada (CAN)	11	Indonesia (IDN)	19	Singapore (SGP)
4	China (CHN)	12	India (IND)	20	Thailand (THA)
5	Germany (DEU)	13	Italy (ITA)	21	New Zealand (NZL)
6	France (FRA)	14	Japan (JPN)	22	United States (USA)
7	Korea (KOR)	15	Campuchia (KHM)	23	
8	Malaysia (MYS)	16	Laos (LAO)		

Notes:

1. According to the classification of Harmonized System Nomenclature (2012), from source: http://www.wcoomd.org/
2. The effect of TFInonagri become $(e^{0.316} - 1)* 100\% = 37.1\%$; TFIagri = $(e^{-0.067} - 1)* 100\% = 6.4\%$

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