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The Nexus between Inward Foreign Direct Investment and Global Value Chains in Developing Countries: A Case Study of Viet Nam

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Abstract: *In recent decades, Viet Nam, a developing economy, has significantly improved its export structure and, to some extent, its participation in global value chains (GVCs), which along with foreign direct investment (FDI) is considered amongst the main driving factors for Viet Nam's impressive economic growth. By employing the AJC-UNCTAD-Eora database on Association of Southeast Asian Nations GVCs, this current study aims to empirically explore the nexus between FDI and other factors for GVC participation in Viet Nam during the 2000–2019 period. The estimation shows that the economic size and market development of Viet Nam and its trading partners are the main determinants of Viet Nam's GVC participation. We find that inward FDI flows into Viet Nam have a positive impact on the country's GVC participation in both the forward and backward linkages. The estimation demonstrates that geographical distance is an impediment for Viet Nam's backward GVC participation, whilst engagement in free trade agreements is found to advantageously affect Viet Nam's GVC participation in both backward and forward linkages. We find a positive influence of Viet Nam and its and trading partners' logistics performance on Viet Nam's GVC participation. The paper also provides policy implications for Viet Nam to better use FDI and other sources to enhance and deepen its GVC participation in the future.*

Keywords: Viet Nam; GVC participation; FDI; determinants; backward; forward.

JEL Classification: F1; F14

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1. Introduction

Research by the United Nations Conference on Trade and Development (UNCTAD) (2013) has estimated that about 80% of global trade (in terms of gross exports) is linked to the international production networks of multinational enterprises (MNEs). In other words, many goods are no longer produced by a single manufacturer or in a single country or region. They are assembled from raw materials and components sourced from different locations across borders around the world (Nguyen et al., 2016).

Countries can attract foreign direct investment (FDI) to overcome the relative scarcity of capital, technology, and knowledge, and thus integrate into global value chains (GVCs) (Fernandes, Key, and Winkler, 2020). FDI can have direct and indirect effects on countries' GVCs. The direct effect is that foreign and domestic firms in joint ventures are likely to produce and sell sophisticated inputs to international markets. The second effect is indirect, revealed through the spillover impacts of FDI on domestic firms' level of innovation, and is divided into horizontal and vertical spillovers (Truong and Dong, 2021). The horizontal spillover effect measures the extent to which foreign investment in the same industry enhances the productivity and sophistication level of domestic firms via learning-by-observation and worker turnover. By observing or copying the production techniques of foreign companies in the same industry, local companies can learn to produce more complicated goods. Meanwhile, local firms can benefit from the technologies and managerial skills of foreign firms through joint ventures, reverse engineering, and by hiring workers who are being trained to work in FDI firms (Tran, Truong, and Dong, 2020). On the other hand, vertical spillovers (or inter-industry spillovers) measure the extent of positive externalities to domestic suppliers or customers from the presence of foreign enterprises. Vertical spillovers can occur under backward and forward linkages. Backward linkages occur when foreign firms make contracts with domestic suppliers of intermediate inputs and directly transfer knowledge and technologies to enhance the production capability of their local suppliers (Tran, Truong, and Dong, 2020). This, in turn, helps domestic firms increasingly engage in GVCs. In terms of the forward linkage channel, domestic firms can participate

in higher GVCs when foreign firms and their affiliations located in the domestic market supply intermediate inputs using new technologies or processes.

As a result of China's rising importance in global FDI and trade, particularly in the manufacturing sector, many studies on the relationship between GVCs, FDI, and economic growth have focused on the country (Yao, 2009; Xu, 2010; Fu, 2011; Zhu and Fu, 2013; Swenson and Chen, 2014; Yu and Hu, 2015; Wang and Chen, 2020). Meanwhile, little attention has been paid to GVC participation in smaller developing economies, such as Viet Nam, for which most studies concentrate on the country's conventional trade (Tran and Heo, 2009; McCaig, 2011; Truong, Dong, and Nguyen, 2019; Nguyen, 2016; Nguyen, 2015; Ha and Tran, 2017). Since the beginning of the Doi Moi (renovation) policy based on market orientation in the mid-1980s, Viet Nam has undertaken significant international and regional economic integration, as revealed through its participation in many bilateral and multilateral free trade agreements (FTAs). The most notable achievements include Viet Nam's participation in the Association of Southeast Asian Nations (ASEAN) since 1995, the signing of the Viet Nam–United States (US) bilateral trade agreement in 2000, Viet Nam's accession to the World Trade Organization (WTO) in 2007, and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) in 2018 (Tran, Truong and Dong, 2020; Truong and Dong, 2021).

Trade and FDI are considered amongst the main driving factors of Viet Nam's impressive economic growth, which was an average of 6.1% between 2008 and 2018. The country is now amongst the fastest-growing economies in the region and the world. However, Viet Nam's growth rates became substantially lower in the first decade of the 21st century and even lower after 2008, putting the country in high danger of falling into a middle-income trap (Herr, Schweisshelm, and Truong, 2016). Overcoming this huge challenge will require Viet Nam to make greater progress in GVC participation, which can be obtained only by performing the appropriate policy reforms and adjustments, particularly in FDI, trade, and industrial and institutional areas.

Against this backdrop, our current study aims to examine the nexus between FDI and other relevant factors for the improvement of Viet Nam's GVC

participation (revealed through backward and forward participation). From this empirical evidence, this study draws policy implications for Viet Nam to efficiently capitalise on FDI and other relevant factors to improve the country's GVC participation, thereby contributing to its higher economic growth in the following years. In terms of data sources, this study principally employs the ASEAN-Japan Centre (AJC)-UNCTAD-Eora database on ASEAN GVCs[1] and other sources to analyse the determinants of Viet Nam's GVC participation.

2. Literature Review

The term 'value chain' refers to the whole production process of a good or service from the design and raw material processing to manufacturing and market services for the final customers. A GVC indicates production taking place across multiple countries (Simola, 2021). Under the broad definition, a GVC applies to any production that combines intermediate inputs originating from two or more countries (Antras, 2020; Li, Meng, and Wang, 2019). Under a narrower definition, the term indicates complex GVC trade that requires two or more border crossings (Simola, 2021). More specifically, Wang et al. (2017) distinguish between simple and complex GVC activities and classify GVC participation into the following four activities: (i) export its domestic value added in intermediate exports used by a direct importing country to produce products for the importing country's final consumption (simple GVC); (ii) export its domestic value added in intermediate exports used by a direct importing country to produce products for importing countries' exports to third countries (complex GVC forward participation); (iii) importing foreign value added in intermediate imports to produce products for domestic use (simple GVC); (iv) importing foreign value-added in intermediate imports to produce products for its gross exports (complex GVC backward participation).

UNCTAD (2013) provides the definition of GVC participation, which is widely adopted in studies. Accordingly, GVC participation is defined as (FVA+DVX)/Gross Exports, where: FVA is the foreign value added incorporated

[1] https://www.asean.or.jp/en/centre-wide-info/gvc_database_paper11/

in a country's exports, DVX is the domestic value added incorporated in other countries' exports, and Gross Exports (total value-added exports) is FVA + DVA, where DVA is the domestic value added.

Measuring GVCs is difficult because of the lack of appropriate data (World Bank, 2017). However, with improved data availability, the use of international input-output data has allowed slicing the value added embodied in production chains by country and sector, which helps avoid double-counting for goods and services crossing borders several times during the production process. There are several international input-output databases currently available, including EORA, IDE-JETRO, OECD TiVA, and WIOD. All are based on similar methodologies but differ in certain underlying assumptions, details, and coverage (Simola, 2021). Using these databases, a large number of studies have focused on GVCs and their determinants in different countries.

Using the UNCTAD-Eora Global Value Chain Database, UNCTAD (2013) found a strong and increasing positive statistical nexus between inward FDI stock growth in countries and their GVC-participation growth rates for 187 nations in the two periods of 1990–2000 and 2001–2010. The research ranked countries by the ratio of inward FDI stock to gross domestic product (GDP) and grouped them into quartiles in 2010. The estimation shows that countries with the largest FDI relative to the size of their economies have higher GVC participation.

Van der Marel (2015) grouped the variables that have an influence on GVC participation into three categories: structural forces and endowments (market size, GDP, GDP per capita, population, and availability of capital), traditional trade and regulatory barriers (trading across borders, doing business, trade enabling, barriers to entrepreneurship, and barriers to investments, etc.), and new issue areas (FDI restrictions, financial credit availability, labour market efficiency, innovation climate, and research and development investments, etc.). Using pairwise correlation analysis and the OECD TiVA database for 58 countries, Van der Marel (2015) finds a positive impact of GDP per capita and a negative impact of market size (population), FDI restrictions, and regulatory barriers on trading across borders on backward participation.

Using the database from OECD TiVA, Kowalski et al. (2015) provide a systematic empirical assessment of the determinants of GVC participation in developing countries, with a particular focus on the regions of Asia and Africa/the Middle East. Using the benchmark specification and a gravity model, Kowalski et al. (2015) discovered that structural factors, such as geography, the size of the market, and the level of development, are key determinants of GVC participation. Trade and investment policy reforms, as well as improvements in logistics and customs, intellectual property protection, infrastructure, and institutions, can also play an active role in promoting further engagement.

Nguyen et al. (2016) limit the measure of TiVA as the sum of intermediate input imports divided by the total imports for 22 developing countries over a 20-year period from 1995 to 2014 to examine the determinants of GVC participation in Asian developing countries, such as FDI inflows, trade, productivity, and the technology level. Using a fixed-effects regression model, the study reveals the interesting fact that inward FDI negatively affects the GVC participation of a developing country. In other words, an increase in FDI invested in a developing country substitutes intermediate goods imported from downstream or decreases the dependence on intermediate imports of the host country.

Buelens and Tirpák (2017) apply an augmented gravity model framework to a newly constructed dataset that combines GVC-related metrics and bilateral FDI stock for 40 developed and emerging economies and found a positive association between bilateral FDI stock and both gross bilateral trade and the bilateral import content of exports. They concluded that foreign investors play an active role in shaping host economies' export structures and their participation in international production networks.

Following the use of the term GVC participation by UNCTAD (2013) and employing the OECD TiVA database, Kersan-Skabic (2019) studied elements influencing GVC participation in European Union (EU) member states (EU-15 and EU new member states). The estimated results revealed that the most important drivers of GVC participation for the EU-15 and EU-new member states were GDP growth, lagged GVC participation, FDI, the development of the financial sector, the share of services in GDP, the share of high-tech products in exports, and the level

of wages. Nevertheless, the indicators and strength of the impacts of some of these variables differ between the two groups of countries.

Wang and Chen (2020) define a GVC based on the decomposition of the value added created by domestic production; only the value-added crossing national borders for production purposes rather than consumption purposes is treated as GVC participation. Using a panel dataset covering 42 countries in the WIDO database and employing traditional panel models, the spatial Durbin model (SDM), and the threshold model, they find that increased outward FDI not only facilitates the GVC participation of parent countries but also has a profound impact on that of other countries. The host countries, in particular, may benefit from outward FDI spillovers, such as production technology and management skills, which are conducive to their GVC participation. The spillover effects of outward FDI play a vital role in the GVC participation of low total factor productivity (TFP) countries. However, for developed countries with high TFP levels, outward FDI has a positive impact on deep GVC participation but does not influence shallow participation.

Fernandes, Kee, and Winkler (2020) test the determinants of GVC participation in more than 100 countries over the last 3 decades. Their results, based on instrumental variable (IV) cross-country estimates and difference-in-difference country-sector analysis, suggest that endowments, geographical distance, political stability, trade policy, FDI, and domestic industrial capacity are all very important factors in explaining GVC participation. Some of these determinants, such as trade policy, FDI, geographical distance, and factor endowments, affect GVC trade more than traditional trade.

Whilst numerous studies on Viet Nam's economic integration have focused on the impact of trade liberalisation on development, poverty reduction, employment, and so on (Kien and Heo, 2009; McCaig, 2011; Nguyen, 2015; Nguyen, 2016; Ha and Tran, 2017), few studies examine the nexus between FDI, GVCs, and economic growth. There is still a lack of empirical studies examining the effects of FDI factors on Viet Nam's GVC participation (backward and forward channels). Therefore, our study partially fills this gap by examining the effects of inward FDI flows and other relevant elements, such as economic size, market development, logistic performance, FTAs, and trade openness on GVC

participation in Viet Nam. The paper capitalises on input data mainly from the AJC-UNCTAD-Eora database on ASEAN GVCs and is supplemented by other sources, such as the World Bank Development Indicators, United Nations Comtrade, UNCTAD database, and the General Statistics Office of Vietnam (GSO).

3. Viet Nam's Development Policy after the 1990s

In 1991, Viet Nam introduced the concept of 'industrialisation-modernisation' aiming to promote economic diversification, reduce heavy dependence on heavy industries, and combine the industrialisation of traditional industries with the development of advanced and modern industries to meet the requirements of globalisation and the knowledge economy (Do, 2016). In 2001, the 'Strategy for Acceleration of Socialist-oriented Industrialisation' to modernise the country by 2020 was launched, aiming to build selected important heavy industrial establishments with high technology, with the following leading industries: electronics, steel, leather and footwear, construction materials, mineral processing, beverage, dairy, pulp, and paper.

In 2007, the Vietnamese government approved a list of priority industries for the period 2007–2010, with a vision of 2020, and a number of incentive policies for these industries by Decision No. 55/2007/QD-TTg of 23 April 2007. In 2014, the government established a series of measures to support their development, including ratifying 'Viet Nam's Industrial Development Strategy to 2025 with a Vision by 2035', in which the electronic industry and telecommunications were emphasised as key industries. Accordingly, the government will encourage the development of software, especially embedded software in hardware, electronics, and telecommunications devices to meet domestic demand, and develop dual-purpose fields serving national defence, such as cruise missile electronic control, reconnaissance and search electronics, telecommunications, and unmanned aerial vehicle electronics (Government Port, 2014).

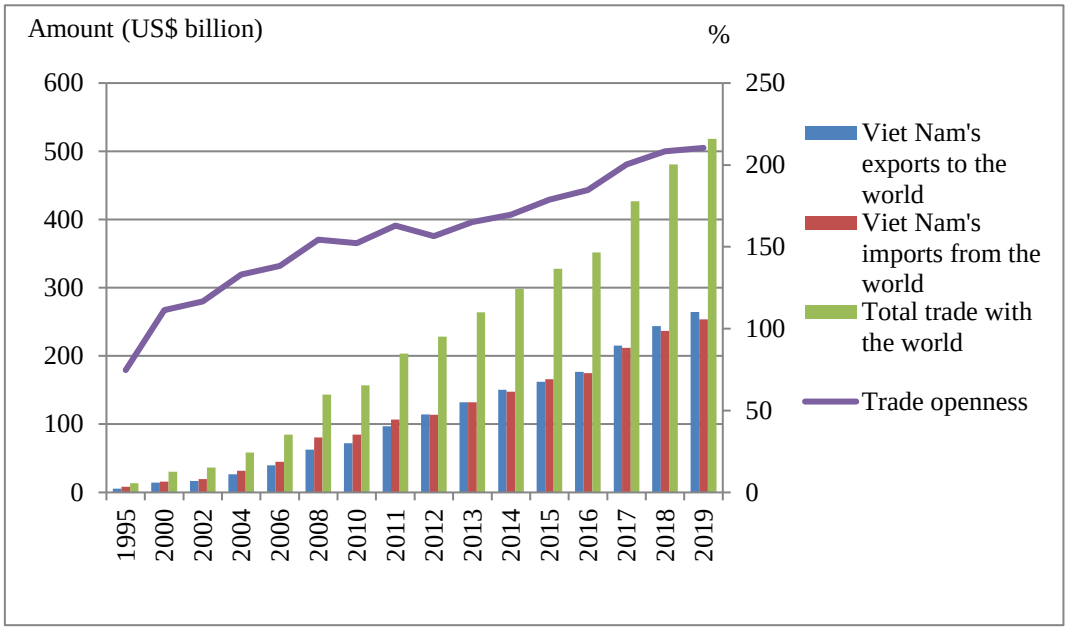
The government has applied various privileges and incentives for foreign firms, including for the attractiveness of the investment environment. In early 2017, the Vietnamese government issued Decision 68/2017/QĐ-TTg on the development plan for supporting industries over the 2016–2025 period. The aim is to promote,

support, and attract domestic and foreign investments into important supporting industries (including electronics and mechanical engineering industries; garment and textile, leather, and footwear industries; hi-tech industries; and the automotive industry) to create outputs that meet the needs of domestic production and exports and create a gateway for local enterprises to step into the GVCs. Under the programme, the output should satisfy 45% and 65% of the input demand of domestic manufacturing by 2020 and 2025, respectively (The Prime Minister, 2017). Other efforts by the government include land rental fees and tax incentives. Additional financial incentives are also provided, including R&D incentives, investment credit, and environmental protection schemes (Dezan Shira and Associates, 2018).

4. Viet Nam's Economic Integration into the World Economy

Along with the implementation of economic renovation and industrial development after the 1990s, the total commodity trade exchange between Viet Nam and the rest of the world grew rapidly from only US$13.6 billion in 1995 to US$157.0 billion and US$518.0 billion in 2010 and 2019, respectively. Viet Nam's export value to the world market expanded to US$265.6 billion in 2019 compared with US$72.2 billion in 2010 and US$5.4 billion in 1995. Likewise, Viet Nam's import value from the world market increased to US$253.4 billion in 2019 from US$84.8 billion in 2010 and US$8.1 billion in 1995. This led to a huge expansion of Viet Nam's trade-to-GDP ratio (trade openness) from 74.7% in 1995 to 152.2% and 210.4% in 2010 and 2019, respectively (see Figure 1).

Figure 1: Viet Nam's International Trade with the Rest of the World, 1995–2019



Source: Author's compilation from the UN Comtrade Database and World Development Indicators of the World Bank.

Viet Nam has also made significant achievements in improving its export basket by increasing the share of manufactured products that contain a higher level of sophistication. For example, the contribution of machinery and electronic products in Viet Nam's total export value to the global market reached 40.2% in 2017, up from 7.9% and 14.1% in 2000 and 2010. In contrast, the export share of products that often embraced a low degree of sophistication, such as fuels, dropped to 2.2% in 2017 from 26.4% in 2000 (see Table 1).

Table 1: Changing Patterns of Viet Nam's Export Products, 2000–2017

	2000		2010		2015		2017	
Product Group	Value (US$ million)	Share (%)	Value (US$ million)	Share (%)	Value (US$ million)	Share (%)	Value (US$ million)	Share (%)
Animals	1,583.0	10.93	4,260.8	5.9	5,201.1	3.21	6,448.6	3
Chemicals	111.8	0.77	1,234.4	1.71	2,592.5	1.6	3,225.4	1.5
Food Products	193.6	1.34	2,078.9	2.88	4,746.8	2.93	5,264.8	2.45
Footwear	1,507.9	10.41	5,404.4	7.48	12,783.6	7.89	15,618.7	7.26
Fuels	3,824.8	26.41	7,979.7	11.05	4,996.6	3.08	4,847.1	2.25
Hides and Skins	195.9	1.35	1,104.4	1.53	3,286.5	2.03	3,671.6	1.71
Mach and Elec	1,151.2	7.95	10,221.2	14.15	57,413.1	35.44	86,488.2	40.2
Metals	126.9	0.88	2,791.5	3.86	5,713.5	3.53	8,328.7	3.87
Minerals	40.1	0.28	343.3	0.48	1,081.3	0.67	1,137.5	0.53
Miscellaneous	812.6	5.61	4,837.4	6.7	10,821.6	6.68	16,146.6	7.51
Plastic or Rubber	294.5	2.03	4,306.7	5.96	5,189.9	3.2	7,152.8	3.33
Stone and Glass	214.3	1.48	3,666.3	5.08	2,421.6	1.49	2,576.4	1.2
Textiles and Clothing	2,095.4	14.47	13,303.7	18.42	27,270.1	16.83	31,811.8	14.79
Transportation	99.9	0.69	1,281.3	1.77	3,112.0	1.92	3,500.8	1.63
Vegetables	1,968.2	13.59	8,011.4	11.09	12,115.7	7.48	15,322.9	7.12
Wood	262.7	1.81	1,411.2	1.95	3,270.8	2.02	3,576.8	1.66
Total	14,482.7	100	72,236.7	100	162,016.7	100	215,118.6	100

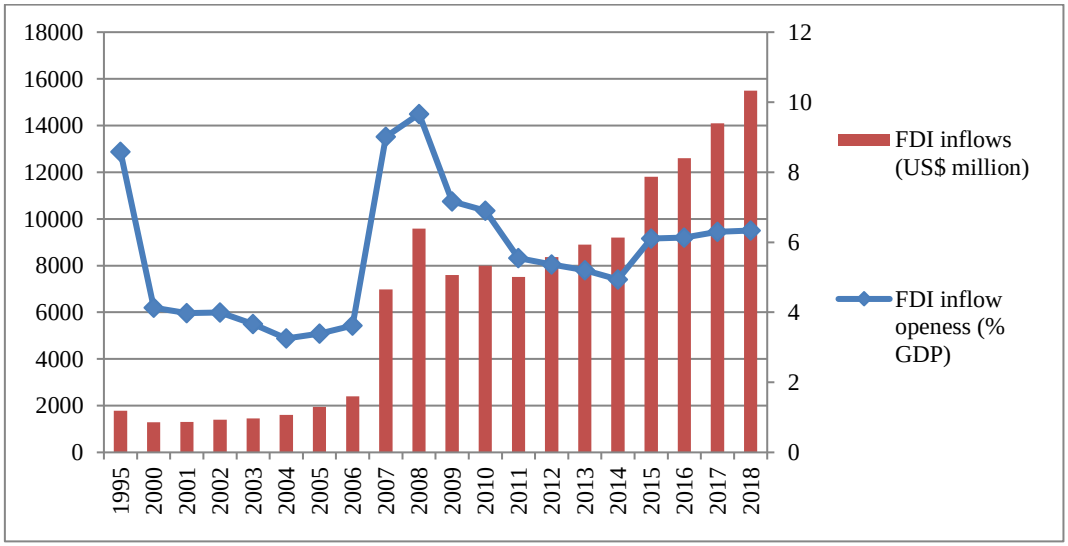
Source: Author's compilation using World Bank, World Integrated Trade Solution (WITS). https://wits.worldbank.org/ (accessed 22 June 2020).

Similarly, there has been an impressive expansion of realised inward FDI flows into the Vietnamese economy, from US$1.7 billion in 1995 to US$8.0 billion in 2010. Despite the slowdown of the global economy in recent years, FDI flows into Viet Nam have been on the rise, reaching US$11.8 billion and US$15.5 billion in 2015 and 2018 respectively (see Figure 2). In terms of sectoral distribution, data from the GSO of Viet Nam demonstrate that in 2018, the manufacturing and processing sector garnered the most interest from foreign investors, accounting for 47% of the registered capital. The real estate sector ranked second (18.5%) followed by the retail sector (10.3%). Statistics from the GSO also show that as of 2018, there

were 112 countries and territories investing in Viet Nam. Amongst them, Japan took the lead, making up 24.2% of Viet Nam's total inward FDI flows, whilst the Republic of Korea (henceforth, Korea) and Singapore were the runners-up, comprising shares of 20.3% and 14.2%, respectively. Foreign firms as a whole, and Samsung in particular, play a vital role in the Vietnamese economy, with shares of about 70% and 20% of Viet Nam's exports in 2016, respectively.

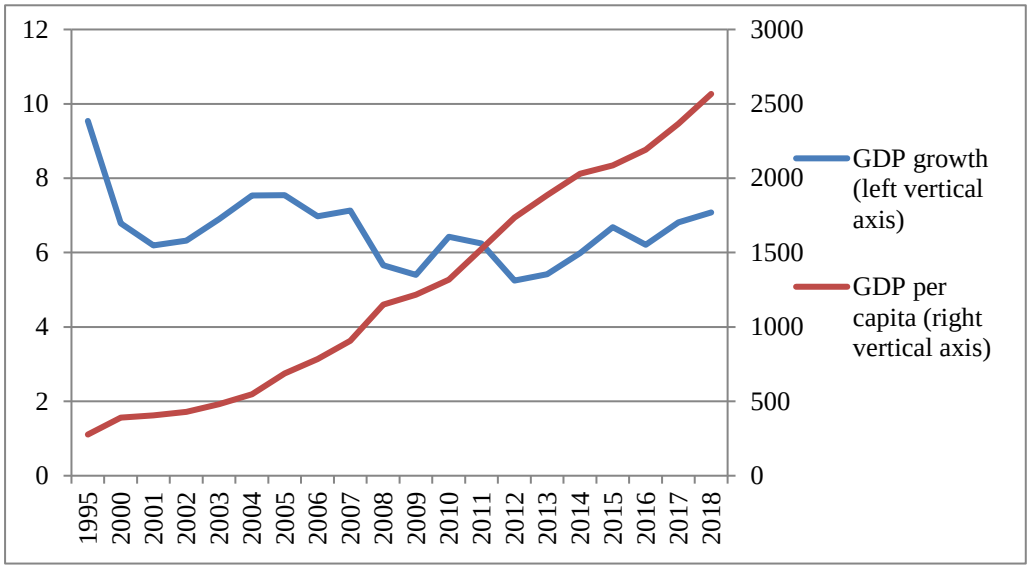
FDI and trade are considered amongst the main driving factors for impressive economic growth, reaching 6.1% on average between 2008 and 2018. Viet Nam is now amongst the fastest-growing economies in the region and the world. This has resulted in considerable improvements in Viet Nam's income per capita, which reached nearly US$2,600 in 2018, about nine times higher than it was in 1995 (see Figure 3).

Figure 2: Inward FDI Flows into Viet Nam, 1995–2018



FDI = foreign direct investment.
Source: Authors' compilation using the UNCTAD database and World Development Indicators of the World Bank.

Figure 3: GDP Growth (%) and GDP per Capita (US$) of Viet Nam, 1995–2018



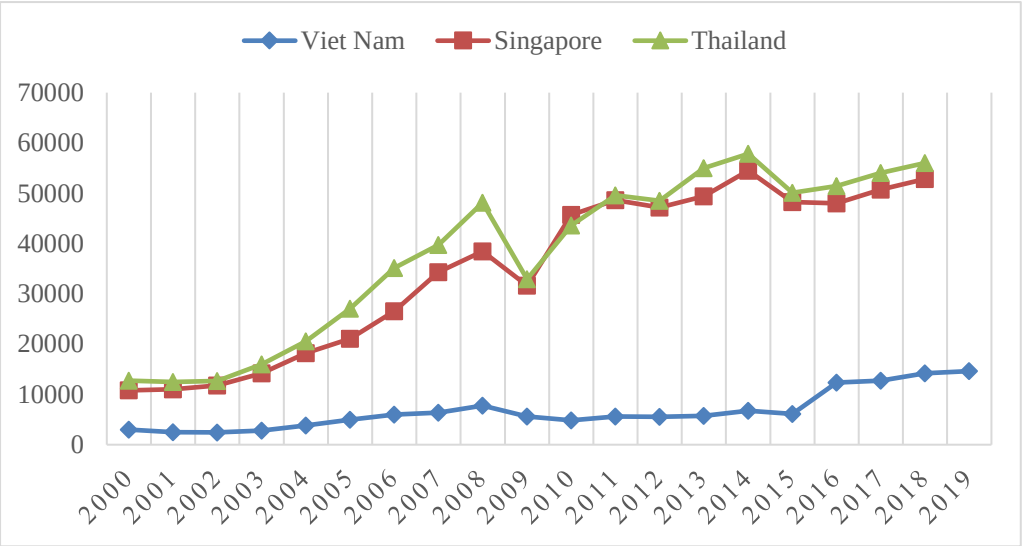
GDP = gross domestic product.
Source: Author's compilation from the World Bank's World Development Indicators.

In general, in recent decades, Viet Nam has become increasingly integrated into the regional and global economies and is now amongst the most open economies in the world. Trade and FDI have played a vital role in the economic growth of Viet Nam; as a result, Viet Nam's income per capita has also improved significantly. The next section analyses the country's GVC participation.

5. Viet Nam's GVC Participation

We consider Viet Nam's GVC participation using two indicators: backward GVC participation and forward GVC participation. Backward GVC participation refers to the ratio of the foreign value-added (FVA) content of exports to the economy's total gross exports. This is the 'buyer' perspective or sourcing side in GVCs, where an economy imports intermediates to produce its exports. Meanwhile, forward GVC participation corresponds to the ratio of the domestic value-added sent to third economies to the economy's total gross exports (DVX). It captures the DVX contained in inputs sent to third economies for further processing and exporting through value chains. This is the 'seller' perspective or the supply side in GVC participation (Kowalski et al., 2015). To have a more comprehensive evaluation, the current study compares Viet Nam's GVC participation with selected ASEAN countries (Singapore and Thailand).

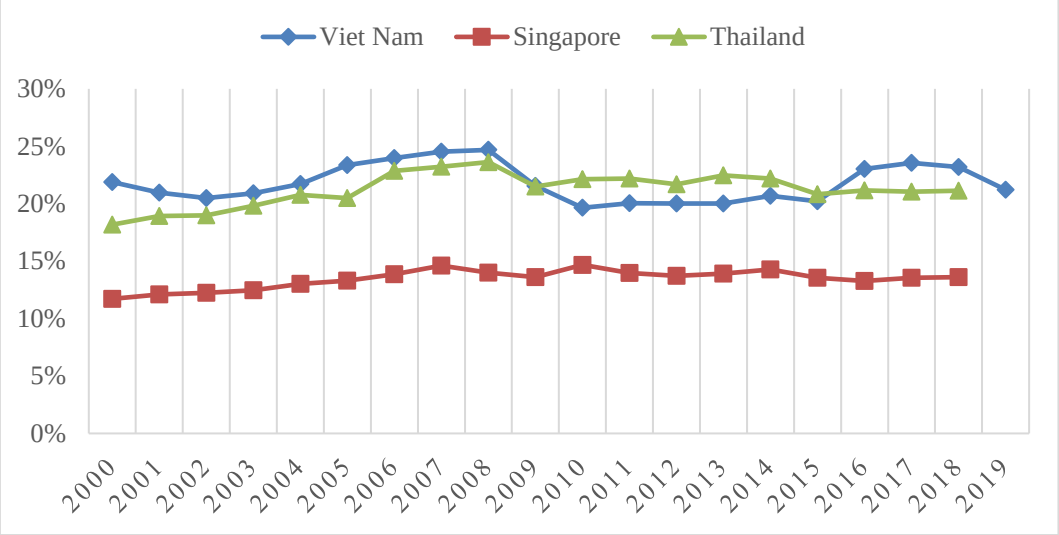
Figure 4: Value of DVX from Selected ASEAN Countries (US$ million)



Source: Author's calculations from AJC-UNCTAD-Eora database on ASEAN GVCs.

First, we look at Viet Nam's domestic value-added exports used in other countries' exports compared to the two ASEAN economies of Singapore and Thailand. Figure 4 shows that DVX from Viet Nam used as an input in other countries' exports increased significantly from US$2.9 billion in 2000 to US$14.6 billion in 2019. Despite this impressive growth, Viet Nam's DVX was much lower than that of Thailand and Singapore. The major economies that used the input from Viet Nam for their export activities between 2000 and 2019 were China, Germany, and Japan (Appendix 1). In terms of forward participation (DVX share in total exports), Figure 5 demonstrates an upward trend in Viet Nam's forward GVC participation during the period 2000–2008, reaching 21.8% and 24.3%, respectively. However, this indicator remarkably decreased over the period 2009–2015. After that, Viet Nam's forward GVC participation tended to increase, reaching 23.0% in 2016 and 23.5% in 2017; however, it was again followed by a decreasing trend, accounting for 23.2% and 21.2% in 2018 and 2019, respectively. Compared to Singapore and Thailand, Viet Nam's forward GVC participation is higher; however, in terms of value, Viet Nam's DVX is much lower than the two other ASEAN countries.

Figure 5: Forward Participation (DVX Share in Exports) in Selected ASEAN Countries

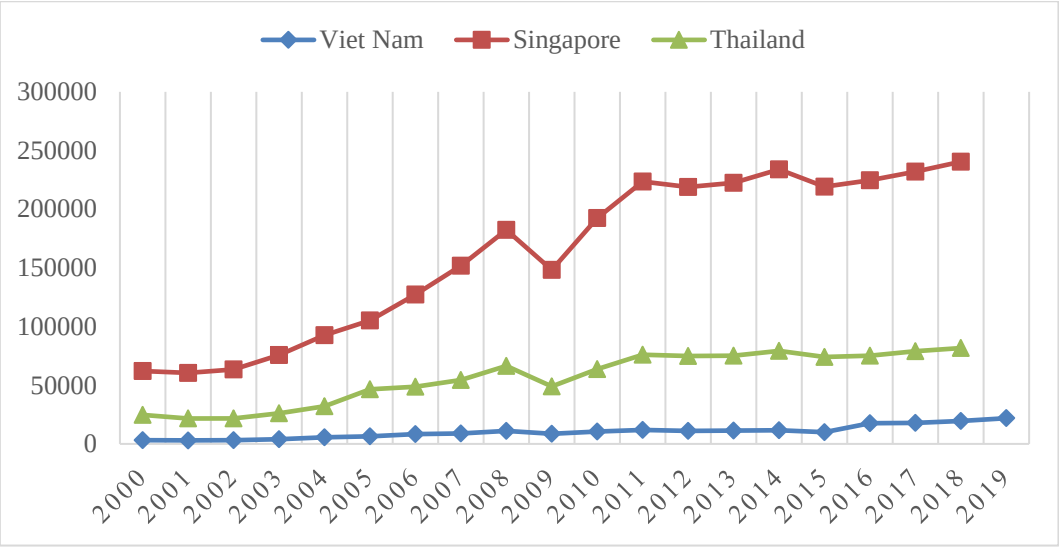


Source: Author's calculations from AJC-UNCTAD-Eora database on ASEAN GVCs.

Another crucial aspect for considering the GVC participation of a country is the FVA content of gross exports (backward participation). This indicates what part of a country's gross exports consists of inputs that have been produced in other countries. The estimation results are presented in Figures 6 and 7.

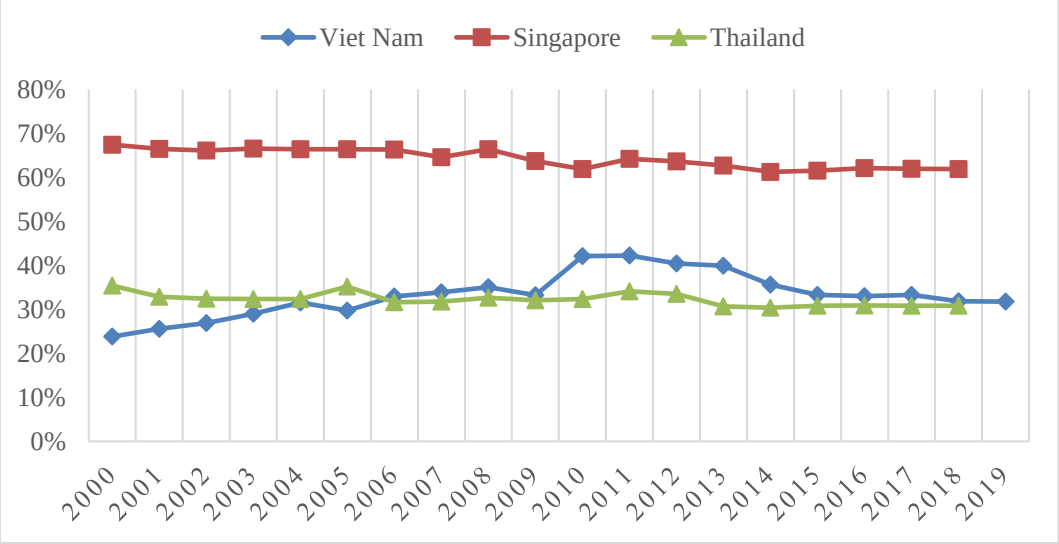
Figure 6 shows that Viet Nam's FVA exports to the world significantly expanded to US$21.8 billion in 2019 compared with US$3.2 billion in 2000. Nevertheless, compared with Thailand and Singapore, Viet Nam's FVA exports were much lower. In terms of value-added creators, in 2000, Taiwan was the largest FVA source in Viet Nam's FVA exports to the world market, with a share of 18%. This was followed by Japan (15%) and China (9%). However, in 2019, China became the largest FVA creator, comprising 23% of Viet Nam's FVA exports to the world. The next most important source was Japan, at 20%, followed by Korea at 8% (see Appendix 2). This shows that Viet Nam's export activities are increasingly dependent on inputs provided by China.

Figure 6: FVA Exports to the World from Selected ASEAN Countries (US$ million)



Source: Author's calculations from AJC-UNCTAD-Eora database on ASEAN GVCs.

Figure 7: Backward Participation (FVA Share in Exports) in Selected ASEAN Countries



Source: Author's calculations from AJC-UNCTAD-Eora database on ASEAN GVCs.

Looking at backward participation, Figure 7 shows that Viet Nam's backward GVC participation grew from 23.8% in 2000 to 31.7% in 2019, revealing that Viet Nam's export activities have increasingly relied on foreign inputs. The level of Viet

Nam's backward participation is quite similar to that of Thailand, whilst this indicator is much lower than that of Singapore.

We also delve into Viet Nam's GVC participation at the sectoral and subsector levels. The sectors include the primary, secondary, and tertiary sectors, which are then divided into subsectors. The results are presented in Tables 2 and 3, respectively.

Table 2: Value-added Exports from Viet Nam to the World at the Sectoral Level

Sector/subsector	2000		2017	
	Value (US$ million)	Share (%)	Value (US$ million)	Share (%)
Primary	**5,522.32**	**41.09**	**20,055.56**	**41.04**
Agriculture, hunting, forestry, and fishing	2,370.14	17.64	8,804.79	18.02
Mining, quarrying, and petroleum	3,152.18	23.46	11,250.77	23.021
Secondary	**2,910.69**	**21.66**	**12,223.56**	**25.0**
Food, beverages, and tobacco	409.62	3.05	3,475.79	7.11
Textiles, clothing, and leather	947.54	7.05	2,727.33	5.58
Wood and wood products	218.91	1.63	852.17	1.74
Publishing, printing, and reproduction of recorded media	68.78	0.51	169.93	0.35
Chemicals and chemical products	256.84	1.91	958.50	1.96
Rubber and plastic products	85.32	0.63	452.41	0.93
Non-metallic mineral products	132.56	0.99	728.31	1.49
Metal and metal products	134.15	1.00	581.49	1.19
Machinery and equipment	106.99	0.80	225.90	0.46
Electrical and electronic equipment	230.88	1.72	752.50	1.54
Precision instruments	27.19	0.20	100.40	0.21
Motor vehicles and other transport equipment	127.63	0.95	521.35	1.07
Other manufacturing	164.28	1.22	677.49	1.39
Tertiary	**5,005.07**	**37.25**	**16,586.44**	**33.94**
Electricity, gas, and water	399.86	2.98	1,407.24	2.88
Construction	11.94	0.09	242.46	0.50
Trade	1,422.94	10.59	5,618.33	11.50

Hotels and restaurants	523.23	3.89	1,831.34	3.75
Transport, storage, and communications	875.68	6.52	2,337.98	4.78
Finance	383.25	2.85	1,241.19	2.54
Business activities	998.98	7.43	2,877.06	5.89
Education	52.17	0.39	227.60	0.47
Health and social services	42.98	0.32	162.05	0.33
Community, social, and personal service activities	161.71	1.20	532.67	1.09
Public administration and defence	4.43	0.03	18.78	0.04
Other services	104.91	0.78	23.56	0.05
Travel agency and tour operator services	23.00	0.17	66.19	0.14
Unspecified	**0.00**	**0.00**	**0.00**	**0.00**
Total	**13,438.08**	**100.00**	**48,865**	**100**

Source: Author's compilation from AJC-UNCTAD-Eora database on ASEAN GVCs.

More specifically, Table 2 considers how export value is added by sectors and subsectors in Viet Nam, which includes both domestic value added and FVA. The results show that in 2000, the primary sector, which is based on natural resources, comprised the largest proportion in Viet Nam's value-added exports to the world, at 41.0%; it was followed by the tertiary and secondary sectors, accounting for 37.2% and 21.6%, respectively. In 2017, the primary sector still occupied the highest share of Viet Nam's value-added exports to foreign countries. The next value-added source was the tertiary sector, which mainly includes service activities, comprising 33.9% in 2017. Meanwhile, there was an increase in the importance of the secondary sector, which mainly includes manufacturing industries, in Viet Nam's value-added exports, reaching 25.0% in 2017. In terms of subsectors, in 2017, a large part of the value added in the primary sector was created in mining, quarrying, and petroleum industries comprising 23.0%, followed by the agriculture, hunting, forestry, and fishing industries at 18.0%. With respect to the value added in the secondary sector, in 2017, the largest contribution was from the food, beverages and tobacco industries, comprising 7.1%. This was followed by the textiles, clothing, and leather industries at 5.5%. Regarding the tertiary sector, most value added was generated in trade activities and business activities, accounting for 11.5% and 5.8% in 2017, respectively.

Table 3: FVA Exports from Viet Nam to the World at the Sectoral Level

Sector/Subsector	2000		2017	
	Value ($ million)	Share (%)	Value ($ million)	Share (%)
Primary	**419.1**	**12.84**	**3,051.16**	**16.95**
Agriculture, hunting, forestry, and fishing	196.54	6.02	2,075.91	11.53
Mining, quarrying, and petroleum	222.56	6.82	975.25	5.42
Secondary	**2,275.39**	**69.74**	**11,973.79**	**66.52**
Food, beverages, and tobacco	340.17	10.43	2,763.43	15.35
Textiles, clothing, and leather	1,076.92	33.01	3,790.69	21.06
Wood and wood products	83.19	2.55	532.04	2.96
Publishing, printing, and reproduction of recorded media	23.18	0.71	115.94	0.64
Chemicals and chemical products	72.17	2.21	784.21	4.36
Rubber and plastic products	28.38	0.87	327.47	1.82
Non-metallic mineral products	35.87	1.1	356.74	1.98
Metal and metal products	81.69	2.5	707.63	3.93
Machinery and equipment	93.27	2.86	312.07	1.73
Electrical and electronic equipment	243.42	7.46	1015.9	5.64
Precision instruments	12.64	0.39	42.53	0.24
Motor vehicles and other transport equipment	26.1	0.8	407.45	2.26
Other manufacturing	158.4	4.85	817.7	4.54
Tertiary	**567.13**	**17.38**	**2,972.18**	**16.51**
Electricity, gas, and water	1.08	0.03	12.87	0.07
Construction	11.59	0.36	189.79	1.05
Trade	148.04	4.54	716.25	3.98
Hotels and restaurants	106.02	3.25	491.58	2.73
Transport, storage, and communications	141.16	4.33	779.33	4.33
Finance	39.09	1.2	258.9	1.44
Business activities	53.17	1.63	222.37	1.24
Public administration and defence	1.07	0.03	5.1	0.03
Education	5.37	0.16	44.09	0.24
Health and social services	9.56	0.29	80.01	0.44
Community, social, and personal service activities	35.29	1.08	140.94	0.78
Travel agency and tour operator services	4.14	0.13	28.8	0.16
Other services	11.55	0.35	2.15	0.01
Unspecified	**1.13**	**0.03**	**4.27**	**0.02**
Total	**3,262.75**	**100**	**18,001.4**	**100**

Source: Author's compilation from AJC-UNCTAD-Eora database on ASEAN GVCs.

Next, Table 3 provides information on Viet Nam's FVA exports to the world at the sectoral level. It is interesting to note that the secondary sector significantly dominated the FVA exports from Viet Nam to foreign countries, with its share reaching 69.7% and 66.5% in 2000 and 2017, respectively. Meanwhile, in 2017, the share of Viet Nam's FVA exports between the primary and tertiary sectors was almost equal, accounting for 16.9% and 16.5%, respectively. In the secondary sector, in 2017, the largest share was found in the textiles, clothing, and leather industries, reaching 21.0%, followed by the food, beverages, and tobacco industries, accounting for 15.3%. The next most important contribution was the electrical and electronic equipment industries, at 5.6%. Regarding the tertiary sector, in 2017, the most crucial sources were transport, storage, and communications services as well as trade activities, accounting for 4.3% and 3.9%, respectively.

6. Data and Methodology

6.1. Research methodology

We consider FVA and DVX as proxies for trade flows; thus, the gravity model for estimation is applied. The gravity model is amongst the most well-known and popular approaches for analysing international trade flows. In the beginning, Tinbergen (1962) showed that it is possible to apply the gravity model to estimate the relationship between the scale of economy, distance, and trade volume between countries. In fact, many scholars have been widely successful in developing the literature on the original gravity model and have applied its specifications in empirical studies. One of the most fruitful variations is the specification proposed by Anderson and van Wincoop (2003), in which the traditional gravity equation is argued to be biased because it does not consider the effects of multilateral resistance terms. Based on the specification suggested by several studies, including Nguyen et al. (2016), Kowalski et al. (2015), Ines Kersan-Škabić (2019), and Fernandes et al. (2020), the current study adopts an extended augmented gravity model of Anderson and van Wincoop (2003) to examine the linkages of GVCs between Viet Nam and its partners. The estimation equation takes the form as follows:

$$GVC_{ijt} = \alpha_0 + \alpha_1 lngdp_{it} + \alpha_2 lngdp_{jt} + \alpha_3 lnincome_{it} + \alpha_4 lnincome_{jt} + \alpha_5 lndistance_{ij} + \alpha_6 lnfdi_{ijt} + \alpha_7 lnlogistics_{it} + \alpha_8 lnlogistics_{jt} + \alpha_9 lntradeopen_{it} + \alpha_{10} lntradeopen_{jt} + \alpha_{11} fta_{ijt} + \gamma_t + \pi_{ij} + e_{ijt} \quad (1)$$

where i and j denote Viet Nam and its trading partners, and t presents a yearly time period; GVCrepresents two dimensions: Viet Nam's domestic value-added exports incorporated in its trading partners' exports (DVX), which refers to forward participation; and foreign value added (FVA) created by the partners in Viet Nam's exports, which refers to backward participation, both of which are in values; gdp is the gross domestic product of Viet Nam and its partners; $income$ depicts the income per capita of Viet Nam and its trading partners; $distance$ is the physical distance between the capital of Viet Nam and its counterparts; fdi is the inward FDI into Viet Nam from its trading partners. $logistics$ presents the index of logistic performance of Viet Nam and its partners; $tradeopen$ is the trade open index (exports plus imports of goods and services as a percentage of GDP) which is the trade openness of Viet Nam and its partners; fta denotes the formal free trade agreements between Viet Nam and its trading counterparts and is a binary variable that is unity if Viet Nam officially belongs to the same FTA (bilateral or multilateral FTA) with country j or otherwise zero; γ_t and π_{ij} are time fixed effects and country-pair fixed effects; finally, e is the error term.

Although the application of the gravity equation in international trade has numerous advantages, the specifications of the gravity model by nature are still subject to many problems of estimation, such as multilateral resistances, zero trade, and heteroscedasticity. As indicated by Baldwin and Taglioni (2006), the multilateral resistance of unobservability might result in common errors called gold medal errors. For the zero trade issue, it is quite clear that zero trade faces the problem of transforming the trade data into a log-form that is dropped from the sample. Additionally, Santos Silva and Tenreyro (2006) demonstrated that working with cross-sectional data of trade flows is unavoidable in the presence of heteroscedasticity, which may cause biased and inconsistent results. To solve the abovementioned problems, we first apply the variation of the Anderson and van Wincoop gravity equation for an estimation that deals well with the problem of

multilateral resistance (Anderson and van Wincoop, 2003; Yotov et al., 2016). In addition, we compile the trade data into a panel dataset that is able to partially reduce the problem of heteroscedasticity (Gujarati, 2009).

For a more comprehensive approach to estimating the gravity equation, we employ the Poisson pseudo-maximum-likelihood (PPML) estimator, which was introduced and successfully applied by Santos Silva and Tenreyro (2006). This approach was once again theoretically and empirically confirmed by Santos Silva and Tenreyro (2011). It is widely admitted that Santos Silva and Tenreyro's approach has effectively addressed the problems of the estimation's gravity equation (Hoang et al., 2020; Yotov et al., 2016).

Undoubtedly, it would be interesting and helpful to operate the estimation at the sectoral level with a comparably longer period of study; however, limitations of collecting data on some variables, such as FDI inflows, do not allow us to implement it. Therefore, we focus on the aggregate analysis rather than on separate sectors. To partially remedy such data limitations, we consider as large a sample as possible, which includes 34 trading partners for a 20-year period.

6.2. Hypotheses and data

We compiled panel data for Viet Nam and its 34 trading partners for a period of 20 years (2000–2019). Viet Nam's GVC trade with 34 countries/territories comprised more than 90% of Viet Nam's GVC trade with the world in 2019, which helps to increase the reliability of our estimation results (see Appendix 3 for the detailed trading partners). Data for the proxies for GVC participation, including DVX and FVA, are collected from the AJC-UNCTAD-Eora database on ASEAN GVCs.

For *gdp*, as conventional countries with larger market sizes tend to engage more in GVCs, this variable is expected to have a positive sign. Similarly, the higher the per capita income of a country, the higher the aggregate forward and backward engagement that country obtains; thus, $income$ would positively affect GVC participation. Data for gdp and $income$ in US dollars are retrieved from the World Bank's World Development Indicators database.

$Distance$ is the traditional gravity variable incorporated to measure the geographical barriers amongst trading partners. In the literature, countries tend to

trade more with proximity markets because of the possibility of reducing transportation and transaction costs. Therefore, $distance$ is expected to have a negative impact on countries' GVC participation. Data on distance in kilometres are obtained from the CEPII.

For fdi, the empirical evidence and theoretical foundations show that the impacts of FDI in countries' GVC participation are principally positive (Kaminsky and Ng, 2005; UNCTAD, 2013; Lopez Gonzalez, 2016; Buelens and Tirpák, 2017; Damijan, Kostevc, and Rojec, 2018). Since we consider a 20-year period and the 34 main trading partners of Viet Nam, zero FDI inflows are unavoidable. As mentioned in the previous section, we estimate the specification with a log form that cannot work with zero values. To deal with such a problem, observations of zero are replaced by a value of one that results in zero when being transformed into a log form. In line with the literature, we expect this variable to have a positive sign. Data for inward FDI flows into Viet Nam at the aggregate level are collected from the GSO, Ministry of Planning and Investment, Viet Nam.

Regarding $logistics$, it presents the index of the logistic performance of Viet Nam and its partners. Recent studies have shown that international trade crucially depends on the support of logistics services (Gani, 2017; Marti and Puertas, 2017). Therefore, we incorporate the index of logistics performance to some extent to determine whether logistics affects GVCs. To create the index of logistics performance, we generate the average value in a scale (1 lowest to 5 highest) of six components of logistics parameters, which are introduced by the World Bank. These include the ability to track and trace consignments, the competence and quality of logistics services, the ease of arranging competitively priced shipments, the efficiency of the customs clearance process, the frequency with which shipments reach a consignee within the scheduled or expected time, and the quality of trade and transport-related infrastructure. Note that data for all components of logistics are indexed in the database from 2005; therefore, for other years, we replace it with the average value. Inserting an average value for missing observations might affect the magnitude of the estimated coefficient for the index of logistics performance. However, we explore whether the trend of improvement in logistics performance has enhanced the pattern of GVCs. Thus, this solution

helps to deal with missing observations and does not affect the meaning of the estimation of the logistics performance. All figures to calculate the index of $logistics$ are parameterised on a scale from 1 to 5 and are obtained from the World Bank's World Development Indicators database.

With respect to fta and $tradeopen$, undoubtedly, trade policies are important for bilateral traditional trade, but they may play even larger roles for GVC trade as intermediates and semi-finished products cross international borders multiple times. We expect that the trade openness index and engagement in bilateral and multilateral FTAs can reduce barriers to trade in intermediate products, thereby facilitating backward and forward GVC engagement in a country. Note that fta is a proxy of trade agreements between Viet Nam and its partners. Since Viet Nam is an official member of ASEAN, FTAs between ASEAN and its partners are also considered FTAs of Viet Nam and its partners. In the end, we hope that fta could conventionally have positive effects on GVC participation. Data on fta are taken from the WTO Center and the Vietnam Chamber of Commerce and Industry (VCCI), whilst $tradeopen$ are collected from the World Bank's World Development Indicators database. A summary of the variables considered is presented in Table 4.

Table 4: Summary of Variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
DVX	680	1.76E+05	2.47E+05	1.78E+03	1.36E+06
FVA	680	2.71E+05	5.92E+05	5.11E+02	5.01E+06
fdi	680	450.206	1392.476	0	14969.2
gdpi	680	1.24E+11	7.47E+10	3.12E+10	2.62E+11
gdpj	680	1.54E+12	2.94E+12	4.08E+10	2.14E+13
incomei	680	1370.858	763.3348	390.0933	2715.276
incomej	680	35380.12	24615.18	443.3142	111968.3
distance	680	6868.194	3491.963	807.95	13797.25
logisticsi	680	3.04183	0.070962	2.89	3.27
logisticsj	680	3.668141	0.363586	2.37	4.22
tradeopeni	680	154.9466	29.79329	111.4171	210.4002
tradeopenj	680	106.5318	87.67748	19.79813	442.62
fta	680	0.257353	0.437497	0	1

Source: Authors' own estimation.

7. Estimation Results

We provide estimation results for the determinants of Viet Nam's GVC participation at the aggregate level for both the linear gravity model (including pooled ordinary least squares (OLS), random effects, and fixed effects) and the non-linear model, namely PPML. The estimated results with the linear approach are presented in Appendix 4 and Appendix 5, whilst the estimation with the PPML approach is presented in Tables 5 and 6. Comparing R-squared and the number of significant coefficients in the estimated results with PPML with those under other approaches in Appendix 4 and Appendix 5, it is once again possible to confirm that the PPML approach is a more appropriate technique relative to the linear approach. Thus, our economic interpretations are based on the estimated results using PPML. Note that we perform the fixed effects PPML only.

Column (I) reports the estimated results when we incorporate *fdi* with the traditional variables of the gravity model only. We incorporate the logistics performance index and trade openness index to check whether our results are robust. The estimated results are presented in columns (II) and (III), respectively. Our results show that the impact of FDI on Viet Nam's GVC participation is robust. Column (IV) shows the estimated results when considering all factors. We base our estimated implications on the results from Column (IV).

First, we consider the determinants of Viet Nam's forward GVC participation. The estimation presented in Table 5 shows that inward FDI flows positively influence Viet Nam's forward GVCs. This result indicates that foreign-owned firms play an important role in Viet Nam's GVC forward participation (exports of the domestic value added used in other countries' exports). A possible reason for this is that Viet Nam's participation in GVCs is increasingly associated with FDI flows as subsidiaries provide inputs to their parent firms. In this case, trade in intermediates mainly takes the form of intrafirm transactions with production stages located in different countries, that is, vertical production networks within multinationals (Martínez-Galán and Fontoura, 2019). The estimation shows that the scale of the economy of Viet Nam and its trading partners has an advantageous effect on Viet Nam's forward GVC participation. We also discover a positive nexus between the per capita income of the trading partners and Viet Nam's GVC

participation in the forward channel, whilst no evidence is found to reveal the impact of per capita income in Viet Nam. The estimation shows that the logistics performance of Viet Nam and its trading partners positively affects Viet Nam's forward GVC participation. This implies that improvements in the logistics system (such as roads and ports) in Viet Nam could significantly promote the country's forward GVC engagement.

Table 5: Estimated Results for Viet Nam's DVX (Forward Linkage)

Variable	(I)	(II)	(III)	(IV)
lngdpi	1.3061***	1.1809***	0.7524*	0.2933***
	(0.2918)	(0.2810)	(0.3759)	(0.3750)
lngdpj	0.0492***	0.0421***	0.0827***	0.0653***
	(0.0037)	(0.0037)	(0.0048)	(0.0050)
lnincomei	1.3957***	1.2411***	0.8605*	-0.3613
	(0.3174)	(0.3054)	(0.3959)	(0.3951)
lnincomej	0.0164**	0.0276***	1.3115	0.0317***
	(0.0049)	(0.00725)	(0.0053)	(0.0067)
lndistance	-0.0424***	-0.0253**	-0.0140	-0.0092
	(0.0079)	(0.0082)	(0.0090)	(0.0087)
fta	0.0462***	0.0584***	0.0781***	0.0779***
	(0.0093)	(0.0099)	(0.0103)	(0.0105)
lnfdi	0.0104***	0.0078***	0.0052*	0.0046*
	(0.0022)	(0.0021)	(0.0021)	(0.0020)
lnlogisticsi		-0.0796		0.0013**
		(0.1309)		(0.1239)
lnlogisticsj		0.5669***		0.4789***
		(0.0502)		(0.0430)
lntradeopeni			0.1945**	0.2624***
			(0.0685)	(0.0652)
lntradeopenj			0.0860***	0.0567***
			(0.0098)	(0.0094)
_cons	-22.0312***	-20.0999***	-14.1147*	-6.0798
	(5.1579)	(4.9303)	(6.5133)	(6.4629)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
N	680	680	680	680
R-squared	0.5576	0.6400	0.6173	0.6697
Pseudo log-likelihood	-1476.9254	-1471.7727	-1473.1354	-1469.8342

Robust standard errors are in parentheses.
Legend: * p<0.05; ** p<0.01; *** p<0.001
Source: Authors' own estimation.

In the model, with all factors considered, we do not find an impact of geographical distance on Viet Nam's forward GVCs, as the coefficient is statistically insignificant. This outcome may imply that the negative effect of physical distance in forward GVC linkages between Viet Nam and trading partners would be significantly mitigated by improvements in logistics and trade liberalisation. The estimation shows a positive effect of *fta* on Viet Nam's forward GVC participation. This result affirms the significant role of trade liberalisation and economic linkages (particularly under FTAs) in Viet Nam and its partners in broadening Viet Nam's forward GVC participation. There are also positive impacts from trade openness between Viet Nam and its trading partners on Viet Nam's GVCs participation in the forward linkage. This outcome reinforces the importance of trade liberalisation from both Viet Nam and its trading partners for the improvement of Viet Nam's forward GVC participation.

Next, we estimated the determinants of Viet Nam's GVC participation in the backward channel. The estimation results are presented in Table 6.

Table 6: Estimated Results for Viet Nam's FVA Exports (Backward Linkage)

Variable	(I)	(II)	(III)	(IV)
lngdpi	0.0629	0.0960**	0.4521	0.5106**
	(0.1844)	(0.1951)	(0.2503)	(0.2695)
lngdpj	0.0822***	0.0808***	0.0876***	0.0835***
	(0.0030)	(0.0029)	(0.0040)	(0.0041)
lnincomei	-0.0546	-0.0858	0.4623	0.5278
	(0.2008)	(0.2121)	(0.2646)	(0.2848)
lnincomej	0.0175***	0.0081*	0.0150***	0.0073*
	(0.0029)	(0.0038)	(0.0028)	(0.0036)
lndistance	-0.1018***	-0.0982***	-0.0977***	-0.0964***
	(0.0053)	(0.0053)	(0.0054)	(0.0054)
fta	0.0605***	0.0629***	0.0657***	0.0656***
	(0.0070)	(0.0072)	(0.0079)	(0.0078)
lnfdi	0.0090***	0.0084***	0.0080***	0.0078***
	(0.0014)	(0.0014)	(0.0015)	(0.0015)
lnlogisticsi		-0.1054		-0.0535
		(0.0861)		(0.0869)
lnlogisticsj		0.1192**		0.1155**
		(0.0379)		(0.0395)
lntradeopeni			0.1460***	0.1577***
			(0.0436)	(0.0447)
lntradeopenj			0.0135*	0.0065
			(0.0061)	(0.0062)
_cons	-0.3882	-0.9403	8.0696	9.1532*
	(3.2604)	(3.4231)	(4.3476)	(4.6493)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
N	680	680	680	680
R-squared	0.8682	0.8702	0.8708	0.8723
Pseudo log-likelihood	-1459.3584	-1459.1048	-1459.1113	-1458.9079

Robust standard errors are in parentheses.

Legend: * p<0.05; ** p<0.01; *** p<0.001

Source: Authors' own estimation.

Similar to the forward channel, in all models, we found that FDI inflows have a positive effect on Viet Nam's GVC participation via backward linkages. This shows the increasing input imports of foreign firms in Viet Nam from abroad. The positive role of inward FDI flows in Viet Nam's backward GVC linkages can be explained in the following ways. First, foreign firms tend to import inputs because they often use inputs supplied by their business partners with a long business history and very high skills. Second, it may be due to the underdevelopment of supporting industries in Viet Nam, forcing both foreign and local firms in the country to import inputs from abroad. Third, it may be due to a limited linkage between foreign firms and local suppliers that lead foreign firms to increase the import of inputs from abroad.

The estimation demonstrates the positive role of the trading partners' economic size and market development on Viet Nam's backward GVC participation. We also discover the advantageous influence of Viet Nam's economic size on its backward GVC participation, whilst there is no evidence of the impact of Viet Nam's income per capita. As expected, geographical distance has a disadvantageous impact on Viet Nam's backward GVC linkages, which explains why Viet Nam's input demand from abroad tends to focus on proximity markets. As presented in the previous section, Viet Nam's FVA creators are mainly East Asian economies, particularly China, which is a global GVC hub. This could help firms in Viet Nam and Viet Nam's partners reduce their transportation and transaction costs. On the other hand, engagement in FTAs is found to enhance Viet Nam's backward GVC participation. This expected outcome indicates the positive effect of tariff reductions implemented by both Viet Nam and its trading partners on Viet Nam's backward GVC participation. We also find an advantageous influence of the logistic performance of trading partners on Viet Nam's backward GVC participation. Meanwhile, there is no evidence for the impact of Viet Nam's logistic performance on its backward GVC linkages. This implies a need to improve logistics performance in order to foster Viet Nam's backward GVC participation. Another important point is that there is a positive relationship between Viet Nam's trade openness and backward GVC participation. This outcome suggests that trade

liberalisation could facilitate the import of inputs from foreign countries to serve as export activities in Viet Nam.

8. Discussion and Policy Implications

Along with the rapid growth in trade and investment, Viet Nam has increasingly integrated into GVCs, allowing the country to expand its own domestic value-added exports. In terms of value, Viet Nam has shown higher integration in GVCs as a buyer and seller since 2000. Measures for importing to export consider that a significant part of the country's exports consists of FVA.

Despite such improvements, Viet Nam faces numerous constraints to increasing GVC participation in the country. Viet Nam's inward FDI flows tend to be associated more with importing foreign inputs for export processing (backward channel) rather than with exporting domestic value added for export processing abroad (forward channel). In other words, the linkages from foreign firms to the domestic private sector, as well as between local suppliers, are weak. The lack of backward supply linkages ('local sourcing') in the production of foreign firms' factories, such as Samsung Electronics Vietnam, offers a useful glimpse at the micro level to understand some of the challenges related to Viet Nam's GVC participation. Samsung held a workshop with the Vietnamese government and 200 local firms to identify the components that could be sourced locally. None of the 200 local firms met Samsung's requirements (Tong and Kokko, 2019). Attracting foreign firms, especially large MNEs in high-tech industries, is not enough to generate the positive spillover effects and demand multipliers necessary to create sustainable industrial development. If the supply linkages are weak, then there are few direct contacts between MNEs and local firms, less learning, fewer spillover benefits, and weaker prospects for upgrading and developing competitive local firms (Tong and Kokko, 2019). Thus, one crucial question for the Vietnamese government is how to promote stronger backward supply linkages (between domestic firms and foreign firms, especially MNEs) and ensure local enterprises' GVC participation.

The limitation of linkages between the Vietnamese economy and FDI flows, as well as the barriers to Viet Nam's GVCs participation via the forward channel, is likely because, in many manufacturing industries, Viet Nam only engages in the lowest midstream activities of GVCs, such as subassemblies and finished products. The Southeast Asian economy heavily depends on imported components and subassemblies. Local production is very limited; as a result, Viet Nam does not have another option but to rely on component imports to support its export activities. Upstream activities in Viet Nam's manufacturing sector are very weak. Design is carried out abroad, and the main components (such as electronic chips) are principally imported from foreign countries when only a few foreign firms have limited R&D activities in the country. At the downstream level, these activities are performed by foreign companies and produced outside Viet Nam, whilst local companies have limited international exposure and marketing capabilities due to a lack of experience and capital. This suggests that encouraging R&D activities between domestic firms themselves as well as through collaboration between foreign firms and local firms, for instance, by applying financial incentives, should be implemented.

To improve and enlarge foreign firms' contribution to Viet Nam's GVC participation, efforts to attract FDI should not be limited to large MNEs at the core of GVCs but should also be aimed at large supplier firms in upstream industries across the MNEs' value chains. On the one hand, previous studies (UNCTAD, 2013; Buelens and Tirpák, 2017; Herr et al., 2016; Tong and Kokko, 2019) have demonstrated the vital role of large MNEs in a host country's GVCs participation, including Viet Nam. MNEs in core GVCs are more likely to assist both local suppliers and foreign suppliers in their value chains in the early phases of the production process (Amendolagine et al., 2019). Thus, Viet Nam's FDI policy needs to focus on attracting large MNEs. On the other hand, there are some reasons for attracting large (tier-1) suppliers. First, tier-1 suppliers provide inputs in the form of specialised parts, which in turn contain generic and specialised components. Given the fact that local firms may not possess the skills to process and produce specialised parts, it is a good choice for them to concentrate on the manufacturing of more generic components before proceeding to the production of more complex

products (Tong and Kokko, 2019). Second, domestic firms may gain information embedded in products supplied by foreign-owned suppliers and exporting suppliers regarding foreign customers and preferences (Abegaz and Lahiri, 2020). Third, the scale of tier-1 foreign suppliers is usually smaller than that of large lead MNEs, and this characteristic may help to strengthen the negotiating power of national governments (Tong and Kokko, 2019). Therefore, by establishing contacts with tier-1 foreign suppliers, local firms would benefit from learning and spillovers and have more opportunities to participate in value chains (even as lower-tier suppliers).

In addition, policies to attract FDI flows into Viet Nam should first be directed at industries that facilitate the country's GVC participation within these industries, which then may creative spillover effects for improving GVC participation in other sectors and sub-sectors. In order to attract foreign investment in Viet Nam, efforts to improve infrastructure development, the labour market (particularly the skilled labour force), political and economic stability, and investment incentives (such as tax reductions) should be top priorities, as the literature shows that these factors are the main determinants of FDI flows into countries (Janicki and Wunnava, 2004; Vijayakumar et al., 2010; Kimino et al., 2007; Kaur, 2016; Aziz and Mishra, 2016).

Viet Nam's GVC participation in both the backward and forward channels could be further enhanced by continuously promoting Viet Nam's trade liberalisation as well as its economic linkages under bilateral and multilateral FTAs. The government needs to facilitate the use of FTAs by, for example, simplifying the procedures for obtaining certificates of origin, disseminating information on the merits of using FTAs, and providing financial support and human resource training for the enterprise sector.

Finally, complex production processes and low trade costs that span several borders require efficient logistics. The estimation in our study shows that the development of logistics helps to enhance Viet Nam's GVC participation in the forward channel. Thus, to enhance Viet Nam's GVC participation, the country should continue improving its logistics systems, such as access to good quality ports, roads, railways, and airports, and access to modern telecommunication technology and a stable supply of electricity.

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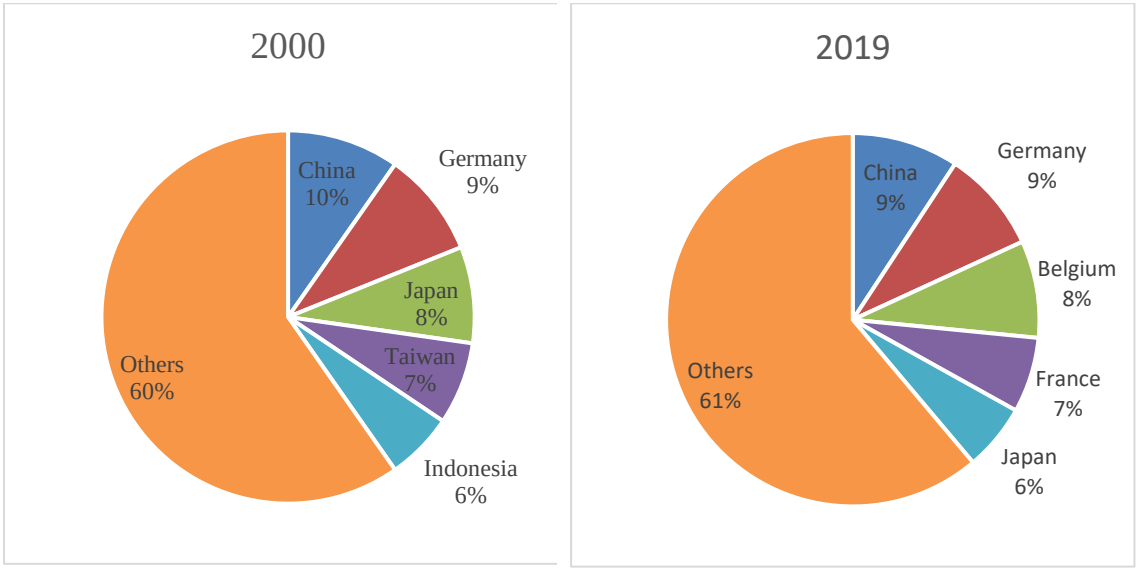
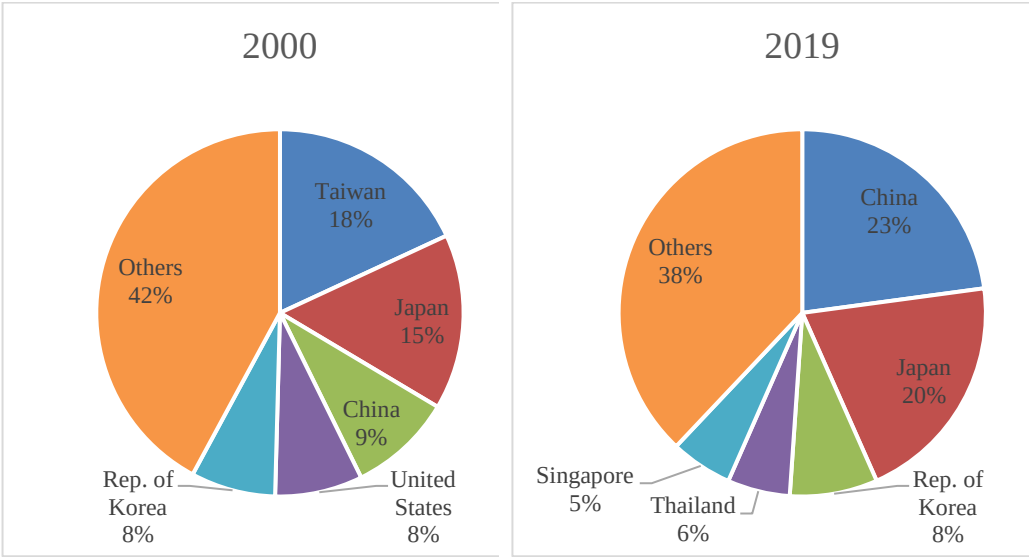
Appendix 1: Viet Nam's DVX to the World by Major Destinations in 2000 and 2019



Source: Authors' calculations from the AJC-UNCTAD-Eora database on ASEAN GVCs.

Appendix 2: FVA Exports to the World from Selected ASEAN Countries by Value Added Creator in 2000 and 2019



Source: Authors' calculations from the AJC-UNCTAD-Eora database on ASEAN GVCs.

Appendix 3: List of Countries/Territories in the Study

Australia	**Netherlands**
Austria	**New Zealand**
Belgium	**Norway**
Canada	**Philippines**
China	**Poland**
Czech Republic	**Russia**
Denmark	**Singapore**
France	**Republic of Korea**
Germany	**Spain**
Hong Kong	**Sweden**
India	**Switzerland**
Indonesia	**Malaysia**
Ireland	**Thailand**
Israel	**Turkey**
Italy	**United Arab Emirates**
Japan	**United Kingdom**
Luxembourg	**United States**

Appendix 4: Estimated Results for Viet Nam's DVX with Pooled OLS, Random Effects, and Fixed Effects

Variable	Pooled OLS	Random Effects	Fixed Effects
lngdpi	2.9874	2.9409	2.6829
	(1.8519)	(1.8735)	(1.8657)
lngdpj	0.5765***	0.59765***	0.6533***
	(0.0923)	(0.0892)	(0.1891)
lnincomei	-3.4684	-3.4716	-3.1787
	(1.9959)	(1.9779)	(1.9691)
lnincomej	-0.5547***	-0.5950***	-0.7263***
	(0.0885)	(0.0845)	(0.1861)
lndistance	-0.1974***	-0.1301***	(omitted)
	(0.1858)	(0.1860)	
fta	0.1994**	0.1880**	0.1950**
	(0.0405)	(0.0469)	(0.0671)
lnfdi	0.0232	0.0070**	0.0043
	(0.0936)	(0.0109)	(0.0109)
lnlogisticsi	-0.0599	-0.0273	0.0295
	(0.6074)	(0.6257)	(0.6188)
lnlogisticsj	3.8796***	3.8238***	2.8570***
	(0.6104)	(0.6393)	(0.7003)
lntradeopeni	3.2869***	3.2552***	3.3048***
	(0.3228)	(0.3217)	(0.3192)
lntradeopenj	0.5205***	0.5777***	0.5220***
	(0.1024)	(0.1081)	(0.1141)
_cons	-71.8859*	-71.8964*	-67.5446*
	(32.6511)	(32.6531)	(32.4280)
Year fixed effects	Yes	Yes	No
Individual fixed effects	Yes	Yes	No
N	680	680	680
R-squared	0.5825	0.5825	0.4913

Robust standard errors are in parentheses.

Legend: * p<0.05; ** p<0.01; *** p<0.001

Source: Authors' own estimation.

Appendix 5: Estimated Results for Viet Nam's FVA Exports with Pooled OLS, Random Effects, and Fixed Effects

Variable	Pooled OLS	Random Effects	Fixed Effects
lngdpi	-8.1369***	-8.1359***	-8.2139***
	(0.8656)	(0.7656)	(0.9195)
lngdpj	0.6602***	0.6243***	0.4989***
	0(.0620)	(0.0620)	(0.0932)
lnincomei	8.7801***	8.1834***	8.8951***
	(1.1195)	(1.1185)	(0.9705)
lnincomej	0.2670***	0.2909***	-0.1707
	(0.0595)	(0.0495)	(0.4917)
lndistance	-1.0611***	-1.1885***	(omitted)
	(0.2158)	(0.1157)	
fta	0.16493***	0.1656***	0.1663***
	(0.0425)	(0.0345)	(0.0331)
lnfdi	0.0068**	0.0071*	0.0036
	(0.0066)	(0.0056)	(0.0053)
lnlogisticsi	-0.7258*	-0.7402*	-0.7040*
	(0.4210)	(0.4120)	(0.3050)
lnlogisticsj	1.2792***	1.2245***	0.6449
	(0.3491)	(0.3394)	(0.3451)
lntradeopeni	2.4312***	2.4717***	2.4693***
	(0.1755)	(0.1657)	(0.1573)
lntradeopenj	-0.0673	-0.0685	-0.0898
	(0.0669)	(0.0665)	(0.0562)
_cons	136.5141***	136.1414***	132.6496***
	(16.9435)	(16.8437)	(15.9822)
Year fixed effects	Yes	Yes	No
Individual fixed effects	Yes	Yes	No
N	680	680	680
R-squared	0.7825	0.7825	0.5263

Robust standard errors are in parentheses.

Legend: * p<0.05; ** p<0.01; *** p<0.001

Source: Authors' own estimation.

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