Bridging the productivity gap: A comparative analysis of foreign-owned and domestic firms in Viet Nam*

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Abstract

This study investigates the productivity gap between foreign-owned and domestic firms in Viet Nam. Using quantile regression estimation for the period of 2011–2020, the study first examines the impact of firms' specifics and of provincial governance quality on firms' total factor productivity at different points of the productivity distribution. The results show that labour productivity, market share and return on assets appear to significantly affect firm productivity regardless of firm groups or quantiles. To understand the productivity gap between foreign and domestic firms, the study uses the quantile decomposition approach to differentiate the factors that contribute to the gap at different quantiles. Our findings reveal that across quantiles most of the productivity gap is explained by firms' specifics, especially labour productivity. To address the productivity gap between foreign-owned and domestic firms in Viet Nam, policymakers should focus on enhancing domestic firms' access to technology, firms' experience and human capital development, as firm-specific factors appear to be major contributors to the productivity differential. In addition, improving provincial governance quality and creating an enabling environment for both foreign-owned and domestic firms can further stimulate productivity growth and foster healthy competition in the manufacturing sector.

Keywords : domestic firms, foreign direct investment, quantile decomposition, total factor productivity gap, Viet Nam

JEL classification codes : F63, L25, L60, O53

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1. Introduction

Foreign direct investment (FDI) has played a pivotal and transformative role in shaping the economic landscape of Viet Nam throughout the past few decades. Viet Nam is known for its remarkable economic growth of an average of more than 5 per cent annually for the 2010–2022 period[1] and has experienced an unprecedented surge in FDI inflows,[2] particularly within such critical sectors as manufacturing, services and infrastructure. Viet Nam's young and competitive labour force, favourable investment policies and strategic geographical location have acted as a magnet, drawing multinational corporations to the country, according to the World Bank and the Ministry of Planning and Investment of Viet Nam (2017). As one of the fastest-growing economies in South-east Asia over the past few decades, Viet Nam has been an attractive destination for foreign investors from more than 90 countries, seeking to capitalize on its robust growth potential.[3] Though FDI has been instrumental in the development of Viet Nam's economy, questions remain regarding its efficacy in generating productivity spillovers to domestic firms. Literature on the issue suggests that these spillovers are rather modest (Anwar and Nguyen, 2010; Ha et al., 2021; Ha et al., 2023) and performance gaps persist between foreign-owned and domestic firms. Despite the significant presence of FDI in the Vietnamese economy, the expected transfer of knowledge and expertise to local firms has not been as extensive as anticipated. Furthermore, it is essential to acknowledge that notable productivity disparities also persist between foreign-owned and domestic firms. Although FDI has undoubtedly contributed to the nation's economic growth and development, these persistent gaps emphasize the need for policymakers to consider how to maximize the positive effect of FDI on local firms and address the existing disparities, thus ensuring a more inclusive and sustainable economic growth trajectory for Viet Nam.

Understanding the productivity gap between foreign-owned and domestic firms holds profound implications for Viet Nam's industrial development, economic growth and overall competitiveness in the global market. Understanding the factors that contribute to this gap is vital in formulating effective policies that promote sustainable economic development and foster a favourable environment for foreign-owned and domestic firms to thrive. The gap has far-reaching implications for industrial development, economic growth and global competitiveness. For several reasons, then, a thorough understanding of the factors contributing to this gap is crucial for policymakers to be able to design effective strategies that promote sustainable economic development and create an enabling environment in which both foreign-owned and domestic firms can prosper.

FDI often brings in advanced technology, managerial expertise and global supply chain links that contribute to the modernization and upgrading of industries. Yet, where the productivity gap between foreign-owned and domestic firms widens significantly, the domestic sector may need to catch up with the technological advancements brought by foreign investors. This could result in a lopsided industrial structure, where sectors dominated by FDI experience rapid growth and domestic industries play catch-up, hindering balanced economic development. Studies have shown that foreign-owned firms in Viet Nam tend to outperform domestic firms in terms of productivity levels. For instance, Nguyen (2019), Nguyen (2015) and the World Bank and the Ministry of Planning and Investment of Viet Nam (2017) found that foreign-owned firms in the country were more productive,

[1] More information can be found in the International Monetary Fund's country profile, available at www.imf.org/en/Countries/VNM (accessed 15 March 2024).

[2] See World Bank, Foreign direct investment, net inflows, available at https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=VN (accessed 15 March 2024).

[3] For more information, see World Bank, World Development Indicators, available at https://databank.worldbank.org/source/world-development-indicators (accessed 15 March 2024).

paying higher wages and achieving higher export intensity than domestic firms.

Moreover, the productivity gap between foreign-owned and domestic firms can significantly affect overall economic growth. A highly productive and competitive business environment attracts more investment, fosters innovation and encourages knowledge spillovers, which can contribute to higher rates of economic growth. Conversely, domestic firms that struggle to attain the productivity levels of foreign-owned firms may be hindered in their ability to expand, invest in new technologies and become globally competitive. Empirical research has indicated a positive correlation between FDI and economic growth in Viet Nam; however, the extent to which domestic firms benefit from FDI varies depending on factors that influence their productivity levels (Alfaro et al., 2010; Tiwari and Mutascu, 2011). In addition, in an increasingly globalized world, competitive domestic firms are crucial for Viet Nam to thrive in international markets. If domestic firms cannot compete with foreign-owned ones in productivity and efficiency, they may face challenges in exporting products and penetrating global supply chains. This could limit their market share and potential for growth, leading to a higher trade deficit and reduced economic resilience in the country.

This study undertakes a pioneering examination of the productivity gap between foreign-owned and domestic firms in the context of Viet Nam using a panel data set covering the 2011–2020 period. Its primary objective is to deliver a comprehensive analysis that not only highlights the extent of this disparity but also delves into the underlying determinants and potential mechanisms responsible for such differences. The study sheds some light on the productivity gap between foreign-owned and domestic firms in Viet Nam. First, this research is among the first studies to explore the productivity gap between foreign-owned and domestic firms in Viet Nam. FDI has significantly reshaped the country's economic landscape (World Bank and Ministry of Planning and Investment of Viet Nam, 2016), yet there has been a conspicuous lack of comprehensive analyses addressing the extent of the productivity gap and the intricacies involved in its dynamics. This study fills that void, offering a clear examination of factors that contribute to the gap. Second, our study takes an innovative approach by investigating the factors influencing total factor productivity (TFP) at different quantiles. This allows us to gauge the magnitude of the gap and provides insights into how this gap varies across different points of the productivity distribution. This approach is instrumental in capturing aspects that might be overlooked in conventional analysis, providing a more nuanced understanding of productivity dynamics. Furthermore, our study employs a decomposition approach, enabling us to comprehensively assess the driving forces behind the productivity gap at distinct points within the distribution. This method dissects components that contribute to the gap, shedding light on whether differences are rooted primarily in firms' specific factors or in external factors such as the local business environment.

The study is structured as follows. The next section summarizes key theories explaining the productivity gap between foreign-owned and local firms and some empirical evidence on this matter. Section 3 describes the methodology and data used in this research. Section 4 discusses the findings and section 5 concludes.

2. Literature review

The initial internalization-theory model developed by Rugman (1981) to explain why FDI occurs was economics-based and therefore efficiency-driven. Following Buckley (1985), it showed that FDI takes place when its benefits exceed its costs, leading to the decision to invest overseas (Rugman and Verbeke, 2008). Rugman's internalization theory explains why firms pursue direct investment, by balancing the benefits of internalization against alternative market entry modes such as licensing or exporting. Firms invest abroad to fully

exploit ownership-specific advantages such as proprietary technology or managerial expertise, which are better protected through direct ownership. In addition, firms seek to leverage location-specific advantages such as access to resources or favourable regulations, maximizing profitability by establishing a physical presence in foreign markets. Internalization reduces the transaction costs associated with coordinating external transactions, as firms centralize decision-making and minimize reliance on complex contractual arrangements.

Similarly, the eclectic paradigm proposed by Dunning (2000) comprises three main factors: ownership (O), location (L) and internalization (I). Ownership refers to the firm-specific advantages (such as proprietary technology, brand recognition or managerial expertise) that enable a company to compete effectively in the global marketplace. Firms with valuable ownership advantages are more likely to engage in FDI to leverage these assets in foreign markets. Location factors pertain to the advantages offered by specific regions or countries, including access to resources, skilled labour, infrastructure or favourable regulatory environments. Firms are motivated to invest in locations where they can maximize their competitive position and profitability. Internalization involves the decision-making process by which firms choose between alternative modes of market entry, such as exporting, licensing or FDI. Internalization occurs when the benefits of controlling foreign operations (such as protecting proprietary knowledge or minimizing transaction costs) outweigh the advantages of using external market mechanisms. These theories primarily seek to explain the motivations behind FDI and the strategic decisions made by multinational corporations. Yet, the productivity of foreign-owned firms compared with that of domestic firms depends on various factors, such as operational efficiency, market competitiveness, management quality, the regulatory environment, access to resources and technological capabilities. FDI does not inherently guarantee higher productivity, as domestic firms can also be highly productive and competitive in their respective markets.

It is well documented in the literature that multinational enterprises and firms engaged in the global market are often more productive than domestic and domestic-focused firms (Sanfilippo, 2015; Tomiura, 2007). Multinational firms are often more likely to be part of the international supply chain, where they are highly connected worldwide and therefore can have more opportunities to improve their productivity. One of the ways is learning by exporting, which means that firms become more productive to be able to vie with a broader range of competitors when they get involved in the international market, resulting in higher productivity (Clerides et al., 1998; De Loecker, 2007 and 2013; Martins and Yang, 2009; Newman et al., 2016). This hypothesis posits that firms experience productivity gains only after they commence exporting. Essentially, engaging in international markets exposes firms to heightened global competition, motivating them to enhance their productivity. However, it is worth noting that only a limited number of studies have rigorously tested the learning-by-exporting hypothesis (Wagner, 2006b), and the evidence supporting this theory remains somewhat contentious. In summary, exporters and firms involved in FDI tend to exhibit higher levels of productivity than domestic firms. However, it's important to emphasize that while more productive firms often choose to enter international markets, the act of participating in the international arena does not necessarily lead to automatic productivity improvements (Wagner, 2007).

The second stream explains the productivity difference between international and domestic firms through the self-selection effect. This perspective posits that firms with superior management practices, advanced technology, a skilled workforce and higher productivity levels are more likely to enter international markets autonomously. This self-selection process, based on the firm's inherent attributes and capabilities,

effectively results in international firms being more productive than their domestic counterparts. This notion finds empirical support in various studies. For instance, (Bernard et al., 1995) examined the United States manufacturing sector and found that exporting firms tended to be larger and more productive than non-exporters. Their research indicated that firms with higher productivity were more inclined to engage in international trade activities. Greenaway and Kneller (2007) provide a comprehensive analysis of how firm heterogeneity, specifically factors such as management quality, technological capabilities and a skilled labour force, influences a firm's decision to engage in exporting and FDI, in the case of the United Kingdom. Wagner (2007) analysed German manufacturing firms and found that firms with higher productivity levels were more likely to become exporters. This self-selection mechanism is underpinned by the idea that firms possessing the capabilities and resources necessary for internationalization are the ones that ultimately venture into global markets, reinforcing the notion that international firms tend to have higher productivity levels because of their self-selected nature.

To our knowledge, limited attention has been paid to the productivity gap between foreign and domestic firms in the literature over the decades. A few studies have examined the productivity difference to a certain extent and found that multinational firms often appear to have higher productivity. Sanfilippo (2015) investigated productivity disparities among foreign affiliates of emerging market multinationals from Brazil, China, India, the Russian Federation and South Africa, comparing them with counterparts from developed countries and domestic multinational enterprises (MNEs). Utilizing a comprehensive data set covering foreign affiliates in Europe, the findings indicated that MNEs from emerging markets generally exhibit lower productivity levels, with an average productivity gap of approximately 30 percentage points when contrasted with well-established competitors. This disparity is not uniform and varies across sectors, technology intensity and geographical destinations. In addition, within-firm diversity is pivotal, as it is less productive entities that predominantly drive the productivity gap. At the same time, top-tier firms approach performance levels similar to those of their established counterparts, especially in the services sector. Another study (Ferrante and Freo, 2012) investigated the productivity gap between internationalized and domestic firms using the quantile decomposition method on Italian firms from 2001 to 2003. It found that, accounting for compositional effects, the productivity premium remains but its magnitude diminishes significantly. Compositional effects were revealed as pivotal determinants of the productivity premium for internationalized firms. Once these effects are controlled for, the productivity premium decreases substantially, typically falling to levels around or below 5 per cent. This holds regardless of the estimation methods. Of particular significance, the disparity in the gross productivity premium between groups remains consistent across the entire distribution, whereas the spread for the net productivity premium becomes narrower and less uniform. Specifically, the net premium is found to be positive for less productive firms, whereas it becomes negligible for the most productive firms.

Wojciechowski (2017) investigates the correlation between labour productivity in Poland, the influx of FDI in Poland and the productivity gap between Poland and the 15 countries of the European Union before 2004.[4] The research revealed that although investment decisions regarding country selection are primarily influenced by the size of the target market, geographical distance remains a negative factor affecting the volume of FDI. Furthermore, the relative disparity in business backwardness or labour

[4] The so-called EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

productivity relative to the 15 European Union countries had an unfavourable impact on productivity enhancement. Shen et al. (2021) explored how inward FDI affects the performance of domestic firms in China. The model indicates that the influence of FDI spillover effects hinges on the productivity gap between domestic firms and foreign counterparts. Specifically, for low-productivity domestic firms, the positive impact of FDI spillover decreases as the productivity gap widens whereas the opposite holds true for high-productivity firms. In essence, when the productivity gap widens, the entry of foreign firms enhances the efficiency of high-productivity firms but diminishes the efficiency of low-productivity ones. Empirical evidence supporting this theoretical model is provided using data from the annual survey of Chinese industrial enterprises. Tomiura (2007) investigated a firm-level data set for more than 118,300 firms in the Japanese manufacturing sector and found that foreign-owned firms exhibit significantly higher productivity levels than do foreign outsourcers and exporters; the latter, in turn, exhibit higher productivity than domestic firms. This hierarchical productivity pattern aligns with theoretical expectations and has remained robust even when accounting for factors such as industry, firm size and factor intensity. Consequently, this research furnishes empirical validation for the applicability of the heterogeneous firm model in the context of international trade.

In Viet Nam, to our best knowledge, there is not yet any study looking at the productivity gap between foreign investment and local firms. Our study aims to fill in the gap by examining the determinants of a firm's TFP at different quantiles. A large body of literature on the relationship between foreign-owned and domestic firms in Viet Nam focuses on the effect of FDI on domestic firm performance, where FDI is found to have an effect on local firm productivity (Anwar and Nguyen, 2010; Ha et al., 2021 and 2023), export spillovers (Anwar and Nguyen, 2011; Ha et al., 2020), firm survival (Kokko and Thang, 2014), wage differentials (Nguyen, 2015) or wage spillovers (Pomfret, 2010). Yet, the productivity gap between the two has not yet been investigated. The main objective of this study is to fill the gap in the literature on Viet Nam by considering the productivity gap between FDI and domestic manufacturing firms at different points of the productivity distribution across sectors and what accounts for the gap.

3. Methodology

3.1 TFP estimation

Following the Cobb-Douglas production function (Douglas, 1928), the total output of firm i in industry j at time t (Y_{ijt}) is a function of its capital (K_{ijt}), labour (L_{ijt}) and TFP (A_{ijt}), detailed as follows:

$$Y_{ijt} = K_{ijt}^{\alpha}(A_{ijt}L_{ijt})^{(1-\alpha)} \quad (1)$$

where $0 < \alpha < 1$

Taking the logarithm of equation (1) yields

$$lnY_{ijt} = \alpha lnK_{ijt} + (1-\alpha)lnL_{ijt} + lnA_{ijt} \quad (2)$$

which can be written as

$$y_{ijt} = \beta_k k_{ijt} + \beta_l l_{ijt} + \varepsilon_{ijt} + e_{ijt} \quad (3)$$

where y_{ijt} is total output, k_{ijt} is capital stock, l_{ijt} is the labour of enterprise i in sector j at time t, in log form. Since A_{ijt} is assumed as constant in equation (1), which refers to the unobserved part of the production function, we consider lnA_{ijt} as $(\varepsilon_{ijt} + e_{ijt})$, which is divided into two parts: the unobserved productivity (ε_{ijt}) which refers to the mean of log total factor productivity (Newman et al., 2015) and a random error term (e_{ijt}).

Estimation of equation (3) gives us the estimated result for total factor productivity as follows:

$$\hat{\varepsilon}_{ijt} = y_{ijt} - \widehat{\beta_k}k_{ijt} - \widehat{\beta_l}l_{ijt} - e_{ijt} \quad (4)$$

Estimating production functions is a complex task fraught with challenges, particularly

because of issues such as endogeneity and multicollinearity. In the pursuit of unbiased estimation using ordinary least squares (OLS) methodology, the error terms need to have a zero mean and remain uncorrelated with explanatory variables such as labour and capital. However, the presence of observed variables, such as labour and capital, often correlates with unobserved inputs or productivity shocks, such as managerial prowess or the quality of land and materials. This correlation introduces biases in the estimation of production functions. Furthermore, the interdependence between labour and capital inputs exacerbates the issue of multicollinearity. Typically, firms with greater capital requirements also require larger labour forces, resulting in a correlation between these inputs and potentially biased estimators. The OLS estimation framework presupposes that input selections are made independent of a firm's efficiency level. However, this assumption is often unrealistic, as firms frequently base their input decisions on unobservable productivity shocks. This discrepancy between actual practice and the OLS assumption results in a biased estimation of coefficients in the production function. For example, firms with higher productivity levels may opt to employ more labour, leading to an upward bias in the coefficient estimation for labour if productivity differentials are not controlled for. Conversely, the relationship between firms' labour decisions and their productivity levels could manifest as a downward bias in OLS estimates of the labour coefficient. This dynamic is indicative of the tendency for more productive firms to become increasingly capital-intensive, further complicating coefficient estimation. In addition, the issue of simultaneity introduces biases in the estimation of capital coefficients, with the direction of bias contingent upon various factors.

To mitigate these challenges, researchers have developed methodologies to control for unobservable variables in production function estimation. Early approaches (Olley and Pakes, 1992; Levinsohn and Petrin, 2003) focused on addressing endogeneity through the inclusion of investment or intermediate inputs. However, these methods do not fully resolve the issue of multicollinearity. An alternative proposed by Wooldridge (2009) involves a one-step estimator utilizing the generalized method of moments (GMM) approach, offering a promising avenue for improving the accuracy of production function estimation amid the complexities of our data. This addresses the issue of estimating production functions for firms when there are unobservable factors that can affect the production process, which holds several advantages. One of the main advantages of Wooldridge's approach is its ability to control for unobservable or omitted variables that can affect a firm's production. In empirical economic analysis, it is common for certain important factors influencing production to be unobservable or difficult to measure. Wooldridge's method allows researchers to account for these unobservable factors using proxy variables, in which we use materials (energy consumption) as the proxy. The use of proxy variables helps reduce bias in the estimated production function. By including proxy variables that are correlated with the unobservable factors, the model can capture some of the unobservable variations in production, leading to more accurate estimation of parameters. Although it might be better if we had the information for the use of immediate inputs, these data are not available in our survey. Therefore, we choose to go with energy consumption as the proxy.

3.2 Factors that impact TFP

Building upon the earlier research by Anwar and Nguyen (2010), Fujimori and Sato (2015) and Newman et al. (2015), our model aims to investigate the influence of internal and external factors on productivity as in the model below:

$$TFP_{ijt} = \alpha_0 + \alpha_1 markertshare_{ijt} + \alpha_2 size_{ijt} + \alpha_3 age_{ijt} + \alpha_3 export_{ijt} + \alpha_4 labour\ productivity_{ijt} + \alpha_5 ROA_{ijt} + \alpha_6 HHI_{jt} + \alpha_7 PCI_{ijt} + \alpha_8 entry\ cost_{ijt} + \alpha_8 land\ access_{ijt} + \alpha_9 policy\ bias_{ijt} + u_{ijt} \quad (5)$$

Where TFP_{ijt} is the TFP of enterprise i in sector j at time t computed by utilizing the GMM estimation approach (Wooldridge, 2009) to estimate the Cobb-Douglass production function.

Our model captures two categories for the explanatory variables: firms' characteristics and provincial business environment. $Markertshare_{ijt}$ is measured as the proportion of the firm's revenue in the sector's total revenue, and $size_{ijt}$ is the size of firm I in sector j, which is computed by taking a logarithm of the total employees of the firm. As most Vietnamese firms are small and medium-sized, perhaps characterized by non-decreasing returns to scale, we expect that size positively affects firm productivity. Age_{ijt} might be linked with firm TFP based on the accumulation of learning and experience over time. $Export$ is the annual total export volume in logarithm form. As exports are argued to have a positive impact on productivity (Arnold and Hussinger, 2005; Newman et al., 2016; Wagner, 2006a and 2006b), the more export-intense a firm is, the more productive that firm could be. $Labor\ productivity_{ijt}$ is the average value added per worker at firm i. Higher labour productivity is expected to lead to higher TFP overall. Similarly, return on assets (ROA) measures a firm's financial performance and is expected to give a positive sign to firm TFP. HHI_{jt} denotes the Herfindahl-Hirschman index of industry j, which measures the concentration of that market. The index may exert either a positive or a negative influence on firm productivity. All these variables are at the industry level. Following Newman et al. (2015), *HHI* is calculated as follows:

$$HHIjt = \sum\left(\frac{xijt}{Xjt}\right)^2 \quad (6)$$

where $xijt$ is the output of firm i in industry j at time t; Xjt is the total output of industry j.

The remaining variables in equation (5) are control variables at the provincial level. PCI_{pt} – the Provincial Competitiveness Index – measures the overall business environment in each province.

The index comprises 10 component indicators, encompassing key areas of economic governance pertaining to business development in relevant provinces and cities. A locality is considered to have a good business environment when it possesses characteristics such as low market entry costs, easy land access and stable land use, a transparent business environment and publicly available business information. $Entry\ cost_{pt}$ and $land\ access_{pt}$ are some detailed components of the quality of the business environment that might affect the productivity difference between foreign-owned and domestic firms, given that foreign-owned firms might have some advantages over domestic firms in the entry cost of land access in some provinces owing to the policy of attracting FDI to these provinces. $Policy\ bias_{p,t}$, in contrast, measures the bias that a local government may favour State-owned firms over private firms including FDI.

3.3 Productivity gap decomposition

To assess the productivity differential, we first consider the observable differences in TFP distributions between foreign-owned firms (group 1) and domestic firms (group 0). We aim to isolate the effects of differences in the distribution of covariates on TFP between these two groups. The Blinder-Oaxaca decomposition approach (Blinder, 1973; Oaxaca, 1973) is widely used to examine factors that contribute to differentials, especially in wage inequality analysis (Doan et al., 2023; Jann, 2008; Neumark, 2004) or productivity differential analysis (Adzawla et al., 2020; Islam et al., 2019; Min and Bansal, 2023; Shita et al., 2020). These differences are characterized as functions of differences in characteristics and differences in coefficients associated with those characteristics. Although this original method allows researchers to analyse the differences around the outcome variable's mean, decomposition at different points of the distribution requires further development. Firpo (2018) and DiNardo et

al. (1996) propose a feasible methodology for decomposing differences in distributional statistics beyond the mean, which is the recentered influence function, called RIF decomposition (the Oaxaca-Rif method) (Rios-Avila, 2020). This approach is claimed to be simple to implement. Following Rios-Avila (2020), we suppose that there is a joint distribution function that captures the interconnections among TFP and the exogenous characteristics X, and the categorical variable T (T = 1 for foreign-owned firms and 0 for domestic firms) that identifies the group that firms are in. The productivity gap between foreign-owned and domestic firms can be calculated as follows:

$$\Delta TFP = TFP_1 - TFP_0 \quad (7)$$

For each firm, the factors that affect its TFP are defined in equation 5. To have a better understanding of how the difference in the characteristics and the difference in coefficients contribute to the overall productivity gap at different points in the TFP distribution, we need to identify the counterfactual productivity distribution $TFPc$, which is the productivity distribution that group 1 would have if it had characteristics similar to those of group 0. The difference in the productivity distributions between the two groups can be estimated at a particular point on the distribution such as at the 25th, median and 75th percentiles. The difference ΔTFP then can be decomposed as follows:

$$\Delta TFP = TFP_1 - TFP_c + TFPC_c - TFP_0 \quad (8)$$

The observed differences between the TFP distributions over the foreign-owned and domestic firms are decomposed into a component explained by the differences in the composition of covariates, a component explained by different returns to covariates (coefficients) and a residual component. In this way, it becomes possible to compute the impact of each of the components on the overall outcome distribution. The differences between distributions are evaluated moving from the lower to the upper tail of the conditional distribution of the TFP, moving through quantiles that vary from 0 to 1. The component created by covariates can be interpreted as the effect induced by the heterogeneity in characteristics; the component created by coefficients can be interpreted as the net internationalization productivity premium; and the last component measures the residual difference. When interpreting results, a caveat should be kept in mind. Because of the method's construction, it provides an accounting decomposition conditional on a given model and may detect only the influence of modeled covariates.

The Oaxaca-Rif decomposition process involves two stages. In the first stage, a counterfactual firm productivity distribution is constructed for the domestic firms, assuming that they had the same characteristics as the foreign-owned firms. The difference between the actual productivity distribution and the counterfactual one reflects the difference in firm characteristics. In addition, the difference between the actual distribution of productivity in the domestic firms and the counterfactual distribution represents productivity differences caused by differences in firm characteristics. The second stage further dissects the composition and structure effects into contributions from individual explanatory variables. This allows for assessment of the impact of specific factors on the productivity gap between the two groups of firms. Equation (8) can be explained into components as follows:

$$\Delta TFP = \bar{X}_1(\hat{\beta}_1 - \hat{\beta}_c) + (\overline{X_1} - \overline{X_c})\widehat{\beta_c} + (\overline{X_c} - \overline{X_0})\widehat{\beta_0} + \bar{X}_c(\hat{\beta}_c - \hat{\beta}_0) \quad (9)$$

We followed Rios-Avila (2020) to apply Oaxaca-Rif estimation to our sample. The 25th, 50th and 75th percentiles were selected for the decomposition process. This approach enabled us to explore the various factors and dynamics that differentiate productivity in these two groups of firms at different quantiles, allowing for a comprehensive understanding of the variations and distinctions between them.

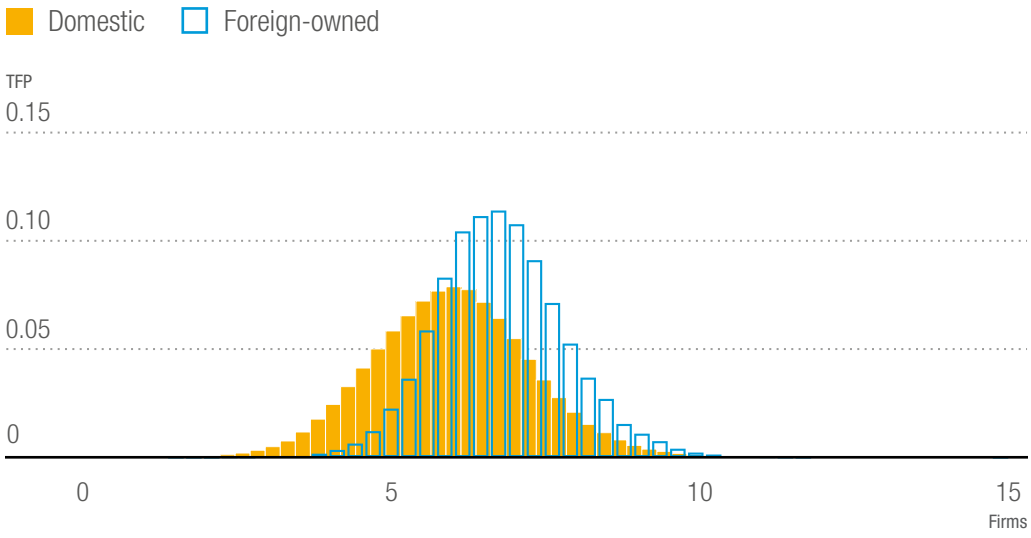
4. Data

We employ a panel data set of domestic enterprises derived from the Viet Nam Enterprise Survey (VES), which has been conducted annually by the Vietnamese General Statistical Office since 2001. The survey serves multiple purposes, including (i) gathering fundamental information for management, policymaking, socioeconomic development plans, and national and local business development plans, as well as for investors and businesses; (ii) synthesizing indicators in the national statistical indicator system and the annual official reports of provincial statistics branches; (iii) evaluating the application of technology in processing and manufacturing enterprises; and (iv) updating the enterprise database. The survey encompasses all active firms with more than 50 employees, including State-owned enterprises, collective sector enterprises, private domestic firms and foreign-invested domestic firms operating across various sectors and regions. Specifically, it includes all State-owned enterprises, all enterprises with FDI capital and all non-State enterprises with at least 20 employees (or at least 100 employees for Hanoi and Ho Chi Minh City, and at least 50 employees for Hai Phong, Da Nang City, Dong Nai and Binh Duong). The VES survey captures four main aspects of firm activities: (i) general information about firms and their branches; (ii) labour and labour income; (iii) business activities; and (iv) other factors such as technology improvement and intermediate inputs, which vary depending on the survey year.

To compute firm TFP for the study period from 2011 to 2020, we estimate the production function for each sector at the firm level. The Vietnamese manufacturing industry is divided into 24 two-digit sectors, coded from 10 to 33 in the VSIC 2012 classification. Our production function estimation uses the value added approach, with capital calculated as the deflated value of assets and labour measured by the total number of employees at the end of the year. Energy consumption is used as the instrumental variable in the GMM estimation approach suggested by Wooldridge (2009). Figure 1 shows a clear difference in TFP in foreign-owned and domestic firms, with foreign-owned firms appearing to have higher TFP.

The histograms presented in figure 1 reveal insightful patterns regarding TFP in foreign-owned and domestic firms. Notably,

Figure 1
TFP in foreign-owned and domestic firms in the 2011–2021 period



Source: Authors' calculation from the Viet Nam Enterprise Survey.

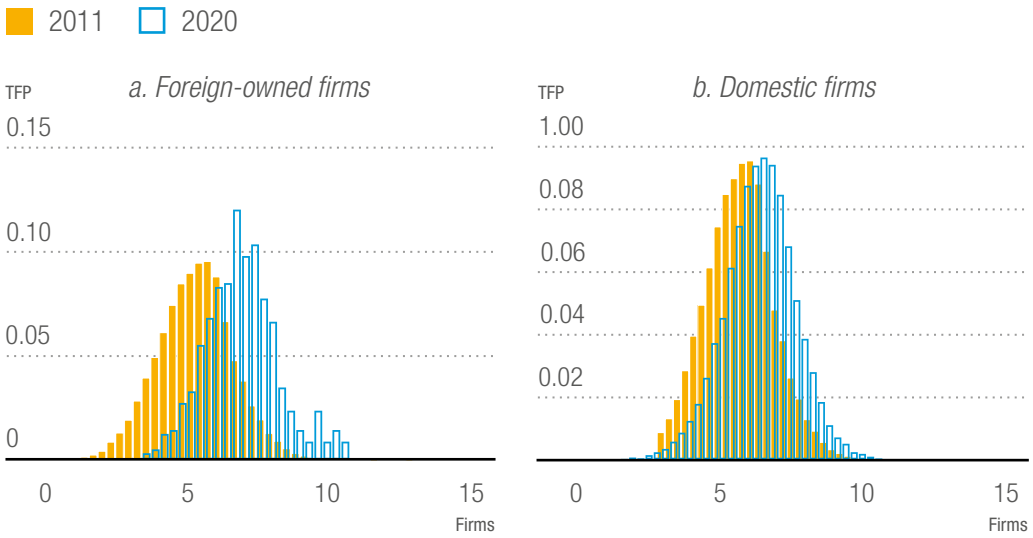
it becomes apparent that the distribution of TFP in the foreign-owned sample is consistently centered at a higher level than that observed within the domestic sample. This central tendency suggests that foreign-owned firms exhibit systematically higher TFP performance than their domestic counterparts. Furthermore, the temporal dimension of the data provides valuable insights into the dynamic nature of TFP in these two distinct categories of firms. Over time, the distribution of TFP in the foreign-owned sample exhibits a discernible rightward shift, indicating a consistent increase in TFP levels. In contrast, the domestic sample also experiences an increase but to a relatively lesser extent, resulting in a smaller rightward shift. Figure 2a shows the change of TFP in the foreign-owned sample in the 2011–2020 period, and figure 2b presents that change in the domestic sample.

These graphs reveal that not only is TFP higher in foreign-owned firms, but it also shows a more pronounced upward trajectory from 2011 to 2020. This suggests that foreign-owned firms have not only maintained a consistently superior TFP level but have also exhibited a more rapid rate of improvement over the specified period.

The control variables in equation (5) are largely available in or derivable from the VES data set. For instance, wages (average labour income) can be obtained by dividing the total cost of labour by the total number of employees, and export intensity is computed as the share of exports by volume in total firm revenue. We provide in table 1 some descriptive statistics on the variables used. A correlation matrix is also reported in the appendix table.

The total number of observations in the final data set is 409,782. There are some missing values in some variables, which are replaced by either the previous value or the future value of that variable, which a panel data set allows us to do. For TFP, it is 6.067, indicating an average level of efficiency in converting inputs into outputs. The relatively low standard deviation of 1.285 suggests that TFP values tend to cluster around this mean. Regarding market share, we find that it is a highly skewed variable, with a mean close to zero (0.000) but a standard deviation of 0.006, implying that while most observations have minimal market share, there are outliers with substantial market presence, as indicated by the maximum value of 2.345. Age averages 8.179 years, ranging from 0 to 97. This wide dispersion indicates

Figure 2
TFP change in foreign-owned and domestic firms in 2011 and 2020



Source: Authors' calculation from the Viet Nam Enterprise Survey.

Table 1
Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
TFP	409 782	6.067	1.285	0.012	15.012
Market share	409 782	0	0.006	0	2.345
Age	409 782	8.179	6.786	0	97
Size	409 782	3.124	1.622	0	11.335
Labour productivity	409 782	4.457	1.009	0	14.730
ROA	409 782	0.024	9.885	-92.462	6255.447
Export proportion	409 782	0.007	0.029	0	1
PCI	407 979	62.120	3.910	45.117	75.086
Entry cost	407 979	7.956	0.782	5.861	9.598
Land access	407 979	6.255	0.796	4.123	8.839
Policy bias	409 782	5.224	1.026	3.115	8.810
HI	409 782	0.017	0.126	0.001	5.525

Source: Authors' calculatation from the Viet Nam Enterprise Survey.

that the data set includes entities of various ages, possibly representing different stages of development or longevity in the market. Size, measured as the log form of total labour, has a mean of 3.124, whereas labour productivity exhibits a moderate mean of 4.457 and a standard deviation of 1.009, suggesting a certain degree of consistency in productivity across entities, albeit with some variability.

Data for variables that represent the provincial business environment come from the Provincial Competitiveness Index (PCI) survey. It is a comprehensive measure of economic governance, business environment and administrative reform efforts of provincial and city governments in Viet Nam. It was developed by the Viet Nam Chamber of Commerce and Industry with support from the United States Agency for International Development. The PCI represents the collaborative work of both local and international experts associated with the Chamber. Built on the most extensive and meticulous annual survey of businesses in Viet Nam, the PCI survey serves as a collective voice of the private business community regarding the business environment across provinces and cities in Viet Nam. The index does not solely aim for scientific research or to commend or criticize provinces with high or low scores. Instead, it seeks to understand and explain why some regions outperform others in private sector development, job creation and economic growth. It functions as a vital instrument for assessing economic competencies and policy effectiveness at the provincial and municipal levels, thereby contributing to the advancement of private sector-led economic development in Viet Nam.[5] By design, the value of the index spans from 0 to 100, with a higher value indicating a better business environment. In our data set, the PCI has a mean value of 62.12 and a relatively low standard deviation of 3.910. The data range from a minimum of 45.117 to a maximum of 75.086, indicating a narrow distribution, with PCI values clustered closely around the mean. Other components range from 0 to 10 by design and are centred around 8 for entry cost, 6.2 for land access and 5.2 for policy bias (a measure of firms' perception of the privileges given to State-owned firms).

[5] For more details, see the Provincial Competitiveness Index, available at https://pcivietnam.vn/en (accessed 15 March 2024).

5. Results and discussions

5.1 Quantile regression

In the first step, quantile regression is employed on panel data sets for several compelling reasons. First, it provides an overall view of the variables that affect firm TFP and how the effects vary across distributions of the TFP. This approach is particularly advantageous when dealing with heterogeneity in the data, as it allows examination of the distributional effects of covariates on the quantiles of interest (Canay, 2011). In the context of panel data, where observations are collected over time for multiple entities, quantile regression offers valuable insights into how the determinants affect various segments of the distribution, making it especially relevant for capturing diverse economic phenomena. In this section, we apply quantile regression for panel data analysis to discern the heterogeneous effects of key factors on economic performance in both domestic and foreign-owned firms. We control for firm and year fixed effects (embedded in the *qregpd* command) and for provincial context by including the provincial business environment. The empirical findings are presented in tables 2 and 3, providing a comprehensive depiction of the varying effects across different quantiles of firms' TFP.

The results of the quantile regression analysis conducted on the domestic sample reveal

Table 2
Quantile regression on the domestic sample

Variable	Q25	Q50	Q75
Market share	-0.053 (0.127)	0.210*** (0.048)	1.008*** (0.072)
Age	0.019*** (0.003)	-0.0023* -0.002	0.012* (0.006)
Size	0.209*** (0.006)	0.160*** (0.008)	0.082** (0.035)
Labour productivity	0.696*** (0.037)	0.664*** (0.017)	0.436*** (0.066)
ROA	0.003 (0.005)	0.016*** (0.003)	-0.007*** (0.002)
Export	-0.014*** (0.005)	0.032*** (0.005)	-0.014 (0.011)
PCI	0.021*** (0.003)	0.018*** (0.002)	0.048*** (0.010)
Entry cost	-0.089*** (0.027)	-0.025*** (0.006)	-0.010 (0.047)
Land access	0.004 (0.020)	0.081*** (0.021)	0.003 (0.011)
Policy bias	-0.066*** (0.021)	-0.095*** (0.010)	-0.057*** (0.010)
HHI	-0.313 (0.242)	1.312*** (0.464)	0.322 (0.21)
Observations	289 872	289 872	289 872
Number of groups	97 924	97 924	97 924

Source: Authors' calculation from Viet Nam Enterprise Survey.
Note: Quantile regression on panel data using qregpd package in Stata. Year and firm fixed effects are included. Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.01.

Table 3
Quantile regression on the foreign-owned sample

Variable	Q25	Q50	Q75
Market share	0.1860*** (0.0121)	0.1880*** (0.0259)	0.3120*** (0.0024)
Age	0.0089*** (0.0001)	0.0094*** (0.0003)	0.0153*** (0.002)
Size	0.1520*** (0.0023)	0.1340*** (0.0064)	-0.0341 (0.0270)
Labour productivity	0.7390*** (0.0103)	0.7150*** (0.0066)	0.3880*** (0.0725)
ROA	0.0003*** (0.0002)	0.0002*** (0.0001)	0.0002*** (0.0002)
Export	0.0214*** (0.0013)	0.0104*** (0.0256)	0.0448*** (0.0064)
PCI	0.0121*** (0.0033)	0.0129** (0.0054)	-0.0051 (0.0051)
Entry cost	0.0533*** (0.0124)	0.0210** (0.0088)	-0.1130*** (0.0169)
Land access	-0.0665*** (0.0137)	-0.0089 (0.011)	0.0494*** (0.0136)
Policy bias	0.0360*** (0.004)	0.0308* (0.018)	0.0841*** (0.0092)
HHI	-0.7240*** (0.0674)	0.0430 (0.0541)	1.1330*** (0.2400)
Year	0.0047 (0.0045)	0.0010 (0.0067)	0.0089 (0.0083)
Observations	42 258	42 258	42 258
Number of groups	9 507	9 507	9 507

Source: Authors' calculation from Viet Nam Enterprise Survey.
Note: Quantile regression on panel data using qregpd package in Stata. Year and firm fixed effects are included. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.01$.

several key findings about the effect of firm characteristics and provincial context on firm TFP. This sample includes both State-owned firms (1.18 per cent of the total sample) and private firms (86.39 per cent of the sample) over the 2011–2020 period. The effect on domestic firms of factors representing firms' specifics is not identical across quantiles. For instance, market share, firm size, firm age and firm market concentration index are found to have a significant impact on domestic firms in the lowest and the highest quantiles. Only labour productivity was found to have a consistently positive effect on firm TFP across all quantiles. Export activity boosts firm TFP in the 25th and the 75th percentiles but harms TFP of firms in the 50th percentile. Similarly, variables that represent the provincial business environment do not have a consistent effect on domestic firms across all quantiles, as the overall PCI is found not to boost firm TFP in the middle but at the lower and higher quantiles. Interestingly, policy bias, which measures the level at which a province might give more privilege to State-owned firms,[6]

[6] Details about policy bias can be found at The Provincial Competitive Index, PCI Methodology, available at https://pcivietnam.vn/en/about/pci-methodology.html (accessed 15 March 2024).

is found to harm domestic firms, including State-owned ones, across all quantiles.

When we look at the results for the foreign-owned firms (12.44 per cent of the total sample), almost all variables that represent firm characteristics are found to have a consistent effect on foreign-owned firms' TFP across all quantiles. Table 3 reports the results.

Within the foreign-owned firms, it is noteworthy that all firm-specific factors except HHI exhibit a similar effect on firm TFP across all quantiles. This finding suggests a degree of uniformity in the influence of these variables on TFP across different quantiles within the foreign-owned firm sample, implying that their effects maintain a consistent pattern throughout the TFP distribution. Furthermore, when examining other factors in the foreign-owned sample, such as the provincial context, we find that overall, a better business environment improves the TFP of foreign-owned firms. Policy bias, however, is found to harm FDI in the medium and high quantiles, which is explainable because higher policy bias in a province indicates more favour given to State-owned related enterprises, which might discourage both private and foreign-owned firms.

5.2 Quantile decomposition

As we have shown, in domestic and foreign-owned firms there is a difference in TFP, as well as in the relationships between TFP and other factors. To examine what factors contribute to the difference, in the next step we apply Oaxaca-Rif decomposition to different quantiles to elucidate the productivity disparity between foreign-owned and domestic firms. This approach provides a comprehensive understanding of the productivity gap at different segments of the productivity spectrum. By dissecting the gap at these specific quantiles, we can discern how the factors contributing to the divergence may vary across distinct productivity levels. The results for the first 25th percentile, presented in table 4, show how TFP in domestic firms (group 1) differs from that of foreign-owned firms (group 0) and what contributes to the difference.

Using the Oaxaca-Rif estimation method, our study uncovers fascinating insights. First, at the 25th percentile, it becomes apparent that foreign-owned firms exhibit higher productivity, surpassing domestic firms by 0.944 points, and this gap gets larger at higher quantiles. This intriguing disparity underscores the effect of FDI on firm productivity, even within the lower quantile of the distribution. It underscores the significance of understanding how FDI status can influence a firm's performance, even for those at the lower end of the productivity spectrum. The second key point is that a substantial portion of this productivity differential is attributable to observable factors. Approximately 80.5 per cent of the total difference, which amounts to roughly 0.76 points, can be attributed to firms' characteristics and provincial characteristics. This underscores the importance of considering not only individual firm traits but also regional context when evaluating productivity disparities between foreign-owned and domestic firms. In this context, labour productivity, age and export activities are the most significant contributors to the difference. Furthermore, our analysis confirms the existence of unobservable or residual factors that contribute to the productivity gap. Approximately 19.5 per cent of the total difference, equivalent to 0.184 points, remains unexplained by the observable variables. These unobservable factors may encompass aspects such as managerial decisions, organizational culture or other idiosyncratic elements that require further investigation. Understanding these residual factors is crucial to a comprehensive grasp of the intricate dynamics at play in foreign-owned and domestic firm productivity.

Regarding the productivity difference at the mean, the result reported in table 5 shows a larger gap between foreign-owned and domestic firms than at the 50th percentile. In the 50th percentile distribution, the TFP of foreign-owned firms is 1.402 points higher

Table 4
Productivity difference at the 25th percentile

Variable	Overall	Explained	Unexplained
Market share		0.0021** (0.0009)	-0.0047*** (0.0004)
Age		-0.0014***] (0.0003)	-0.0647*** (0.0091)
Size		-0.1810*** (0.0082)	0.5940*** (0.0148)
Labour productivity		-0.4050*** (0.0049)	0.6260*** (0.0283)
ROA		0.0001 (0.0001)	-0.0001 (0.0002)
Export		-0.1560*** (0.0077)	-0.0295*** (0.0019)
PCI		-0.0094*** (0.0009)	1.7410*** (0.1240)
Entry cost		-0.0021*** (0.0008)	0.2710*** (0.0740)
Land access		-0.00644*** (0.0015)	-0.3620*** (0.0585)
Policy bias		-0.0008 (0.0017)	-0.4280*** (0.0449)
HHI		-0.0005 (0.0002)	0.0004 (0.0015)
Domestic (group 1)	5.1720*** (0.0037)		
Foreign-owned (group 0)	6.1160*** (0.0061)		
Difference	-0.9440*** (0.0072)		
Explained	-0.7600*** (0.0096)		
Unexplained	-0.1840*** (0.0109)		

Source: Authors' calculations.
Note: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

than that of domestic firms. The productivity gap, particularly at the mean, is significantly influenced by firms' characteristics, with a strong emphasis on factors such as firm size and labour productivity. This observation highlights the substantial role of the learning-by-doing effect, often proxied by firm age, in explaining the productivity differential between foreign-owned and domestic firms. It underscores that the longer a firm has been in operation, the more proficient it becomes, thus increasing its productivity. Furthermore, human capital emerges as another major contributor to the productivity gap. The skills, knowledge and expertise of the workforce within a firm play a crucial role in determining its productivity, emphasizing the importance of investment in human capital development for both foreign-owned and domestic firms. These findings underscore the multifaceted nature of the productivity gap and provide essential insights into the

Table 5
Productivity difference at mean

Variable	Overall	Explained	Unexplained
Market share		0.0278*** (0.0043)	0.0016 (0.0014)
Age		0.0066*** (0.0017)	-0.1580 (0.0459)
Size		-0.7040*** (0.0437)	-0.0862 (0.0689)
Labour productivity		-0.6410*** (0.0185)	2.8680*** (0.1340)
ROA		0.0002 (0.0002)	-0.0001 (0.0001)
Export		-0.2110*** (0.0394)	-0.1140*** (0.0086)
PCI		0.0051*** (0.0015)	-3.6570*** (0.5930)
Entry cost		-0.0005 (0.0005)	0.1290 (0.3500)
Land access		0.0066 (0.0059)	0.5450* (0.2880)
Policy bias		0.0004 (0.0007)	-0.6950*** (0.2190)
HHI		0.0001 (0.0008)	0.0003 (0.0077)
Domestic (group 1)	2.7040*** (0.0136)		
Foreign-owned (group 0)	4.1060*** (0.0273)		
Difference	-1.4020*** (0.0305)		
Explained	-1.5100*** (0.0457)		
Unexplained	0.1080** (0.0544)		
Constant			1.2750* (0.7540)

Source: Authors' calculations.
Note: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

key drivers that underpin disparities between these two categories of firms at the 50th percentile of the productivity distribution.

At the 75th percentile, reported in table 6, we observe a productivity gap of 1.349 points, which, while smaller than that of the 50th percentile, remains significantly larger than that of the 25th percentile.

As with other points along the distribution, this productivity gap is primarily attributed to firm-specific characteristics. A portion of this difference is elucidated by observable factors related to institutional quality. This finding underscores the persistence of a productivity disparity, even among firms at higher quantiles, suggesting that the effect

of firm characteristics remains consistent throughout the distribution. Moreover, the influence of institutional quality, though not the sole determinant, is a contributing factor that can be identified and quantified. This emphasizes the multifaceted nature of the productivity gap, in which both intrinsic firm attributes and the broader institutional environment play pivotal roles in influencing the performance differential between firms, particularly at the 75th percentile.

Table 6
Productivity at the 75th percentile

Variable	Overall	Explained	Unexplained
Market share		0.0285***	-0.0085***
		(0.0043)	(0.0016)
Age		0.00457***	-0.1420***
		(0.0013)	(0.0426)
Size		-0.7330***	-0.2040***
		(0.0402)	(0.0675)
Labour productivity		-0.7230***	1.9120***
		(0.0191)	(0.1290)
ROA		0.0003	-0.0001
		(0.0003)	(0.0001)
Export		-0.2090***	-0.0916***
		(0.0377)	(0.00815)
PCI		-0.0168***	-2.6880***
		(0.0043)	(0.5740)
Entry cost		-0.0070*	-0.0489
		(0.0039)	(0.3430)
Land access		0.0066	0.8980***
		(0.0072)	(0.2720)
Policy bias		-0.00745	-0.8330***
		(0.0083)	(0.2090)
HHI		-0.0002	-0.0005
		(0.0008)	(0.0072)
Domestic (group 1)	2.9520***		
	(0.0128)		
Foreign-owned (group 0)	4.3010***		
	(0.0263)		
Difference	-1.3490***		
	(0.0292)		
Explained	-1.6570***		
	(0.0442)		
Unexplained	0.3080***		
	(0.0522)		
Constant			1.5140**
			(0.7190)

Source: Authors' calculations.
Note: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

6. Conclusion and policy recommendations

Our analysis has shed light on several key aspects of the productivity gap between foreign-owned and domestic firms across different quantiles. First and foremost, we have unequivocally established the existence of a productivity gap, indicating that foreign-owned and domestic firms exhibit differential levels of productivity at various points along the distribution. Second, we have observed that the most substantial productivity gap is situated at the 50th percentile, signifying the centrality of this point in the distribution. This midpoint serves as a critical juncture where the disparities between foreign-owned and domestic firms are most pronounced. Third, our investigation has revealed that firms' observable characteristics, such as size, labour productivity and experience, play a pivotal role in promoting TFP as well as in explaining the majority of the productivity gap between these types of firms.

According to the International Labour Organization, Viet Nam's labour productivity is considerably lower than that of most of the countries in the region (Viet Nam stands at $10.22 per hour, compared with $13.53 for China or $15.06 for Thailand).[7] This shows large room for improvement. As labour productivity is the most significant contributor to firm TFP as well as to the TFP gap, firms' strategies to prioritize investment in employee training and development, embracing technology adoption, could help improve labour productivity and narrow the TFP gap. Implementing flexible work arrangements and promoting employee well-being could further enhance productivity by accommodating diverse needs and fostering a supportive work environment. On the governmental front, providing training programmes and investing in higher education to promote skills development both play crucial roles in enhancing labour productivity and TFP and hence, in reducing the TFP gap.

In addition to prioritizing strategies to enhance labour productivity, policymakers must recognize the critical role of knowledge transfer initiatives in narrowing the productivity gap. Fostering linkages between domestic and foreign-owned firms is key to facilitating productivity spillovers (Barrios, 2002; Gorg and Strobl, 2001); however, the connection between Vietnamese and foreign-owned firms is rather loose as foreign-owned firms often cooperate more with their home-country firms, with which they have well-established relationships. According to the Ministry of Investment and Planning, in 2017, only 10 per cent of domestic enterprises acted as suppliers for foreign-owned firms in Viet Nam, and foreign-owned firms purchased only 26.6 per cent of their inputs by value from Vietnamese firms, with a majority of their purchases being made from other foreign-owned firms based in Viet Nam.[8] The loose linkage between foreign-owned and domestic firms prevents productivity spillovers from occurring. The Government, therefore, should provide policy that encourages partnerships, joint ventures or mentorship programmes between foreign-owned and domestic firms that can effectively promote technology diffusion, improved management practices and skill enhancement. Such collaborative efforts create avenues for knowledge transfer, allowing domestic firms to leverage the expertise and resources of their foreign-owned counterparts. A collaborative effort could be made for foreign-owned and domestic firms through vertical linkages where Vietnamese firms act more closely as inputs suppliers or customers for foreign-owned firms from the upstream and downstream sectors of the value chain. Supplier-buyer relationships or subcontracting arrangements enable domestic firms to access advanced technologies and processes utilized by foreign-owned firms.

[7] More details are available at the International Labour Organization, Statistics on Labour Productivity, available at https://ilostat.ilo.org/topics/labour-productivity (accessed 15 March 2024).

[8] More details can be found at Viet Nam, Ministry of Finance, 2018, Boosting linkages between FDI and domestic enterprises, 1 August, available at https://mof.gov.vn/webcenter/portal/btcvn/pages_r/l/tin-bo-tai-chinh?dDocName=UCMTMP128622.

This exposure facilitates the adoption of best practices and innovative techniques, ultimately enhancing productivity. Horizontal relationships, including joint research and development projects or strategic alliances, that promote collaborative learning and skill development across firms operating within the same industry or sector could also help. However, it is rather challenging for Vietnamese firms to collaborate with their competitors in the same industry since domestic firms are often small and nascent. To promote such collaborations, policymakers can provide incentives for foreign-owned firms to collaborate with domestic firms, for instance, offering tax breaks or incentives for foreign-owned firms that engage in partnerships or joint ventures with domestic firms. These could include tax credits for research and development conducted jointly or reduced corporate tax rates for profits generated through collaborative projects. These human capital development and knowledge transfer initiatives contribute to the overall resilience and sustainability of the domestic economy by fostering a culture of innovation and continuous improvement. As such, policymakers must prioritize these initiatives as integral components of their broader economic strategy (Fujimori and Sato, 2015; Marcin, 2008).

Furthermore, the findings underscore the influence of institutional quality on the productivity gap; therefore, improving the institutional quality at the provincial level might also help reduce the productivity gap between foreign-owned and domestic firms. Local institutional quality has been improved over the years; however, issues such as corruption and bureaucracy remain as barriers to enhancing firm productivity (Ha et al., 2023). Policymakers should prioritize efforts to enhance the business environment by reducing bureaucratic hurdles, improving contract enforcement and ensuring regulatory transparency. Creating competitive local business environments through investment-friendly policies and infrastructure development will help build a more transparent, dynamic and inclusive business environment that supports the growth and competitiveness of domestic firms while reducing the productivity gap with foreign-owned firms. By providing a more favourable and predictable regulatory framework, Viet Nam can attract higher-quality FDI, and this, in turn, can positively affect domestic firms by creating a more conducive ecosystem for knowledge spillovers and collaboration.

Acknowledging the significant productivity disparities evident at the 50th and 75th percentiles, policymakers must prioritize the enhancement of support mechanisms for domestic firms, especially those situated at the median and high tiers. Policies that enhance labour productivity or foster linkages between foreign-owned and local firms, such as technology transfer platforms to connect domestic firms with foreign partners and mentorship programmes in which successful firms share their knowledge and best practices with smaller enterprises, should focus on firms in the median and high quantiles. Narrowing the productivity gap at the median and high levels promotes inclusivity by creating opportunities for a broader spectrum of firms to thrive. This fosters a more equitable distribution of wealth and resources, ultimately strengthening social cohesion and stability.

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Appendix table
Correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. TFP	1												
2. Market share	0.171	1											
3. Age	0.190	0.082	1										
4. Size	0.394	0.181	0.313	1									
5. Labour productivity	0.631	0.144	0.159	0.238	1								
6. ROA	0.019	0.003	0.003	0.003	0.028	1							
7. Export	0.313	0.168	0.155	0.630	0.234	0.001	1						
8. PCI	0.168	0.028	0.089	-0.007	0.194	0.002	0.026	1					
9. Entry cost	-0.044	-0.016	-0.005	-0.030	-0.045	-0.002	-0.018	-0.225	1				
10. Land access	0.023	0.014	-0.034	0.042	-0.003	0.000	0.066	0.224	0.041	1			
11. Policy bias	0.051	0.020	0.019	0.083	0.032	0.000	0.089	0.343	-0.397	0.349	1		
12. HHI	0.006	0.088	-0.006	-0.01	0.005	0.000	-0.007	0.012	-0.004	0.000	-0.007	1	
13. FDI share	0.209	0.122	0.000	0.442	0.243	0.006	0.535	0.051	-0.046	0.079	0.078	0.015	1

Source: Authors' calculations.
Note: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.