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Foreign Direct Investment - Small and Medium Enterprises Linkages and Global Value Chain Participation: Evidence from Vietnam

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Abstract

Using a multinomial logit model with the panel-data set of Vietnam manufacturing firms, this paper investigates the impacts of foreign direct investment (FDI) - small and medium enterprises (SMEs) linkages and other factors on SMEs' participation in the global value chain (GVC). We consider GVC firms are those engaging in any of the three modes including (i) using domestic inputs to export (D2E), (ii) using imported inputs to produce for the domestic market (I2P), (iii) using imported inputs to export (I2E). We discover that FDI-SME linkages statistically encourage Vietnamese SMEs to integrate into the GVC via I2P and I2E, while no statistical association between FDI-SME linkage and D2E participation is found. GVCs participation likelihood is also positively correlated with the introduction of new product introduction. The establishment of firms' production facilities in industrial zones and foreign ownership are both reported to be significantly decisive factors to SMEs' decisions on GVC participation. Besides, there is a strong association between firms' attributes, i.e. employment, capital intensity as well as financial access, and their participation in the GVC. Local governance quality (proxied by the Provincial Competitiveness Index) and the share of skilled labor at the province-level can facilitate firms' integration into GVCs, while greater market concentration may be a hurdle to such potential.

Keywords: Global Value Chain, FDI-SME Linkage, Manufacturing, Vietnam

JEL Classification Code: F14, F15, F21, L14, O14

1. Introduction

With a dominant presence and important contributions to the economy, the sector of small and medium enterprises (SMEs) has always received attention from Governments, international organizations as well as researchers. World Bank (n.d.) affirms that SMEs play an important role in the economic development of countries around the world, especially for developing countries. Specifically, SMEs account for 90% of the total number of enterprises and attract 50% of the total number of employees all over the world. The formal SME group alone contributes 40% to the GDP of emerging economies. In the ASEAN region, SMEs account for 98% of the total number of enterprises and create more than 60% of jobs for the economy (OECD & UNIDO, 2019).

In Vietnam, as of December 31, 2018, SMEs account for more than 97.2% of the total number of enterprises nationwide. The SMEs sector contributes about 47% to GDP, 40% to the state budget as well as more than 50% to annual economic growth. SMEs also create approximately 5.63 million jobs, thus helping to solve socio-economic issues and promote sustainable and inclusive development (Ministry of Planning and Investment, 2020).

However, given their modest size and limited operating experience, it is difficult for SMEs to obtain economies of scale and access strategic resources (OECD-WB, 2017). As a result, SMEs have relatively low productivity and competitiveness, making them less likely to enter the world market as it is indicated that to make themselves globally present, businesses need to be highly productive. Also,

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because of their small sizes, SMEs usually find it difficult to compete in the domestic economy with established enterprises, face competition from imported goods, and lack requisite productive capacity and technologies to meet demand in the international markets (Melitz, 2003 thus highlighting a benefit from trade that has not been examined theoretically before. The paper adapts Hopenhayn's (1992a; Helpman et al., 2004; Wagner, 2012).

Specifically, contributions to import as well as export turnovers of the SMEs sector are still quite modest. In the ASEAN region, for example, these figures are all below 30% (OECD & UNIDO, 2019). Statistics in many countries and regions show that SME exports only contribute 28% of the total export value of developing countries in Europe, 16% in the Middle East, and 8.7% in developing Asian countries, and this figure in African countries is only 3% (Ganne & Lundquist, 2019).

Vietnam's SMEs are no exception even though Vietnam is known as one of the most open economies in the world with active participation in various international trade agreements. The presence of Vietnam's SMEs in GVCs is quite low as only 21.6% of Vietnam's SMEs are GVC participants, while the figures of Thailand and Malaysian SMEs amount to 30% and 46% (Wignaraja, 2013).

Despite such limited direct participation of SMEs in GVCs, studies show that SMEs can still fully benefit from this integration in different aspects. At the firm level, engaging in export can allow SMEs to increase revenue, improve economies of scale, and spillover effects on information and knowledge from foreign customers, thus improving productivity (Taglioni & Winkler, 2016; WTO, 2016; Lopez-Gonzalez, 2017). Imports can also help SMEs access quality inputs and technology transfer from foreign suppliers, leading to higher productivity, greater diversification of product portfolio, and upgrading in the production chain (Kasahara & Rodrigue; 2008; Bas & Strauss-Kahn, 2014; Kowalski et al., 2015; Lopez-Gonzalez, 2017).

What is more, it is suggested that linkages with foreign direct investment (FDI) enterprises can be a good channel through which SMEs can indirectly integrate into GVCs without paying high entry costs to foreign markets (World Bank, 2017; Lopez-Gonzalez, 2017). These linkages can help to convey the spillovers of technology and knowledge from multinational companies (MNCs) to domestic firms (Nguyen et al.,2006; Nguyen & Nguyen, 2008; Tran, 2011; Thangavelu, 2014). Thus, through such linkages, SMEs can enhance their competitiveness and ability to participate directly in GVCs.

However, there is limited empirical evidence regarding the association between FDI-SMEs linkages and GVC participation. Current literature mainly focuses on the impact of FDI on GVC participation, in which they found the spillover effect between FDI and SMEs through the industry-level linkages. Using the panel data set for Vietnam manufacturing SMEs during seven years (from 2012 to 2018) with the multinomial logit regression, this paper investigates the impact of FDI-SMEs linkages on firms' GVC participation. To our knowledge, this is the first paper that provides empirical evidence of the strong relationship between FDI-SMEs linkages and GVC participation at the firm level in Vietnam.

The remainder of this paper is structured as follows: Section 2 summarizes the literature. Section 3 describes data, sets out the econometric framework and estimation strategy. Section 4 presents and interprets the results. Finally, Section 5 concludes and highlights some policy implications.

2. Literature Review

2.1. Conceptualization of GVC Participation at the Firm Level

The advance in information and communication technology (ICT) and transportation technology has facilitated GVC activities with production fragmentation and engagement of two or more countries along the production process (Jones & Kierzkowski, 1990). Fragmentation explains the division of production processes into separate parts that can be made in distinct locations, even in different countries. In turn, such fragmentation results in the cross-border movement of intermediate products, which can be classified as simple or complex depending on the number of border crossings (World Bank, 2017) especially trade in high-value manufacturing and services. At a simple level, intermediate goods only cross the border once, while at a complex level, GVC activities associate with intermediate goods being transported across the border at least twice (Wang et al., 2017). Thus, whether on a simple or complex level, GVCs relate to the establishment of global production networks in which firms in different countries undertake various functions of the production process and then exchange through import and export activities. Recently, quite a number of works are dedicated to conceptualizing firms' participation in GVCs using information about firms' trading status.

Dollar et al. (2016) examined the linkage between regional institutions and GVC participation and studied the impact of institutional quality on GVCs participation at both the country and firm levels. In particular, at the firm level, Dollar et al (2016) point out that production activities of enterprises can be divided into four main groups: (i) D2P- using domestic inputs to produce for the domestic market (ii) D2E- using domestic inputs to produce for the export markets; (iii) I2P- using imported inputs to produce for the

domestic market; (iv) I2E - imported inputs to produce for the export market. Accordingly, GVC participants are defined as those who adopt D2E (export only), I2P (import only), or I2E (import &export), while the choice of D2P indicates purely domestic businesses. Similarly, Rigo (2017) categorized firms' participation in GVC in developing countries into four modes including exporter-only, importer-only, two-way trader, and non-GVC firms (who do not involve in any export and import activities).

In line with these studies, Lu et al. (2018) calculated the foreign value-added ratio (FVAR) to measure the global value chain (GVC) participation of Chinese exporting firms from 2000 to 2006. They found that (1) productivity increases and financial constraints reduce FVAR; (2) productivity affects FVAR for both first-time and continuous exporters, while financial constraints only significantly affect first-time exporters; and (3) financial constraints dampen the positive effect of productivity on FVAR. Their findings thus suggested that productivity and financial constraints play important roles in determining firms' GVC participation.

Lopez-Gonzalez (2017) and Gane and Lundquist (2019) also argued that export and import activities reflect SMEs' direct engagement in GVCs. In a word, GVC participation can be portrayed through the import and export activities of firms. Therefore, in this paper, we use information related to firms' trading status, i.e. importing inputs and exporting outputs, to define firms' decisions on GVC participation in Vietnam. There are four modes of GVC participation for Vietnam manufacturing SMEs including non-GVC participation, D2E, I2P, and I2E.

2.2. FDI-SME Linkage and GVC Participation

According to OECD (2013) the Foreign Direct Investment-SME (FDI-SME) linkage can be seen as the business cooperation between multinational companies and local SMEs. The linkage can be either horizontal (between firms in the same stage of the production process) or vertical (between firms of different stages along the production process). By cooperating with FDI enterprises, the local SMEs can gradually upgrade technology to meet the demands of foreign partners, obtain information regarding the available opportunities for exports/imports.

Many attempts have been made to explore the impact of FDI on the firm's import/export activities. Aitken et al. (1997) stated that FDI entities can provide inputs that are not available before, thereby facilitating domestic firms' engagement in the export market. They also argued that proximity to FDI enterprises is positively correlated with a firm's probability to export. Based on this point of view, Greenaway et al. (2004) examined the effect of FDI on exports of domestic firms in the UK using data from 1992–1996. The results of Heckman's two-step regression model showed that linkages with FDI enterprises help domestic enterprises capture information about foreign markets, thus promoting export activities.

Ruane and Sutherland (2005) investigated the spillover effects of the FDI sector on exports of Irish enterprises. They confirm that the intensity of FDI presence in manufacturing industries increases the export probability of domestic enterprises. The authors also found that this positive influence mainly came from American businesses when they put greater pressure on competition, and indirectly boosted the export propensity of Irish enterprises. However, it is found that foreign-owned enterprises' export intensity is negatively correlated with that of domestic firms. They also suggested that the spillover effect is bigger once FDI entities sell more to the host country market (i.e. forward FDI for the SMEs).

The research by Kneller and Pisu (2007) used data on manufacturing enterprises in the UK in the period 1992–1999 to examine the effects of linkages with FDI enterprises on exports. The authors indicated that FDI enterprises affect exports of not only enterprises in the same industry but also enterprises in other industries through vertical linkages. The quantitative model of the authors exhibited that the presence of FDI enterprises in the same industry and region can encourage firms' export decisions. Besides, the export orientation of FDI enterprises positively associates with the size of spillover effects. The results demonstrated that FDI enterprises in downstream industries have a positive impact on the export intensity of domestic firms.

Anwar and Nguyen (2011a), using firm-level data, examined the effects of foreign investment on the exporting behavior of domestic firms in the Vietnamese manufacturing and service sectors. They found that investment by foreign firms has a significant positive effect on the decision of domestic firms in the same and upstream sectors to export. To identify firm-level evidence, Anwar and Nguyen (2011b) analyzed the effects of FDI linkages on export activities of Vietnam's enterprises. They found that FDI presence can improve the export rate of domestic firms through industry-level forward and horizontal linkages, while backward linkages may have negative impacts as these linkages can increase the sunk entry cost to the export market of domestic firms. Thangavelu (2014) used the database of Vietnam General Staistics Organisation (GSO)'s Annual Enterprise Census from 2004–2008 to investigate the impacts of FDI-linkages on Vietnamese SMEs in the manufacturing sector. The author concluded that linkages with FDI entities are a good source of productivity growth and thereby affect the chance for SMEs to link with the global production network.

World Bank (2017) reported that 46% of FDI-linked SMEs imported inputs, while this rate was only 21% in the

group of non-linked enterprises. Statistics in other countries such as China, Malaysia, and Thailand also represent the same situation when showing a positive correlation between linkages and enterprises' import activities. It can be explained by the fact that some inputs are of low quality and/or unavailable in the domestic market, hence FDI-linked firms tend to import more to meet the requirement of FDI partners. In other words, the status of linking with FDI enterprises may affect firms' decisions on both exports and imports.

2.3. Determinants of Firms' GVC Participation

Besides the impact of FDI-SME linkages on the GVC participation, previous studies found other factors associated with the firm's decision to join the GVC. A firm's decision to join GVC depends on its characteristics and business environmental factors (such as local government support, location, and sector attributes). Studies analyzing cross-country data show that the SME's decision of participating in the GVC depends on (i) firm characteristics such as firm size (Wignaraja, 2013; Urata & Baek, 2020), firm's age (Wignaraja, 2013), productivity (Harvie et al., 2010) and the foreign ownership status (Harvie et al., 2010; Urata & Baek, 2020); (ii) firm's financial status (proxied by financial stability and interest coverage ratio (Harvie et al., 2010); (iii) firm's innovative efforts, such as the ability to achieve international standards, the use of ICT, patent (Wignaraja, 2013), the creation of new divisions, and the purchase of new machines (Harvie et al., 2010). Besides, the country-level characteristics can influence SMEs in deciding on GVC participation. Urata and Baek (2020) found that country-level factors such as trade openness and FDI inflows, educated labor force, good quality of infrastructure and logistics systems as well as good governance, positively affect SMEs' propensity and intensity of GVC participation. Among the cross-country studies above, Harvie et al. (2010) and Wignaraja (2013) only focused on the ASIA context including Vietnam while Urata and Baek (2020) considered the global context in which they use data of 111 countries collected from the World Bank's enterprise surveys which also included Vietnam. Harvie et al. (2010) and Wignaraja (2013) mainly focused on the propensity of firms to join GVCs, thus employing Probit regression models, while Urata and Baek (2020) were interested in the propensity as well as the intensity of the participation, hence conducting both Probit and Tobit estimations.

In terms of single country data analysis, Kyophilavong (2010) and Rasiah et al. (2010) both departed from Harvie et al. (2010) model to conduct researches in developing countries context (i.e. Laos and Malaysia respectively). Using Probit models, they also confirm the importance of labor training, expansion of business in increasing a firm's propensity to participate in GVCs.

Dollar et al. (2016) attempted to study how institutions may affect GVC participation at both the country and firm-level. The analysis at the firm level shows that the decision to participate in GVC of China firms is driven by its ownership status (i.e. state-owned, foreign firms, etc.), firm size, total factor production (TFP), and capital intensity. In terms of business environment attributes, local governance quality, GDP per capita and R&D efforts can encourage firms' GVC integration while city labor cost and transport cost discourage these activities.

Motivated by the Melitz (2003) thus highlighting a benefit from trade that has not been examined theoretically before. The paper adapts Hopenhayn's (1992a model of firm heterogeneity, Lu et al. (2018) considered the effects of productivity and financial accessibility on the ratio of imported inputs in a firm's export value (FVAR). The estimated results show that TFP, R&D capacity, and sector concentration have a positive effect on FVAR, while financial difficulty reduces this ratio. The number of years in operation negatively associates with FVAR. Besides, the authors identify that SOEs tend to have lower FVAR, while firms originating from Hong Kong, Macau, and Taiwan enjoy higher FVAR.

Reddy and Sasidharan (2020) examined the participation of small and medium-sized enterprises (SMEs) in global value chains (GVCs) and highlight the role of financial constraints in shaping their participation in GVCs. They used a rich unbalanced panel of 888 SMEs for Indian manufacturing over the period 2006–2016. Their findings highlighted that GVC firms in the sample find financial constraints to be a significant deterring factor for Indian SMEs attempting to participate in GVCs. Further, the findings of their study are robust to alternative definitions of SMEs and GVCs.

Regarding firm-level data analysis in Vietnam, Nguyen and Nishijima (2009) analyzed the data of 1,150 Vietnamese firms in 2004 using the World Bank Enterprise database. The dependent variable that reflects the firm's participation in GVCs is the ratio of export value to total revenue. The estimation results demonstrated that value-added per labor, imported inputs, firm size, capital intensity, foreign ownership, and competition in the market all have positive impacts on firms' participation in exports. Besides, using the IV-Tobit estimation method, the authors also confirmed that the use of websites also helps to increase the export intensity. Recently, Nguyen et al. (2019) used data of 208 surveyed firms to discover determinants of Vietnamese SMEs' participation in global production networks. Following Harvie et al. (2010), they build a logit model to identify the impacts of some factors on SMEs' propensity to join production networks. They

found that younger firms are more likely to participate in the network. Besides, the larger firms enjoy a greater probability to be network members. The estimation results also indicated that foreign ownership and productivity are decisive to a firm's engagement in a production network. Additionally, labor skill intensity, the introduction of new products/services, and membership of business associations can facilitate production network participation.

Moreover, Nguyen et al. (2020) discussed the factors affecting the participation of SMEs in GVCs, thereby pointing out opportunities and challenges for Vietnamese SMEs when participating and upgrading along GVCs. Specifically, the authors argued that corporate governance, innovation capacity, macroeconomic environment, accessibility to formal credit, and logistics infrastructure are decisive to SMEs' engagement in GVCs. However, this study is only descriptive and has not shown any empirical evidence of the impacts of these factors on the participation of SMEs in GVCs.

From this brief literature review, it can be seen that GVC participation is determined by a number of firm and location/sector-related attributes. Firm attributes represent different aspects of firms such as size, capital intensity, ownership structure, productivity, access to finance as well as innovative capability. Location/sector-related factors may include institutional quality, infrastructure, and logistics system, labor skills and education, trade openness, FDI inflows, etc. These findings provide the foundation for our construction of explanatory variables which are discussed in more detail in section 3.2.

Although many studies examine the determinants of GVC participation in Vietnam using both cross-country and single-country data, the investigation is limited for the impact of FDI-SME linkage on the GVC participation in Vietnam. In this paper, we aim to test whether or not linkages with FDI entities can be a catalyst for firms' participation in GVCs through not only export but also import activities. However, there is hardly any empirical evidence for positive spillover effects through horizontal linkages as FDI entities tend to prevent know-how and technology leakage to domestic competitors in the same industry (Javorcik, 2004). Meanwhile, vertical linkages, especially backward linkages between FDI entities and domestic suppliers, are considered as an effective channel of knowledge and technology transfer (Driffield & Noor, 1999; & Gertler, 2008). Therefore, in this paper, we only focus on the vertical linkages between SMEs and FDI enterprises.

The main hypotheses of our paper are as below:

H1: *Vertical linkages are significantly and positively related to a firm's propensity to participate in GVCs.*

H2: *Backward linkages are significantly and positively related to a firm's propensity to participate in GVCs.*

H3: *Forward linkages are significantly and positively related to a firm's propensity to participate in GVCs.*

3. Data and Method

3.1. Data Source and Estimation Strategy

This paper employs panel data from the Vietnam Enterprise Census conducted annually by the General Statistics Office (GSO) during the period 2012–2018. GSO is the state agency responsible for collecting, processing, analyzing, and providing data about enterprises in Vietnam since 2000. Annual enterprise surveys are implemented to collect business information to assess the current status and capacity of businesses of all industries and economic sectors. From this database, we can determine firm attributes such as legal types, employment, capital intensity, etc. Since 2012, GSO has conducted surveys of manufacturing enterprises to collect information related to firms' sourcing and selling behavior. We use the information related to firms' export and import to identify their integration in GVCs, while information about firms' relationships with suppliers and customers are used to identify FDI-SMEs linkages. We also employ the Provincial Competitiveness Index (PCI) surveyed annually by the Vietnam Chamber of Commerce and Industry (VCCI) and the United States Agency for International Development (USAID) to proxy for local governance quality. Information related to labor force quality is extracted from the General Statistics Office online database.

Adapted from Dollar et al. (2016), this study categorizes GVC participation into four categories. Thereby, firm 's GVC choice at time is denoted as follows:

$GVCmode_{it} = 0$ if the firm adopts D2P (i.e. non-GVC participation);
$GVCmode_{it} = 1$ if the firm adopts D2E (i.e. export only);
$GVCmode_{it} = 2$ if the firm adopts I2P (i.e. import only);
$GVCmode_{it} = 3$ if the firm adopts I2E (i.e. import and export).

Following existing studies on GVC participation in assuming that a firm will join GVCs if the expected utility/ benefit from participation is higher than non-participation. The benefit of firm i adopting GVC mode = j at time t (Y^*_{jit}) is:

$$Y^*_{jit} = Z'_{it}\beta + \varepsilon_{jit} \quad (1)$$

Where Z_{it} is the vector of observed covariates, and β is the vector of parameters to be estimated.

Although Y^*_{jit} is a latent variable, we can observe the outcome of a firm's adoption of GVCmode$_{it}$, as below:

$$\text{GVCmode}_{it} = \begin{cases} 0 \; if \; Y^*_{0it} > \max\left(Y^*_{mit}\right) \\ \quad \ldots \\ J \; if \; Y^*_{jit} > \max\left(Y^*_{mit}\right) \end{cases} \quad (2)$$

for all $m \neq j$; $j = 0, 1, 2, 3$ for different GVC modes.

In other words, a firm would choose the choice generating the highest level of benefit. In such a situation when a firm can have more than two choices, a Multinomial Logit Model is suitable for analysis. The probability of firm at time to choose GVCmode = j then is given by:

$$Pr\left(GVCmode_{it} = j\right) = \frac{e^{\alpha_j + \beta_j X_i}}{\sum_{k=0}^{3} e^{\alpha_k + \beta_k X_i}} \quad (3)$$

Where X_i is a vector of explanatory variables which is discussed in detail in the next section. B_j is parameters to be estimated. In this paper, we use the choice of D2P as the base category of which coefficient $\beta_0 = 0$. Estimation is based on the maximum likelihood method.

3.2. Explanatory Variables

This section discusses the construction of explanatory variables of a firm's participation in GVC. As aforementioned, GVC integration actually associates with exports and imports, therefore variables that affect a firm's decisions to export and import also have impacts on a firm's decision on GVC entry. Indeed, Taglioni and Winkler (2016) amended the Roberts and Tybout (1997) model of a firm's export to discuss the determinants of GVC participation. The authors indicated that a firm's propensity to join GVC is determined by the firm's expected revenues (R) and costs (C) as well as sunk entry costs (S). If GVC participation is binary, then the probability of firm i to join GVC is:

$$Pr(\text{GVC}_{it} = 1) = Pr(R_{it} > (C_{it} + S(1 - \text{GVC}_{it-1})) \quad (4)$$

A firm hence only joins GVCs if its expected profit is positive. Thus, Taglioni and Winkler (2016) suggested the estimation equation to explain GVC participation is as follows:

$$\text{GVC}_{it} = \alpha_0 + \beta \text{firm}_i + \gamma \text{policy}_{cst} + D_i + D_{cs} + D_t + \varepsilon_{ict} \quad (5)$$

Where GVC$_{it}$ denotes firm's participation in GVCs

firm$_i$ represents the vector of firm-level determinants,

policy$_{cst}$ represents the vector of policy determinants.

D_i, D_{cs}, D_t denotes firm fixed effects, country-sector fixed effects, and year fixed effects.

ε_{ict} represents the error term.

Departing from this model and following the current literature related to export and import activities as well as GVC participation, we include the following variables in our analysis: (i) variables proxied for FDI-SMEs linkages, (ii) firm-level attributes (iii) province and sector level attributes.

3.2.1. FDI-SME Linkage

As mentioned, FDI linkages are found to have positive spillovers on domestic firms' performance in hosting countries (Nguyen et al., 2006; Nguyen & Nguyen, 2008; Tran 2011). Several studies have also found evidence of FDI linkages on a firm's exports (Kneller & Pisu, 2007; Anwar & Nguyen, 2011a). World Bank (2017) demonstrated that FDI-linked SMEs tend to import more inputs than their non-linked counterparts. Therefore, FDI-SMEs linkage can be an important explanatory variable of a firm's decisions on GVC participation.

Furthermore, to avoid endogeneity, FDI-SMEs linkage variables are used as 1-year lagged values. The use of lagged value is also consistent with the view of scholars and organizations that participating in linkages with FDI enterprises offers SMEs opportunities to learn from partners who can transfer the knowledge, technology, and managerial skills, thus helping SMEs to gradually enhance their competitiveness and thereby foster their direct participation in GVCs (World Bank, 2017; Lopez-Gonzalez 2017).

We define three variables to represent FDI-SMEs linkages as follows:

Vertical linkage: equals 1 if the firm either purchase from or supply to FDI entities, 0 otherwise.

Backward linkage: equals 1 if the firm supply to FDI entities, 0 otherwise.

Forward linkage: equals 1 if the firm purchase from FDI entities, 0 otherwise.

3.2.2. Firm Attributes

From the literature survey, many firm characteristics could affect a firm's decision on GVC participation. In this study, we include the following attributes: (i) firm age, which is the number of years in operation, (ii) employment, which is measured by the logarithm of the total number of employees, (iii) capital intensity, which is measured by the logarithm of total fixed assets per worker, (iv) debt-to-total assets ratio, to proxy for financial access, (v) productivity (vi) firm ownership, (vii) product innovation, (viii) establishment of production facilities in industrial zones.

Specifically, as suggested by Tucci (2005) and Dollar et al. (2016), firm size and capital intensity are used in 1-year lagged values to avoid the endogeneity problem. Dummies of firm ownership which represent state ownership and foreign ownership are also included in our analysis.

Besides, many studies have shown the effect of financial access on firms' performance (Zarrouk et al., 2020), hence

influence firms' ability to internationalize and join global value chains (Harvie et al., 2010; Lu et al., 2018; Urata & Baek, 2020; Sanyal et al., 2020). In this study, we adopt the views of Berman and Héricourt (2010) as well as Vietnam's GSO to use the debt -to- total asset ratio as a proxy for a firm's ability to access external finance.

A firm's productivity is defined as Total Factor Productivity (TFP), which is estimated using the method of Levinsohn and Petrin (2003). Similar to a firm's employment and capital intensity, TFP is also included as a 1-year lagged value to avoid endogeneity.

Innovative efforts are proved to have impacts on firm performance (Ali et al., 2020), hence promote enterprises' ability to join GVCs. In this study, we follow the viewpoint of the World Bank (2017) and OECD (2015) to use information related to the expansion of product portfolio as a proxy of a firm's innovation.

Besides, as Taglioni and Winkler (2016) emphasized the importance of industrial zones, in this study, we aim at exploring whether or not the establishment of production facilities in industrial zones affects the decision on GVCs engagement.

3.2.3. Province and Industry Attributes

In this study, we consider two provincial attributes: (i) Provincial Competitiveness Index compiled by VCCI and USAID annually as a proxy for the institutional environment at the provincial level (ii) the percentage of trained workers at 15 years of age and above of each province/city.

The industry attribute is proxied by the HHI of firms' sales within the same VSIC 2007 2-digit industry.

We also control for fixed effects of year, economic regions, and industry in our analysis.

4. Results

4.1. Empirical Results

The summary statistics on the adoption of GVC mode are represented in Table 2. Overall, approximately 25% of firms surveyed are GVC participants. More specifically, around 13% of firms are exporters only, while about 6% are importers only. Although two-way traders (I2E) generally just account for 5.36% of firms, it can be seen that this

Table 1: Explanatory Variables

Variables	Measure
FDI-SMEs linkage Variables	
Forward linkage	Dummy variable, equal 1 if the firm supplies inputs to FDI enterprises, 0 otherwise
Backward linkage	Dummy variable, equal 1 if the firm buys inputs from FDI enterprises, 0 otherwise
Vertical linkage	Dummy variable, equal 1 if the firm buys inputs from or supplies inputs to FDI enterprises, 0 otherwise
Firm-level Attributes	
Firm age	Number of years in operation
Employment	The logarithm of the number of workers
Capital intensity	The logarithm of fixed assets per worker
Debt-to-total asset ratio	Firm's debt divided by total asset
TFP	The logarithm of Total Factor Productivity, estimated using Levinsohn and Petrin (2003) method
State ownership	Dummy variable that equals 1 if the firm is state-owned, 0 otherwise
Foreign ownership	Dummy variable that equals 1s if the firm has foreign equity, 0 otherwise
Industrial Zone	Dummy variable that equals 1 if the firm established its factory in an industrial zone, 0 otherwise
Innovation	Dummy variable, equal 1 if firm introduces new products, 0 otherwise
Province and Industry Level Attributes	
Provincial Competitiveness Index	To proxy for quality of local governance
ProvinciaTrained labor force	Percentage of the trained labor force at 15 years of age and above
Industry concentration	HHI, indicating concentration/competition of industry at VSIC 2007 2-digit level

Table 2: Statistics on the Adoption of GVC Mode by Survey Year

GVC Mode	Frequency (%)							
	2012 (*n* = 5,075)	2013 (*n* = 5,021)	2014 (*n* = 2,740)	2015 (*n* = 2,781)	2016 (*n* = 2,562)	2017 (*n* = 2,346)	2018 (*n* = 2184)	Total (*n* = 22,709)
D2P (0)	79.37	78.71	71.97	73.00	71.62	72.59	73.12	75.38
D2E (1)	13.34	13.48	14.09	13.12	13.19	12.75	12.18	13.25
I2P (2)	3.84	4.24	7.52	7.41	8.04	7.63	7.42	6.02
I2E (3)	3.45	3.57	6.42	6.47	7.14	7.03	7.28	5.36

Table 3: Summary Statistics

Variable Name	Obs	Mean	SD	Min	Max
Vertical linkage	15585	0.175	0.380	0.000	1.000
Backward linkage	15585	0.170	0.376	0.000	1.000
Forward linkage	15585	0.009	0.093	0.000	1.000
Firm age	15585	12.058	5.871	0.000	73.000
Employment(log)	15585	3.671	0.894	1.386	5.298
Capital intensity (log)	15585	4.720	1.420	–2.967	11.126
TFP	15585	8.984	1.592	4.212	14.047
Debt to total asset ratio	15585	0.582	0.308	0.000	1.864
State ownership	15585	0.033	0.180	0.000	1.000
Foreign ownership	15585	0.025	0.155	0.000	1.000
Innovation	15585	0.170	0.376	0.000	1.000
Establishment of production facilities in industrial zones	15585	0.380	0.486	0.000	1.000
Provincial Competitiveness Index	15585	60.640	3.294	48.961	70.694
Trained labour force	15585	22.584	10.165	7.100	44.900
Industry concentration	15585	0.037	0.078	0.006	1.000

group demonstrates a greater and greater proportion of the surveyed firms over the recent years.

The summary statistics of the estimation sample are reported in Table 3. As can be seen, 17.5% of the sample are FDI-linked SMEs. However, most of them play the role of suppliers to FDI firms as the mean of the backward linkage variable is 0.170 while that of the forward linkage variable is just 0.009. Of the estimation sample, the majority of SMEs are private enterprises, as only 3.3% of observations are SOEs, while 2.5% are foreign-owned entities. About 17% of firms conduct product innovation, while 38% of the sample demonstrate that firms establish their production facilities in industrial zones.

The *T*-test results reported in Table 4 indicate that GVC firms are more likely to be linked with FDI entities than non-GVC counterparts. GVC participants are also older, larger, more productive with higher capital intensity, greater access to finance compared to non-GVC firms. What is more, firms engaging in GVCs are more likely to be foreign-owned, innovate their products, and establish facilities in industrial zones. GVC firms tend to operate in provinces with a greater Provincial Competitiveness Index and a higher percentage of trained labor, as well as less concentrated industries more than non-GVC ones.

The results of the Multinomial logit regression model are reported in Table 5. As can be seen, FDI- linkage status of SMEs, in general, facilitates firms' propensity to integrate to GVCs through I2P and I2E modes. These findings are in line with previous studies such as Kneller and Pisu (2007) and Greenaway et al. (2004). It means that while engaging in linkages, especially as suppliers to FDI entities, firms can enjoy transfers in terms of knowledge, technology, and

Table 4: Characteristics of GVC and Non-GVC Firms

	GVC	Non-GVC	Difference	*t* value
FDI-SMEs vertical linkage	0.228	0.154	0.074	11.093***
Firm age	12.188	11.007	1.181	12.673***
Employment	4.223	3.512	0.711	44.870***
Capital intensity	4.932	4.641	0.291	11.442***
TFP	9.813	8.672	1.141	41.046***
Debt to total asset ratio	0.623	0.555	0.068	14.347***
State ownership	0.042	0.038	0.004	1.4384
Foreign ownership	0.072	0.007	0.064	28.175***
Establishment of production facilities in industrial zones	0.249	0.130	0.119	21.330***
Innovation	0.436	0.368	0.068	9.025***
PCI	60.635	59.895	0.739	13.650***
Trained labor force	23.541	21.441	2.100	13.630***
Industry concentration	0.030	0.041	–0.010	–8.236***

Note: *** Indicates statistical significance at 1% level.

managerial skills from partners. They can learn from linkages to improve productivity and enhance competitiveness. What is more, FDI entities are known for having not only superior capacity in terms of technology and managerial skills but also strict requirements regarding quality standards and delivery. However, some inputs are not available domestically or of low quality. Therefore, to meet customer requirements, linked- SMEs tend to use imported inputs more than non-linked firms. Apart from that, linked-SMEs can also acquire information about international markets and foreign customer tastes from FDI partners. Therefore, they are more likely to engage in I2P and I2E activities.

More specifically, the backward linkages are found to have statistical impacts on firms' choices. However, there is not yet statistically significant evidence of the forward linkages' impact on firms' decisions on GVC participation, while forward linkages are insignificantly related to such decisions. These results are quite reasonable as currently, most manufacturing firms in Vietnam just engage in midstream activities of the supply chain, hence mainly play the role of suppliers to FDI enterprises (UNIDO & UIBE, 2018). Therefore, backward linkages appear to be a statistically significant determinant of GVC participation.

The estimation results also indicate that employment, capital intensity, and TFP are positively correlated with a firm's propensity to engage in GVCs as either a one-way trader (D2E/I2P) or a two-way trader (I2E).

Apart from that, older SMEs demonstrate a greater propensity to join GVCs, where such experience accumulate throughout the years in operation help firms to gain more confidence to conduct GVC activities. Firms' capabilities to access external finance and innovate products can facilitate GVC participation, which is in line with previous studies such as Lu et al. (2018) and Reddy and Sasidharan (2020). Regarding ownership structure, foreign-owned firms appear to be more active participants in GVCs which is similar to the conclusions of Nguyen and Nishijima (2009), Dollar et al. (2016), and Lu et al. (2018). However, state ownership reports a negative but statistically insignificant impact on firms' decision to participate in GVCs. The establishment of production facilities in industrial zones supports firms to join GVCs, reflecting the idea of Taglioni and Winkler (2016) as these authors pointed out the importance of industrial zones to the probability of a firm to involve in GVCs.

Moreover, it is discovered that provinces with greater PCI and a higher percentage of the trained labor force can support firms' engagement in I2E while discouraging firms to join GVCs as importers only. These results are consistent with the findings of other scholars such as Dollar et al. (2016) and Urata and Baek (2020). Besides, a greater HHI signals greater market concentration and less competition, thus giving SMEs less chance to be GVC participants, which is similar to the conclusion of Anwar and Nguyen (2011b) who revealed that market concentration negatively affects not only firms' export decision but also export intensity.

4.2. Robustness Check

As a firm's direct integration into GVCs involves export and import activities, we would like to test the impacts of

Table 5: MNL Regression Results

Variables	Model 1			Model 2		
	D2E	I2P	I2E	D2E	I2P	I2E
	GVCmode = 1	GVCmode = 2	GVCmode = 3	GVCmode = 1	GVCmode = 2	GVCmode = 3
FDI-SMEs vertical linkage	–0.071	0.260***	0.347***			
FDI-SMEs backward linkage				–0.061	0.255***	0.351***
FDI-SMEs forward linkage				–0.219	–0.207	0.270
Firm age	0.027**	0.094***	0.121***	0.027**	0.094***	0.121***
Firm age squared	–0.001***	–0.002***	–0.003***	–0.001***	–0.002***	–0.003***
Employment (log, lagged)	0.725***	0.290***	1.040***	0.726***	0.293***	1.039***
Capital intensity (log, lagged)	–0.031	0.158***	0.073**	–0.031	0.159***	0.073**
Debt-to-total asset ratio	0.279***	0.276**	0.605***	0.280***	0.278**	0.604***
TPF (log, lagged)	0.155***	0.428***	0.422***	0.155***	0.428***	0.421***
State ownership	–0.101	–0.146	–0.259	–0.102	–0.147	–0.257
Foreign ownership	1.685***	1.490***	1.904***	1.685***	1.496***	1.901***
Establishment of production facility in Industrial Zone	0.295***	0.647***	0.492***	0.296***	0.649***	0.491***
Product innovation	0.181***	0.358***	0.307***	0.181***	0.356***	0.306***
Provincial Competitiveness Index	0.007	–0.047***	0.024*	0.007	–0.047***	0.024*
Provincial trained labour force	0.007**	0.038***	0.013***	0.007**	0.038***	0.013***
Industry competition	–3.659**	–1.070	–5.337***	–3.659**	–1.059	–5.375***
Constant	–6.366***	–8.163***	–14.583***	–6.364***	–8.164***	–14.569***
	(0.486)	(0.735)	(0.803)	(0.486)	(0.735)	(0.804)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Economic Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,585	15,585	15,585	15,585	15,585	15,585
Pseudo R^2	0.1555	0.1555	0.1555	0.1556	0.1556	0.1556

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

FDI-SMEs linkages on the decisions to export and import. The decisions of whether or not to export and whether or not to import might be correlated with one another as they both require firms to have an understanding of international markets and commerce conventions. Therefore, a multivariate probit model is also appropriate to analyze the propensity of firms' engagement in GVCs as one-way traders (D2E- only export; I2P- only import) or two-way traders (I2E).

The results are quite similar to the findings of MNL models. It is confirmed that linked-SMEs are more active participants in GVCs as importers only or two-way traders, while they are less likely to export by using 100% domestic inputs.

5. Conclusion

This paper contributes to the literature on GVCs participation by providing empirical evidence of Vietnam's manufacturing SMEs. While learning by exporting is well documented in international business studies, we aim at investigating whether or not linkages with FDI entities provide learning opportunities for local firms to enhance competitiveness hence improving the potential to participate in GVCs. The regression results reveal that linking with FDI partners, especially as suppliers, could encourage SMEs' engagement in I2P and I2E activities. It reflects the current situation of Vietnam as most firms just engage in midstream

Table 6: Robustness check- Multivariate Probit Regression Results

Variables	Model 3			Model 4		
	D2E	I2P	I2E	D2E	I2P	I2E
FDI-SMEs vertical linkage	–0.106**	0.147**	0.128**			
FDI-SMEs backward linkage				–0.100*	0.141**	0.128**
FDI-SMEs forward linkage				–0.205	–0.065	0.187
Firm age	0.009	0.037***	0.050***	0.009	0.037***	0.050***
Firm age squared	–0.000	–0.001***	–0.001***	–0.000	–0.001***	–0.001***
Employment (log, lagged)	0.311***	0.046	0.371***	0.311***	0.047	0.370***
Capital intensity (log, lagged)	–0.037**	0.066***	0.004	–0.037**	0.066***	0.004
Debt-to-total asset ratio	0.114*	0.095	0.193**	0.114*	0.096	0.192**
TPF (log, lagged)	0.058***	0.157***	0.140***	0.058***	0.157***	0.139***
State ownership	–0.024	–0.089	–0.126	–0.024	–0.089	–0.124
Foreign ownership	0.426***	0.213	0.584***	0.428***	0.217	0.582***
Establishment of production facility in Industrial Zone	0.026	0.304***	0.128*	0.027	0.305***	0.128*
Product innovation	0.051	0.127**	0.096*	0.051	0.127**	0.096*
Provincial Competitiveness Index	0.006	–0.028***	0.008	0.006	–0.028***	0.009
Provincial trained labour force	–0.004*	0.022***	0.005*	–0.004*	0.022***	0.005*
HHI	–1.008**	–0.352	–0.488	–1.006**	–0.351	–0.488
Constant	–3.033***	–2.870***	–5.684***	–3.032***	–2.869***	–5.680***
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Economic Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,585	15,585	15,585	15,585	15,585	15,585

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

activities of the value chain (UNIDO & UIBE, 2018), while the local sources of inputs are insufficient to meet the demand of FDI firms, especially in terms of quality (World Bank, 2017). Therefore, Vietnam's manufacturing SMEs are greatly dependent on foreign sources, and FDI-linked firms are more likely to use imported inputs to produce for both domestic and foreign markets.

What is more, other firm and location/sector attributes included in our models also reveal statistically significant impacts on SMEs' potential to join GVCs. Specifically, older, larger, and more productive firms enjoy a greater chance to make themselves present in GVCs. Our findings highlight the importance of capital intensity and access to finance to firms' potential to be GVC players. Foreign-owned firms demonstrate a greater propensity to participate in GVCs, while the establishment in industrial zones, as well as innovative efforts, could also enable firms to act as global players. Our results also imply that greater local governance, higher labor quality, and greater market competition (lower HHI) could offer favorable conditions for firms to integrate into GVCs.

Apart from the contributions, our paper still has some limitations. Using the secondary data, we just identify whether or not firms have linkages with FDI enterprises, and have not investigated the quality of such linkages. Furthermore, this study just discovers the effects of FDI-SMEs linkages and other factors on the propensity to participate in GVCs and does not cover GVC participation intensity due to the lack of data. Therefore, a possible direction for our future study is to survey and interview firms so that we can obtain more information to calculate indicators and the quality of such relationships between FDI firms and local SMEs to further understand the impacts of linkages and other determinants on GVC intensity.

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