

ERIA Discussion Paper Series**No. 410****Spillover Effects of Foreign and Domestic Exporting Firms on Export Decisions of Local Manufacturing Firms: Evidence from Viet Nam**Quang Hoan TRUONG^{#§}*Institute for Southeast Asian Studies, Vietnam Academy of Social Sciences (VASS)*

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December 2021

Abstract: *Our paper investigates the spillover effects generated by foreign and domestic exporting firms on export decisions of local manufacturing firms in Viet Nam – a developing economy – over 2010–18. In the export participation, we find positive spillover effects from foreign and domestic exporting firms on domestic firms’ export participation, while negative spillover effects are detected with the backward channel. Estimation shows the positive forward spillover effects from domestic exporting firms on domestic counterparts’ export participation; on the contrary, the forward spillover effects generated by foreign direct investment exporting firms are negative. In addition, we discover the opposite spillover effects from foreign direct investment and domestic exporting firms on the probability of export exit of domestic firms, with the negative impact under the horizontal channel and the positive one under the backward channel. There are also effects of firms’ characteristics such as labour productivity, wage, firm size, and capital intensity on the export participation and export exit of domestic firms. From empirical evidence, the paper provides policy implications to strengthen linkages between foreign and domestic exporting firms with local firms in Viet Nam.*

Keywords: spillover effects; export status; foreign and domestic exporting firms; Viet Nam.

JEL Classification: F15; F23

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[§] This research was conducted as a part of the project of the Economic Research Institute for ASEAN and East Asia (ERIA) Deepening Economic Integration ‘Global Market Entry, Survival, and Exit of Firms: Understanding the Process and the Effects’. The authors are deeply indebted to Dr. Ha Thi Thanh Doan and other members of this project for their invaluable suggestions. The opinions expressed in this paper are the sole responsibility of the authors and do not reflect the views of ERIA.

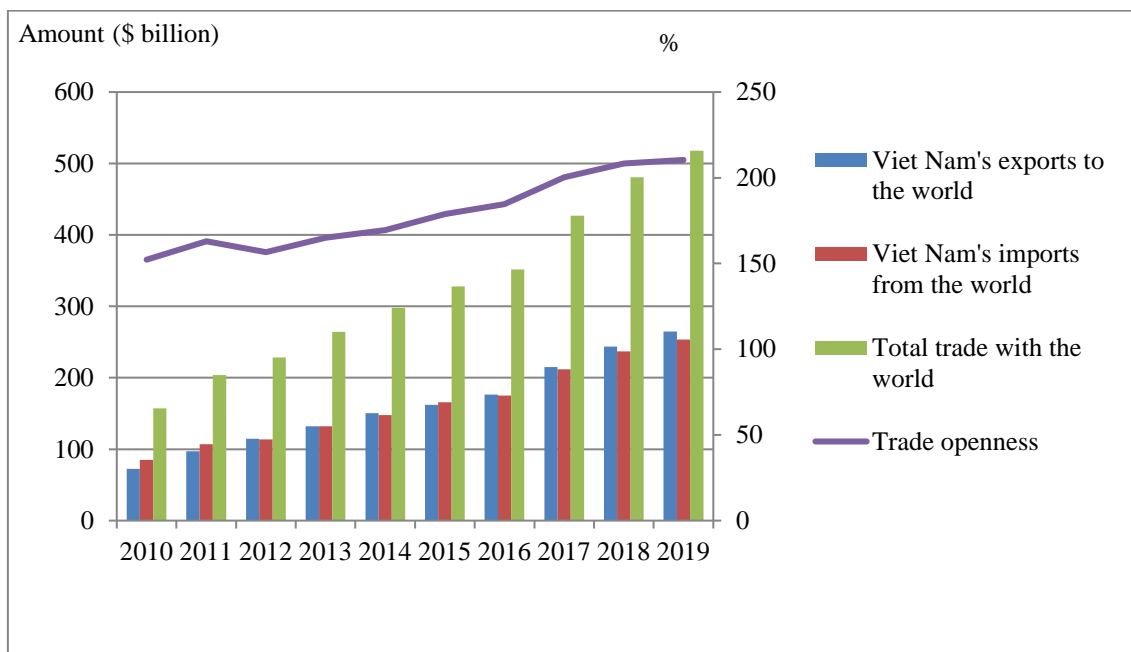
1. Introduction

It is believed that the developing countries that are embedded in the low end of export activities can upgrade their position by, for example, improving their attractiveness for and the quality of inward foreign direct investment (FDI). FDI could have direct and indirect effects on countries' product sophistication and their export participation. The direct effect is that foreign and domestic firms in a joint venture are likely to produce and sell sophisticated products to international markets. Meanwhile, the indirect effect is revealed through the spillover impacts of FDI (horizontal and vertical spillovers) on domestic firms' level of innovation (Javorcik, 2004). After having accumulated sufficient capabilities, many of these local firms undertake outward international expansion and become multinationals themselves. On the other hand, to enhance their position within export activities, firms from developing countries that started off at the lowest position can use international expansion as a way to move up to a higher value-added position. The primary direction of their movement depends on the nature of the value chain governance structure. However, there is still a lack of studies that empirically investigate the spillover effects generated not only by multinational enterprises (MNEs) but also by domestic exporting firms on the export decisions of local firms in developing countries such as Viet Nam.

Since the beginning of the Doi Moi (renovation) based on market orientation in the mid-1980s, Viet Nam – a developing economy – 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) in 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 in 2018 (Tran et al., 2020). Recently, the European Union (EU)–Viet Nam FTA has taken effect since August 2020 and is considered an ambitious pact providing almost 99% of the elimination of customs duties between the EU and Viet Nam, paving the way for increased trade between the two sides. As a result, Viet Nam is now amongst the most open economies

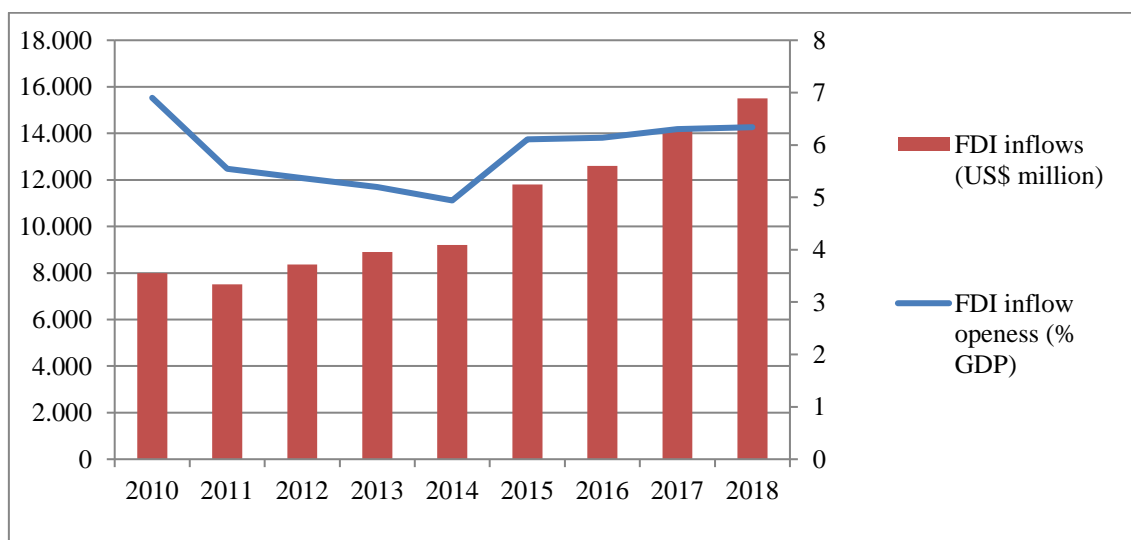
in the world, and trade and FDI have played a vital role in its economic growth (see Figures 1 and 2).

Figure 1: Viet Nam’s International Trade with the Rest of the World, 2010–19



Source: Authors’ compilation from United Nations Comtrade Database, <https://comtrade.un.org/data/>, accessed 9 December 2020 and World Development Indicators of World Bank.

Figure 2: Inward FDI Inflows into Viet Nam, 2010–18



FDI = foreign direct investment, GDP = gross domestic product.

Source: Authors’ compilation from United Nations Conference on Trade and Development (UNCTAD) database, <https://unctadstat.unctad.org/wds/TableViewer/tableView.asp>, accessed 9 December 2020 and World Development Indicators of World Bank.

While many previous studies have investigated productivity gains from FDI or the relationship between export status and productivity in Viet Nam (see Le and Pomfret, 2011; Anwar and Nguyen, 2011; Vu, 2012; Le and Shaffer, 2013; Kokko and Thang, 2014; Newman et al., 2016; Vu et al., 2016; Huynh et al., 2019; Le, 2019; Yang, 2019; Ha et al., 2020, Nguyen and Nguyen, 2020), a few attempts have been made to examine the spillover effects to other aspects of domestic firms in this Southeast Asian economy. The notable work of Ha et al. (2020) investigated the channel that foreign investment benefits the export participation of Vietnamese firms over a period of 6 years. While partly following Ha et al. (2020), our study differs as follows. First, while Ha et al. (2020) focused only on export entry, our paper looks at both export participation and export exit. Second, we consider the spillover effects from both foreign-owned firms and domestic exporting firms on domestic firms while the work of Ha et al. (2020) explored the spillover effects generated by foreign firms only. Third, our study covers a 9-year period, which is longer than that of Ha et al. (2020).

Our paper also follows the work of Abegaz and Lahiri (2020) about the spillover effects of foreign and outward-looking domestic firms on local firms in Ethiopia. Our paper will provide an example for the case of firms in a developing country that is trying to enter the global market. As noted, over the recent decade, Viet Nam has been considered a very preferred destination for FDI and a successful example of an export-led growth economy in Southeast Asia. Thus, Viet Nam offers an interesting and relevant case study to decompose spillover effects from FDI firms and domestic exporting firms on domestic counterparts. In addition, the sample size in our paper is much larger than that of Abegaz and Lahiri (2020). Besides, we do not divide spillover effects into many types because we think that it is difficult to clearly distinguish between them. We try to alleviate this problem by distinguishing between the effects of foreign-owned exporting firms and domestically owned exporting firms.

Our study, by employing firm micro-data from Vietnam Enterprise Survey (VES) in 2010–18, investigates the spillover effects generated by foreign-owned and domestic exporting firms on export decisions of Vietnamese manufacturing firms. This research proposal contributes to existing studies in several ways. First, to the best of our knowledge, this study is amongst the first that explore the spillover effects of both foreign

and domestic exporting firms on the export participation and export exit of local manufacturing firms in Viet Nam. Second, it elucidates the process and mechanisms that foreign-owned and outward-looking domestic firms use to create the spillovers to both export participation and export eschewing of local firms in developing countries. Third, it investigates the influence of spillover indexes generated by foreign and outward-looking domestic firms on the export decisions of Vietnamese manufacturing firms at both export participation and export exit. Finally, it employs an updated and rich database of firms in Viet Nam within a 9-year period (2010–18) that could incorporate time variation to observe more clearly the export behaviour of firms.

2. Literature Review

Many existing studies have focused on spillover effects of FDI on domestic firms' exporting activities with inconsistent results.

An early work of Aitken et al. (1997) studied the export behaviour of domestic firms in Mexico and found that the proximity of multinational firms raises the probability for domestic firms to access export markets. However, Bernard and Jensen (2004) found no evidence of export spillovers on a panel of United States (US) manufacturing firms. Ma (2006) highlighted the varying relationships between multinational exports and local foreign entry based on the type of ownership. The results from separating foreign-invested enterprises into overseas Chinese companies and Organisation for Economic Co-operation and Development-based multinational firms suggest that the export activity of the former does not increase the probability of exporting by local firms, whereas the latter positively influences the export decision of local firms, particularly under processing trade. Kneller and Pisu (2007) studied industrial linkages and export spillovers from FDI in the United Kingdom. They found positive and significant horizontal and regional export spillovers concerning the decision to participate in export markets. Foreign presence leads to information spillovers that reduce the sunk costs of exporting for domestic firms. Using data for Chilean manufacturing plants from 1990 to 1999, Alvarez and López (2008) found strong evidence that domestic as well as foreign-owned exporting plants improve the productivity of local suppliers. They also find some

evidence of horizontal spillovers from exporting, but these are mainly generated by plants with foreign ownership.

Sun (2012) investigated the impact of FDI on domestic exporting firms in China. The research discovered that domestic firms respond to an increase in the presence of FDI by increasing their exports, even though the increase in foreign presence can drive up production costs and make the domestic market more profitable. Using firm-level census data from 2000–03, Chen et al. (2013) found that FDI has had a positive impact on the export value of domestic firms in China, mainly through backward technology spillovers and a positive impact on the export-to-sales ratio of domestic firms through horizontal export-related information spillovers. Sun and Anwar (2016) detected that the domestic sales and exports are complementary for local firms in China's pharmaceutical industry, whereas in the case of the textile, transportation equipment, beverage, communication equipment, and general equipment manufacturing industries, domestic sales and exports are substitutes. An increase in the average domestic sales increases foreign presence in all industries. The same applies to an increase in the average export intensity.

Abegaz and Lahiri (2020) examined spillovers from domestic exporting and foreign-owned firms to the export entry and exit of local manufacturing firms in Ethiopia for the period 1996–2010. They find that downstream and upstream foreign-owned exporting firms improve the probability of domestic firms' entering into export markets.

There are many studies focusing on the impact of firms' characteristics on their export entry and export survival. Ferragina et al. (2012) distinguished the Italian firms in foreign multinationals (FMNEs), domestic multinationals (DMNEs), and domestic non-multinational firms (NMNEs). Estimation showed that FMNEs are more likely to exit the market than national firms in manufacturing and services; in contrast, DMNEs have a higher chance of survival compared with the other firm categories in services. Sarmento and Forte (2019) explored that foreign presence at the industry level increases Portuguese firms' probability of exit from manufacturing sectors, while firms with foreign ownership have a lower probability of exit than purely domestic firms. Wagner (2013) examined the links between firm survival and three types of international trade activities, i.e. exports, imports, and two-way trade, by using unique new representative data for manufacturing enterprises from Germany. The results indicate a strong positive link between a firm's

survival on the one hand and imports and two-way trading on the other hand, while exporting alone does not play a role for exiting the market or not.

Askenazy et al. (2015), by using a unique longitudinal dataset on French firms, found that financial constraints hamper a firm's ability to cover fixed entry costs, as well as recurrent costs associated with maintaining the presence in a foreign market, thereby reducing the probability of entering into a new foreign market and increasing the probability of abandoning an existing foreign market. Dzhumashev et al. (2016) found that exporting has competing effects on the firm survival of the Indian information technology industry. On the one hand, exporting and investing in productivity are complementary activities; on the other, exporting activity is an additional source of uncertainty for the firm.

With respect to Viet Nam, there are also studies that investigate productivity gains from FDI, or the relationship between export status and productivity of firms in Viet Nam. Meanwhile, very few studies have focused on the spillover effects of both foreign and domestic exporting firms in the export decisions of Vietnamese manufacturing firms. Nguyen and Sun (2012) investigated firms' export behaviour in Viet Nam's manufacturing sector, using a Heckman sample selection model estimated over firm-level data in 2003 and 2004. They found that firm-specific characteristics have significant impacts on firm export behaviour; there exist significant export spillovers from FDI to domestic firms, and spillovers are heterogeneous and depend on firm characteristics. Kokko and Thang (2014), using detailed firm-level data for 2001–08, examined the aggregate effect of FDI on the survival of domestic private firms in Viet Nam. They found that horizontal and upstream FDI raises the exit hazard significantly, while downstream FDI may reduce the hazard. Newman et al. (2016) uses an extensive 2005–12 firm-level panel dataset from Viet Nam and separates out productivity effects of exporting due to self-selection. They find strong evidence that private domestic firms in Viet Nam learn and accumulate knowledge from export markets, with learning attributed in some part to within-firm innovations, in particular research and development.

Baccini et al. (2019) explored that WTO accession is associated with a higher probability of exit, lower markups, and substantial increases in productivity for private firms but not for state-owned enterprises (SOEs) in Viet Nam. Domestic barriers to entry and preferential access to credit are key drivers of the different responses of SOEs to trade

liberalization. Le (2019) explored that FDI, as well as the GDP per capita, have positive impacts on private investment in both the short and long run. Meanwhile, inflation can harm private investment and its impact level in long run is smaller than in the short run. Yang (2019) explored that FDI stimulates more domestic entrants in the short run, while the aggregate effect of FDI varies across FDI types. Horizontal FDI tends to have no impact on local start-ups, while vertical FDI is found to have a positive impact on the inflow of domestic entry for only the backward linkage and not for the forward linkage. Using a large Vietnamese firm-level dataset, recent research by Ha et al. (2020) found evidence of significant spillovers on both the export decision and performance from multinationals to domestic firms. With respect to vertical linkages, they find evidence that foreign firms exert a significant positive effect on domestic firms' export activities in upstream sectors and a strongly significant negative effect on the export behaviour of domestic firms in downstream sectors. They also find evidence suggesting that low-tech firms' export behaviour is more likely to be influenced by the presence of multinationals than that of high-tech manufacturing firms.

In short, recent literature has increasingly paid attention to spillover effects on the export decision of local firms with mixed results. Several works show significant positive spillover effects from FDI while some find no or statistically insignificant effects from FDI spillover. There are also mixed results in existing studies on the impact of the firms' characteristics on local firm's export decision. The diverse results could be attributed to differences in nations' ability to gain from foreign presence which reflect varying levels of absorptive capacity and market structure. With respect to Viet Nam, some studies find significant impacts of FDI spillovers on domestic firms' export activities, while others do not find the role of FDI presence in domestic firms' participation in international markets. In particular, there is sporadic research that empirically examines the spillover effects of both foreign and domestic exporting firms on export participation and export exit of local manufacturing firms in Viet Nam and other developing countries. Thus, it is necessary to have more empirical studies of spillover effects from FDI and domestic exporting firms on domestic firms' export participation in Viet Nam.

3. Data and Methodology

3.1. Export Participation and Export Exit

Theoretically and practically, firms participate in exporting based on a range of exogenous and endogenous components. It is a fact that some may strategise in a way of offering sales either internationally or domestically only or both. Admittedly, this strategy can be affected by the participation of foreign enterprises through domestic investment activities. Besides, the export-participating behaviour of firms might be influenced by the performance of outward-looking domestic firms. We will involve both internal and external components to analyse spillover effects on the export status and decision of export exit. To explore the firm's export participation or exiting decisions, we apply the panel dataset with the probit approach. As shown by Abegaz and Lahiri (2020) and Ha et al. (2020), the probit estimation model is more appropriate for export participation status. The function takes a form as follows:

$$EN_{ij,t} = \varphi_0 + \varphi_1 EN_{i,t-1} + \sum \varphi_{2i} FC_{i,t-1} + \sum \varphi_{3j} SP_{jt} + \eta_j + \zeta_t + \varepsilon_{ij,t}, \quad (1)$$

where i, j , and t , in turn, are firm, industry, and time. $EN_{i,t}$ presents the probability of exporting participation status and takes a value of 1 if a firm exports; otherwise, it takes 0. FC is a vector of a firm's characteristics, including performance, type of ownership (1 if firms are state-owned, and 0 if firms are private), number of labours, capital intensity, and location. SP presents a vector of spillover indexes presenting the horizontal and vertical participation of foreign-exporting firms and domestic exporting firms. η and ζ are individual industry and time fixed effects. Finally, ε is the error term.

Similar to the firm's export participation, the equations for the export-exiting decision model is as follows:

$$EX_{ij,t} = \phi_0 + \sum \phi_{1i} FC_{i,t-1} + \sum \phi_{2j} SP_{jt} + \eta_j + \zeta_t + \varepsilon_{ij,t}, \quad (2)$$

where, $EX_{i,t}$ is the decision of export exit amongst the previous exporting firms. The firm i is considered as a decision of export exit at time t if the firm i exports at time $t-1$ and chooses to exit at time t . The variable takes the value of 1 if the firm decides to exit; otherwise, 0. Though a firm might enter or exit at any time, we would like to focus only

on the firm's behaviour of year t compared to year $t-1$ rather than the interval spells. Thus, the 2 consecutive years approach (year t and year $t-1$) of exporting exit decision is intuitively more suitable. For a case of adopting an export-driven strategy like Viet Nam, it is common that firms may eschew the foreign markets at a specific time due to uncertainties such as financial difficulties or shocks of input shortage, but these firms may participate in the exporting activity again after they handle the problem or get support from authorities.

3.2. Spillover Effects

In contrast to Abegaz and Lahiri (2020), we look at spillover effects generated by two types of firms: foreign exporting firms, and domestic exporting firms. The reason is that it is difficult to distinguish the spillover effects between many different types of firms. It is also believed that, due to stronger linkages with MNEs and the advantage of a firm's characteristics (such as size and capital intensity), foreign exporting firms are considered the major source of spillover effects compared with FDI firms that serve the domestic market only. In literature, there are two types of spillover effects: horizontal and vertical spillovers. Horizontal spillovers refer to externalities created by these types of firms to local firms that are active in the same industry; while, vertical spillovers are the ones generated by these firms to both upstream and downstream players in the supply chain. These vertical spillovers are divided into backward spillovers and forward spillovers.

In particular, horizontal spillovers take effect when local firms gain information externalities provided by MNEs and exporting firms regarding foreign markets, foreign consumers, foreign technology, the way that local firms can distribute their products (Aitken et al., 1997), and access to trade infrastructure. This may lower the costs of entry and acquisition of export market information and help domestic firms start exporting. Meanwhile, domestic firms may also look to the international market as an outlet when an increase in competition comes from the presence of MNEs and the exporting firms in an industry.

On the vertical side, backward spillovers occur when foreign firms or domestic exporting firms make contracts with domestic suppliers of intermediate inputs and directly transfer knowledge and technologies to enhance the production capability of their

local suppliers and help them start exporting (Alvarez and López, 2008). Furthermore, local firms may access the distribution services and logistics infrastructure of MNEs in the downstream sector. It should be noted that the effect of the backward spillover channel relies on the degree to which MNEs source locally. When inputs are predominantly acquired from abroad, positive backward spillovers are limited in size (Javorcik, 2008).

Forward spillovers occur when domestic firms can produce more sophisticated products and start exporting when foreign-owned firms located in the domestic market supply intermediate inputs using new technologies or processes. In addition, domestic firms may gain information embedded in the products supplied by foreign-owned suppliers and exporting suppliers regarding foreign customers and preferences (Abegaz and Lahiri, 2020). It is worth noting that the magnitude of the effect of positive forward spillovers depends on the availability of sophisticated inputs before the entry of multinational downstream firms and the quality input of exporting firms. If sophisticated inputs are accessible via imports and the technological gap between local and foreign firms is too large, the forward spillovers are limited in size (Javorcik, 2008). The forward spillover effects could even become negative if there are sharp differences in technology, quality standards, and the costs of doing business between foreign firms and local counterparts; these factors trigger the foreign firms to sell their intermediate products to international market (Chen et al., 2013). As a result, there is stronger competition between domestic firms and foreign firms in the same downstream industries, which could negatively influence domestic firms' export participation (Chen et al., 2013).

On the other hand, the presence of foreign or domestic exporting firms may also lead to the exit of firms in global markets. As noted, the presence of foreign firms or domestic exporting firms could affect the export decision of domestic firms both through increasing competition and/or from information externalities. When the competition increases from the presence of FDI firms and domestic exporting firms or the sunk cost due to information externalities, domestic firms are forced to be more productive, allowing them to start exporting or survive in the international market. However, when this is not done, the higher competition may lead to the exit of local firms in the international market (Kneller and Pisu, 2007). Domestic firms may face competition from FDI and domestic firms in the labour and resource markets that trigger local companies to leave the international market (crowding-out effect). Additionally, FDI firms' activities may also

lead to an increase in input prices, creating competitive difficulties for domestic firms, thus leading to the exit of less-efficient domestic rivals (Görg and Strobl, 2003). Another channel is that, due to information asymmetries, domestic firms may feel that the entry cost in the international market is too high and uncertain. They might also feel that the profitable opportunities available in foreign markets are too low. This factor discourages local firms from export market participation (Greenaway and Kneller, 2004). Under the backward channel, there is also the case that domestic firms find it hard to provide intermediate input due to higher requirements from FDI and domestic exporting firms, leading domestic firms to leave the production chain established by the latter.

For a developing country, it is possible that foreign-owned exporters are the main source of technologies and knowledge (Alvarez and López, 2008). Therefore, we expect that the spillover effect from FDI exporting firms could be stronger than that of domestic exporting firms. Foreign-owned firms in developing countries are often affiliations of MNEs, so we expect that spillover effects via vertical channels from foreign exporting firms are stronger than the effect generated by domestic exporting firms. There is a possible case that domestic and foreign-owned firms may compete to enlarge their exports and attract international customers. Such competition may enhance the export activities of domestic firms (Abegaz and Lahiri, 2020). However, the literature shows that it is difficult to clearly decompose the differences in the magnitude and mechanisms of effects between FDI exporting firms and domestic exporting firms. Thus, our paper, besides studying the spillover effect from FDI exporting firms, searches for evidence on the existence of the spillover effects generated by domestic exporting firms rather than focusing on distinguishing the differences in spillover effects from domestic exporting firms and foreign counterparts.

Employing the approach by Alvarez and López (2008), and Abegaz and Lahiri (2020), we compute horizontal spillover indexes for each group of exporting firms as follows:

Horizontal effects index for the participation of the exporting foreign firms:

$$Hori_F_E_{jt} = \frac{EY_{jt}^F}{Y_{jt}} \quad (5.1)$$

where, EY_{jt}^F is total sales of foreign firm's exports in sector j at time t , and Y_{jt} is total sale of sector j at time t . By the same taken, horizontal effects index of local exporting firms, is calculated as follows:

$$Hori_{D_E_{jt}} = \frac{EY_{jt}^D}{Y_{jt}} \quad (5.2)$$

where, EY_{jt}^D is total export sales of domestic exporting firms.

The backward spillover index for downstream exporting foreign firms is presented as follows:

$$Back_F_E_{jt} = \sum_{j \neq k} \alpha_{kj} Hori_F_E_{jt} \quad (5.3)$$

where, α_{jk} is the share of upstream output j supplied to downstream industry k to total output of upstream industry j . Similarly, the forward spillovers index for the presence of exporting foreign firms is exhibited as follows:

$$Forw_F_E_{jt} = \sum_{j \neq k} \beta_{jk} Hori_F_E_{jt} \quad (5.4)$$

where, β_{kj} is the share of upstream sector k 's output sold to downstream industry j .

Doing the same process, the formulation to compute backward and forward spillover effects for presence of domestic exporting firms are expressed as follows:

$$Back_D_E_{jt} = \sum_{j \neq k} \alpha_{kj} Hori_D_E_{jt} \quad (5.5)$$

and

$$Forw_D_E_{jt} = \sum_{j \neq k} \beta_{jk} Hori_D_E_{jt} \quad (5.6)$$

We use the input–output table 2012 to calculate vertical spillover effects of the backward and forward index. Note that the input use does not separate firms into foreign or domestic ownership; thus, we use the same coefficients for both foreign firms and exporting domestic firms. However, by incorporating firms' characteristics, to some

extent, our model still presents the productivity difference between foreign and domestic firms.

3.3. Data and Variables

Data used for the models are compiled from several following sources:

(i) Data at the firm level are collected from the VES database for 2010–18.

(ii) Data of backward and forward spillover effects are derived from the input–output table of Viet Nam for 2012.

The VES includes major information of all registered enterprises; in this study, we compile a panel dataset of all manufacturing enterprises across the 9-year period. Specifically, it includes firm characteristics, gender participation, access to finance, annual sales, workforce composition, licensing, trade, competition, capacity utilization, land and permits, taxation, and performance measures.

Remarkably, the product classification of VES uses the Vietnam Standard Industrial Classification (VSIC) definition and the system of Vietnamese products. Most sectors in this data can be found in VSIC codes, including 88 sectors at the two-digit level. The raw data contain sectors codes for each firm in the dataset; by linking that code to the VSIC codes, we can see which sector each firm belongs to. In this dataset, we can also see the ownership status of firms.

Table 1 provides summary statistics of raw data from VES. Total firms registered in Viet Nam rapidly increased from 286,541 firms in 2010 to 455,300 and 621,686 firms in 2015 and 2018, respectively. The number of domestic firms had grown from 277,602 firms in 2010 to 606,877 firms in 2018, sharing over 95% of total firms. Despite the rapidly increasing number of foreign firms, their share in Viet Nam’s total firms remained very low between 2010 and 2018. The total number of firms in the manufacturing sector reached 98,309 in 2018 from 43,996 in 2010, of which the share of domestic firms increased from 88.9% in 2010 to 91.5% in 2018. The number of foreign firms also grew to 8,275 in 2018, amounting to 8.85% of total manufacturing firms, which was significantly higher than the average proportion of foreign firms in all sectors.

Table 1: Summary Statistics of VES

Year	Total firms	Domestic firms	Foreign firms	Manufacturing firms		
				Domestic firms	Foreign firms	Total firms
2010	286,541	277,602	8,939	39,150	4,846	43,996
2011	343,215	331,048	12,167	46,634	5,530	52,164
2012	358,557	349,587	8,970	49,948	4,875	54,823
2013	381,599	371,595	10,004	51,299	5,247	56,546
2014	415,656	404,476	11,180	56,555	5,902	62,457
2015	455,300	443,373	11,927	59,156	6,210	65,366
2016	517,695	503,685	14,010	65,752	6,984	72,736
2017	593,184	577,672	15,512	75,482	7,661	83,143
2018	621,686	606,877	14,809	90,034	8,275	98,309

VES = Vietnam Enterprise Survey.

Source: Authors' processing from VES.

From the raw VES data, we create the clean data used for estimation. The summary statistics are presented in Table 2. In general, the number of firms does not reduce significantly in clean data compared to raw data. For example, we dropped 5,721 firms in 2017 and 4,321 firms in 2018 in clean data, or less than 5% of total firms. The firms dropped are mostly domestic manufacturing firms which do not have enough information about export value (negative volume), tax identification (identified as unknown), and negative and zero value in sales, labour, and capital, respectively.

Table 2: Summary Statistics of VES (Clean Data)

Year	Total firms	Domestic firms	Foreign firms	Manufacturing firms		
				Domestic firms	Foreign firms	Total firms
2010	284,127	275,453	8,674	39,005	4,800	43,805
2011	321,554	310,433	11,121	44,375	5,421	49,796
2012	357,006	348,103	8,903	49,813	4,855	54,668
2013	379,286	369,672	9,614	51,192	5,151	56,343
2014	412,953	402,082	10,871	56,392	5,848	62,240
2015	415,457	403,899	11,558	54,790	6,122	60,912
2016	479,710	466,393	13,317	62,290	6,756	69,046
2017	547,837	533,242	14,595	69,991	7,431	77,422
2018	605,384	591,094	14,290	85,900	8,088	93,988

VES = Vietnam Enterprise Survey.

VES = Vietnam Enterprise Survey.

Source: Authors' processing from VES.

The 2012 input–output table comprises a square matrix of 164 sectors at time t . We can link most of these sectors with a 2-digit sector code from the 2007 VSIC, while the

other sectors that have no clear link are ignored. From that, we can estimate the spillover index from foreign and domestic exporting firms over 2010–18, as shown in Table 3. The spillover effects include horizontal, backward, and forward linkages of FDI exporting firms, as well as domestic exporting firms.

We constructed an unbalanced panel data from the raw data of VES. As noted, the sectors that firms registered in VES are VSIC; thus, we can link the 5-digit sectors of firms with the 2-digit sector in the manufacturing sector (see Appendix 1). There are firm characteristic variables in the models including ownership, location (industrial zone), exporting, firm size, capital intensity, wage, and market share of the firm in the industry. Other variables include the spillover effect index. The summary statistics of variables are presented in Table 3.

Table 3: Summary Statistics of Variables

Variable	Mean	Std. Dev.	Min	Max
HoriFDI	0.0535	0.1056	0.0000	0.0782
BackFDI	0.0013	0.0038	0.0000	0.0562
ForwFDI	0.0012	0.0039	0.0000	0.0958
HoriEX	0.0027	0.0271	0.0001	0.4192
BackEX	0.3674	0.2634	0.0032	0.4531
ForwEX	0.2087	0.0987	0.0001	0.3784
Hori_F_E	0.0301	0.0547	0.0000	0.0914
Back_F_E	0.0374	0.0675	0.0000	0.0925
Forw_F_E	0.9523	0.6518	0.0000	0.2012
Hori_D_E	0.0118	0.0177	0.0000	0.0323
Back_D_E	0.0345	0.0784	0.0000	0.0647
Forw_D_E	0.0302	0.06622	0.0000	0.0729
productivity	891.8653	6878.6590	0.0000	1493925
wage	68.1877	349.4722	0.0100	106175
firm size	1.6891	0.8807	1	4
capital-intensive	63516	119578	0.05	2.89E+08
location	0.4407	0.2317	0	1
ownership	0.0995	0.2994	0	1

Source: Authors' estimation from VES and IO Table 2012.

4. Estimation Results

We explore the spillover effects of FDI manufacturing firms and domestic manufacturing firms on the export participation and export exit of domestic firms in Viet Nam.

Before discussing the spillover effects in detail, we estimate traditional export spillovers, which use the total exporting share of foreign firms and total exporting values of domestic exporting firms to generate the aggregate horizontal and vertical (including backward and forward) effects. It is popular to show that these spillover effects partially affect the export entry and export exit decision of firms (Kneller and Pisu, 2007; Abegaz and Lahiri, 2020; Greenaway et al., 2004). Estimated results are shown in Table 4 and Table 5.

Table 4: Estimated Results for Export Participation with Aggregate Spillover Indexes

Variable	Spillovers from FDI firms		Spillovers from exporting firms	
	(1)	(2)	(3)	(4)
EN _{t-1}	0.1869*** (0.0081)	0.1874*** (0.0082)	0.2086*** (0.0079)	0.2087*** (0.0079)
Inprod	0.1220*** (0.0027)	0.1241*** (0.0027)	0.1430*** (0.0027)	0.1429*** (0.0027)
Inwage	0.3151*** (0.0045)	0.3117*** (0.0045)	0.3854*** (0.0044)	0.3855*** (0.0044)
Infirmsize	1.6472*** (0.0085)	1.6442*** (.0085)	1.9892*** (0.0082)	1.9892*** (0.0082)
Incapital	0.0645*** (0.0031)	0.0670*** (0.0031)	0.0726*** (0.0031)	0.0725*** (0.0031)
location	-0.0737*** (0.0029)	-0.0749*** (0.0029)	0.0490*** (0.0028)	-0.0489*** (0.0028)
ownership	-0.2988*** (0.0120)	-0.2967*** (.0120)	0.4677*** (0.0124)	-0.4677*** (0.0124)
HoriFDI	5.9264*** (0.0590)	6.8666*** (.0883)		
BackFDI		2.9343 (2.8014)		
ForwFDI		-8.4435*** (2.2812)		

HoriEX			0.2212**** (0.2161)	0.4431* (0.1681)
BackEX				-0.4668 (0.1347)
ForwEX				0.2670 (0.5990)
_cons	-4.4390*** (0.0222)	-4.4520*** (0.0223)	5.0140*** (0.0217)	-5.0139*** (0.0217)
year fixed	yes	yes	yes	yes
industry fixed	yes	yes	yes	yes
R-squared	0.4109	0.4120	0.3724	0.3724
N	568220	568220	568220	568220

FDI = foreign direct investment.

Note: Robust standard errors in parenthesis

*p<0.05; ** p<0.01; *** p<0.001

Source: Authors.

For the export participation model, the estimation results in Table 4 show that foreign-owned firms generate spillover effects on the export participation of domestic firms via horizontal channels. This is in line with previous studies (Chen et al., 2013; Ha et al., 2020). By contrast, the presence of FDI firms generates a negative spillover impact on domestic firms' export participation via forward channels, showing a significant technological gap between foreign firms and local counterparts. The technological gap is one of the crucial elements leading to spillover effects, but if the gap is too large, negative effects could occur with respect to domestic firms due to the emergence of the crowding-out effects. As a developing country, only industries or firms with quite advanced technologies in Viet Nam can absorb advanced technologies associated with the FDI presence (Le, 2007). When looking at the spillover effect from exporting firms (without identifying whether they are foreign-owned or domestic firms), we find that exporting firms generate a positive horizontal effect on the export participation status of domestic firms. In addition, a firm's characteristics such as labour productivity, export experience, wage, scale, and capital intensity have a positive effect on domestic firms' export participation.

For the export exit model, estimation results in Table 5 show that there is no evidence to reveal the horizontal and vertical spillover effect generated by foreign-owned firms, as well as by exporting firms. We also do not find the impact of a firm's characteristics on the export exit of domestic firms.

Table 5: Estimated Results for Export Exit Decision with Aggregate Spillover Indexes

Variable	Spillovers from FDI firms		Spillovers from exporting firms	
	(1)	(2)	(3)	(4)
Inprod	0.0415 (0.2029)	0.0360 (0.2048)	0.0317 (0.2067)	0.0206 (0.2071)
Inwage	-0.1882 (0.2007)	-0.1862 (0.2011)	-0.1881 (0.1963)	-0.1919 (0.1968)
lnfirmsize	0.7302 (0.6725)	0.7335 (0.6713)	0.7152 (0.6273)	0.7063 (0.6267)
Incapital	0.0011 (0.2039)	-0.0019 (0.2041)	0.0066 (0.2067)	0.0146 (0.2075)
location	-0.1103 (.2902)	-0.1113 (0.2926)	-0.1126 (0.2809)	-0.1174 (0.2779)
ownership	-0.2017 (1.0380)	-0.2000 (1.0342)	-0.1974 (1.0179)	-0.1935 (1.0245)
HoriFDI	0.0036 (1.7547)	-0.2092 (2.2920)		
BackFDI		13.5174 (59.5028)		
ForwFDI		-4.9294 (54.1715)		
HoriEX			-0.0003 (0.0017)	-0.0004 (0.0156)
BackEX				0.0761 (0.2994)
ForwEX				-0.3362 (1.4405)
_cons	-4.3910** (1.4449)	-4.3484** (1.4618)	-4.3341** (1.3706)	-4.2585** (1.3774)
year fixed	yes	yes	yes	yes
industry fixed	yes	yes	yes	yes
R-squared	0.2988	0.1789	0.2598	0.3912
N	43,906	43,906	43,906	43,906

FDI = foreign direct investment.

Note: Robust standard errors in parenthesis

*p<0.05; ** p<0.01; *** p<0.001

Source: Authors.

Next, we consider the separate spillover effects of foreign exporting firms and domestic exporting firms on the export decisions of domestic firms in Viet Nam's manufacturing industry. Table 6 and Table 7 provide estimation results for export participation and export exit decision, respectively.

For export participation, the estimation outcome in Table 6 shows that the export participation of domestic firms is positively influenced by horizontal spillovers generated from FDI exporting firms and domestic exporting firms. This implies positive impacts from FDI and domestic exporting firms as competitors creating on the export participation

of domestic firms. More specifically, local firms in Viet Nam may obtain information externalities (such as international markets, customers' preferences, foreign technology) provided by foreign-owned firms (Le and Pomfret, 2011). Likewise, domestic exporting firms may create a knowledge spillover effect on the export participation of domestic firms. Vietnamese domestic firms may also access to existing trade infrastructure established by foreign and domestic exporting firms, leading to the reduction of the costs of entry and acquisition of export market information. As a result, domestic firms can start exporting. Meanwhile, domestic firms in Viet Nam often do not have advantages such as firm size, and capital intensity; thus, they may also look for the international market as an outlet when the competition level from the presence of FDI and domestic exporting firms in an industry increases.

With respect to vertical linkages, estimation outcome demonstrates the negative backward spillover effect from both FDI and domestic exporting firms on the market participation of Vietnamese domestic firms. As noted by Javorcik (2008), the effect of the backward spillover channel relies on the degree to which MNEs source locally. When inputs are predominantly acquired from abroad, positive backward spillovers are limited in size. The effects may turn negative if exporters purchase most inputs from abroad instead of sourcing locally.

Looking inside Viet Nam, it is observed that FDI and domestic firms have a low level of localization. One of the main causalities is that Viet Nam has underdeveloped supporting industries; in other words, there is weakness regarding the domestic firms' ability to supply input for FDI and domestic exporting firms. This fact can be clearly observed in key exporting industries such as the electronics industry and the textile and garment industry. More specifically, Samsung's factories in Viet Nam rely heavily on Republic of Korea (henceforth, Korea) suppliers that have co-located in Viet Nam to produce intermediate inputs or depends on imports from Korea and third countries. Despite the recent expansion, the number of Vietnamese local suppliers, particularly Tier-1 suppliers, remained very low. Efforts to increase local content by local enterprises have gained limited outcomes. For example, Samsung held a workshop with the Vietnamese government and 200 local firms to see which of these components could be sourced locally. None of the 200 local firms was able to meet Samsung's requirements (Tong and Kokko, 2019). Similarly, domestic firms in the textile and garment industry focus on

vertically integrating within Viet Nam and selling their products to the local markets rather than the international markets via making attempts to establish global supply and distribution relationships with MNEs. In addition, both FDI and domestic firms in Viet Nam's textile and garment industry are heavily dependent on input from outside, particularly China. These factors lower the backward linkages between FDI firms and domestic firms in those industries.

Table 6 also shows a negative forward spillover effect from FDI exporting firms on export participation of domestic firms. This result implies that foreign-owned firms in upstream sectors discourage domestic firms in the downstream sectors from engaging in exporting activities, revealing the significant technological gap between local and foreign firms (Javorcik, 2008). The negative forward spillover impacts can be attributed to differences in product quality standards, lack of compatibility in technology levels, and costs of doing business, which likely induce FDI and domestic exporting firms to sell their intermediate products to either other FDI and domestic exporting firms or the international market rather than to domestic firms in the downstream industries (Chen et al., 2013). This generates higher competition between domestic firms and foreign counterparts in the same downstream industries which can disadvantageously influence domestic firms' export participation in Viet Nam. On the contrary, we explore that domestic exporting firms have a positive forward spillover effect on domestic firms' export participation status. The possible reason is that the technological gap between domestic exporting firms and domestic counterparts is not too large.

The estimating results represent that domestic firms' export experience in the previous year has a significant influence on their export participation status, which is consistent with the literature (Aitken et al., 1997; Chen et al., 2013; Ha et al., 2020). Firms with export experience often have information and established business networks in the international market, which reduce the sunk costs and encourage them to continue exporting in next years (Inui et al., 2017; Ha et al., 2020). Another possible explanation is that firms having experience in foreign markets tend to have higher productivity compared to firms without export experience, as the former can diversify the risk more easily and have higher knowledge absorptive capacity (Franco and Gelübcke, 2015).

The estimation results for other characteristics of firms such as labour productivity, wage, firm size, and capital intensity show positive signs. Domestic firms with higher

labour productivity could compete better; consequently, they tend to engage more in export activities compared to lower-labour productivity firms. Large firms tend to cultivate the international market to increase revenue and maximize profit. In general, these results are in line with previous studies (Kneller and Pisu, 2007; Anwar and Nguyen, 2011; Le and Pomfret, 2011; Sun, 2012). Interestingly, we detected that the location variable has a negative relation with the export participation of domestic firms. The possible reason is that local firms find difficulties in competing with foreign firms in the industrial zone. In addition, domestic firms may not have information about the international market, or they could not engage in established production networks of FDI and domestic exporting firms. Estimation results show that ownership status (public or private) has a disadvantageous effect on the export participation of domestic firms, indicating that state-owned firms tend to be less involved in export activity than private firms. As a reflection of this, due to complicated administrative procedures, Vietnamese SOEs are less dynamic than private firms to make export decisions.

Table 6: Estimated Results for Export Participation

Variable	(1)	(2)	(3)	(4)	(5)	(6)
EN _{t-1}	0.1744*** (0.0087)	0.1743*** (0.0087)	0.2150*** (0.0082)	0.2120*** (0.0082)	0.1721*** (0.0094)	0.1669*** (0.0094)
lnprod	0.1469*** (0.0028)	0.1484*** (0.0029)	0.1140*** (0.0027)	0.1161*** (0.0027)	0.0958*** (0.0030)	0.1023*** (0.0030)
lnwage	0.2580*** (0.0047)	0.2567*** (0.0047)	0.4313*** (0.0046)	0.4302*** (0.0046)	0.2934*** (0.0051)	0.2873*** (0.0051)
lnfirmsize	1.6452*** (0.0088)	1.6424*** (0.0088)	1.8817*** (0.0084)	1.8792*** (0.0084)	1.3328*** (0.0093)	1.3252*** (0.0094)
lncapital	0.0525*** (0.0033)	0.0541*** (0.0033)	0.0973*** (0.0032)	0.1012*** (0.0032)	0.0970*** (0.0036)	0.1069*** (0.0036)
location	-0.0569*** (0.0030)	-0.0590*** (0.0030)	-0.0134*** (0.0028)	0.0140*** (0.0028)	-0.0053 (0.0031)	-0.0093*** (0.0031)
ownership	-0.2087*** (0.0121)	-0.2075*** (0.0121)	-0.5662*** (0.0138)	-0.5696*** (0.0139)	-0.2204*** (0.0135)	-0.2203*** (0.0135)
Hori_F_E	3.6638*** (0.8279)	2.1887*** (0.4795)			2.3401*** (0.9089)	3.3500*** (0.5783)
Back_F_E		-6.2800** (0.9784)				-8.2056*** (2.2223)
Forw_F_E		-3.9138*** (1.1628)				-2.4296*** (0.4128)
Hori_D_E			2.5406*** (0.8973)	5.9528*** (0.2567)	3.1054*** (0.0568)	4.5523*** (0.5088)
Back_D_E				-9.621*** (0.23619)		-6.3045*** (0.5845)
Forw_D_E				8.6458*** (1.3141)		4.5435*** (1.9814)
_cons	-4.3893*** (0.0232)	-4.4012*** (0.0232)	-5.2467*** (0.0228)	5.2776*** (0.0229)	-4.5521*** (0.0250)	-4.6220*** (0.0252)

year fixed	yes	yes	yes	yes	yes	yes
industry fixed	yes	yes	yes	yes	yes	yes
R-squared	0.3834	0.3534	0.3181	0.4205	0.3573	0.3612
N	568220	568220	568220	568220	568220	568220

Note: Robust standard errors in parenthesis

*p<0.05; ** p<0.01; *** p<0.001

Source: Authors.

Next, Table 7 provides estimation results for determinants of domestic firms' export exit. For spillover effects, the estimation shows that FDI exporting firms and domestic exporting firms generate negative horizontal spillover effects on the export exit of domestic firms. In other words, domestic firms tend to reduce exit from the international market due to horizontal spillover effects generated by FDI and domestic exporting firms. These estimation results are consistent with the estimates for the export participation model, while contrasting with the findings of Abegaz and Lahiri (2020). This indicates the positive competitive effects of FDI and domestic exporting firms on the survival probability of domestic counterparts. The possible reason is that the increasing competition forces domestic firms to become more productive to survive in the international market (Kneller and Pisu, 2007). Additionally, the sunk cost of information externalities (such as foreign technology and markets) triggered by the presence of FDI and domestic exporting firms (Aitken et al., 1997) could help domestic firms in Viet Nam to increase their export survival probability.

Estimates show a positive backward spillover effect from FDI and outward-looking domestic firms on the exit probability of domestic firms in the international market. In other words, the spillover effect generated by FDI and domestic exporting firms could increase the exit hazard of domestic firms. The possible reason is that domestic firms' ability to provide input for foreign and domestic exporting firms is constrained as the latter raises the quality requirements of the intermediate good provided by the former. Consequently, domestic firms are removed from the production chain of FDI and domestic exporting firms and are replaced by other affiliates or competitors. This obstructs technological and information spillover effects on domestic firms under the backward channel, making it difficult for them to survive in the international market. Meanwhile, no evidence is found to reveal the forward spillover effects from FDI and domestic exporting firms on the export exit of domestic firms since these variables are

statistically insignificant. In general, estimates show stronger spillover effects from FDI and domestic exporting firms on export participation compared with the export exit of domestic firms.

Table 7. Estimated Results for Export Exit

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Inprod	-0.0296** (0.0097)	-0.0321*** (0.0097)	0.0607 (0.2076)	0.07023 (0.2072)	-0.0315** (0.0100)	-0.0401*** (0.0101)
Inwage	-0.6464*** (0.0116)	-0.6460*** (0.0116)	-0.2007 (0.1917)	-0.2087 (0.1881)	-0.6468*** (0.0119)	-0.6385*** (0.0120)
lnfirmsize	1.0610*** (0.0321)	1.0724*** (0.0323)	0.7462 (0.6252)	0.7215 (0.6267)	1.1808*** (.0336)	1.2035*** (0.0338)
Incapital	-0.0390*** (0.0098)	-0.0436*** (0.0098)	-0.0148 (0.2080)	-0.0206 (0.2074)	-0.0560*** (0.0102)	-0.0679*** (0.0103)
location	-0.1863*** (0.0104)	-0.1868*** (0.0105)	-0.1455 (0.3003)	-0.1499 (0.3033)	-0.2365** (0.0107)	-0.2415*** (0.0108)
ownership	-0.5037*** (0.0406)	-.5055*** (0.0407)	-0.1220 (0.9826)	-0.1447 (0.9955)	-0.4471*** (0.0419)	-0.4446*** (0.0420)
Hori_F_E	-	-	-	-	15.4082*** (0.6060)	19.8096*** (0.8990)
Back_F_E	-	18.4134*** (1.3656)	-	-	-	20.4524*** (11.1213)
Forw_F_E	-	-12.8288 (2.0971)	-	-	-	-23.0282 (14.1269)
Hori_D_E	-	-	-14.2622 (3.0138)	-19.7015 (4.5971)	17.9671*** (3.5191)	23.0685*** (5.0700)
Back_D_E	-	-	-	41.4425 (10.0226)	-	19.4111*** (8.2159)
Forw_D_E	-	-	-	-28.5245 (15.4030)	-	-29.9629 (5.6622)
_cons	0.6804*** (0.0622)	0.7085*** (0.3496)	4.3047** (1.3555)	4.2696** (1.3533)	0.83104*** (0.0642)	0.91225*** (0.0648)
year fixed	yes	yes	yes	yes	yes	yes
industry fixed	yes	yes	yes	yes	yes	yes
R-squared	0.2912	0.2930	0.2989	0.2987	0.3297	0.3337
N	43,906	43,906	43,906	43,906	43,906	43,906

Note: Robust standard errors in parenthesis

*p<0.05; ** p<0.01; *** p<0.001

Source: Authors.

With respect to firms' characteristics, estimates in Table 7 demonstrate a negative impact of firms' labour productivity, wage, and capital intensity on the export exit of domestic firms, which is in line with the literature. For firms' productivity, as there is always competition in the international market, the less efficient firms have a higher probability of exit compared with the efficient firms (Ferragina et al., 2012; Alvarez and

Görg, 2009; Franco and Gelübcke, 2015; Inui et al., 2017). In terms of capital intensity, domestic firms with higher capital intensity tend to survive more in the international market. Our estimation finding is consistent with the studies of Taymaz and Özler (2007), and Kejžar (2011). Capital intensity may include sunk costs and become a barrier to exit (Dixit, 1989). In addition, firms with low variable-cost production techniques are more likely to withstand negative shocks and remain in the market (Sarmiento and Forte, 2019). In terms of wage variable, domestic firms paying high labour wages tend to have a lower exit probability in the international market. The possible explanation is that firms with high wages may attract skilled labour that helps them to survive in a competitive international market.

Estimation shows a negative relation between variable location and export exit of domestic firms, indicating that industrial domestic firms tend to have lower exit probability. This is possible because firms in industrial zones receive more incentive for export so they can perform better, increasing their survival chances in the international market. We found that variable ownership negatively affects the decision of export exit in the domestic firms, showing that state-owned firms tend to leave the international market less than private firms do. Again, this is likely because of the complicated procedures for export exit in the state-owned firms, while it is much easier for private firms to withdraw their operation from the international market.

5. Conclusion and Policy Implication

Our paper aims to shed light on the spillover effects and their channels by which foreign and outward-looking domestic firms affect the export participation and export exit of Viet Nam's local manufacturing firms. We found that beside FDI firms, the domestic exporting firms can also generate the spillover effects on export participation and export exit of local manufacturing firms in Viet Nam.

In the export participation, we found that foreign and domestic exporting generate positive horizontal spillover effects on export participation of domestic firms. On the contrary, we found a negative backward spillover effect from FDI and domestic exporting firms on domestic firms' export probability in the international market. We find the opposite direction in the forward spillover effects on domestic firms' export participation,

with the positive impact from domestic exporting firms and the negative one from foreign exporting firms. In the export exit, we found horizontal spillover effects from FDI and domestic exporting firms can lower the exit hazard of domestic firms. By contrast, backward spillover effects from FDI and domestic exporting firms are found to increase domestic firms' exit probability. We also found a positive linkage of firms' characteristics such as export experience, labour productivity, wage, firm size, and capital intensity with domestic firms' international market participation. Likewise, we found firms' productivity, labour wage, and capital intensity are factors that lower the exit probability of domestic firms.

From empirical evidence, the paper provides several policy implications as follows. First, we found negative effects from the presence of FDI factor on the export participation status of local manufacturing firms in Viet Nam. Thus, the policies from the government should focus on enabling the FDI sector to create positive spillover effects, as well as to strengthen the domestic sectors. This could be partly realized by imposing local content requirements and technological and skill transfer, with specific schedules for FDI activities in Viet Nam. As a result, the negative effects of foreign firms on domestic firms' export participation could be mitigated. Second, to improve backward linkages between domestic firms with FDI and domestic exporting firms, it is important for the Vietnamese government to attract foreign firms with export potential as well as support domestic exporting firms using local intermediate inputs. This requires the host country to create necessary conditions for export activities such as improved infrastructure, skilled labour force, and simple administrative procedures, particularly the predictability of FDI attracting policy. Third, the policies should continuously aim at improving the technological and absorptive capabilities of domestic firms, which, in turn, helps to increase their labour productivity. This will not only help domestic firms to compete with foreign counterparts but also maximize the creation effects from the FDI presence on domestic firms' export participation status. Fourth, since there are forward spillover effects from domestic exporting firms, this sector should be encouraged to provide input for domestic counterparts in Viet Nam so that Vietnamese domestic firms could learn more about the technology of products. This may also help domestic firms to reduce exit probability in the international market.

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Appendix

Appendix 1: Summary of Manufacturing Sectors at 2-Digit in VES.

2-digit sectors	Sectors
10	Manufacturing of food
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and of products of wood and cork
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of pharmaceuticals, medical chemical, and botanical products
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronics, and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment
29	Manufacture of motor vehicles, trailers, and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment

Source: Authors' processing from VSIC 2007.

Appendix 2: Explanation of Variables.

Variable	Explanation
EN_{t-1}	Export participation lagged one year
FDI exporting firms	Foreign firm engages exporting activities
Domestic exporting firms	Domestic firm engages exporting activities
Inprod	Total revenue over total labor of firm (log form)
Inwage	Yearly wage of labor on average (log form)
Infirmsize	Scale of firms (log form)
Incapital	Total capital over total labor of firm, yearly (log form)
location	Firm locates in industrial zones
ownership	Type of firms: owner-stated or private firms
HoriFDI	Horizontal effect index of foreign firms
BackFDI	Backward spillover index of foreign firms
ForwFDI	Forward spillover index of foreign firms
HoriEX	Horizontal effect index of exporting firms
BackEX	Backward spillover index of exporting firms
ForwEX	Forward spillover index of exporting firms
Hori_F_E	Horizontal effects index of exporting foreign firms
Back_F_E	Backward spillover index for exporting foreign firms
Forw_F_E	Forward spillovers index of exporting foreign firms
Hori_D_E	Horizontal effects index of domestic exporting firms
Back_D_E	Backward spillover index of domestic exporting firms
Forw_D_E	Forward spillovers index of domestic exporting firms

Appendix 3: Number of Exporting firms.

Year	Domestic firms	FDI firms	Total firms
2010	2,359	2,972	5,331
2011	2,126	1,096	3,222
2012	4,596	3,912	8,508
2013	6,400	4,181	10,581
2014	6,144	4,448	10,592
2015	7,292	5,022	12,314
2016	5,434	4,575	10,009
2017	4,513	5,441	9,954
2018	5,042	6,237	11,279
Total	43,906	37,884	81,790

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