

FIRM AND INDUSTRIAL CHARACTERISTICS AND THE LINKAGE BETWEEN FOREIGN DIRECT INVESTMENT AND DOMESTIC FIRMS IN VIETNAM

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Abstract: - This paper investigates the determinants of linkages between foreign direct investment (FDI) and domestic firms in Vietnam, using data from 2011 to 2023. Linkages are found to be persistent and dependent on a range of firm-level, industrial, and macroeconomic characteristics, including institutional quality. Larger, more productive, and younger domestic firms are more likely to form linkages with FDI firms. The FDI penetration ratio raises the likelihood of linkages, while the ratio of industry exports to total national exports lowers it. Firms located in more developed provinces with higher institutional quality are also more likely to form linkages. The results indicate that linkages in Vietnam are currently low, partly because export-oriented FDI firms are less likely to source inputs locally. However, the findings suggest that linkages are poised to increase due to their persistent nature and a critical mass effect driven by sustained FDI inflows.

Impact Statement: This paper identifies the key firm-level, industrial, and macroeconomic determinants of linkages between foreign direct investment (FDI) and domestic firms in Vietnam. The findings provide a robust evidence base for policymakers to design targeted strategies that foster stronger and more beneficial FDI-domestic firm linkages....

Keywords: backward linkage, forward linkage, horizontal linkage, FDI, firm characteristics, industrial characteristics

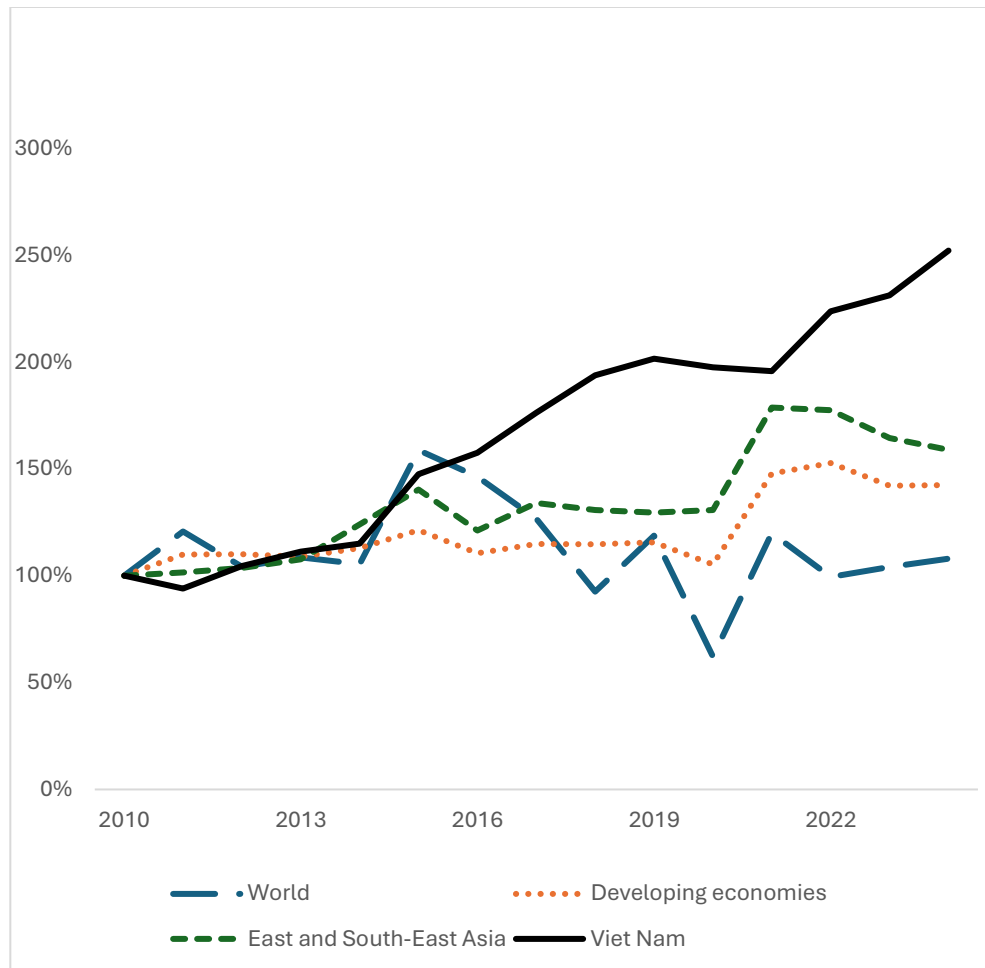
1. INTRODUCTION

Foreign direct investment (FDI) is an important source of capital, especially for developing countries. However, the benefits from FDI are not automatic but depend on the absorptive capacities of host countries (Crespo & Fontoura, 2007). One such crucial absorptive capacity is the ability of domestic firms to participate in the global value chains led by FDI firms. When domestic firms supply inputs for FDI firms, or vice versa, forming vertical linkages, positive productivity spillovers often occur (Blalock & Gertler, 2008; Havranek & Irsova, 2011; Javorcik, 2004).

Recent reports from the United Nations show that global FDI growth is losing pace with global trade and GDP; while global FDI was roughly 20% higher in 2024 than in 2010, this represents a growth rate three times smaller than that of global GDP and trade within the same period (United Nations, 2025). However, the trends across countries and regions are heterogeneous. Vietnam is among the countries where the growing trend of FDI inflow seems resilient to global shocks, such as the Covid-19 pandemic or the recent rise in global trade protectionism (Figure 1).

Figure 1. Trends in FDI inflows





Source: UN Trade and Development (<https://unctad.org/topic/investment/world-investment-report>)

FDI has brought immense benefits to Vietnam. As of the end of 2024, FDI firms had invested 322.5 billion USD into 42,002 projects. In 2024 alone, exports from FDI firms reached 290.8 billion USD, accounting for 71.8% of national exports (Government Portal, Vietnam, 2025). FDI firms contributed 20.5 billion USD to government revenue (equivalent to 24.7%) and employed 5.1 million domestic workers, or 10% of the labor force (Anh Tuyet, 2025). Certain high-tech industrial exports, such as those from the electronics sector, would not exist in Vietnam without the presence of FDI.

Despite these contributions, early signs of an “enclave economy” are also present, as linkages between FDI and domestic firms were weak and did not significantly change between 2010 and 2017 (Dao et al., 2021; Dao, 2021). The term “enclave economy” was used by Gallagher and Zarsky (2007) to describe Mexico’s IT sector, which provides a cautionary tale. Following NAFTA’s implementation in 1994, Mexico successfully attracted FDI to manufacture IT goods for the U.S. market. However, with weak local linkages and 95% of inputs being imported, FDI factories found it easy to relocate to China after its 2001 WTO entry. Within a few years, Mexico’s electronics exports dropped by 60%, FDI fell by 123%, and 20,000 jobs were lost (Gallagher & Zarsky, 2007). The Mexican experience highlights the critical importance of building local absorptive capacity and fostering strong FDI-domestic firm linkages.

While there are similarities between the Vietnamese and Mexican cases—both benefit from FDI-led exports following free trade agreements, with limited initial linkages—Vietnam has maintained a more sustainable FDI growth trend. Since its WTO entry in 2007, FDI inflow has grown consistently, seemingly unaffected by global shocks that have restrained global FDI trends. With a longer timeframe of growing FDI inflow, Vietnam provides another important empirical case study on the determinants of FDI-domestic firm linkages.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1. Foreign direct investment, economic growth and absorptive capacity

The massive increase in global FDI from 1980 to 2011 has driven academic interest in the FDI-economic growth relationship. In exogenous growth literature, where growth stems from capital accumulation (Solow, 1956; Barro & Sala-I-Martin, 1995), FDI accelerates this process, stimulating growth, particularly in developing countries as their capital are far from steady-state levels. In endogenous growth literature, FDI contributes to the growth of total factor productivity (TFP) through several channels: integrating the host country into global trade (Markusen & Venables, 1998); upgrading technology and management practices (Baldwin et al., 1999; Saggi, 2000); and enhancing human capital (Genco et al., 1993; Hansson, 2001).

Despite this theoretical connection, empirical evidence is mixed. For instance, while De Mello (1999) and Xu (2000) found positive impacts of FDI on growth and TFP respectively, other macro-level studies found no significant effect, such as Carkovic and Levine (2000) and Herzer et al. (2008). These discrepancies suggest that the impact of FDI is not automatic but is conditional on host countries' absorptive capabilities, including education, infrastructure (Saggi, 2000), technological capacity (Borenzstein et al. 1998), and financial market development (Alfaro et al., 2001).

2.2. FDI-domestic firms linkages and their impact

In contrast to mixed macro-level evidence, firm- and industry-level studies show much more robust evidence of the positive impact of FDI-domestic firm linkages. The literature primarily discusses two forms: vertical linkages (backward, where FDI firms source from domestic suppliers, and forward, where domestic firms source from FDI firms) and horizontal linkages (intra-industry connections with local competitors).

The evidence strongly supports positive spillovers from backward linkages. Javorcik (2004) found that a one-standard-deviation increase in foreign presence in sourcing sectors was associated with a 15% output rise for domestic suppliers in Lithuania. Similarly, Alfaro et al. (2022) found that after supplying to a multinational buyer in Costa Rica, local firms increased employment by 26% and boosted growth by 20% after four years. A meta-analysis by Havranek and Irsova (2011) covering 47 countries confirmed robust positive spillovers from backward linkages, small spillovers from forward linkages, and no spillovers from horizontal linkages.

2.3. Policies to foster linkages between FDI and domestic firms

The conclusive evidence on the benefits of linkages motivates countries to design policies to foster them. The World Bank (2019) identifies successful programs in Singapore, Malaysia, Thailand, the Czech Republic, and Ireland (Table 1). There is no "one size fits all" policy. For instance, China mandated that FDI firms form joint ventures with local companies to gain access to its domestic market. However, such a policy for fostering linkages would likely be ineffective in countries with smaller consumer bases. Similarly, Singapore's strategy of enhancing local research and development (R&D) capabilities is of secondary importance for less developed nations, where immediate priorities often center on providing domestic small and medium-sized enterprises (SMEs) with access to finance and worker training. Finally, tax incentives, a historically effective tool, are no longer as viable following the agreement by 138 countries to adhere to a global minimum corporate tax rate. Strategies must be tailored to a country's specific context, and linkage enhancement programs often share two common goals: (i) enhance domestic capacities and (ii) reduce the costs for firms to form linkages. Therefore, a key task for both policy makers and empirical researchers is to investigate the country- and context-specific factors that determine these linkages.

Table 1. Programs and Policies to foster vertical linkages between FDI and domestic firms in selected countries

Countries	Programs/Policies to foster linkages	Objectives
Singapore	Local Industry Upgrading Program (1986); Partnerships for Capability Transformation (2010); Proactive matchmaking support	Encourage: i. Adoption of local SMEs into FDI's GVC; ii. Joint product/project development between FDI firms and local SMEs; iii. Matching FDI firms and suitable local partners

Malaysia	Vendor Development Program (1988); Industrial Linkage Program (1996); Global Supplier Program (2000); Tax and other incentives provided to foster FDI linkages and improve suppliers' skills; Penang Skills Development Centre	Encourages vertical linkages using tax incentives. Provide training for local SMEs to meet FDI firms' need
Thailand	Supporting Industry Master Plan (1995); FDI incentives schemes; Ongoing support from the Board of Investment / Ministry of Industry (Match making service, capacity development for supporting industries); Automotive Human Resource Development Program; New investment policy (2015)	Promote capacities of local support industries (technology, production methods, human capital), promotes cluster development, match making service.
Czech Republic	National Supplier Development Program (2000-2002)	Finance and matchmaking service for local suppliers
Ireland	National Linkage Program - NLP (1984); The fourth phase of the NLP; Global Sourcing Initiatives (2012)	Upgrading local suppliers' capacity

Source: World Bank (2019)

2.4. Determinants of linkages between FDI and domestic firms

There is a vast empirical literature on the determinants of linkages. These determinants can be grouped into three categories: (i) foreign firm characteristics, (ii) domestic firm characteristics, and (iii) host economy and industry characteristics.

Foreign firm characteristics: FDI firms seeking domestic markets are more likely to form linkages with domestic firms than export-market-seeking FDI firms, as the latter often require stringent quality standards that domestic firms may not meet (Altenburg, 2000; Belderbos et al., 2001; UNCTAD, 2000). Joint-venture firms have more knowledge of local suppliers and are more likely to source locally compared to wholly foreign-owned firms (Akyuz, 2018; Chen & Chang, 2011; Sánchez-Martín et al., 2014; Toth, 1998). Large FDI firms are less likely to link with domestic firms compared to small FDI firms, since the former can produce inputs in-house at a lower cost due to economies of scale (Barkley & McNamara, 1994; Halbach, 1989; Schackmann-Fallis, 1989). High-tech FDI firms are less likely to form linkages due to fears of technology leakage (Dunning, 1980; Martin et al., 2015; UNCTAD, 2001). Cultural closeness between foreign and domestic firms also increases the likelihood of forming linkages (Akyuz, 2018; Köylü, 2016; Zhang, 2005).

Domestic firm characteristics: Large domestic firms are more likely to supply for FDI firms, as they can overcome supply-chain entry costs, such as marketing and technology costs (Nguyen, 2018). They can also meet the large-quantity input demand of FDI firms, which smaller domestic firms cannot do. The smaller the technology gap between FDI and domestic firms, the more likely linkages are to be formed (Liu et al., 2009; UNCTAD, 2001). Having employees who have studied abroad or worked for foreign companies also increases the possibility of forming linkages for domestic firms (Kamata & Tanaka, 2017).

Host economy and industry characteristics: The degree of linkages between FDI and domestic firms can depend on the nature of the sectors in which they operate (Sánchez-Martín et al., 2014). FDI in natural resource and food processing sectors, which often require on-site inputs, form strong linkages with domestic firms. Apparel and electronics industries require large-scale and high-quality inputs, which are often imported or purchased from other FDI firms rather than from local firms. The quality of institutions, such as the level of corruption, affects linkages and spillovers from FDI. Empirical evidence from macro data (Hayat, 2019) and micro data (Nguyen et al., 2024) shows that spillovers from FDI are conditional on the host country's institutional quality. The financial development of a host

country increases the absorptive capacity of domestic firms and the access to capital of foreign affiliates, which directly carry out the activities related to forming linkages, such as training or technology transfer (Hermes & Lensink, 2003). Linkages and positive spillovers from FDI are more likely to happen in countries that reach a certain level of financial development.

3. DETERMINANTS OF FDI AND DOMESTIC FIRM LINKAGES IN VIETNAM

Macro data proves Vietnam's success in mobilizing FDI, with inflows remaining resilient to global shocks and contributing over two-thirds of export volume. However, micro-level data reveals that linkages between FDI and domestic firms were weak and stagnant from 2010 to 2017 (Dao et al., 2021; Dao, 2021). Nonetheless, multiple studies have found evidence of positive spillovers for domestic firms once linkages are formed, conditional on factors like proximity, ownership structure, and human capital (Nguyen, 2008; Kyburz & Nguyen, 2017).

This study employs the annual Vietnamese enterprise survey dataset from 2011 to 2023 to investigate the factors determining these linkages. Compared to Dao (2021), this study utilizes data for a longer period, extending beyond the implementation of major free trade agreements like the CPTPP (2019) and EVFTA (2020). From 2017 to 2023, Vietnam's annual exports and accumulated FDI stock increased by over 67% and 74%, respectively. This study investigates whether this increased scale affects linkages. On one hand, rising demand could incentivize domestic firms to upgrade and join FDI-led value chains, strengthening linkages. On the other hand, large FDI firms might rely on their global supply networks as import costs are minimized due to large orders, which weakens linkages. Whether which effect is dominant is an empirical question investigated in this paper.

4. DATA AND METHODOLOGY

4.1. Data

The dataset covers the period from 2011 to 2023. Enterprise-level data are sourced from the Vietnamese enterprise survey, collected by the National Statistics Office and the Ministry of Finance. Macro data, including FDI stock, GDP, and CPI, are from the annual reports of the National Statistics Office. Sector-level export volumes are obtained from TradeMap (<https://www.trademap.org/>), and the Provincial Competitiveness Index (PCI) is from the Vietnam Chamber of Commerce and Industry (VCCI).

This paper investigates six manufacturing sectors: (i) Processing of Food, Beverages, and Tobacco; (ii) Textiles, Apparel, Footwear, and Related Products; (iii) Wood Processing, Paper, and Printing; (iv) Chemicals, Pharmaceuticals, Rubber, and Plastics; (v) Non-metallic Minerals and Metals; and (vi) Electrical Equipment, Electronics, and Machinery. These sectors collectively account for 88.3% to 91.9% of Vietnam's total export volume during the study period (Table 2).

Table 2. Export Share of Selected Sectors in Vietnam (%)

Sector	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Processing of Food, Beverages, and Tobacco	19.3	17.9	15.1	15.4	13.6	13.3	12.6	11.0	9.9	9.2	8.5	8.6	9.7
Textiles, Apparel, Footwear, and Related Products	25.9	24.0	24.6	25.9	26.7	26.1	23.7	23.6	23.8	20.6	18.8	20.1	18.5
Wood Processing, Paper, and Printing	0.6	0.6	0.5	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7
Chemicals, Pharmaceuticals, Rubber, and Plastics	19.2	16.9	13.4	11.6	7.9	6.7	7.1	6.5	6.4	6.0	6.8	7.1	6.7
Khoáng phi kim, kim loại	7.3	5.0	4.9	5.1	4.5	4.4	4.3	4.9	5.1	5.3	6.4	4.9	4.9

Thiết bị điện, điện tử, máy móc	1	2	3	3	3	4	4	4	4	4	4	4	4
	8.9	6.9	2.6	2.3	7.7	0.4	3.7	3.5	3.7	7.3	7.5	6.9	8.0

Source: <https://www.trademap.org/>

4.2. Dependent Variables

This paper investigates the determinants of three types of linkages: horizontal, backward, and forward. The measures for horizontal linkage (Hor_{jt}), backward linkage ($Back_{jt}$), and forward linkage (For_{jt}) serve as the dependent variables in three separate regressions. Horizontal linkage (Hor_{jt}) captures the extent of foreign presence in industry j at time t . It increases with the output of foreign-invested firms and the proportion of foreign equity in those firms. Backward linkage ($Back_{jt}$) measures the extent to which FDI firms purchase inputs from domestic suppliers in other industries. Forward linkage (For_{jt}) measures the extent to which FDI firms supply inputs to domestic firms in other industries. Dependent variables are calculated using the methods developed by Javorcik (2004). Specifically:

$Hor_{jt} = [\sum_{i \in j} FS_{it} * X_{it}] / \sum_{i \in j} X_{it}$ where FS_{it} is foreign equity participation in firm i in industry j , or $i \in j$, at time t . X_{it} is the output of firm i in industry j at time t .

$Back_{jt} = \sum_{k \text{ if } k \neq j} \gamma_{jk} * Hor_{kt}$ where γ_{jk} is the proportion of industry j 's output supplied to industry k drawn from the 2019 input-output matrix. This calculation does not measure the inputs provided by the intra-sector (*i.e.* $k \neq j$) because this effect is expressed in variable Hor_{jt} .

$For_{jt} = \sum_{l \text{ if } l \neq j} \delta_{jl} * Hor_{lt}$ where δ_{jl} is the ratio of industry j 's input purchased from industry l drawn from the 2019 input-output matrix. This calculation does not measure the inputs by the intra-sector (*i.e.* $k \neq j$) because this effect is expressed in variable Hor_{jt} .

4.3. Explanatory Variables

Lagged values of Hor_{jt} , $Back_{jt}$ and For_{jt} are included as explanatory variables. This approach is supported by Dao (2021), who found strong persistence in measures of linkages. Numerous survey studies find that FDI firms increase their number of domestic suppliers over time. For example, the number of domestic suppliers to Honda in the U.S. increased from 30 in 1983 to more than 400 in 1997 (Handfield & Krause, 1999). Similarly, in Vietnam, local tier-1 suppliers to Samsung, the largest FDI investor in the country, increased from just 5 in 2014 to 306 in 2023 (VnEconomy, 2023). FDI firms need time to learn about the local supply chain and invest in local suppliers through training or technology transfer. Once a relationship is formed, it becomes costly to switch suppliers.

The model also incorporates several **firm-level characteristics**:

Technology level (TFP): A firm's TFP is calculated by applying the method of Levinsohn and Petrin (2003), built on the idea first developed in Olley and Pakes (1992). The technology gap between FDI and domestic firms is an important determinant of linkages (Liu et al., 2009; Unctad, 2001).

Size: Following Bernard and Jensen (1999), a firm's size is measured by the size of its labor force. Larger domestic firms are more likely to overcome the sunk entry cost into the FDI-led global value chain (Nguyen, 2018).

Age: A firm's age, measured as its number of years in operation, is also considered. On the one hand, FDI firms seek reliability, quality, and scale (Unctad, 2013), which are more likely to be met by older, more established local firms. On the other hand, young firms are more able to adapt to changes and new technology (Álvarez & Crespi, 2003; Zou and Ghauri, 2010). This adaptability is also a quality needed for entry into the FDI-led global value chain.

At the industry level, the following **industrial characteristics** are included:

Industrial Concentration Index (HHI): Previous studies have found mixed evidence regarding HHI and linkages. In an industry with a high HHI, there are few dominant local firms. It is less costly for FDI firms to find quality local suppliers (Girma et al., 2009), but domestic firms also have less incentive to upgrade to join the FDI-led global value chain (Haskel et al., 2007).

Ratio of industry exports to total national exports: At the firm level, export-market-seeking FDI firms require stringent quality and standards and are less likely to source domestically. At the macro level, if the market is large

enough, domestic firms are more willing to make the initial investment in new technology and/or human capital needed to supply to FDI firms.

FDI penetration ratio (ratio of FDI to total industry capital): Large-sized FDI firms are less likely to source locally (Schackmann-Fallis, 1989; Halbach, 1989; Barkley & McNamara, 1994). However, a large number of FDI firms in the same industry can create a critical mass demand effect, which makes investment to upgrade more attractive for local firms (Amendolagine et al., 2013).

Sector dummy variable: The nature of each industrial sector matters for the degree of linkages (Martin et al., 2014).

The PCI is included, as it is a good measurement of cross-regional differentials in *institutional quality* in many studies. Evidence of a correlation between institutional quality and linkages is found in macro (Hayat, 2019) and micro data (Nguyen et al., 2024).

Finally, key *macroeconomic variables*, including provincial GDP and CPI, are controlled for. A larger local economy is correlated with higher levels of financial and human capital development, which are important absorptive capacities for forming linkages. A higher price level raises the cost of sourcing locally for FDI firms, which can reduce linkages.

4.4. Estimation Method

To estimate the relationship, this study employs a dynamic panel regression model using the one-step Arellano–Bond (1991) Generalized Method of Moments (GMM) estimator. This method is specifically designed for short-T, large-N panel data, effectively addressing the endogeneity of the lagged dependent variable by using its lagged values as internal instruments. The one-step GMM estimator is preferred as it is more robust in small or medium-sized samples and ensures consistency in the context of this study's short panel data.

5. RESULTS AND DISCUSSION

Descriptive statistics are presented in Table 3, and the regression results are in Table 4.

Table 3. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
hori	479989	0.0307	0.0674	0.0019	1.0000
back	479989	0.0324	0.0706	0.0016	1.2116
for	479989	0.0311	0.0722	0.0012	1.2862
FDI penetration ratio	479989	0.0127	0.0106	0.0000	0.0496
Firm Size Measured by Employment	482794	0.0029	0.0015	0.0000	0.0105
TFP	475686	0.0034	0.0016	-0.0045	0.0149
Number of Years in Business Operations	482794	0.0080	0.0073	0.0010	0.0950
Industrial Concentration Index (Herfindahl–Hirschman Index, HHI)	482794	0.0039	0.0065	0.0011	0.1948
Ratio of Industry Exports to Total National Exports	482794	0.0028	0.0045	0.0000	0.0100
Log GDP	482794	0.1899	0.0129	0.1518	0.2082
Log CPI	482794	-0.0126	0.1733	-0.6795	0.0748
PCI	482794	63.4058	4.1050	45.1200	75.0900

Source: NSO, VCCI

Table 4. Regression Results

	(1)	(2)	(3)
VARIABLES	<i>Hor</i>	<i>For</i>	<i>Back</i>
Lag <i>Hor</i>	0.3653*** (0.0036)		
Lag <i>For</i>		0.2861*** (0.0038)	
Lag <i>Back</i>			0.3649*** (0.0039)
FDI penetration ratio	0.2490*** (0.0175)	0.1880*** (0.0180)	0.2320*** (0.0183)
Firm Size Measured by Employment	0.2175** (0.1105)	0.1584 (0.1132)	0.2165* (0.1153)
Lag TFP	0.2723*** (0.0737)	0.2704*** (0.0755)	0.1940** (0.0769)
Number of Years in Business Operations	-1.2111*** (0.0859)	-1.0473*** (0.0879)	-1.3400*** (0.0896)
Industrial Concentration Index (HHI)	0.1354*** (0.0258)	0.0280 (0.0264)	0.1004*** (0.0269)
Ratio of Industry Exports to Total National Exports	-0.1431*** (0.0423)	-0.1572*** (0.0433)	-0.1476*** (0.0441)
Log GDP	0.6718*** (0.0982)	0.4243*** (0.1006)	0.7518*** (0.1024)
Log CPI	-0.2686*** (0.0174)	-0.3404*** (0.0178)	-0.2634*** (0.0182)
PCI	0.6492*** (0.0247)	0.6882*** (0.0253)	0.6419*** (0.0258)
Sector	-0.2070*** (0.0249)	-0.2386*** (0.0255)	-0.3832*** (0.0260)
Observations	193,834	193,834	193,834
Number of id	52,463	52,463	52,463

The regression results show that the lagged dependent variables (Lag *Hor*, Lag *For*, Lag *Back*) have positive and statistically significant coefficients in all three models. This is consistent with survey-level data showing that the

number of domestic suppliers to FDI firms increases over time and reflects the dynamic, persistent nature of these relationships.

Firm size has a positive impact on linkages, though it is only statistically significant for horizontal and backward linkages. Economically, this suggests that large-scale domestic enterprises possess the productive capacity and ability to meet the stringent standards required by FDI partners. The lagged TFP coefficient is positive and significant, indicating that firms with higher productivity—reflecting superior technology and managerial skills—are more likely to form and maintain linkages with FDI firms.

Remarkably, the number of years of operation has a significant negative effect across all models. This result suggests that younger firms may be more dynamic and adaptable, actively seeking cooperation opportunities for growth and innovation, whereas older, more established firms may be less flexible. This finding aligns with studies in Chile (Álvarez & Crespi, 2003) and China (Zou & Ghauri, 2010).

At the industry level, the FDI penetration ratio has a positive and significant effect on all three forms of linkages. This supports the "critical mass" hypothesis (Amendolagine et al., 2013), where a higher concentration of FDI firms creates sufficient demand to make it attractive for local firms to invest in upgrading their capabilities. The industrial concentration index (HHI) is positive and significant for horizontal and backward linkages, suggesting that in concentrated industries, dominant domestic firms may find it easier to cooperate with FDI firms.

The coefficient for the ratio of industry exports to total exports is negative and highly significant. This is a key finding, suggesting that as industries become more export-oriented, their constituent FDI firms are more likely to integrate with global partners rather than source from domestic firms, which may not meet the stringent quality standards required. This result is in line with previous firm-level studies (Altenburg, 2000; Belderbos et al. 2001).

Finally, macro-level variables are highly significant. Provincial GDP has a strong positive effect, reflecting that larger local economies with more developed business ecosystems facilitate linkage formation. In contrast, the CPI has a negative effect, suggesting that high inflation increases risks and uncertainty, deterring cooperation.

The PCI has a large positive coefficient, underscoring the critical role of a transparent and supportive institutional environment in fostering linkages between FDI and domestic firms.

6. CONCLUSION

This paper studies the determinants of linkages between FDI and domestic firms in Vietnam using panel data from 2011 to 2023. The determinants include past linkages, firm characteristics (TFP, age, size), industrial characteristics (FDI penetration, exports, HHI), and macro-environmental factors (PCI, provincial GDP, CPI).

The analysis reveals that linkages are persistent, with past linkages being a powerful determinant of future ones. This highlights the importance of policies that foster linkages, as their impact can be very long-term. Characteristics of domestic firms are also critical; larger, more productive, and younger domestic firms are more likely to form linkages with FDI enterprises.

The coefficient on the FDI penetration ratio is positive, while the coefficient on the ratio of industry exports is negative. This has an interesting implication. As suggested by Dao et al. (2021), linkages in Vietnam may be low now because export-market-seeking foreign firms have located in the country primarily to leverage its free trade agreements and low-cost production, rather than its domestic productive capacities. However, the positive and significant effects of linkage persistence and the FDI penetration ratio suggest an optimistic outlook. As the inflow of FDI continues to grow, creating a critical mass, and as existing linkages deepen over time, the overall level of integration between FDI and domestic firms is poised to strengthen in the future.

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Authors' contributions

The single author conceptualized and designed the study, performed the analysis, and wrote, reviewed, and approved the final manuscript.

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