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SỰ THAM GIA CHUỖI GIÁ TRỊ TOÀN CẦU VÀ NĂNG SUẤT LAO ĐỘNG CỦA DOANH NGHIỆP: BẰNG CHỨNG THỰC NGHIỆM TẠI VIỆT NAM

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Tóm tắt

Chuỗi giá trị toàn cầu đã trở thành một xu hướng chưa từng có ở các quốc gia đang phát triển, đặc biệt là trong các ngành sản xuất. Nghiên cứu của chúng tôi xem xét cách các doanh nghiệp Việt Nam trong các ngành sản xuất hưởng lợi từ việc tham gia vào chuỗi giá trị toàn cầu. Chúng tôi tổng hợp dữ liệu từ Cuộc khảo sát Doanh nghiệp của Tổng cục Thống kê từ năm 2000 đến 2014 với dữ liệu về chuỗi giá trị toàn cầu từ TiVA OECD, sử dụng phương pháp kiểm soát hàm điều khiển để kiểm soát hiện tượng nội sinh trong việc tính toán chỉ số chuỗi giá trị toàn cầu. Các kết quả của chúng tôi cho thấy rằng các doanh nghiệp hoạt động trong các ngành có sự tham gia ngược cao thường có năng suất thấp hơn. Các doanh nghiệp chuỗi giá trị toàn cầu tham gia cả xuất khẩu và nhập khẩu có lợi hơn từ kinh nghiệm quốc tế của họ so với các doanh nghiệp chỉ tham gia xuất khẩu hoặc nhập khẩu. Chúng tôi khám phá ra rằng cách tham gia vào chuỗi giá trị toàn cầu tác động đến lợi ích từ việc liên kết ngược, trong đó các doanh nghiệp tham gia cả chế độ xuất khẩu và nhập khẩu thể hiện lợi ích lớn hơn từ sự tham gia ngược so với các doanh nghiệp chỉ tham gia xuất khẩu hoặc nhập khẩu. Điều này ngụ ý về một chính sách thương mại được thiết kế tốt cho liên kết ngược, trong đó chính phủ nên khuyến khích phát triển chuỗi cung ứng nội địa và giảm sự phụ thuộc vào các nguồn cung từ các đối tác nước ngoài

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FIRM PERFORMANCE AND GLOBAL VALUE CHAIN PARTICIPATION: EVIDENCE FROM VIETNAM

Abstract

Global value chains have become an unprecedented trend in emerging countries, especially for manufacturing sectors. Our study examines how Vietnamese firms in manufacturing sectors gain from GVC participation. We compile data from GSO Survey Enterprise from 2000 to 2014 with GVC data from TiVA OECD using control function approach controlling endogeneity in GVC indicator calculation. Our findings indicate that firms operating in sectors with high backward participation tend to have lower productivity. GVC firms that engage in both export and import are more beneficial from their international experience compared to only exporters or importers. We explore that the mode of GVC participation moderates the gains from backward linkage, in which firms engaging in both exports and imports mode exhibit larger gains from backward participation than firms only engaging in exports or imports. It implies a well-designed trade policy for backward linkage in which the government should encourage the development of domestic chains and lower reliance on inputs supplied from foreign partners.

Keywords: Global value chain, Firm performance, Backward linkage, Vietnam

1. Introduction

The global value chain (GVC) configuration has been actively constructed in recent decades. GVC's share of global trade levelled off from 40% in the 1990s to over 50% in 2007 but slightly slowed down due to Global Financial Crisis (World Bank, 2020). The new age of GVCs stemmed from the information and communication technology (ICT), the removal of many non-tariff barriers thanks to multilateral trade agreements and the blooming of capitalism, combined with the extensive use of foreign parts and components (Antràs & Chor, 2022). Global value chain is a broad term which can be conceptualized as "a series of stages in producing final goods to consumers. Each stage adds value, and at least two stages are being produced in different countries" (Antràs, 2020). GVC participation goes beyond traditional export or import, in which firms participate in GVC when they supply inputs to foreign firms produced elsewhere, even domestically.

Multinational corporations (MNCs) are the key and foremost drivers of such "trading in tasks" in which they began to allocate production processes to other countries rather than produce them in only one country. Such trading in tasks enables the participation of more countries in global economic activities, especially developing countries. GVC has been identified as the development engine of many emerging countries in East Asia, in which GVC can fuel inclusive and sustainable growth and drives institutional changes. It is estimated by World Bank (2020) that a 1% increase in GVC participation can boost the income per capita by more than 1%, above double the effect of conventional trade. GVCs matter for development to two extents: firstly, they accelerate hyper-specialization, and secondly, they ensure durable firm-to-firm relationships. Thus, GVCs enable better gain from increasing

productivity and income, becoming more powerful tools to eradicate poverty. However, GVC specialization is unevenly distributed across regions. While many developed countries are engaging in innovative and advanced manufacturing or services, developing countries are operating at the stage of limited manufacturing and commodities or supplying raw materials (World Bank, 2020).

In recent years, the rapid development of global value chains (GVC) has emerged as unprecedented new features in international trade. The nature of international trade has changed as final goods are no longer the main trading article, but rather intermediate goods. (R. Baldwin & Venables, 2013) define GVC as the series of stages in the production of a product or service for sale to consumers in which Each stage adds value, and at least two stages are in different countries. According to this definition, a firm participates in a GVC if it produces at least one stage in a GVC. Those stages include activities such as research and development (R&D), design, production, marketing, distribution, and support to the final consumer. This participation allows firms to leverage their comparative advantage in a specific task, access more market with low-price input and even knowledge transfer. In our study, we mention two components of GVC participation, backward and forward linkages (Epede & Wang, 2022). GVC participation is beyond the traditional definition of international trade, not only direct export or import but also including the supply of inputs for global production network.

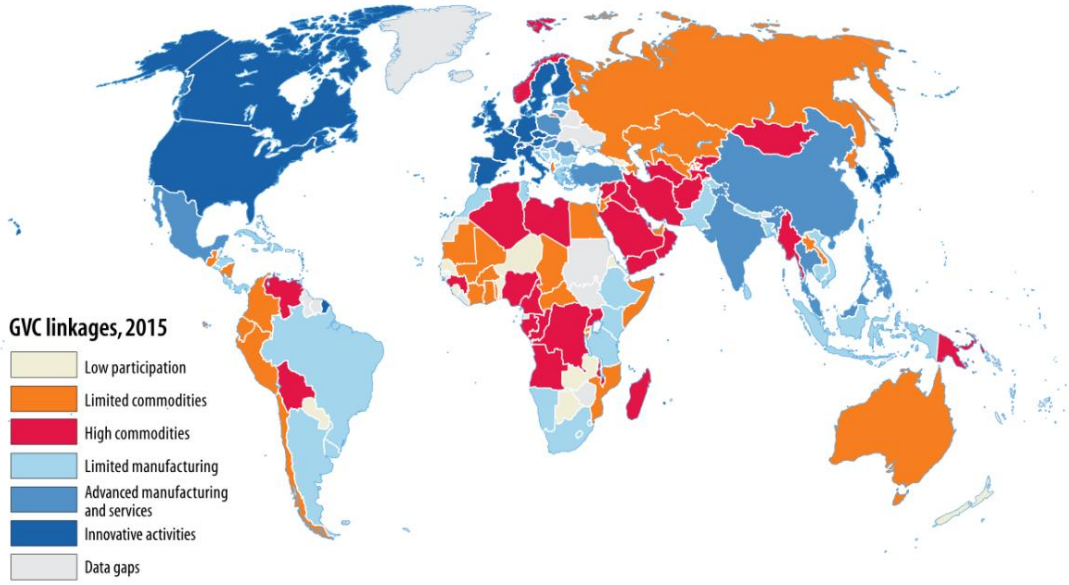

Figure 1. Uneven Sectoral Specialization in GVCs

Source: World Development Report (World Bank, 2020).

For developing countries, SME involvement in the GVC could be either through trading activities or engaging with lead or multinational firms (Kuzmisin et al., 2017; Tajoli & Felice, 2018). From Figure 1.4, we notice the major role of GVC participation in developing countries is through low to medium value-added tasks. Using intermediates becomes a trend in global manufacturing network, in which DVA share and FVA share of six Asia manufacturing hubs have evolved over times.

After Doi Moi in 1986, Vietnam's economy underwent substantial reformation, enabling the country to be more integrated into the global economy. Vietnam's trade grew alongside its deepening global integration and participation in GVCs. Attracting foreign direct investment (FDI) is among the enablers of the upgradation in GVCs. Domestic value added in gross exports has improved by 16.6% from 1995 to 2001 (Minh et al., 2019). Figure 1.1 shows the escalation of GVC–related trade in Vietnam from 1995 to 2020.

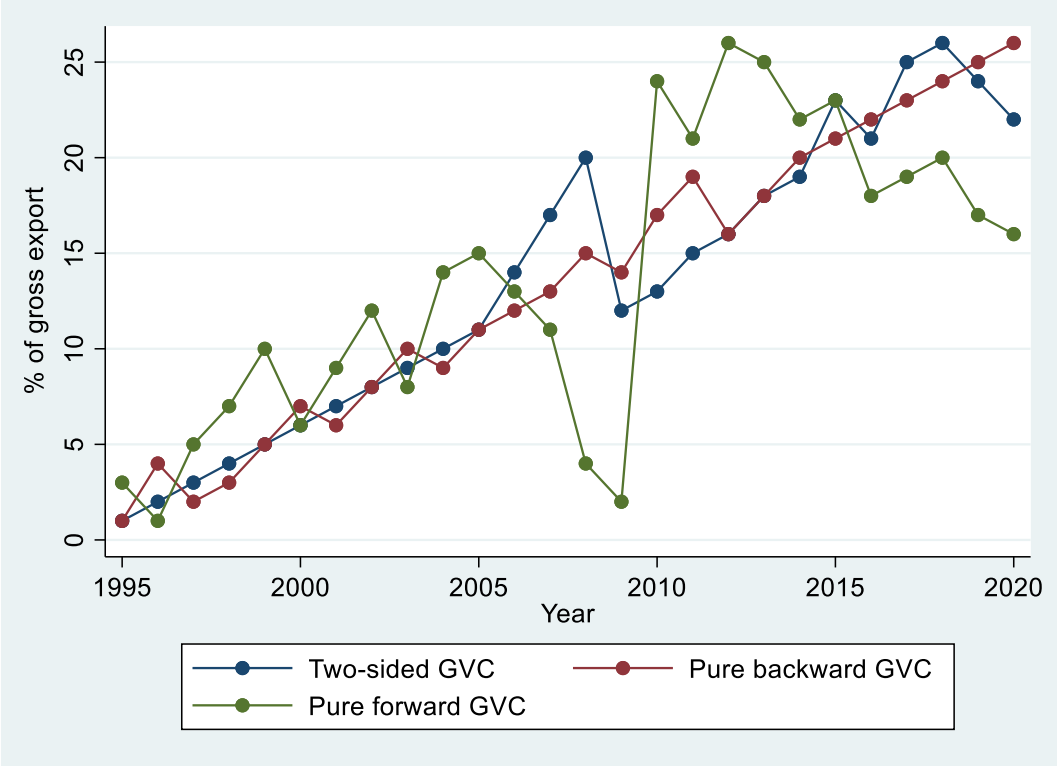

Figure 2. GVC participation by different modes of Vietnam

Source: WITS World Bank 2020. Data extracted from OECD TiVA.

However, the positive sign of the GVC trade does not tell the whole story. Firstly, even though the deep integration in the manufacturing exports, Vietnam records the low domestic value added embedded in gross exports. Another shortfall of GVC participation is that the strong performance is led by FDI firms which contribute more than 70% in total exports, while domestic firms are underrepresented in the value chains. Furthermore, the dual-track economy shows the weak competition of domestic value chains and the limited participation of domestic firms. Notably, domestic firms, especially small and medium enterprises (SMEs), are currently facing low productivity, focusing on quantity rather than quality.

Besides the leading role of MNCs in operationalizing global production networks, there are large rooms for SMEs in developing countries to join such networks and rip-off benefits of globalization. However, in the real trade world, anti-globalization is also a relevant issue with developing economies as a group of SMEs does not have enough capital to go over transaction costs when embedded in GVCs. Moreover, their labor skills are not adapted with high technology operations transferred from the lead firm in the chain. That prevents the participation of SMEs in the GVCs and the development of globalization. Nevertheless, small

firms play a key role in economic development because they utilize more local resources and create more new jobs than large firms. Their improved efficiency could facilitate economic development, and help developing countries move up the value chain.

Resource endowment, efficiency maximization, market access are three key growth drivers for GVC (ADB, 2021). The primary goal of efficiency maximization is to reduce costs within an enterprise or the overall supply chain to achieve high productivity. Supply chain management concepts such as zero inventory, just-in-time delivery of goods, and outsourcing have both been designed to reduce total supply chain costs. Consolidated operations (e.g., supplier or logistics consolidation) and production agglomeration (e.g., industrial or SME clusters) can also reduce total supply chain costs by achieving low transaction costs and economies of scale. Hence, assessing the efficiency level of SMEs in the context of GVC would be beneficial to paving the way for upgrading in the global value chain.

A burgeoning literature focuses on examining GVC participation at the county and sectoral level, while a handful of them zoom into firm-level participation. GVCs are essentially firm-level phenomena. Hence, it is better to investigate using a bottom-up approach utilizing firm-level data. However, this micro approach does not receive adequate attention from scholars due to insufficient data at the firm level. Our study addresses this research gap by employing a firm-level database from General Statistics Office (GSO) of Vietnam conducted annually to track the performance of firms in different sectors. We focus on firms in 24 manufacturing sectors as this sector is the most vibrant and active sector in value chains as well as contributes the largest share of Vietnam's GDP. The dataset covers the time frame from 2000 to 2014. We propose questions about whether participating in GVCs enable gains from trade for firms in Vietnam regarding different legal status. In this study, we employ the instrument variable (IV) approach to control for endogeneity arising from GVC indicator calculation.

2. Literature review

2.1.Conceptualization of global value chains: Value-added approach

Global production network enables goods to cross-border multiple times. Therefore, traditional measure of trade volume does not adequately reflect the contribution of a country to global output. The hyper-specialization requires a zoom-in on the contribution of each process in a specific country to the value of products as a proxy of international economic integration. Thus, the value-added, or the additional value embedded in a product each time it crosses the border, is a more relevant measure to quantify the export performance of a country or a sector.

The pioneering research on trade in value-added can be considered that of Leontief and Strout (1963) pioneered in formalizing the first approach to analyze the nature of a global production network, which can be considered the first attempt at analyzing trade in value-added. However, it was only twenty years later that two types of economic research began to pay attention to "the value added" in trade flows.

Value added falls into the macro approaches that deal with a country or a country industry as a unit of analysis in quantifying aspects of GVC. World Input-Output Table has become the

main ingredient to decompose the value contribution of each country (Antràs & Chor, 2022). The initial effort of unpacked sources of value-added contained in gross exports was presented in the study of Hummels, Ishii, & Yi (2001) about the nature of vertical specialization in the global trade pattern. Since production stages are fragmented elsewhere, a country can use its intermediate inputs to produce its exports. Regarding forms of GVC participation, it can clearly define in terms of backward linkage (a country's exports embodying imported content) and forward linkage (a country's exports contained in the importing country's imports). Literature on GVC measurement proposes several ways to compute value-added in exports (VAX) indicator, embarked on Johnson and Noguera (2012), and extended on later work by Koopman, Wang, and Wei (2014) for gross-export accounting to deal with double-counting issues of customs data. There are two modes of GVC participation, i.e., *forward participation* (produces and ships input to another country that is further re-exported) and *backward participation* (uses imported inputs to produce export goods). Distinguishing the mode of participation is important since exposure to foreign economic forces depends on the absolute and relative importance of forward and backward linkages in GVCs. Borin, Mancini, and Taglioni (2021) suggest that assuming two modes of GVC participation may mischaracterize the relative importance of backward-to-forward linkage. The authors propose three distinct modes of GVC participation, i.e., *purely backward participation, purely forward participation,* and *two-sided participation.*

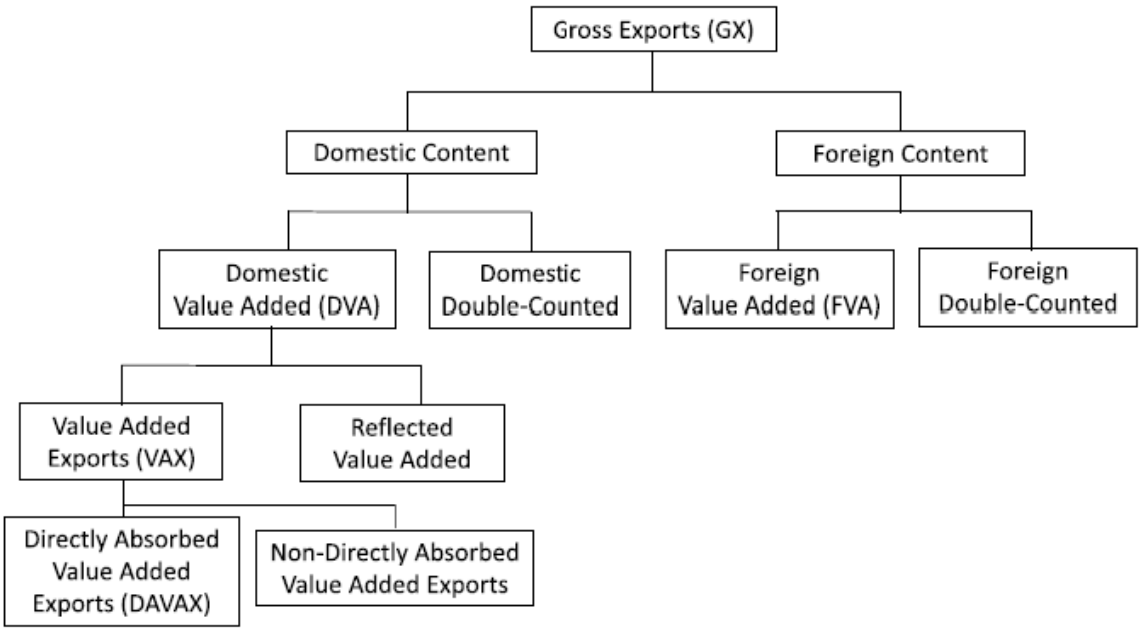

Figure 3. Decomposing sources of value-added in gross exports

Source: Koopman et al. (2014)

2.2.Firm performance and GVC integration

The rise of global value chains in the past three decades has received significant attention from many researchers and policymakers (Amador, 2015; Gereffi, 1994; UNCTAD, 2017). Several aspects of this phenomenon have been investigated by economic literature, and early studies concentrate on the measurement of GVCs at broad level that the unit of analysis is a country or a country-industry. This measurement leads to the development of world input-

output tables, a key tool for economists studying GVCs (Johnson, 2018; Koopman et al., 2014). This tool gives a broad view of GVC participation and positioning within GVCs, as well as the consequence of GVC participation. Generally, GVCs allow countries to benefit from the comparative advantage of other countries with product fragmentation and specialization (Antràs, 2020; R. Baldwin & Venables, 2013).

Macro approach to GVCs argues that empirically, factor endowment of the country plays an analogous role in shaping GVCs or positioning of country/industry in GVCs. Besides, trade costs, market size, geographical characteristics, and institutional quality matter for GVC participation (Antràs, 2020; Antràs & Chor, 2022; Antràs & Yeaple, 2014). Such determinants are relatively aligned with predictions from traditional trade theories such as Herkscher – Ohline model or comparative advantages but zoom closer into the advantages in each stage of production.

Recent literature on the effect of GVC participation by using firm data or sector-firm data has shed light on the link between GVC involvement and firm performance. Particularly, firm performance has taken a prominent place as a research focus on this linkage. Firm performance can be examined by various aspects such as growth, profitability, financial, innovation, productivity and efficiency (Lu et al., 2016; Mahy et al., 2018; Reddy & Sasidharan, 2020). Such a focus makes it clear that participation in GVCs affects firm performance through efficiency and productivity gains. A relevant strand of the extant literature focused on labor productivity, or total factor productivity (TFP) indicator representing firm productivity (Gueye et al., 2020; Hummels et al., 2001; Montalbano et al., 2018; Shujiro Urata, 2021). Using firm-level data, many studies explore how GVC integration can improve firm performance in terms of productivity (labor productivity, TFP), export propensity, and profit.

While overwhelming literature focuses on how country/sectors participate in GVCs, the assessment of firm performance in GVCs does not receive adequate attention. Integration into the global market enables firms to exploit economies of scale, acquire new knowledge and technology, and become more innovative. GVC participation is beneficial to firms to improve competitiveness thanks to access to cheaper intermediate inputs, technological spillover and upgrading (Boffa, Jansen, & Solleder, 2019). There are various ways that researchers elaborate on GVC participation, such as using dummy for *backward and forward participation* or indicators of foreign value added and domestic value added.

Two modes of GVC participation, i.e., backward linkage and forward linkage, have implications for firm efficiency. On the one hand, backward linkage increases a firm's efficiency through productive aspects. It allows firms to access more international markets with low-cost and high technological content intermediate input. Firms may offshore less-rewarding stages of production and focus on high-value stages, or so-called vertical specialization (Hummels et al., 2001). On the other hand, forward linkages improve efficiency, driven by the relationship between lead firm and other suppliers (i.e., firms sell intermediate goods to other companies rather than to end customers) in the chain. Conceptual studies have identified knowledge diffusion and transfer as an important aspect of this link (Ernst & Kim, 2002; Inkpen & Tsang, 2005). It provides a valuable opportunity to increase SME's productivity and efficiency through learning about technologies, organisational and managerial practices

(Alessandro et al., 2015). This relationship is more important with the development of relational GVCs in which businesses have to make constant exchanges with each other, requiring their activeness in keeping their reputation with business partners, thereby improving their productivity and efficiency. Stronger relationships along GVCs can reduce the cost of risk, making businesses operate more efficiently.

In general, researchers univerally agree that joining GVCs boosts firm performance. Research by Baldwin and Yan (2014) study the impacts of Canadian firms on global value chains, showing the enormous effect of GVC participation. Firms participating in GVC show 5% higher productivity in the first year and 9% in the next four years. Meanwhile, firms leaving GVCs experience a 1% decrease in productivity in the first year and 8% in the next four years. Benkovskis, Masso, Tkacevs, Vahter, & Yashiro (2020) use a matched firm–level dataset of Estonian and Latvian firms to gauge the effect of GVC participation on export performance. The authors realize that productivity gain is large for the export of knowledge-intensive services, intermediate goods and re-exports, and these sectors often generate high value-added within value chains. Manghnani, Meyer, Saez, & Van Der Marel (2021) explore how GVC participation in different forms would alter the productivity of Indian firms. Empirical results suggest that GVC participation is associated with around 13% to 22% productivity premium than domestic firms. Montalbano, Nenci, and Pietrobelli (2017) suggest that GVC involvement and position in GVCs matter for firms' productivity in LAC regions. The authors emphasize that firms operating upstream sector in GVCs tend to exhibit higher levels of productivity than firms operating in downstream sectors. This finding is further confirmed in the study of Banh, Wingender, and Gueye (2020) in which firms operating in downstream industries in Estonia tend to have lower productivity. Del Prete, Giovannetti, and Marvasi (2017) use the World Bank Enterprise Survey of Egypt and Morocco to understand how GVC participation has implications for firm performance. The authors apply the difference-and-difference method and propensity score matching, finding that GVC firms outperform in productivity in both ex-post and ex-ante.

Urata and Baek (2022) examined the impact of a firm's GVC participation on total factor productivity using the Basic Survey of Japanese Business Structure and Activities, Ministry of Economy, Trade and Industry, including manufacturing firms from 1994–2018. They defined GVC participation as when a firm engaged in both importing and exporting, and found that a firm's GVC participation generally has positive impacts on productivity, but not very strong. Authors pointed out the long-term learning effect, indicating that GVC participating firms take time to learn new technology. Del Prete et al. (2017) investigated whether only the most productive firms can join GVC and improve country's competitiveness or whether joining GVC can itself make firms more productive. Using World Bank Enterprise Surveys data for two North African countries, Egypt and Morocco, in 2004 and 2007, the result suggests that firms which enter GVCs perform better ex-ante, and benefit from ex-post additional increases in productivity.

Thanks to the availability of new data for trade in value added, an increasing number of empirical works have addressed firms' GVC participation by value-added data (Taglioni & Winkler, 2016). Montalbano et al. (2018) used GVC participation index measuring by OECD-

WTO TiVA database and match it with the last wave of the WBES firm-level data for Latin American countries (dataset with 12,146 firms distributed across 30 LAC countries). Their study shows that both participation in GVCs and position within GVCs have positive impact on firm productivity. Lu et al. (2016) exploited data from a large Chinese firm-level dataset with 208,078 firm-year observations for the period from 2000 to 2006 to investigate the relationship with the case of China firm and found an inverted U-shaped non-linear relationship between GVC participation and the productivity of Chinese firms. It means GVC participation would improve Chinese firms' TFP, but when the firm is over-embedded into GVCs, it will reduce TFP. Gueye et al. (2020) applied the GVC participation measure proposed by Koopman et al. (2014), which captures all sources of value added in gross exports. The research used Estonian firm-level data from the ORBIS database, containing more than 103,000 firms in 19 NACE (General Industrial Classification of Economic Activities within the European Community) sectors from 1999 to 2016. It also proves a link between firm involvement in GVCs and productivity gains through backward and forward linkages. However, the recent study by Abdullah (2022) about Turkish firm indicates that while forward GVC participation is not significantly associated with productivity growth, simple (complex) forward participation leads to higher (lower) productivity growth.

A number of studies investigate how specific GVC linkage, forward linkage and backward linkage can have implications for firm performance. Empirical evidence shows that the magnitude of effects of forward linkage and backward linkage on firm performance is not similar across studies as it depends on sectors and countries. The backward participation is exemplified by the use of imported inputs. Shepherd and Stone (2013) examine the productivity gains of firms from using imported intermediate inputs and capital goods. Using the sample of 100,000 firms in 115 developing and transition economies extracted from the World Bank Enterprise Survey, the study demonstrates that intermediate inputs and capital goods significantly improve the dynamic gains in terms of total factor productivity (TFP) and innovation in which 1% increase in shared of imported intermediates leads to 0.3% gain in firm's productivity. Bas and Strauss-Kahn (2014) investigate the role of imported intermediates in boosting productivity in France. Estimated based on panel data from 1996 to 2005, the evidence suggests that imported input improves firm performance via three channels: indirect productivity channel, direct–cost channel and quality/technology channel. Halpern, Koren, and Szeidl (2015) find evidence from the Hungarian micro dataset that firms using all input varieties would increase firm revenue productivity by 22%, in which half of this productivity premium comes from imperfect substitutes of domestic and foreign inputs. Notably, imported intermediate inputs from developed countries can contribute larger to productivity than intermediates from developing markets. A similar effect of imported intermediates is also examined by Pane and Patunru (2022) using firm-level data from 2008 to 2012 in Indonesia. Dang and Dang (2020), using the SME database of Vietnam from 2007 to 2015, suggest that backward participation would lower the innovation of SMEs in Vietnam.

Forward linkage is often examined under the export activities of forms. Forward linkage is beneficial to enterprises in which foreign investors/buyers can provide training for the local labor force and disseminate technological knowledge. Amendolagine, Presbitero, Rabellotti,

and Sanfilippo (2019) uncover how local sourcing by foreign investors affects participation and positioning in the global value chains using firm-level data from 19 Sub-Saharan African countries and Vietnam. The result suggests that countries and industries with higher upstream specialization tend to have a larger share of local sourcing from foreign investors. Korwatanasakul and Hue (2022) examine how GVC integration impacts on labor productivity of manufacturing sectors in Vietnam using GSO Survey from 2009 to 2018. The finding suggests that forward participation significantly improves the labor productivity of firms but not of SMEs. Other articles examine the spillover effect of productivity from FDI firms to local firms through the good supply, showing that the appearance of FDI firms tends to be positively associated with higher productivity of local suppliers when they engage in information exchange of technical knowhow for product specifications (Newman et al., 2020; Xu & Sheng, 2012; Zhang, 2019). GVC firms are beneficial from international experience, which is often referred to the "learning from export" (Amendolagine et al., 2019; Newman et al., 2020). Manghnani et al. (2021) suggest that GVC firms have productivity around 13% to 22% higher than domestic firms, especially for firms engage in both export and import activities. A recent study by Korwatanasakul and Hue (2022) explore how different modes of GVC participation, i.e., backward, and forward linkage, would have implications for firms' labor productivity using GSO data from 2008 to 2020. GVC participation is proxied by dummy variables, showing that forward participation generally increases labor productivity, but backward participation does not always necessarily improve labor productivity.

Micro approach to GVC analysis has been underrepresented in a large body of GVC research. Measuring how GVC participation affects productivity is the most obvious way to understand "gain from participating". Modern studies on GVC compile updated data from TiVA, EORA – UNCTAD, etc., in calculating GVC positions. However, research on firm performance in GVCs of Vietnam is still very limited as articles mostly use dummy variables for forward/backward participation. We attempt to fill this research gap by exploring how GVC participation has implications for firms' productivity in Vietnam. We disentangle the effect of sectoral participation in GVCs through FVA measure on firm performance. Hence, we propose three testable hypotheses:

H1: The share of foreign value added in gross exports of Vietnam has negative impact on firm's productivity.

H2: The share of foreign value-added interaction with modes of GVCs (importer, exporter, and both exporter and importer) has a positive impact on the firm's productivity.

H3: Different forms of GVC participation can result in different gains.

3. Methodology

3.1.Measuring the value added

To measure GVC participation of a country, we employ the measure forward GVC participation use in current literature of GVC measurement, introduced by Johnson and Noguera (2012b). We express it as the share of value-added to gross exports, VAX/GX,

indicating the extent to which a country uses imported intermediates as inputs for its export. This indicator is calculated based on the world input-output table, using the value-added accounting framework of Johnson and Noguera (2012a) and Koopman et al. (2014). This measurement is particularly relevant for analyzing a country that is active in downstream activities of the value chain but less informed for a country that specializes in upstream activities (Pahl & Timmer, 2020). Thus, using share of value-added to gross exports is suitable for Vietnam since the country has initiated majority of manufacturing activities based on foreign intermediates.

Trade in value-added is based on an idea of fragmentation of production. According to the definition of GVCs indicated by Antràs 2020, GVC consists of a series of stages involved in producing a product or service that is sold to consumers, with each stage adding value and with at least two stages being produced in different countries. Therefore, the traditional measure of trade volume does not adequately reflect the contribution of a country to global output. Traditional trade in goods and services has been replaced by outsourcing tasks globally thanks to hyper-specialization based on comparative advantages. The current statistics are grossly incompetent in understanding the country of origin and follow the trade-in value added because the data is not supporting that. So, if there is a new measure which can take into account the components trade and link it with the domestic and foreign value added in the exports, then a clearer picture will be evolved, which can help in developing policies, not just for the trade but for development of the sectors, address skill related issues, employment-related issues, infrastructure related issues.

Regarding the value-added approach, World Input-Output Table has become the main ingredient in decomposing the value contribution of each country(Antràs & Chor, 2022). Several global organisations have made an effort to create an international input-output table popularly known as the multi-regional input-output (MRIO) table, the WorldInput–Output Database (WIOD), the OECD TiVA database, and the Eora Global Supply Chain Database. Figure 5 illustrates the structure of the World Input-Output Table. In this JS x JS matrix, the typical entry Zijrs represents the value of inputs from industry r in country i (horizontal array) purchased from the industry s of country j (vertical array).

			Input use & value added								Final use		Total use	
			Country 1			⋯	Country J			Country 1	⋯	Country J		
			Industry 1	⋯	Industry S	⋯	Industry 1	⋯	Industry S					
Output supplied	Country 1	Industry 1	Z_{11}^{11}	⋯	Z_{11}^{1S}	⋯	Z_{1J}^{11}	⋯	Z_{1J}^{1S}	F_{11}^{1}	⋯	F_{1J}^{1}	Y_{1}^{1}
		⋯	⋯	Z_{11}^{rs}	⋯	⋯	⋯	Z_{1J}^{rs}	⋯	⋯	⋯	⋯	⋯	⋯
		Industry S	Z_{11}^{S1}	⋯	Z_{11}^{SS}	⋯	Z_{1J}^{S1}	⋯	Z_{1J}^{SS}	F_{11}^{S}	⋯	F_{1J}^{S}	Y_{1}^{S}
	⋯	⋯	⋯	⋯	⋯	Z_{ij}^{rs}	⋯	⋯	⋯	⋯	F_{ij}^{r}	⋯	Y_{i}^{r}
	Country J	Industry 1	Z_{J1}^{11}	⋯	Z_{J1}^{1S}	⋯	Z_{JJ}^{11}	⋯	Z_{JJ}^{1S}	F_{J1}^{1}	⋯	F_{JJ}^{1}	Y_{J}^{1}
		⋯	⋯	Z_{J1}^{rs}	⋯	⋯	⋯	Z_{JJ}^{rs}	⋯	⋯	⋯	⋯	⋯	⋯
		Industry S	Z_{J1}^{S1}	⋯	Z_{J1}^{SS}	⋯	Z_{JJ}^{S1}	⋯	Z_{JJ}^{SS}	F_{J1}^{S}	⋯	F_{JJ}^{S}	Y_{J}^{S}
Value added			VA_{1}^{1}	⋯	VA_{1}^{S}	VA_{j}^{s}	VA_{J}^{1}	⋯	VA_{J}^{S}					
Gross output			Y_{1}^{1}	⋯	Y_{1}^{S}	Y_{j}^{s}	Y_{J}^{1}	⋯	Y_{J}^{S}	⋯				

Figure 4. Structure of World Input-Output Table

Note: Adapted from Antràs & Chor (2022)

A closely-related task is to unpack the sources of value-added embodied in trade data that is observed "as-is", such as in a country's gross exports. The initial effort of unpacked sources of value-added contained in gross exports was presented in the study of Hummels et al. (1998, 2001)about the nature of vertical specialisation in the global trade pattern. Since production stages are fragmented elsewhere, a country can use its intermediate inputs to produce its exports. There are two modes of GVC participation, i.e. backward linkage (a country's exports embodying imported content) and forward linkage (a country's exports contained in the importing country's imports). Literature on GVC measurement proposes several ways to compute the value-added in exports (VAX) indicator, embarked on by Johnson and Noguera (2012), and extended on later work by Koopman et al. (2014) for gross-export accounting to deal with double-counting issues of customs data.

3.2.Empirical strategy

In this section, we first construct the models to examine the impact of FVA in Vietnam and its interaction with modes of GVCs on firm's productivity. Second, we use control function methods to address endogeneity problems.

To test hypothesis 1, we estimate equation (1) to determine the effects of FVA of Vietnam on firm's productivity as follows:

$$Productivity_{it} = \beta_{11}\, FVA_{it} + \beta_{12} OnlyImp_{it} + \beta_{13} OnlyExp_{it} + \beta_{14} BothExpImp_{it} + x'_{it}\pi_1 + c_{1i} + \mu_{1it} \quad (1)$$

To test hypothesis 2, we estimate equation (2) to determine the interaction of FVA with modes of GVCs on firm's productivity as follows:

$$Productivity_{it} = \beta_{21}\, FVA_{it} + \beta_{22} OnlyImp_{it} + \beta_{23} OnlyExp_{it} + \beta_{24} BothExpImp_{it} + \beta_{25} FVA_{it} * OnlyImp_{it} + \beta_{26} FVA_{it} * OnlyExp_{it} + \beta_{27} FVA_{it} * BothExpImp_{it} + x'_{it}\pi_2 + c_{2i} + \mu_{2it} \quad (2)$$

Where the subscript i denotes the i^{th} firm in the sample, and the subscript t denotes the t^{th} year in the sample. Productivity denotes the labor productivity of firms, FVA denotes the foreign value-added in Vietnam's manufacturing exports, OnlyImp denotes only importer, OnlyExp denotes only exporter, and BothExpImp denotes both exporting and importing firms. x is a vector of control variables such as number of employees, fixed assets, ownership, and time, c is firm-fixed effects, and μ is error terms. We follow the GVC participation modes in the study of Baldwin and Yan (2014) in which GVC firms include firms operating in exports, imports, or both activities firms while non-GVC firms are those neither import nor exports.

Instrumental variable strategy

We use FVA to proxy for integration into GVCs of Vietnam. However, a main empirical challenge in examining the causal effects of trade exposure, e.g. FVA, on productivity is the presence of unobservable demand and supply shocks. Our strategy is related to that used by some scholars to address the endogeneity of FVA (Autor, Dorn, & Hanson, 2013; Bloom, Draca, & Van Reenen, 2016; Dauth, Findeisen, & Suedekum, 2014; Dippel, Gold, Heblich, & Pinto, 2022). They studied the impacts of Chinese imports on US manufacturing employment

(Autor et al., 2013), of China and Eastern Europe on local labour markets in Germany (Dauth et al., 2014; Dippel et al., 2022), and Chinese imports on innovation and productivity in European firms (Bloom et al., 2016). They used Chinese exports (Eastern Europe) to other high-income countries and used the value of products in industries which removed quotas due to China's participation in the WTO (Bloom et al., 2016) to instrument for Chinese (Eastern Europe) trade exposure. We also derive from their spirit; that is, we use the DVA of China to instrument for FVA of Vietnam. The idea behind the instrument is that the increase of China's DVA in all value chains reduces a supply shock and increases import penetration for all partner economies, including Vietnam.

We follow the approach of Wooldridge (2010, 2015) by using control function methods to address the endogeneity problem in the non-linear models as equation (2). Wooldridge (2010, 2015) shows that control function methods are identical in terms of the linear regression models. The 2SLS use the predicted value of endogenous variable, which is obtained in the first stage. In the second stage, while the control function methods use residuals and original endogenous variable in the second stage. The regression results from equation (1) using the two approaches are identical.[2] However, the control function methods to address the endogenous problems in non-linear models as equation (2) is more appropriate than the 2SLS.

3.3.Data

Data for enterprise performance are adopted from Vietnam Enterprise Census from 2000 to 2014. This survey is the most comprehensive survey conducted annually by General Statistics Office (GSO) to assess various aspects of business operations on a national scale.

Regarding GVC data, various databases provide foreign value-added share of gross exports of Vietnam as proxies for Viet Nam's participation in GVCs. We extract Vietnam FVA using The Trade in Value Added (TiVA) database, which provides insights into domestic and foreign value-added content of gross exports by exporting industry and participation in GVCs via backward and forward linkages. TiVA database provides indicators for 66 economies covering the period 1995-2018, including 45 unique industrial activities organized in a hierarchy. We combine the firm-level database of Vietnam in different sectors with value-added matrices in TiVA at sectoral levels. The final sample includes 2,058,690 observations for 24 industries covering the period from 2000 to 2014.

We measure productivity as the logarithm of sale revenue per employee. GVC participation in the manufacturing sector is proxied by the share of foreign value added in gross exports, as the manufacturing sector uses lots of imported input from other countries to produce its exports. We control for firm-specific characteristics, including firm size (measured by number of employees), capital intensity, firm ownership, and its export status. The summary statistics of variables are provided in Table 1, and the correlations of the variables are presented in Table 2.

[2] We use user-written command, xtivreg2 with robust option, to estimate the 2SLS and areg with robust option for both stages to estimate the control function. Results from two approach are available from the authors upon request.

Table 1*:* Description of variables

Variable	Description	Mean	Std. dev.	Min	Max
Dependent variable					
productivity	Log of productivity, measured by sales revenue per employees	4.890	1.513	-6.90	14.02
Endogenous variable					
fva_vnm	Foreign value-added share of gross exports of Vietnam, percentage, measuring backward participation at sectoral level.	42.799	7.879	15.33	60.79
Instrument variable					
dva_chn	Domestic value-added share of gross exports of China, percentage, measuring forward participation at sectoral level	85.415	4.485	60.78	95.85
Control variables					
ln_emp	Log of umber of employee of firms	2.937	1.516	0.00	11.34
ln_cap	Log of capital intensity, measured by the average fixed capital per employee	6.583	2.375	-1.61	16.41
soes	= 1 if firm is state-owned	0.039	0.193	0.00	1.00
private	= 1 if firm is private	0.890	0.312	0.00	1.00
fdi	= 1 if firm is foreign direct investment	0.071	0.257	0.00	1.00
nongvc	Firm do not participate in GVCs = 1, otherwise = 0.	0.856	0.351	0.00	1.00
onlyimport	Having activities related to only imports = 1, otherwise = 0.	0.027	0.162	0.00	1.00
onlyexport	Having activities related to only exports = 1, otherwise = 0.	0.045	0.208	0.00	1.00
bothexp_imp	Having activities related to both imports and exports = 1, otherwise = 0.	0.072	0.259	0.00	1.00
N = 252943					

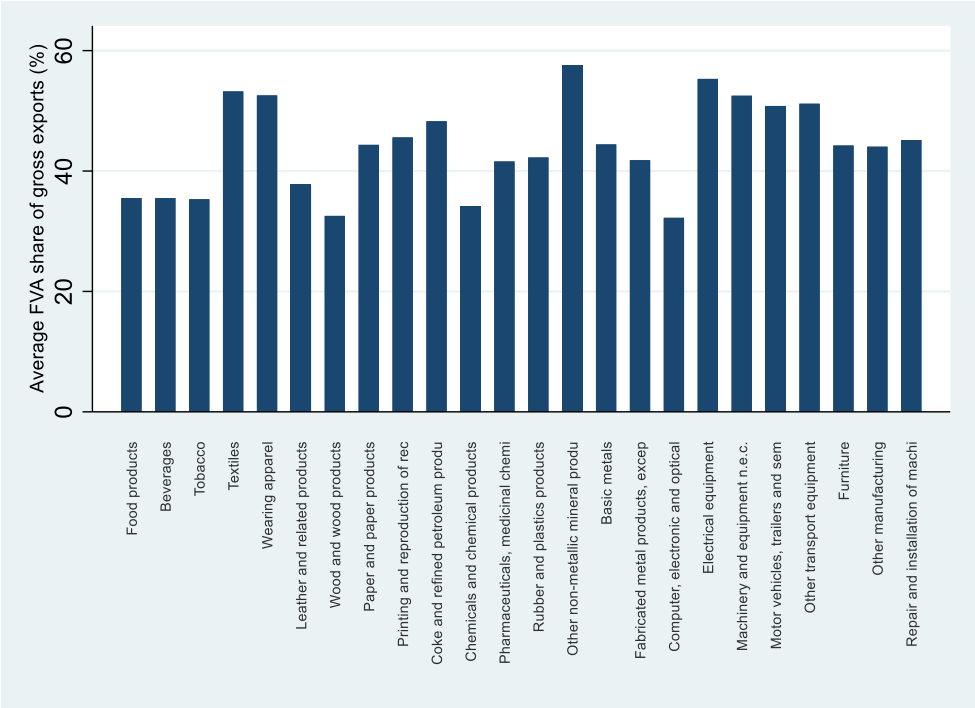

Figure 5. Average FVA share in gross exports of Vietnam from 2000 to 2014

Source: Authors' calculations. Data from OECD TiVA (2022).

Table 2 Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11
1.productivity	1.00										
2.fva_vnm	-0.04***	1.00									
3.dva_chn	-0.04***	-0.29***	1.00								
4.onlyimport	0.13***	0.02***	-0.04***	1.00							
5.onlyexport	0.05***	0.00	0.04***	-0.04***	1.00						
6.bothexp_imp	0.12***	0.11***	-0.01***	-0.05***	-0.06***	1.00					
7.soes	0.05***	-0.09***	-0.06***	0.02***	0.01***	0.02***	1.00				
8.private	-0.11***	-0.03***	0.05***	-0.12***	-0.09***	-0.14***	-0.17***	1.00			
9.fdi	0.10***	0.11***	-0.01***	0.13***	0.10***	0.13***	-0.06***	-0.29***	1.00		
10.ln_emp	0.14***	0.10***	-0.07***	0.13***	0.22***	0.17***	0.27***	-0.28***	0.18***	1.00	
11.ln_cap	0.29***	0.01**	0.08***	0.15***	0.13***	0.27***	0.18***	-0.19***	0.23***	0.32***	1.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' calculations

4. Result & findings

Table 3 presents the effects of China's DVA on Vietnam's FVA (the first stage) in column (1) and the effects of Vietnam's FVA and their interaction with the modes of GVCs on productivity in column (2) and column (3), respectively. Our instrument is valid because the weak identification test equals 364.296 that is greater than the critical value, 10 (Stock & Yogo, 2005). The results in column (1) using the fixed effects estimator shows that China's DVA has significant and positive impact on Vietnam' FVA (column (1)), the one percent-point increase in the share of China's DVA in gross exports rises 0.116 percent point in the share of Vietnam's FVA in gross exports (β=0.116; p-value < 0.01).

Result in column (2) in Table 3 shows that the coefficient of the Vietnam's FVA (fva_vnm) is negative and significant, suggesting an adverse effects on firm's productivity in Vietnam. In particular, one percent-point increase in the share of Vietnam's FVA in gross exports decreases by 7.7 percent in firm's productivity (β= −0.077; p-value < 0.01), which supports Hypothesis H1. In other words, firms in the sector with high backward participation tend to exhibit lower labor productivity. One plausible for this phenomenon is that interaction with international buyers is more crucial to eel.

Notably, the result from the baseline model of control function approach suggests that firms participating in different modes of GVC are associated with higher productivity levels, shown by positive and statistically significant coefficients at 1%. Moreover, it is obvious that the more deeply firms participate in GVCs, the higher productivity they can have, supporting Hypothesis H3. Firms both exporting and importing witness 0.315% higher in productivity for non – GVC firms. Firms only exporting report a 0.238% higher in labor productivity and for import firms, the productivity premium from GVC participation is 0.202%. Our results suggest that using foreign inputs is a source of rising productivity and confirm the effect of learning from exporting (García, Avella, & Fernández, 2012) .

To test how different GVC modes can impact on diffusion from backward linkage, we introduce interaction terms between FVA share and 3 modes of GVC participation (only export, only import, both export and import). Results in column (3) in Table 3 show the coefficients of interaction terms are positive and significant for onlyimport*fva_vnm (A*fva_vnm) and bothimpExp*fva_vnm (C*fva_vnm), suggesting that a firm participates in GVCs and operates in an industry with higher FVA, has higher productivity than its counterparts. Figure 2 also confirms our results, which supports Hypothesis H2. One plausible for this phenomenon is that interaction with international buyers is more crucial to reap benefits from GVC participation. Meanwhile, if firms do not participate in GVCs through imports or exports, the dissemination of knowledge or technology tends to be limited.

Table 3. Regression results from estimating equations (1) and (2)

	(1)	**(2)**	**(3)**
	FirstStage	**productivity**	**productivity**
dva_chn	0.116***		
	(0.011)		
fva_vnm		-0.077***	-0.078***

	(1)	(2)	(3)
	FirstStage	**productivity**	**productivity**
		(0.014)	(0.014)
onlyimport (A)	-0.023	0.202***	-0.809***
	(0.051)	(0.016)	(0.243)
onlyexport (B)	-0.042	0.238***	-0.023
	(0.034)	(0.013)	(0.182)
bothexp_imp (C)	-0.084**	0.315***	-0.146
	(0.041)	(0.013)	(0.143)
A*fva_vnm			0.024***
			(0.006)
B*fva_vnm			0.006
			(0.004)
C*fva_vnm			0.011***
			(0.003)
private	-0.007	0.090***	0.090***
	(0.070)	(0.018)	(0.018)
fdi	0.596***	0.001	0.002
	(0.209)	(0.058)	(0.058)
ln_emp	-0.022	-0.138***	-0.137***
	(0.029)	(0.017)	(0.017)
ln_emp^2	0.003	-0.011***	-0.012***
	(0.005)	(0.002)	(0.002)
ln_cap	-0.016***	0.084***	0.084***
	(0.006)	(0.003)	(0.003)
residuals		0.075***	0.076***
		(0.014)	(0.014)
A*residuals			-0.027***
			(0.006)
B*residuals			-0.016***

	(1) FirstStage	(2) productivity	(3) productivity
			(0.005)
C*residuals			-0.018***
			(0.004)
_cons	25.588***	7.463***	7.513***
	(0.968)	(0.509)	(0.513)
Year fixed effects	YES	YES	YES
Weak identification test	364.296		
N	252943	252943	252943
R^2	0.952	0.786	0.786

Robust standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 4 illustrates the predictive margins of labor productivity regarding 4 modes of GVC participation: *export*, *import*, *both export-import*, *non-GVC (no export, import)*. The result shows that firms in sectors with lower backward participation in general tend to exhibit higher labour productivity. Firms participating in GVCs with both export and import status are associated with higher benefits from backward linkage than other modes of participation. Our findings support the result of Manghnani et al. (2021) in which firms participating in both exports and imports tend to be more productive. The direction of backward participation in firm performance supported recent studies by Dang and Dang (2020) and Korwatanasakul and Hue (2022).

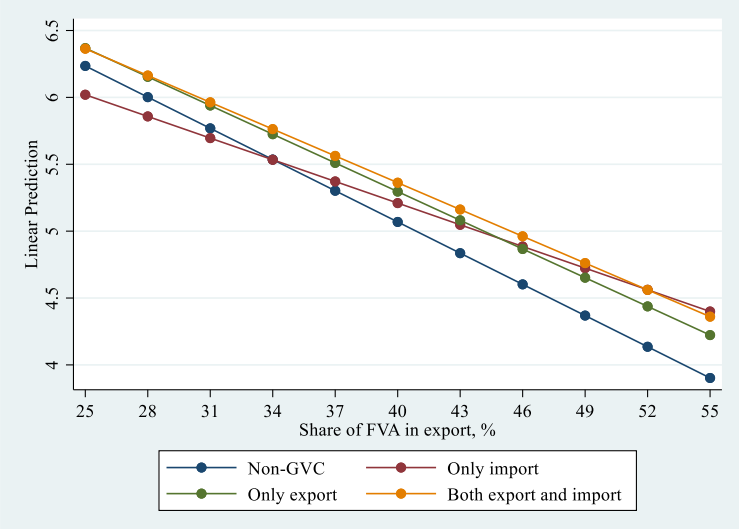

Figure 6 Predictive Margins of GVC modes at different values of FVA

Source: Author calculation by Stata 17

Our study confirms the effects of firm-specific characteristics on labor production. For instance, firm size is negatively associated with labor productivity which aligns with empirical evidence from Xu & Sheng (2012); Del Prete et al. (2017); Newman et al. (2020), showing in the negative coefficients of lnemp and lnemp^2. Larger firms may have complex organizational structure which can hinder the decision-making as well as the spillover effects among employees. Private firms are more beneficial from backward participation. Capital intensity tends to improve labor productivity as capital intensity is often associated with the technological investment, which enables labors to produce more (Manghnani et al., 2021; Montalbano et al., 2017).

5. Conclusion and policy implications

In light of the expansion of GVCs and their possible benefits to the GVC-participating firms, many studies attempt to investigate the relationship between GVC participation and firm's productivity in Viet Nam. Our research has both theoretical and practical contributions.

Regarding theoretical contribution, our study is among the first effort to highlight how GVC participation benefits firm performance by utilizing the official firm dataset in Vietnam and the updated database of GVC measures provided by OECD. We add to GVC analysis in developing countries, especially in Vietnam where GVCs have become unprecedented trends but have not received adequate attention at firm levels. Our results confirm a positive causal relationship between foreign value added in exports and labor productivity in Viet Nam over the period 2000–2014, confirming that backward participation or the use of imported inputs increases productivity of firms. We distinguish three modes of participation, i.e., only import, only export, both export and import. Whether firms engage in import, export, or both activities significantly moderates the effect of foreign value added on labor productivity.

Our study confirms the effects of firm-specific characteristics on labor production. For instance, firm size is negatively associated with labor productivity which align to empirical evidence from Xu & Sheng (2012); Del Prete et al. (2017); Newman et al. (2020). Private firms are more beneficial from backward participation. Capital intensity tends to improve labor productivity as capital intensity is often associated with technological investment, which enables labors to produce more (Manghnani et al., 2021; Montalbano et al., 2017).

From theoretical analysis, we propose several key insights for policymakers in designing appropriate trade policies. Relying on policy. The positive impacts of imports and backward participation suggests that trade policy should open access to imported inputs tends to lower productivity and hence deteriorate firm's performance. Heavy reliance on from foreign inputs and technologies (i.e. intensive backward GVC participation) without further upgrading markets as it can lead to structural stagnation, erosion of national competitiveness, and growth slowdown. Backward participation is beneficial for GVC firms but not evident to non-GVC firms. Thus, findings imply a more well-designed policy approach to backward participation, which lower the dependence on foreign partners and strengthen domestic links. Government

can implement strategies to promote industrial clusters for high technologies, R&D to further enhance increase the upgrading and improve domestic input supply. Notably, encouraging strong domestic linkages can also shield domestic firms from supply chain risks from international partners, further strengthen the resilience of Vietnamese firms in the context of globalization. efficient resource usages. In addition, the government should encourage both direct export and import of firms, not merely supplying output for FDI firms in the home country. In fact, direct import or export often has a high premium for firm productivity thanks to increased international knowledge and experience. The study also suggests that firms should invest in capital capitals for labor to enable higher productivity.

The study provides useful policy implications for governments to design policy targeting increasing technical efficiency for SMEs. New policies can target on following aspects.

Build a high-skilled national workforce: In general, the labor force quality of SMEs is often lower than large firms. Hence, improving labor quality on a national scale is beneficial to SMEs. Basic skills such as language and IT skills are of special needs in recent years, which is an enabler for acquiring new advanced technology in order to boost technical efficiency. To foster skill development and enable SMEs to thrive in global value chains (GVCs), the government can implement nationwide training programs. These initiatives can encompass general training as well as specialized programs targeting advanced skills in strategic industries. Key areas of focus may include technological literacy, advanced language skills, and other relevant competencies. Prioritizing skills for highly integrated GVC sectors will empower SMEs to elevate their roles and contribute higher value-added functions along the value chains. In our study, the workforce holds a critical role in boosting technical efficiency.

Enhancing the role of forward participation of key sector: Forward participation has negative impacts on technical efficiency for SMEs due to the fact that SMEs often supply low-value-added goods to the global market. The simple production process also discourages them from upgrading technology to enhance technical efficiency. It is a complicated issue in which export orientation seems to be detrimental to SME's ability to maximize efficiency. It calls for cautious trade policy design toward encourage the upgrading along the value chain. In other words, SMEs should be encouraged to export new and innovative products, improve the production process, etc. The government can provide support such as financial support to create incentives for SMEs to adopt modern technologies. Opening new market opportunities and helping SMEs to learn from other countries are viable measures.

Designing policies toward imported quality input for production: Imported input has been found to have positive impact on SMEs. However, promoting imports can increase the dependence on foreign supply, making SMEs more vulnerable to global fluctuation, especially during COVID-19 and geopolitical intension (Audretsch & Belitski, 2021). Therefore, the government should promote a high-quality and resilient supply chain, targeting on providing high quality inputs for production.

Increase procurements to encourage SMEs to supply their products: Empirical analysis shows that state-owned enterprises can be more beneficial from supplying to the government.

The government can spur this positive effect by encouraging SMEs production and purchase from them. It enables the stable income sources while help the government support SME activities even better.

Connect business supporting organizations with local firms: Services like logistics, tax consulting, and strategic guidance are vital in enhancing the competitiveness of SMEs. By providing professional and comprehensive business support, SMEs can overcome challenges and create a favorable environment for their growth and success.

Promote the business environment: Enhancements in regulatory frameworks for contract enforcement, anti-trust measures, customs procedures, and cross-border data exchanges are crucial. Additionally, improving the national information and communication technology (ICT) system is essential to ensure seamless connectivity and simplify the search process for MNCs seeking suitable locations and suppliers. Besides, policies should be implemented to facilitate SMEs' access to formal credit. This would enable SMEs to secure larger funds at preferential interest rates, reducing their financial burden while fostering investment in research and development (R&D) activities and innovative solutions. Many SMEs have expressed that the lack of access to formal credit hampers their ability to expand and innovate.

Adopting and innovating technology are critical to the success of SMEs in the process of internationalization: Whether they are producing directly for foreign buyers or supplying large firms that are doing so, SMEs need to be using the latest technologies to generate efficient and high-quality products and to achieve high levels of labor productivity. Technologies are classified into three main categories: supply–side technology policies, demand-size technology policies and systemic technology policies. In terms of supply–side technology, the government can encourage SMEs to adopt global technologies to improve their quality standards as well as reduce obsolete equipment. In terms of demand size, patent policy, antitrust policy, and anticorruption can be beneficial for creating incentives for better technology as it reduces the lobbying power of interest groups. Government procurement of SMEs can be a good measure to encourage the performance of SMEs. Symmetric technology policy calls for collaboration between SMEs and research groups to increase their adoption of the latest technology and more efficient production processes.

REFERENCE

Amendolagine, V., Presbitero, A. F., Rabellotti, R. & Sanfilippo, M. (2019). "Local sourcing in developing countries: The role of foreign direct investments and global value chains", *World Development*, Vol. 113, pp. 73–88.

Antràs, P. (2020). "Conceptual Aspects of Global Value Chains", *World Bank Economic Review*, Vol. 34 No. 3, pp. 551–574.

Antràs, P. & Chor, D. (2022). "Global value chains", Available at: https://doi.org/10.1016/bs.hesint.2022.02.005

Antràs, P. & Yeaple, S. R. (2014). "Multinational Firms and the Structure of International Trade", *Handbook of International Economics*, Vol. 4, pp. 55–130.

Autor, D. H., Dorn, D. & Hanson, G. H. (2013). "The China Syndrome: Local Labor Market Effects of Import Competition in the United States", *American Economic Review*, Vol. 103 No. 6, pp. 2121–2168.

Baldwin, J. & Yan, B. (2014). "Global value chains and the productivity of Canadian manufacturing firms".

Banh, H., Wingender, P. & Gueye, C. (2020). "Global Value Chains and Productivity", *IMF Working Papers*, Vol. 20 No. 117.

Bas, M. & Strauss-Kahn, V. (2014). "Does importing more inputs raise exports? Firm-level evidence from France", *Review of World Economics*, Vol. 150 No. 2, pp. 241–275.

Benkovskis, K., Masso, J., Tkacevs, O., Vahter, P. & Yashiro, N. (2020). "Export and productivity in global value chains: comparative evidence from Latvia and Estonia", *Review of World Economics*, Vol. 156 No. 3, pp. 557–577.

Bloom, N., Draca, M. & Van Reenen, J. (2016). "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity", *The Review of Economic Studies*, Vol. 83 No. 1, pp. 87–117.

Boffa, M., Jansen, M. & Solleder, O. (2019). "Do we need deeper trade agreements for GVCs or just a BIT?", *World Economy*, Vol. 42 No. 6, pp. 1713–1739.

Borin, A., Mancini, M. & Taglioni, D. (2021). "Measuring Exposure to Risk in Global Value Chains", No. 9785, Available at: http://www.worldbank.org/prwp.

Dang, D. A. & Dang, V. A. (2020). "Global Value Chain Participation and Firms' Innovations: Evidence from Small and Medium-Sized Enterprises in Viet Nam", No. 1138, Available at: https://www.adb.org/publications/global-value-chain-participation-firms-innovations-evidence-sme-vietnam

Dauth, W., Findeisen, S. & Suedekum, J. (2014). "THE RISE OF THE EAST AND THE FAR EAST: GERMAN LABOR MARKETS AND TRADE INTEGRATION", *Journal of the European Economic Association*, Vol. 12 No. 6, pp. 1643–1675.

Del Prete, D., Giovannetti, G. & Marvasi, E. (2017). "Global value chains participation and productivity gains for North African firms", *Review of World Economics*, Vol. 153 No. 4, pp. 675–701.

Dippel, C., Gold, R., Heblich, S. & Pinto, R. (2022). "The Effect of Trade on Workers and Voters", *The Economic Journal*, Vol. 132 No. 641, pp. 199–217.

García, F., Avella, L. & Fernández, E. (2012). "Learning from exporting: The moderating effect of technological capabilities", *International Business Review*, Vol. 21 No. 6, pp. 1099–1111.

Halpern, L., Koren, M. & Szeidl, A. (2015). "Imported Inputs and Productivity", *American Economic Review*, Vol. 105 No. 12, pp. 3660–3703.

Hummels, D., Ishii, J. & Yi, K.-M. (2001). "The nature and growth of vertical specialization in world trade", *Journal of International Economics*, Vol. 54, Available at: www.elsevier.nl/locate/econbase

Johnson, R. C. & Noguera, G. (2012). "Accounting for intermediates: Production sharing and trade in value added", *Journal of International Economics*, Vol. 86 No. 2, pp. 224–236.

Johnson, R. C. & Noguera, G. (2012b). "Proximity and production fragmentation", *American Economic Review*, Vol. 102 No. 3, pp. 407–411.

Koopman, R., Wang, Z. & Wei, S. J. (2014). "Tracing value-added and double counting in gross exports", *American Economic Review*, Vol. 104 No. 2, pp. 459–494.

Korwatanasakul, U. & Hue, T. T. (2022). *Global Value Chain Participation and Labour Productivity in Manufacturing Firms in Viet Nam: Firm-Level Panel Analysis*, No. 463, Jakarta.

Leontief, W. & Strout, A. (1963). "Multiregional Input-Output Analysis", *Structural Interdependence and Economic Development*, pp. 119–150. London: Palgrave Macmillan UK.

Manghnani, R., Meyer, B., Saez, S. & Van Der Marel, E. (2021). "Firm Performance, Participation in Global Value Chains and Service Inputs Evidence from India", No. 9814, Available at: http://www.worldbank.org/prwp.

Minh Pham, D., Honore Hollweg, C., Mtonya, B., Elisabeth Winkler, D. & Nguyen, T. (2019). "Connecting value chains for trade competitiveness".

Montalbano, P., Nenci, S. & Pietrobelli, C. (2017). *Opening and linking up: Firms, global value chains and productivity in Latin America Working Paper Series* (No. 30). Maastricht . Available at: http://www.maastrichtuniversity.nl/governance

Newman, C., Page, J., Rand, J., Shimeles, A., Söderbom, M. & Tarp, F. (2020). "Linked-in by FDI: The Role of Firm-Level Relationships for Knowledge Transfers in Africa and Asia", *The Journal of Development Studies*, Vol. 56 No. 3, pp. 451–468.

Pahl, S. & Timmer, M. P. (2020). "Do Global Value Chains Enhance Economic Upgrading? A Long View", *Journal of Development Studies*, Vol. 56 No. 9, pp. 1683–1705.

Pane, D. D. & Patunru, A. A. (2022). “The role of imported inputs in firms’ productivity and exports: evidence from Indonesia”, *Review of World Economics*.

Shepherd, B., & Stone, S. (2013). “Global Production Networks and Employment: A Developing Country Global Production Networks and Employment”, *OECD Trade Policy Papers*, Vol. 154.

Wooldridge, Je¤rey M. (2010). “Econometric Analysis of Cross Section and Panel Data”, Vol. 1, *The MIT Press.*

Wooldridge, Jeffrey M. (2015). “Control Function Methods in Applied Econometrics”, *Source: The Journal of Human Resources*, Vol. 50.

World Bank. (2020). “World Development Report 2020 : Trading for development in the age of global value chains”.

Xu, X. & Sheng, Y. (2012). “Productivity Spillovers from Foreign Direct Investment: Firm-Level Evidence from China”, *World Development*, Vol. 40 No. 1, pp. 62–74.

Zhang, Y. (2019). “Institutions, Firm Characteristics, and FDI Spillovers”, *Emerging Markets Finance and Trade*, Vol. 55 No. 5, pp. 1109–1136.