Governance and Export Performance in Vietnam

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Since Đổi Mới in 1986, Vietnam has implemented a comprehensive economic renovation programme, including governance reform. As a result, the country has experienced impressive growth, mainly fuelled by rapid export expansion. This paper aims to examine the correlation between Vietnam's export efficiency and bilateral-specific governance performance indicator during the 1996–2014 period. The results show that Vietnam's export efficiency is positively correlated with the bilateral governance indicator and regional trade agreements, but negatively correlated with tariffs in the importing countries. The performance of Vietnam's export efficiency also displays an overall increasing trend, with some fluctuation before 2005 and gradual rise afterwards. The country achieved high efficiency in terms of exports to all major trading partners—with the exception of China. At the disaggregated level, export efficiency in electronic equipment is very low, suggesting that there remains large unrealized export potential in this product category. Overall, these results indicate that there is plenty of room for Vietnam's exports to grow in the future if the country can improve its efficiency in particular export products and/or markets.

1. Introduction

The success of East Asia (EA) miracle economies has motivated many countries in the region to adopt a more integrated export-oriented growth policy. Vietnam has also employed this strategy and transformed itself from a closed, isolated and backward country into an open, integrated and fast-growing economy.

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This change in policy from a centrally planned economy towards a "socialist-oriented market economy" is closely tied with the economic renovation programme introduced in Vietnam in 1986, namely *Đổi Mới*. While the reform faced many difficulties such as high inflation, macroeconomic volatility and political uncertainty, it is still regarded as one of the most successful policy reforms in the country. Figure 1 shows that, right after the implementation of the programme, Vietnam's GDP growth increased from 2.7 per cent in 1986 to 7.3 per cent in 1989. The annual growth rate for the next twenty-five years averaged at 6.8 per cent, despite some setbacks due to the 1997 Asian Financial Crisis (AFC) and the 2007 Global Financial Crisis (GFC). This rapid economic growth has led to the opinion that Vietnam is one of the most successful economies in terms of export expansion and economic growth, and could become the next Asian miracle.[1]

Since *Đổi Mới*, economic growth has been closely associated with trade expansion in Vietnam. Over the last thirty years, the nation's annual export growth has averaged at 18 per cent, almost three times larger than GDP growth. Governance reform—aimed at providing growth-fostering policies—was a big part of the economic renovation during this period. It has delivered important policies for export activities such as enterprise law and investment law reforms. Motivated by these observations, this paper attempts to investigate the correlation between Vietnam's export efficiency and governance performance from 1996 to 2014. The analysis provides a clearer view on which dimension of governance is most correlated with higher efficiency and which product category has the most unrealized export potential for the country. It contributes to the growing body of empirical research on Vietnam's export performance by: first, defining Vietnam's export potential from a stochastic frontier gravity model; second, constructing a bilateral-specific governance performance indicator between Vietnam and its trading partners; and third, examining the nation's export efficiency across time and trading partners. The paper attempts to answer two main

FIGURE 1
Vietnam's Annual GDP Growth, 1985–2015 (Percentage)
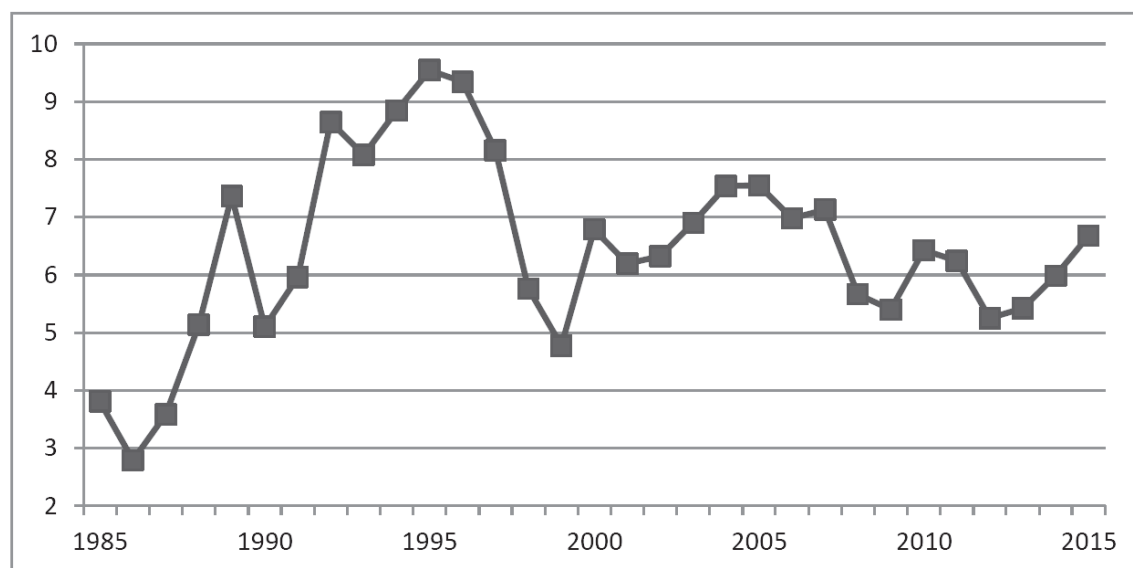
Source: World Development Indicators (WDI).

questions. First, how does governance reform affect export efficiency? And second, how much of export potential has Vietnam achieved with its bilateral trading partners? These questions are answered in the six sections of this paper. The second section provides literature review on the topic. The subsequent section models Vietnam's export performance. The fourth section constructs the bilateral-specific governance indicator and analyses its impact on Vietnam's export performance. The fifth provides further analysis and the final section concludes.

2. Analysis of Vietnam's Export Performance

The transformation of Vietnam from a centrally-planned to a market-oriented economy provides an interesting case to study the effect of policy reforms. Economists have analysed Vietnam's overall economic development (Ohno 2009; Leung 2010) and confirmed the positive impact of the industrialization and trade liberalization policies. As a matter of fact, trade liberalization has helped Vietnam to achieve remarkable export growth in a short period of time. The country's share of global exports increased from only 0.11 per cent in 1995 to roughly 0.94 per cent in 2014. Figure 2 illustrates the change in Vietnamese export composition between 1995 and 2014 at a more disaggregated level, for eleven product categories.[2] It can be seen that the share of agricultural products decreased, and was replaced by a sizeable gain in manufactured products in total exports. From virtually no export of machinery and electrical products in 1995, electrical products became the top export product category in 2014. The graph also shows the relative importance of textile, leather and footwear products in Vietnamese exports, a trend often observed in countries at the early stage of export-oriented industrialization.

FIGURE 2
Composition of Vietnam's Exports (Product Categories)
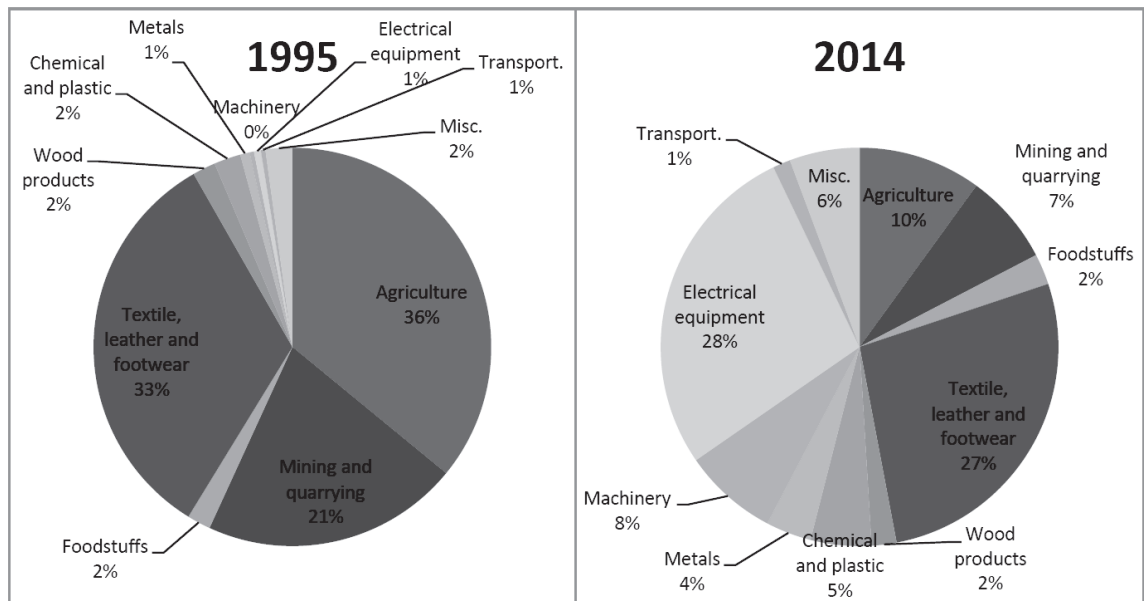
SOURCE: Authors' own illustration.

Overall, Vietnam's exports have achieved remarkable growth during the 1995–2014 period. The change in export composition during this span reflects the industrialization process in the country. Vietnam has become much less dependent on the export of raw and agricultural goods, while continuously diversifying its export basket. Although the share of labour-intensive products (textile, leather and footwear) still accounts for a large portion of exports, it is on a decreasing trend. On the contrary, the share of electrical equipment and machinery has experienced a rapid increase. This is similar to what was observed in other countries in the East Asia region in the past. This pattern will most likely continue in the future.[3]

2.1 The Role of Governance in Vietnam's Export Performance

The relationship between institutions and trade activities has been of particular interest for economists, yet there has been no consensus on the direction of causality. Dollar and Kraay (2003) argued that better institutions and trade are highly correlated. While both factors contribute to long-term growth, it is difficult to disentangle their partial causal effects on growth separately. Sekkat and Méon (2008) found that quality of institutions positively affects export of manufactured goods, but has no impact on total exports and non-manufactured exports. The latter may even correlate negatively with quality of institutions. Levchenko (2007) showed that when institutional differences are considered a source of comparative advantage, the less developed country may not gain from trade. However, when testing empirically whether institutions act as a source of trade, the author concluded that institutional differences are important determinants of trade flows. Overall, Rodrik (2003) summarized the relationship between trade and institutions as a two-way interaction: better institutions foster trade, and more openness to trade begets higher quality institutions. In Vietnam, the role of good governance has been largely recognized after the initial success of the renovation policy. The key reforms in Vietnam were the decentralization of decision-making processes and the recognition of private ownership. These changes generated production incentives for enterprises and other economic organizations, resulting in a period of rapid economic growth.

The decentralization process was not just restricted to economic organizations, but also expanded to other areas such as local/provincial governments, administrative and service delivery units, media and civil society. In particular, Vietnam paid special attention to promote healthy competition between provinces in attracting foreign investments and improving the environment for export activities. Since 2005, the Vietnam Chamber of Commerce and Industry (VCCI) has conducted regular surveys on the perception of firms on the Vietnam Provincial Competitiveness Index (PCI). The PCI ranks provinces based on their economic governance and administrative reform efforts. Every year since 2009, an annual nationwide survey of the Vietnam Provincial Governance and Public Administration Performance Index (PAPI) is also conducted. Similar to PCI, PAPI captures the experiences and perceptions related to the performance of local governments in governance and public administration, but based on a survey of local citizens rather than firms. Despite being conducted by non-governmental organizations, PCI and PAPI have become popular sources of data on how well local governments in Vietnam perform.

Governance reform efforts in Vietnam have led to real improvements in the business environment for enterprises. Since 2000, for example, the Vietnamese government has implemented a series of policies to simplify the registration process for new firms by cutting red tape. In this regard, the most successful policy was the establishment of one-stop agencies that became compulsory in all 11,000 districts and communes of Vietnam in 2003. By 2009, nearly 99 per cent of departments at the district level and 96 per cent of departments at the commune level had applied for the one-stop shop model. These institutions supply a broad range of services on requirements, licensing, and issuing permits to enter specific business activities. Previously, citizens or entrepreneurs could make requests through a "single window" to access all available services (OECD 2011). This policy, however, has reduced the administrative barriers for manufacturing enterprises, leading to an impressive increase in the number of enterprises. Every year from

2000 to 2015, the number of enterprises in Vietnam increased by 17.6 per cent overall, 18.9 per cent for private enterprises and 14.7 per cent for foreign enterprises (GSO 2017). Vietnam has also implemented policies aimed at reducing the post-entry burden, which could interfere with the operation of enterprises. Malesky (2017) reported that these post-entry costs have declined significantly, especially for foreign-invested enterprises. The average waiting time for the procedures to start a foreign firm in Vietnam has decreased from fifty-eight days in 2010 to only thirty-seven days in 2017.

Currently, Vietnam's government continues to show its commitment to create and maintain a favourable environment for all businesses, but there are concerns that commitment alone is not enough. While the governance performance in Vietnam has improved, the results are still below expectations. Good governance advocates are mostly disappointed with the record to date, as transparency is still limited by party control and public accountability remains low (Painter 2014). Pincus (2016) and Ohno (2009) argue that the same policy that worked in the past for Vietnam will not generate similar effects in the future. Vietnam needs a new growth model that requires building proper development strategies, opening the policy-making process to include more stakeholders, and transforming the government from a gatekeeper into a facilitator for domestic and foreign investments.

2.2 Export Performance Analysis

For a country following export-oriented growth like Vietnam, export performance is of the utmost importance. Along with the usual analysis of exports statistics to identify the trend and composition of exports (Athukorala 2009), there are several other approaches to quantify the export performance. The first approach uses the revealed comparative advantage (RCA) index and the second approach measures export efficiency using the stochastic frontier model. Ng and Yeats (2003) calculated the RCA index for East Asian countries in parts and components in 1985, 1995 and 2001. The results showed that, by 2001, Vietnam had only 5 per cent of products with comparative advantage in production and 38 per cent of products with advantage in assembly. Similarly, Chaponnière, Cling and Zhou (2010) examined Vietnam's RCA in comparison with other Asian countries. The authors concluded that Vietnam's trade specialization, which is highly concentrated in a few products (such as oil, textile and clothing, and meat products), shows the characteristic of a low-income country rich in natural resources. Ngo (2005) analysed the catching up industrialization process from 1970 to 1999 and made predictions about Vietnam's future comparative advantage. The author illustrated the RCA pattern in Vietnam through the RCA curve in 1999, shaped like that of a late-industrializing economy with comparative advantage in only natural intensive and some labour-intensive products.

The second approach to quantify a country's export performance is by measuring its export potential. The definition of export potential is based on the estimation of the maximum export achievable given the current level of trade determinants. The export potential is determined by the upper limit of the data set, and does not exceed one. It is derived from a stochastic frontier estimation of the gravity model. There are several studies that have used this approach to measure export efficiency in a number of countries. Kalirajan and Singh (2008), for example, used this approach to compare the export performance of China and India. The results showed that China had realized about 86 per cent of its potential exports, while this number for India is only 68 per cent. The authors attributed China's better performance to the reduction of "behind-the-border constraints".

Armstrong (2012) used a two-stage stochastic frontier gravity model to analyse Japan-China trade efficiency. The result showed that trade between the two nations from 1987 to 2006 was around 38.2 per cent, clearly above the world average (30.5 per cent). In the second stage estimation, the author explained this better trade performance through regional trade agreements, language similarities and economic freedom between the trading partners. The author also showed that the trade ties were not affected by

political tensions, measured using political distance variable. Using the same set up, Armstrong (2015) compared the economic integration of East Asian and South Asian economies. The results showed that the former is more integrated than the latter and that the political distance between countries is more pronounced for South Asia than it is for East Asia. Ravishankar and Stack (2014) revisited the export efficiency of seventeen western European countries to ten new EU member countries over the 1994–2007 period, by using the stochastic frontier approach to estimate the gravity model. The authors reported a high degree of East-West trade integration, with each new EU member states achieving, on average, two-thirds of the export frontier estimates. The features characterizing high export efficiency were export flows between partners with geographical proximity and with small and open economies.

Overall, most studies analysing Vietnam's export performance have only used trade statistics or comparative advantage indices. Another approach is the export efficiency measure, which is estimated from the stochastic frontier gravity model. The advantage of this approach lies in its ability to identify: first, the efficiency level of bilateral exports flows from Vietnam; second, whether or not Vietnam still has remaining export potential in specific markets or specific product categories; and third, the correlation between export efficiency and its determinants, such as governance performance. Existing literature on Vietnam suggests that institutional reforms were successful in the past, but major transformation will be required in order to maintain the country's economic growth in the future. By examining the determinants of export efficiency, this study can provide evidence on which dimension of governance is most important for Vietnam's export efficiency.

3. Modelling Vietnam's Export Performance

This section explains the econometric model set up to measure Vietnam's export efficiency over the past twenty years. Here, export efficiency is defined as the measure of the export potential that is actually being realized. Export potential follows the definition of Kalirajan (2007), that potential trade between two countries is the maximum trade achievable given the current level of the determinants of trade and the least level of restrictions within the system. The potential export in this study is determined by the upper limit of the data set, derived from the stochastic frontier gravity model.

3.1 Stochastic Frontier Gravity Model

The stochastic frontier gravity model is based on the gravity model proposed by Tinbergen (1962) and the stochastic frontier model by Aigner, Knox Lovell, and Schmidt (1977). This approach has been one of the most successful models in explaining trade flows, by producing some of clearest and most robust empirical findings in economics. It has become even more popular since the theoretical derivation by Anderson and van Wincoop (2003). However, Khan and Kalirajan (2011) argue that the model by Anderson and van Wincoop (2003) has a number of limitations, namely: the biased estimates of the OLS estimation; the unrealistic assumption of symmetric trade costs; and the complex custom non-linear least-squares estimation for multilateral resistance terms. Kalirajan (2007) proposed an alternative method of estimating the gravity model through the use of the stochastic frontier, to control for the heterogeneity often found in this model.

Applying the stochastic frontier approach, Kalirajan (2007) shows that the gravity equation can be estimated as equation (1):

$$E_{ij} = \exp(\beta_0 + \beta_1 X_{ij}) \times \exp(v_{ij}) \times \exp(-u_{ij}) \tag{1}$$

where E_{ij} is the export value from country i to country j; X_{ij} are the determinants of potential export; the double-sided error term v_{ij} captures the influence on export flows of other left out variables, including

measurement errors that are randomly distributed across observations in the sample. The single-sided error term u_{ij} reflects the effect of different socio-political-institutional factors in both exporting and importing countries, which create the difference between actual and potential exports between i and j. Khan and Kalirajan (2011) argue that, apart from geographical distance, the effects also come from other constraints, such as historical and cultural ties, or the lines of communication between countries. Such constraints are country-specific for each exporter and importer, and occur due to socio-political-institutional factors in each country. When these factors are omitted, the expected value of the error term is no longer zero, affecting the normality assumption of the error term. In this situation, estimating the gravity model using OLS leads to biased results. The stochastic frontier approach with the composed error terms solves this bias by taking into account heteroscedasticity and non-normality, when the sources of heteroscedasticity are unknown (Aigner, Knox Lovell, and Schmidt 1977).

The stochastic frontier analysis provides the measure for export efficiency, which is the ratio of observed export value to the corresponding stochastic frontier export potential. This measure is expressed in equation (2), where TE_i is the export efficiency that takes a value between zero and one. Efficiency equals zero when export is most inefficient and the observed export is zero. It equals one when export is most efficient and $u_i = 0$, suggesting that the export level is on the frontier.

$$TE_i = \frac{E_i}{\exp(\beta_0 + \beta_1 x_i + v_i)} = \frac{\exp(\beta_0 + \beta_1 x_i + v_i - u_i)}{\exp(\beta_0 + \beta_1 x_i + v_i)} = \exp(-u_i) \qquad (2)$$

Khan and Kalirajan (2011) identified that the bilateral trade determinants can be grouped into three major constraints: natural, behind-the-border, and beyond-the-border constraints. The natural constraints include the standard trade determinants in gravity model, such as demand in the importing country, supply capacity in the exporting country and the distance between the two economies. Behind-the-border and beyond-the-border constraints arise from the institutional and infrastructural rigidities in the exporting and importing country, respectively. These constraints are intuitively similar to the country-specific factors mentioned in other trade literature, such as economic distance or multilateral resistance. Beyond-the-border constraints are then divided into implicit and explicit parts. Explicit beyond-the-border constraints are the observable rigidities, and can be measured through tariff reduction or exchange rate policy in the importing country. In contrast, implicit beyond-the-border and behind-the-border constraints are both unobservable and difficult to measure.

In the stochastic frontier gravity model setting, these constraints are assumed to affect different components of equation (1). The natural and observable explicit beyond-the-border constraints will form the export potential $\exp(\beta_0 + \beta_1 X_{ij})$. The unobservable implicit beyond-the-border constraints, which the exporting country has no control over, are considered as given and will be captured in the stochastic error term v_{ij}. Lastly, the inefficiency term u_{ij} is assumed to capture the effect of behind-the-border constraints on bilateral export flows. These constraints include a wide range of factors such as poor infrastructure, inefficient transport links and networks, low logistics performance and other institutional and political factors in the exporting country. However, the interpretation of one-sided error term u_{ij} is sensitive to the assumption of whether the term captures only behind-the-border constraints, or both behind-the-border and beyond-the-border constraints.

Using the similar stochastic frontier gravity model, Armstrong (2015) assumes that bilateral export potential is determined by natural constraints only. The disturbance term v_{ij} accounts for random variation in trade, similar to the disturbance term in the standard OLS model. The non-negative disturbance term u_{ij} measures the difference between potential export and actual export. This difference is due to all other trade impediments, including policy variables and institutional indicators that are present in both trading partners. The assumption here is that u_{ij} is affected by both behind-the-border and beyond-the-border

constraints, and not just behind-the-borders constraints as in Khan and Kalirajan (2011). In other words, the export frontier is defined as the most liberal and free flowing export relationship based on the distance, endowment structure and scale between trading partners. Export efficiency, or the achievement of potential export, depends on policy variables commonly used to explain trade, such as tariff barriers and regional trade agreement membership.

3.2 Export Performance Estimates

This research uses gross merchandise export data from the Base Analytique du Commerce International (BACI) database based on the harmonized system (HS1996) coding of goods. The data covers the 1995–2014 period. Based on the four-digits HS1996 codes, the export data are classified into five broad groups of commodities and eleven sections of products as shown in Table A1. Export values are converted to real values at constant year (2005) US dollar, using the US GDP deflator. Data for real GDP and GDP deflator are taken from the World Bank's World Development Indicators (WDI). Variables accounting for trade barriers, such as distance, access to sea, common language, common border and colonial links are taken from the Mayer and Zignago (2011) CEPII Geodist database. Data for membership in regional trade agreements (RTAs) are based on Mayer and Zignago (2011) and the WTO list of all RTA for the period after 2006.

For the purpose of measuring export potential in Vietnam, this paper uses the model in equation (3) for Vietnamese exports to 169 trading partners, between 1995 and 2014. The log-linear form for pooled estimation is:

$$
\begin{aligned}
ln(E_{jt}) = \quad &\beta_0 + \beta_1 ln(Y_{jt}) + \beta_2 ln(dis_j) + \beta_3 contig_j + \beta_4 landlock_j \\
&+ \beta_5 col_j + \beta_6 comcol_j + \mu_t + v_{jt} - u_{jt}
\end{aligned} \tag{3}
$$

where E_{jt} is the export flow from Vietnam to importing country j; Y_{jt} is the real GDP (at constant 2005 US dollar) of country j, representing its import demand; dis_j is the geographical distance between Vietnam and country j; $contig_j$ identifies if Vietnam and country j share the same border or not; $landlock_j$ is a variable showing if country j has any direct access to sea; col_j shows if country j was a colonizer in Vietnam; $comcol_j$ shows that Vietnam and country j had same colonizer post 1945; and v_{jt} is the double-sided stochastic error term. A time fixed effect μ_t accounts for any unexpected variation during the period, such as global shock or changes in transportation costs. As Vietnam is the only exporter in the sample, the time fixed effect also captures the capacity of its exports in each year. Therefore, the estimation form excludes the GDP of the exporting country (Vietnam) that is usually seen in standard gravity models.

The one-sided disturbance term u_{jt} is assumed to capture the impact of trade policy and governance performance in Vietnam and its trading partners on the efficiency of bilateral export flows. In other words, the export potential between Vietnam and its trading partner is defined in terms of frictionless trade, depending on the export supply and demand, as well as the natural determinants of trade such as geography and historical linkages. The export efficiency, or how much export potential is being realized, depends on other man-made determinants of trade coming from both Vietnam and its trading partner. Hence, the inefficiency term u_{jt} in equation (3) captures both the effect of behind-the-border and beyond-the-border constraints.

Table 1 shows the estimation results of total exports from Vietnam to its trading partners over the 1995–2014 period. The estimated coefficients all have the expected signs and significance. The results indicate that export potential from Vietnam to an importing country is positively correlated with the GDP of the importer. This shows that import demand in partner countries is an important determinant of Vietnamese export potential. Other factors such as sharing common border or historical ties through

TABLE 1
Estimation Results of the Stochastic Frontier Gravity Model for
Vietnamese Exports (1995–2014)

	Estimates	Standard errors
Importer's GDP	0.930***	(0.015)
Distance	-0.665***	(0.047)
Contiguity	1.417***	(0.199)
Landlocked	-0.529***	(0.072)
Colonial relation	0.559***	(0.103)
Same colonizer	0.904***	(0.088)
_cons	2.528***	(0.633)
sigma_v (σ_v)	1.069***	(0.039)
sigma_u (σ_u)	1.526***	(0.095)
sigma2 (σ^2)	3.475***	(0.233)
Lambda (λ)	1.427***	(0.128)
N	2923	
Time fixed-effect	Yes	

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent.
SOURCE: Authors' own estimation.

colonial relationship also boost the bilateral export potential. On the contrary, geographic distance and the importer's lack of access to sea reduce export potential due to higher trade-related costs.

The value of sigma-squared (σ^2) is significant, indicating that there is significant variation in the potential export from its mean. There are two sources for this variation, random factors (σ_v) or country-specific constraints (σ_u) between Vietnam and its trading partners. The nature of variation in the model can be examined by observing the value of the lambda (λ) coefficient. It measures the ratio of variation due to the inefficiency component over variation due to the idiosyncratic component. If this ratio is larger than one, then a large proportion of the total variation in export potential comes from the socio-political-institutional factors in Vietnam and its trading partner. If this ratio is close to zero, then most of the variation in the model comes from random factors and stochastic frontier estimation will give similar results to OLS estimation. As the result in Table 1 shows that the value of lambda at 1.427, the inefficiency component is responsible for roughly two-thirds of the export potential variation. The large value of lambda also confirms the validity of using the stochastic frontier approach over traditional OLS to explain the variation of Vietnam's export potential.

The average efficiency for Vietnam in achieving the export potential based on the most frictionless trade is 40.9 per cent. If the bilateral flow achieves an efficient level of export, it will operate on the frontier, the inefficiency term u_{jt} will be zero and export efficiency will be 100 per cent. The fact that Vietnam's export only realizes less than half of its potential means that there is still much more scope for actual export to expand.

4. Vietnam's Governance and Export Performance

The next step in this paper is to study the correlation between Vietnam's export efficiency and governance performance. For this purpose, we need a measure for governance performance. While governance and

institutional quality have been of particular interest for policymakers and scholars, there is no strong consensus around a single indicator among researchers. This study uses the Worldwide Governance Indicators (WGI) proposed by Kaufmann, Kraay, and Zoiso-Lobaton (2011). The WGI uses thirty-one different perceptions-based data sources to construct the governance performance measurement. It consists of six composite indicators of broad dimensions of governance, covering over 200 countries from 1996 to 2016. From 1996 to 2002, the indicators were reported every two years and for the purpose of this study, the average of two reported years is taken as the value for the missing year in between.

Governance in WGI database is defined as "the traditions and institutions by which authority in a country is exercised". It can be narrowed down to three areas, including: first, the process by which governments are selected, monitored and replaced; second, the capacity of the government to effectively formulate and implement sound policies; and third, the respect of citizens and the state for the institutions that govern economic and social interactions among them (Kaufmann, Kraay, and Mastruzzi 2011). These areas are then measured through six corresponding indicators of governance, as shown in Table 2. Voice and accountability (*VA)* measures the country's freedom of expression, freedom of association, free media and the extension to which the citizens are able to participate in selecting their government. Political stability and absence of violence (*PV*) measures the likelihood that the government will be overthrown by unconstitutional or violent means, including terrorism. Government effectiveness *(GE)* captures the quality of public services, the quality of the civil service, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Regulatory quality (*RQ*) captures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Rule of law (*RL*) measures the degree of trust in the rules of the society, the quality of contract enforcement, property rights, the police, as well as the likelihood of crime. Lastly, control of corruption (*CC*) is a measurement of the extent to which public power is exercised for private gain, and degree of corruption. Each of these indicators represents different dimensions of governance and ranges from –2.5 to +2.5, with higher values associated with better governance. In this study, the indicators are rescaled to the 0 to 100 range, with 100 indicating the best possible governance.

4.1 Bilateral Governance Indicator

As discussed earlier, the inefficiency term u_{jt} in equation (3) is assumed to be dependent on the effect of both behind-the-border as well as beyond-the-border factors. In other words, export efficiency will be

TABLE 2
Dimensions of Worldwide Governance Indicators

	Areas	Dimensions
World Governance Indicators	Selection, monitoring and replacing of governments	Voice and accountability (VA)
		Political Stability and Absence of Violence/Terrorism (PV)
	Effectively formulate and implement policies	Government Effectiveness (GE)
		Regulatory Quality (RQ)
	Respect of citizens for the institution	Rule of Law (RL)
		Control of Corruption (CC)

Source: Kaufmann et al. (2011).

constrained by governance performance in both exporting and importing country. Therefore, a bilateral-specific indicator that captures governance performance in both Vietnam and a particular trading partner is needed for this study. Equation (4) constructs such a measure for each bilateral export flow between Vietnam and a particular trade partner. The intuition behind this measurement is that the export efficiency depends on the time-variant country-pair specific governance condition in two trading partners. The change in governance performance in Vietnam may affect Vietnamese export efficiency, but so does the change in governance performance of the importing country. The bilateral indicator also takes into account the two-way interaction between governance and trade: a better bilateral governance indicator fosters trade, and trade relation with countries with good governance improves bilateral governance indicator.

$$BWGI_{jt} = \theta_t^{vn} WGI_t^{vn} + \theta_{jt} WGI_{jt} \qquad (4)$$

$BWGI_{jt}$ in equation (4) represents the bilateral measurement of the six governance indicators mentioned above, superscript *vn* indicates Vietnam, subscript *j* stands for importing country *j* and *t* stands for time period. Each of these indicators is the weighted average value of indicators for Vietnam and the importing country *j*. The weight used here (θ) is the country's share in the combined GDP of both countries. For the construction of this bilateral governance indicator, two assumptions must be made. The first is that the governance performance in both countries affects Vietnamese export efficiency in the same direction. While this is a strong assumption, it follows the common perception that better governance in both exporter and importer has positive effect on development, output and trade. The second assumption is that country's weight in bilateral governance indicator depends on its economic size. This is based on the argument that economic size of states is considered a power resource because of lower relative opportunity costs of trade closure (Krasner 1976). In other words, larger states hold a more important position in international relations and have the latent power of blocking trade.

The largest concern in using the WGI database is the high correlation among the six governance indicators. Table A2 confirms this positive correlation among the six bilateral governance indicators calculated from equation (4). Apart from BPV_{jt}, the other five bilateral indicators are highly correlated with the correlation coefficient of around 0.9. This prevents the inclusion of all six indicators in the empirical econometric model for Vietnam's export efficiency, as adding too many indicators at once could result in serious problems of multi-collinearity. Hence, each indicator will be added separately, one at a time, to the regression. To derive an overall effect of bilateral governance on Vietnam's export efficiency, the principal component analysis is used. The aim is to represent the six indicators with a smaller number of other variables that preserve most of the variation in the data. These variables are called "principal components", which are orthogonal to each other. Table 3 shows the results for principal component analysis, where the first component explains more than 85 per cent of the total variance in bilateral governance. A rule of thumb for data compression is to select the principal components that explain at least the average proportion that an original variable explains, which in this case is 100/6 = 16.67 per cent. Therefore, for this analysis, only the first principal component will be selected.

Another concern in using the bilateral pair-specific governance indicator is the difficulty in distinguishing the effect of the governance reform in Vietnam and the governance performance of its trading partner. The increase in the pair-specific governance indicator may come from the increase in Vietnam's governance index (WGI_t^{vn}) or from the increase in the importing country's governance performance (WGI_{jt}). In extreme cases, even if Vietnam's governance performance worsens, the pair-specific indicator can still increase provided that there is a larger increase in WGI_{jt} that outweighs the reduction in WGI_t^{vn}. Nevertheless, Vietnam can still alter the bilateral governance indicator through the country's governance reform, thus changing its export performance. Thus, Vietnam can affect its export efficiency indirectly through bilateral governance indicator, by changing the behind-the-border constraints (WGI_t^{vn}) given the level of beyond-the-border constraints (WGI_{jt}).

TABLE 3

Contribution to Total Variance of Principal Components for Six Bilateral Governance Indicators

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.12835	4.48207	0.8547	0.8547
Comp2	0.646278	0.521311	0.1077	0.9624
Comp3	0.124966	0.078289	0.0208	0.9833
Comp4	0.046677	0.017207	0.0078	0.991
Comp5	0.02947	0.005212	0.0049	0.996
Comp6	0.024258	.	0.004	1

SOURCE: Authors' own estimation.

4.2 Correlation between Governance Performance and Export Efficiency in Vietnam

After estimating equation (3), the level of efficiency in bilateral exports from Vietnam to each of its trading partner can be calculated based on equation (2). Vietnam's export efficiency during the 1996–2014 period is extracted from the inefficiency term u_{jt}. As the purpose of this study is to examine the relationship between export efficiency and governance reform in Vietnam, the natural next step is to resort to a two-stage approach. The bilateral efficiency found in the first stage regression will be used as the dependent variable for the second stage regression employing a set of explanatory variables. This is a widely used approach in microeconomic studies using stochastic frontier model, but it assumes that the inefficiencies are independently distributed in the first stage, while ignoring this assumption in the second stage.

The second stage estimation form follows equation (5):

$$TE_{jt} = \beta_0 + \beta_1 BWGI_{jt} + \beta_2 rta_{jt} + \beta_3 Tariff_{jt} + \varepsilon_{jt} \tag{5}$$

where TE_{jt} is the bilateral export efficiency from the first stage regression; rta_{jt} indicates the presence of RTA between Vietnam and trading partner j; and $Tariff_{jt}$ is the mean Effectively Applied (AHS) Weighted Average tariff by importing country j. $BWGI_{jt}$ is the bilateral governance performance indicator, constructed from equation (4). As discussed above, due to high correlation between the six governance indicators, each dimension will be added in the regression separately. To get an overall effect of bilateral governance, the principal component will be used in place of $BWGI_{jt}$. The expected estimates for the governance indicators' coefficients are positive and significant, suggesting that the improvement in institutional factors in Vietnam and its trading partners correlates with an increase in bilateral export efficiency. For trade policy variables, it is expected that having an RTA in place improves export efficiency, while higher tariffs reduce the capacity to achieve the full export potential.

Table 4 reports the relationship between Vietnam's export efficiency and the man-made determinants of trade, which consist of bilateral governance performance and trade policies. Each column shows the result using different indicators for bilateral governance performance (each dimension and the principal component separately). Trade policy plays an important role in determining export efficiency as evident by large value of estimates for RTA and tariff. The presence of a trade agreement between Vietnam and a trading partner increases the bilateral export efficiency from 8.58 to 10.18 percentage points across

TABLE 4
Estimation Results for Export Efficiency Model for Vietnamese Exports (1996–2014)

	PC	BVA	BPV	BGE	BRQ	BRL	BCC
Governance	1.249***	0.120***	0.236***	0.221***	0.195***	0.186***	0.170***
performance	(0.115)	(0.016)	(0.023)	(0.020)	(0.020)	(0.018)	(0.016)
RTA	9.175***	9.057***	10.177***	8.580***	8.760***	9.045***	9.160***
	(1.148)	(1.158)	(1.208)	(1.148)	(1.133)	(1.157)	(1.161)
Tariff	-0.374***	-0.471***	-0.493***	-0.360***	-0.379***	-0.405***	-0.400***
	(0.069)	(0.067)	(0.063)	(0.070)	(0.070)	(0.069)	(0.068)
_cons	43.022***	39.523***	31.359***	31.819***	34.042***	34.505***	35.360***
	(0.562)	(1.045)	(1.472)	(1.448)	(1.390)	(1.303)	(1.204)
N	1877	1877	1877	1877	1877	1877	1877
r2	0.136	0.120	0.130	0.138	0.131	0.131	0.131

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent. Standard errors in brackets. Columns indicate principal component and six dimensions of bilateral governance indicator.
SOURCE: Authors' own estimation.

different regressions. In contrast, the increase in tariff in the importing country by one percentage point is correlated with a 0.36 to 0.49 percentage point decrease in Vietnam's export efficiency.

The variables of interest, the bilateral governance indicators, show positive and significant effect. Among the six indicators, the magnitude is smallest for voice and accountability (*BVA*), with an increase of the indicator by one correlating with 0.12 percentage point increase in Vietnamese export efficiency. The effect is strongest for political stability and absence of violence (*BPV*), with an estimate of 0.236. This effect is consistent with the conclusion from other studies that effective governance mechanism is necessary and beneficial for smooth trade relations. Kaufmann, Kraay, and Zoiso-Lobaton (2000) found a large causal effect running from improved governance to better development outcomes, such as lower infant mortality rate and higher literacy levels. Better governance also leads to an increase in total output and per capita income, resulting in higher trade volume. Different characteristics of the institutional or governance environment also can influence trade flows. Wu, Li, and Samsell (2012) separated governance environment into three categories, namely, rule-based, relation-based and family-based. Among these, rule-based governance with strong public rule of law increases trade the most. The countries classified as family-based governance lack both public rules and informal network based on private relations, thus negatively affecting the country's trade flow.

The impact of bilateral governance indicators is further analysed in the context of the three areas of governance that they represent. The first broad area is the selection, monitoring and replacing of governments, which includes *BVA* and *BPV*. The results in Table 4 suggest that an improvement in *BPV* correlates with higher increase in export efficiency than an improvement in *BVA*. In other words, political stability matters more than democracy in achieving full export potential for Vietnam. This is somewhat similar to the results found in studies on the effect of governance on growth. Barro (1996) found that, after controlling for other favourable effects on growth and holding the initial level of real per capita GDP constant, the overall effect of democracy on growth is weakly negative. Conversely, Alesina et al. (1996) stated that political instability significantly reduces economic growth and the effect is particularly strong in the case of unconstitutional executive changes such as coups or incidents that drastically change the ideological composition of the executive. Evidence from the growth history of many East Asian countries also supports this argument. For example, Korea achieved economic growth and became

a major exporter under the dictatorial regime that only later evolved into democracy. Likewise, China's one-party regime has led the country to become the second largest economy and largest exporter in the world. Singapore, too, has been growing consistently and has become an international trading hub under one-family rule. These countries have managed to achieve these results by maintaining their political and social stability.

The second area of governance that affects Vietnam's export efficiency is the capacity to formulate and implement policies, measured through the *BGE* and *BRQ* variables. Both of these variables show positive and significant effect, with *BGE* slightly larger than *BRQ*. Most of the improvements in Vietnam were observed through the change in this second area of governance, so its positive effect on export efficiency is an expected result. These improvements include the reforms related to the labour market, market entry, and credit and investment that are closely linked to export activities. But they closely resemble the liberalization effect, which may have a one-time effect rather than long-term effect on efficiency. As the indicator used in the second stage regression is bilateral specific, the positive effect for government effectiveness and regulatory quality may come from the importing country, too. It captures the quality of public policies and sound regulations in the importing country, which create a stable export market for Vietnam and enhance the country's export efficiency.

The third area of governance is the respect of the institutions that govern economic and social interactions, observed through the estimates of *BRL* and *BCC*. There is a strong consensus among researchers that better control of corruption and respecting the rule of law positively correlate with economic growth (Anderson and Marcouiller 2002). The results in Table 4 confirm that bilateral indicators of *BRL* and *BCC* are positively correlated with Vietnamese export efficiency. Higher confidence in the rule of law in both Vietnam and the importing country will provide more incentives for Vietnamese exporters to invest and expand their market. Improvement in the RL_t^{vn} indicator will also equip Vietnam with better instruments to deal with technical barriers put into effect by the importers. Despite the fact that Vietnam has never been ranked above the world average in terms of control of corruption, the government has placed fighting corruption as one of their top policy agenda. The anti-corruption law was adopted in 2005, with the latest proposal for amendment of the law under revision of the National Assembly in 2017.[4] But for the period of this analysis, from 1996 to 2014, Vietnam's control of corruption indicator (CC_t^{vn}) did not change much, so the positive estimate for bilateral indicator (BCC_{jt}) may have come predominantly from the importing country (CC_{jt}).

Overall, the analysis of Vietnam's export performance shows that export efficiency in the country is positively correlated with the bilateral governance performance indicators. This is true for all six dimensions of governance, with the largest estimates for political stability (*BPV*) and government effectiveness (*BGE*). The governance reform in Vietnam can also influence the country's export efficiency indirectly, by changing the bilateral specific governance indicator(s). Moreover, institutional reform has led to much improvement in the second area of governance, with better government effectiveness and regulatory quality, also enhancing Vietnamese export efficiency. To further realize its bilateral export potential, Vietnam should continue to maintain its political stability and increase the effectiveness of policy implementation. Simultaneously, the country should also pay attention to improve other dimensions of governance that did not show signs of improvement, such as voice and accountability, control of corruption and respecting the rule of law. The improvement in these dimensions will generate long-term gains, even after the economic liberalization effect has run out. A number of studies have shown that, when countries make the transition to high-income status, the role of regulatory quality, rule of law, control of corruption, and voice and accountability appear to become more important (World Bank 2016). At the onset of economic growth, deep and extensive governance reform may not be required for Vietnam. But once growth is achieved, it is essential for the nation to build a more open, accountable and inclusive political institution to sustain this growth in the long run.

5. Further Analysis

5.1 Robustness Check

To check the sensitivity of Vietnamese export efficiency analysis, some robustness checks have been conducted in the study. First of all, the second stage regression of export efficiency is separated into two periods, from 1996 to 2004 and from 2005 to 2014. This is done to recognize any different effects of bilateral governance indicators on export performance between the two periods. The year 2005 marked the final stage of preparation for Vietnam's accession to the WTO, with most of negotiations concluded. Table 5 shows the estimation results for Vietnamese export efficiency in these two periods. The results are consistent across different measures of bilateral governance indicators. The estimates for bilateral governance indicators and trade policies have larger absolute values before 2005 than after 2005. This suggests that export efficiency is more sensitive to changes in these variables in the first period than in the second. The different effects of trade policies are quite intuitive with the expected effect of joining the WTO. Prior to joining the organization, having a trade agreement or a reduction in tariff could have a huge impact on Vietnam's export efficiency. But after the WTO accession, Vietnam reached the "most favoured nation" (MFN) status with most of its trading partners, thus reducing the impact of having an agreement or tariff reduction. The smaller effect of bilateral governance indicators, however, is less intuitive and

TABLE 5
Vietnamese Export Efficiency During 1996–2004 and 2005–14

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Before 2005	**PC**	**BVA**	**BPV**	**BGE**	**BRQ**	**BRL**	**BCC**
Governance	1.752***	0.180***	0.290***	0.287***	0.265***	0.274***	0.250***
performance	(0.205)	(0.030)	(0.038)	(0.033)	(0.037)	(0.034)	(0.029)
RTA	14.908***	14.581***	15.576***	14.157***	13.992***	14.732***	14.856***
	(2.008)	(1.991)	(2.278)	(1.972)	(1.946)	(2.008)	(2.026)
Tariff	-0.484***	-0.618***	-0.630***	-0.492***	-0.510***	-0.521***	-0.505***
	(0.102)	(0.099)	(0.094)	(0.102)	(0.103)	(0.101)	(0.101)
_cons	43.255***	37.899***	29.225***	29.366***	31.318***	30.760***	31.800***
	(1.126)	(2.093)	(2.659)	(2.605)	(2.737)	(2.548)	(2.343)
N	756	756	756	756	756	756	756
r2	0.220	0.199	0.202	0.222	0.210	0.218	0.217
Since 2005	**PC**	**BVA**	**BPV**	**BGE**	**BRQ**	**BRL**	**BCC**
Governance	0.993***	0.098***	0.191***	0.178***	0.162***	0.142***	0.130***
performance	(0.144)	(0.020)	(0.028)	(0.025)	(0.024)	(0.022)	(0.021)
RTA	6.344***	6.343***	7.253***	5.804***	6.112***	6.263***	6.364***
	(1.308)	(1.330)	(1.327)	(1.314)	(1.303)	(1.323)	(1.327)
Tariff	-0.191*	-0.256**	-0.327***	-0.194*	-0.181*	-0.227**	-0.219**
	(0.104)	(0.102)	(0.094)	(0.104)	(0.105)	(0.103)	(0.103)
_cons	42.270***	39.299***	32.993***	33.168***	34.674***	35.812***	36.457***
	(0.664)	(1.253)	(1.778)	(1.761)	(1.662)	(1.537)	(1.458)
N	1121	1121	1121	1121	1121	1121	1121
r2	0.080	0.069	0.076	0.081	0.079	0.075	0.075

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent. Standard errors in brackets. Columns indicate principal component and six dimensions of bilateral governance indicator.
SOURCE: Authors' own estimation.

there is no clear reasoning for it. One possible explanation could be the surge in governance reforms in Vietnam prior to the WTO accession to accommodate some of the prerequisites. This is most evident in the 2003–5 period, when most of the governance indicators in Vietnam experienced improvement.

The sensitivity analysis is also performed in the second stage estimation using a different weight to measure the bilateral governance indicator. The weight θ used in equation (4) to construct $BWGI_{jt}$ is now the countries' share of export in total bilateral trade, instead of GDP share. The rationale behind the use of the weight is that the negotiation power in bilateral relationship depends on the trade balance of the country. A country with a large trade surplus will have more negotiation power, and thus a greater weight in affecting the bilateral governance indicator. However, one can also argue that a country with a larger export share will depend more on a particular bilateral relationship, and thus hold less negotiation power. For that reason, using GDP share as the weight is preferred over export share. Table A3 shows the results for the second stage estimation using $BWGI_{jt}$ with export share as weight. The results are mostly positive and significant, except for *BVA, BRQ* and *BCC*. Generally, this is consistent with the positive and significant result for bilateral governance indicators found in Table 4.

Lastly, robustness check is performed using the lags of bilateral governance indicator in the second stage estimation. Some institutional reforms may require a certain time period before they can come to full effect; so the improvement in governance this year may only affect export efficiency next year. Table A4 reports the second stage estimation using one year lag of bilateral governance indicators. The results are similar to Table 4 both in terms of significance and magnitude of the estimates. This similarity can be attributed to the lack of variation in bilateral governance indicators across time.

5.2 Vietnam's Export Efficiency: A Deeper Analysis

This section continues the analysis of Vietnamese export efficiency, but focuses on its performance across different trading partners over time rather than on its determinants. For this purpose, the two-stage estimation approach is no longer the ideal choice. The export efficiency found in the first stage regression as shown in equation (3) assumes that inefficiencies are independently and identically distributed. This is not a significant issue if the focus of analysis is on the determinants of export efficiency. But if the focus shifts to the performance of export efficiency, the inefficiency term u_{jt} should also incorporate the different effects of the governance indicator and trade policies within it. Consequently, the preferred approach for this analysis is the one-stage approach developed by Battese and Coelli (1995), as it provides more consistent estimates for technical efficiency than the two-stage method. Equation (3) is estimated using one-stage regression where the inefficiency term u_{jt} is heteroscedastic with the variance function depending on a linear combination of explanatory variables. The set of explanatory variables for inefficiency term u_{jt} is the same set of variables that is included in equation (5); but instead of running the regression for each $BWGI_{jt}$ separately, it is only estimated once using the principal component of the bilateral governance indicator.

Table 6 shows the results of the one stage stochastic frontier gravity model for Vietnamese exports at the aggregate and disaggregated levels. The results show the combined estimates of the stochastic frontier gravity model in Table 1 and export efficiency model in Table 4, but in one regression instead of two. At the aggregate level, the results are consistent with those found using the two-stage approach, where the principal component of governance performance and RTA are negatively correlated with export inefficiency, while tariff is positively correlated. At the disaggregated level, most product categories experience negative correlation between the principal component of governance performance and export inefficiency, with the only exception of machinery products.

The focus in this section is on Vietnamese export performance in terms of export efficiency. Export efficiency is calculated from the inefficiency term in the one stage regression in equation (2) for each

TABLE 6
One Stage Regression for Vietnamese Export of Different Product Categories (1996–2014)

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Total
Gravity model												
Importer GDP	0.764***	0.956***	0.741***	0.918***	0.834***	0.697***	0.758***	0.916***	0.945***	0.848***	0.902***	0.875***
	(0.024)	(0.029)	(0.021)	(0.017)	(0.023)	(0.042)	(0.030)	(0.027)	(0.040)	(0.036)	(0.021)	(0.017)
Distance	-0.911***	-1.132***	-1.054***	-0.244***	-0.991***	-0.796***	-1.244***	-0.770***	-1.302***	-0.654***	-0.564***	-0.764***
	(0.060)	(0.082)	(0.057)	(0.038)	(0.049)	(0.161)	(0.085)	(0.065)	(0.080)	(0.107)	(0.042)	(0.055)
Contiguity	-0.373*	3.205***	0.519*	1.572***	1.643***	1.679***	1.714***	0.806***	-0.417	0.611	1.840***	0.813***
	(0.207)	(0.340)	(0.299)	(0.268)	(0.226)	(0.239)	(0.557)	(0.295)	(0.216)	(0.436)	(0.317)	(0.198)
Landlocked	-0.321***	-0.646***	-0.029	0.153*	-0.262***	-0.747***	-0.966***	-0.155	-0.654***	-0.224	-0.370***	-0.275***
	(0.102)	(0.171)	(0.124)	(0.078)	(0.094)	(0.102)	(0.123)	(0.123)	(0.146)	(0.189)	(0.079)	(0.067)
Colonial relation	-0.125	0.678***	0.591***	0.346***	0.393***	-0.007	-0.399***	0.105	0.278*	0.366**	0.497***	0.092
	(0.077)	(0.139)	(0.142)	(0.088)	(0.125)	(0.057)	(0.120)	(0.181)	(0.146)	(0.158)	(0.118)	(0.080)
Same colonizer	1.854***	-0.140	1.041***	0.623***	0.030	0.107	0.310	-0.535***	0.446**	0.967***	-0.403**	1.169***
	(0.138)	(0.244)	(0.193)	(0.143)	(0.160)	(0.138)	(0.233)	(0.139)	(0.190)	(0.304)	(0.181)	(0.101)
Constant	6.842***	1.994*	7.145***	-2.789***	2.902***	6.520**	8.526***	0.928	6.812***	-0.810	-1.177*	4.407***
	(0.810)	(1.112)	(0.782)	(0.570)	(0.755)	(2.602)	(1.163)	(0.966)	(1.523)	(1.374)	(0.682)	(0.760)
Export efficiency determinants												
PC	-0.201***	-0.504***	-0.200***	-0.579***	-0.775***	-0.274***	-0.486***	-0.043	-0.096***	-0.461***	-0.759***	-0.423***
	(0.028)	(0.045)	(0.030)	(0.042)	(0.060)	(0.044)	(0.072)	(0.033)	(0.026)	(0.068)	(0.050)	(0.035)
RTA	-0.222	-29.735***	-0.630***	-0.806***	-0.717***	-1.957	-1.599	-30.671***	-1.591***	-5.244	-0.740***	-1.258**
	(0.219)	(1.311)	(0.199)	(0.181)	(0.280)	(2.022)	(1.082)	(1.012)	(0.335)	(5.330)	(0.225)	(0.502)
Tariff	0.028***	0.012	0.022***	0.040***	-0.037***	-0.009	-0.004	0.017	-0.013	0.011	0.031***	0.052***
	(0.008)	(0.016)	(0.008)	(0.007)	(0.014)	(0.013)	(0.010)	(0.014)	(0.011)	(0.018)	(0.009)	(0.009)
Constant_u	1.370***	0.903***	1.502***	0.720***	0.997***	1.192***	1.326***	1.097***	2.062***	1.121***	0.612***	0.097
	(0.124)	(0.115)	(0.136)	(0.106)	(0.120)	(0.273)	(0.208)	(0.182)	(0.161)	(0.182)	(0.133)	(0.151)
N	1752	1530	1519	1822	1548	1741	1496	1516	1479	1265	1643	1877
ll	-3320.905	-3219.481	-2787.834	-2933.585	-2486.021	-2934.661	-2719.202	-2825.415	-2942.127	-2553.804	-2643.148	-2849.637
chi2	1635.603	2604.722	2783.994	4824.177	3446.654	3373.007	2578.121	2442.265	2086.982	1309.310	4578.294	5662.493

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent. Standard errors in brackets. Column numbers represent different categories of products as shown in Table A1. The one-stage regression still generates two constant coefficients with *Constant* being the intercept term for the main body of the equation and *Constant_u* being the intercept term for the export efficiency specification.
SOURCE: Authors' own estimation.

trading partner and each year. Figure 3 illustrates the changes of export efficiency in Vietnam through time. Over the 1996–2014 period, the country's export efficiency averaged at 48 per cent. During this span, export efficiency experienced an overall increasing trend that can be separated into two sub-periods. Before 2005, efficiency fluctuated around 46 per cent, reaching its lowest of 43.2 per cent in 1999 before recovering to 48.9 per cent in 2005. Since 2005, efficiency has gradually increased to reach its peak at 52.2 per cent in 2014. Kalirajan (2007) found larger values for Australian export efficiency, at 61.9 per cent in 1992 and 65.7 per cent in 1996. But the author assumed that the inefficient term u_{ij} only captures the effect of behind-the-border constraints, while explicit beyond-the-border constraints determine the export potential. In contrast, this study assumes that the inefficiency term captures both the effect of behind-the-border as well as beyond-the-border constraints. Using a similar assumption, Armstrong (2015) found that the world's average export efficiency was roughly 50 per cent, similar to the results of this study.

Vietnamese export efficiency across different trading partners can be divided into three groups of countries: high (with export efficiency above 60 per cent), medium (from 40 to 60 per cent) and low (below 40 per cent). Vietnam achieved high export efficiency with thirty-nine trading partners, of which three were above 80 per cent, namely Australia, the Netherlands and Singapore. The other high efficiency trading partners are mostly European countries, including Germany and Switzerland (79 per cent), Belgium and Britain (78 per cent), or major trading partners like the United States (77 per cent), Japan (78 per cent) and Korea (66 per cent). The medium export efficiency group includes fifty-two countries,

FIGURE 3
Average Efficiency of Vietnamese Total Exports during 1996–2014 (Percentage)
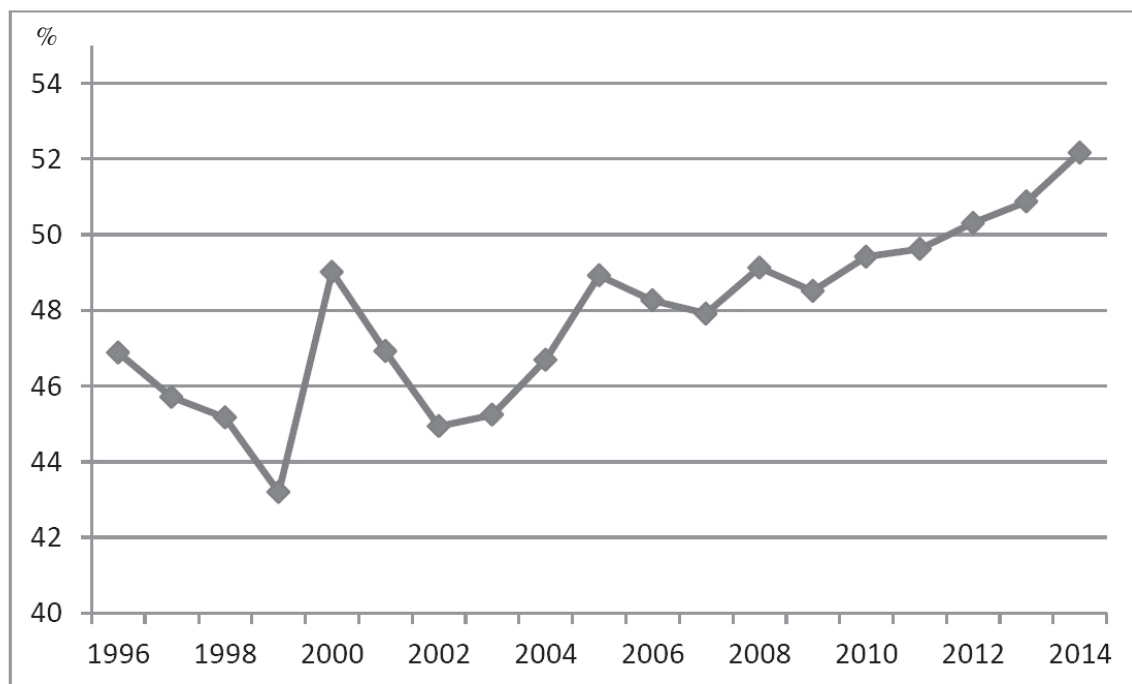
SOURCE: Authors' own illustration.

mostly from Eastern and Central Europe (Russia, Ukraine, Romania), some African countries (South Africa, Uganda, Kenya) and China (40.5 per cent). The last group with low export efficiency consists of sixty-three countries, mostly from South America (Brazil, Argentina) and Africa.

In terms of integrating into regional production networks, Vietnam has high export efficiency relative to most East Asian countries. Exports to active members of the East Asian production networks such as Japan, Singapore, Korea, Hong Kong, Thailand, Malaysia and Indonesia have achieved at least 65 per cent of the total potential. The only exception is the case of China, where bilateral exports from Vietnam have only achieved medium efficiency. China is currently the most active country in the region, taking the role of the region's export engine, as well as the largest exporter in the world. The fact that Vietnam has not realized a large portion of its export potential to the most active member of the regional production network suggests that the country's integration process not been very efficient. But it also suggests that there is room for improvement, and increasing the export efficiency with respect to China could expedite Vietnam's integration.

Lastly, export efficiency in Vietnam is analysed at the disaggregated level for certain product categories. Table A5 shows Vietnam's average export efficiency for all product categories in selected years. Three categories are chosen to study in more detail: agriculture (1); textile, leather and footwear (4); and electrical equipment (9). These products constitute a large share in Vietnam's total exports (Figure 2) and display revealed comparative advantage (Figure A1). It can be noted that export efficiency in these product categories is smaller than efficiency at the aggregate export level. The average export efficiencies are 33.2 per cent for agriculture, 41.4 per cent for textile, leather and footwear and 29.3 per cent for electrical equipment, respectively. Low efficiency at the disaggregated product level indicates that there is more variation in bilateral export value across trading partners at the product level than at the total export level. At the disaggregated level, exports are more likely to be concentrated heavily in one particular country than at the aggregate level, lowering the export efficiency to other trading partners with similar endowments.

Overall, Vietnam's exports have witnessed increased efficiency at both the aggregate and disaggregated level, especially between 2005 and 2014. The country's export efficiency to its top export markets is above 60 per cent, which is relatively high compared to other markets. The only exception is medium export efficiency to China (40.5 per cent), despite the fact that China is currently Vietnam's second largest export market. At the disaggregated level, industries that are considered to have comparative advantage still have abundant unrealized export potential, especially in electronic equipment exports. This suggests that Vietnam's exports may experience another boost in the future if efficiency can be improved in particular products (electrical equipment) and/or specific markets (China).

6. Conclusion

The economic renovation in Vietnam since 1986 has helped the country to become one of the most successful economies in terms of export expansion and economic growth. A large part of this economic renovation has been conducted through governance reform, from formulating and implementing policies to monitoring the power of the state and public officials. Even after thirty years, the government of Vietnam has continued to show its commitment to these reforms along with the export-oriented development strategy. Yet, there are concerns that export and economic growth up until recently have been driven by the one-time liberalization effect, which cannot be sustained in long-term. Thus, the paper attempted to analyse the correlation between Vietnam's governance performance and export efficiency as well as identify the country's exported products that have unrealized export potential.

The results show that Vietnam's export efficiency is positively correlated with the bilateral governance performance indicator and regional trade agreements, while negatively correlated with tariffs

in the importing country. The presence of a trade agreement between Vietnam and a trading partner is found to be the most important determinant, increasing the export efficiency by roughly 9 percentage points. Among the six dimensions of governance, the largest positive correlation is found in the case of political stability (*BPV*) and government effectiveness (*BGE*). As these indicators are measured as bilateral-specific, the implication is that Vietnam can improve its export efficiency either by improving the country's own governance performance or by exporting to a country with relatively better governance performance. During the 1996–2014 period, Vietnam's governance performance has increased for most indicators, especially government effectiveness (*GE*), which has positively enhanced the country's export efficiency.

Vietnam's export efficiency over time displays an overall increasing trend, with some fluctuation before 2005 and gradual increase afterwards. The country achieved high efficiency with most of its major trading partners as well as most EU economies. The only notable exception is China. At the disaggregated level, export efficiency in electronic equipment is very low, suggesting that there is still a large unrealized export potential in this product category.

Lastly, there is still scope for future improvement to this study. The first extension of the study could be to reconduct the analysis with more updated data. While 1995 to 2014 covers most of the economic renovation period in Vietnam, it may not capture some of the more recent developments in the country's regional integration, including the entry of high-tech companies such as Samsung (invested a total of US$15 billion in 2017) and LG (US$1.5 billion in 2016) in Vietnam.[5] Due to the agglomeration of multinational electronics firms, Vietnam is increasingly perceived as an alternative to China with regard to labour-intensive industries. The second possible extension could be the use of Trade in Value-Added (TiVA) data to analyse export efficiency. Since the TiVA database decomposes trade value into domestic value-added and foreign value-added components, more granular insights on Vietnam's export efficiency may be generated.

Acknowledgement

APPENDIX

TABLE A1
Labels and Groups for Product Categories

Category	Label	Gross value-HS1996 code	Broad group of commodity
1	Agriculture	01xx-15xx	Agriculture
2	Mining and quarrying	25xx-27xx, 68xx-71xx	Natural resource
3	Foodstuffs	16xx-24xx	
4	Textile, leather and footwear	41xx-43xx, 50xx-67xx	Labour intensive manufacturing
5	Wood products	44xx-49xx	
6	Chemical and plastic	28xx-40xx	
7	Metals	72xx-83xx	
8	Machinery	84xx	Capital and technology intensive manufacturing
9	Electrical equipment	85xx	
10	Transportation	86xx-89xx	
11	Miscellaneous	90xx-97xx	Miscellaneous

Source: UNComtrade.

TABLE A2
Correlation Table Between the Six Bilateral Governance Indicators

	BVA_{jt}	BPV_{jt}	BGE_{jt}	BRQ_{jt}	BRL_{jt}	BCC_{jt}
BVA_{jt}	1					
BPV_{jt}	0.4313*	1				
BGE_{jt}	0.8744*	0.6019*	1			
BRQ_{jt}	0.9130*	0.5460*	0.9583*	1		
BRL_{jt}	0.8960*	0.6401*	0.9700*	0.9563*	1	
BCC_{jt}	0.8771*	0.6275*	0.9666*	0.9468*	0.9714*	1

Source: Authors' own estimation.

TABLE A3

Estimation Results for Export Efficiency Model for Vietnamese Exports, 1996–2014

	PC	BVA	BPV	BGE	BRQ	BRL	BCC
Governance	0.290**	-0.031	0.242***	0.088**	0.018	0.072**	0.048
performance	(0.142)	(0.029)	(0.037)	(0.037)	(0.038)	(0.034)	(0.030)
RTA	8.566***	8.675***	9.597***	8.329***	8.614***	8.562***	8.600***
	(1.191)	(1.219)	(1.191)	(1.206)	(1.221)	(1.193)	(1.196)
Tariff	-0.593***	-0.655***	-0.545***	-0.579***	-0.628***	-0.596***	-0.606***
	(0.066)	(0.061)	(0.063)	(0.067)	(0.066)	(0.065)	(0.065)
_cons	44.853***	46.350***	31.451***	40.669***	44.400***	41.754***	42.899***
	(0.526)	(1.170)	(2.209)	(2.022)	(1.912)	(1.785)	(1.577)
N	1877	1877	1877	1877	1877	1877	1877
r2	0.101	0.100	0.118	0.102	0.099	0.101	0.100

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent. Standard errors in brackets. Columns indicate principal component and six dimensions of bilateral governance indicator. Bilateral governance indicators are constructed using the export share in bilateral trade as the weight.
SOURCE: Authors' own estimation.

TABLE A4

Estimation Results for Vietnamese Export Efficiency on Lags of Governance Performance, 1996–2014

	PC	BVA	BPV	BGE	BRQ	BRL	BCC
One year lag	1.183***	0.116***	0.231***	0.203***	0.184***	0.177***	0.160***
governance							
performance	(0.114)	(0.016)	(0.022)	(0.020)	(0.020)	(0.018)	(0.016)
RTA	8.839***	8.711***	9.865***	8.288***	8.450***	8.710***	8.817***
	(1.150)	(1.161)	(1.207)	(1.152)	(1.138)	(1.159)	(1.163)
Tariff	-0.358***	-0.448***	-0.469***	-0.349***	-0.362***	-0.389***	-0.383***
	(0.070)	(0.068)	(0.063)	(0.070)	(0.071)	(0.069)	(0.069)
_cons	43.267***	39.840***	31.741***	33.041***	34.791***	35.172***	36.076***
	(0.557)	(1.041)	(1.444)	(1.427)	(1.395)	(1.290)	(1.197)
N	1799	1799	1799	1799	1799	1799	1799
r2	0.132	0.117	0.128	0.132	0.127	0.128	0.127

NOTES: *, **, *** indicate significance at the level of 10 per cent, 5 per cent and 1 per cent. Standard errors in brackets. Columns indicate principal component and six dimensions of bilateral governance indicator.
SOURCE: Authors' own estimation.

TABLE A5
Vietnam's Average Export Efficiency in Different Product Categories, Selected Years (Percentage)

Category	Label	1996	2000	2005	2010	2014
1	Agriculture	34.97	33.59	32.97	33.62	34.91
2	Mining and quarrying	56.76	50.89	48.04	45.78	49.45
3	Foodstuffs	34.67	33.69	31.71	32.20	32.63
4	Textile, leather and footwear	43.03	42.97	42.75	42.89	44.65
5	Wood products	57.38	53.49	45.76	42.25	46.29
6	Chemical and plastic	44.79	43.64	41.15	40.37	42.41
7	Metals	50.83	45.63	39.60	38.06	41.56
8	Machinery	43.48	41.41	42.01	45.50	45.76
9	Electrical equipment	26.64	29.11	29.14	29.29	31.20
10	Transportation	62.52	55.45	47.48	45.14	44.38
11	Miscellaneous	54.40	48.44	41.67	42.28	47.29
	Total export	46.88	49.02	48.92	49.42	52.17

SOURCE: Authors' own estimation.

FIGURE A1
ARCA Curve for Vietnam, 1995–2014
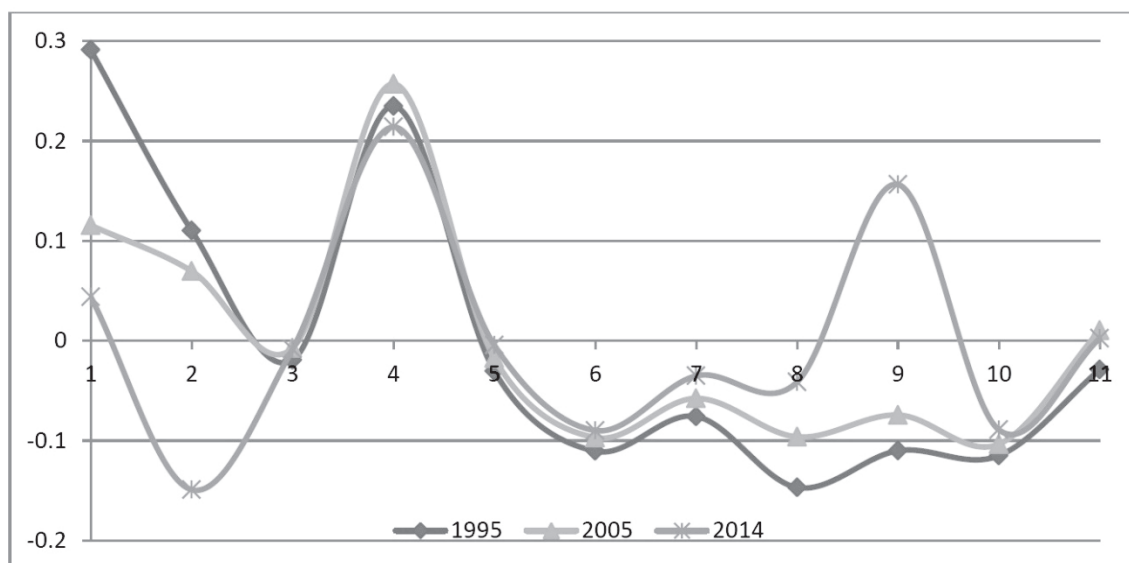
NOTE: ARCA measures ranges from −1 to +1, with a symmetric distribution that centers on a stable mean of zero. Vietnam has comparative advantage in product category if ARCA is positive and comparative disadvantage if the index is negative. Horizontal axis represents categories of products as shown in Table A1.
SOURCE: Authors' own illustration.

NOTES

1. *The Economist*, special issue on Vietnam, 26 April 2008.
2. Refer to Table A1 for specification of product categories.
3. Figure A1 shows that the additive revealed comparative advantage (ARCA) index in Vietnam is consistent with this change pattern.
4. The amended Law on Corruption Prevention and Control (Draft), presented at the XIV National Assembly, 4th session, October–November 2017.
5. Foreign Investment Agency, Ministry of Planning and Investment, Foreign Investment Report, various issues (http://fia.mpi.gov.vn/ChuyenMuc/172/So-lieu-FDI-hang-thang).

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