Assessing the impact of foreign ownership on firm performance by size: evidence from firms in developed and developing countries

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Foreign direct investment (FDI) flows are frequently credited with a wide range of benefits for recipient economies. This research investigates the impact mechanics of FDI by mapping the extent to which firms are owned by foreigners against their performance. Firms in both developed and developing countries are included in the study and the performance indicators used are growth in sales, employment and labour productivity. Based on data from more than 80,000 firms during the period 2010 to 2019, this research is unique because it compares the performance of foreign-owned and domestic firms of different sizes. While the preliminary results show foreign ownership overall does give firms an edge on performance, there is no consistent evidence that this is so by firm size. However, across all developing regions, the study consistently finds that foreign ownership has a positive impact on the sales and productivity growth of micro-size firms. This calls for more research on and policy experimentation with outward-oriented and innovative start-ups.

Keywords: FDI, firm growth, foreign direct investment, productivity, small and medium-sized enterprises, SME

1. Introduction

Over the past three decades, the convergence of distinct economic, technological and policy factors caused international production to enter an era of rapid growth. These factors have fundamentally transformed the way in which firms across industries operate, how they distribute value addition across geographically dispersed locations, and how they apportion activities to actors along their value chains. As a consequence, trade and foreign direct investment (FDI) have grown significantly faster than gross domestic product (GDP) and global value chains (GVCs) have become the dominant forces in a highly globalized economy. FDI flows, despite having slowed down in recent years, still amount to $1.3 trillion globally.

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As such, they are a crucial source of financing and enablers of industrialization, economic diversification and structural transformation especially in developing countries, which have increased their share of global FDI to 54 per cent in 2019 – a record level (UNCTAD, 2019). Similarly, the geographical spread of FDI stock, defined as the number of countries that account for 90 per cent of global FDI flows has been increasing steadily (UNCTAD, 2020), indicating that more and more countries are becoming important players in the global FDI and international production landscape.

Multinational enterprises (MNEs) occupy a pivotal position in the global economy as demonstrated by the high share of sales that MNEs' foreign affiliates have in total global trade. Despite the rapid growth of FDI, a large part of the literature on FDI is focused on the perspective of investing MNEs, with limited research on the performance differentials between foreign affiliates and domestic enterprises as well as between firms with minority foreign ownership and domestic enterprises. In particular, scant attention is paid to how firms with foreign ownership or participation differ in performance from domestic firms in developing countries. As the promotion of FDI has become an almost universal policy objective at both national and regional levels, there is a need to better understand the performance advantages firms with foreign ownership or participation enjoy, if any, compared to domestic firms, in order to craft the most effective policies at the firm, regional and national levels.

The aim of this paper is to expand knowledge about FDI and private sector development. The paper explores the specific angle of the effect of foreign ownership on firm performance, using three indicators: annual employment growth, annual real sales growth and annual labour productivity growth. In addition, the paper explores the impact of FDI, how it varies by firm size and how the results compare by region. By impact of FDI, this paper means to compare foreign affiliates and firms with minority foreign participation with domestic firms, and not the same firms before and after receiving FDI. Although the analysis shows that in general, foreign ownership and participation in firms are associated with performance advantages compared to domestic firms, the results vary, with the positive impact of FDI on firm performance being more pronounced in certain regions and for certain type of firms. For example, large firms that received FDI showed faster employment growth than domestic firms but the differential impact was more pronounced in the transition economies of Eastern Europe and Central Asia. Similarly, there was strong evidence that foreign owned micro-sized firms outperformed domestically-owned micro-sized firms in both employment growth and productivity but the correlation was stronger in developing economies, including Africa, Asia and the Pacific and Latin America and the Caribbean. The clearest evidence of the positive impact of FDI on firm performance was seen when analysing the impact of increasing share of foreign ownership in a linear form with performance for which there was a significant correlation across all the three performance indicators.

The rest of the paper proceeds as follows: section 2 provides a brief literature review, section 3 presents data and methodology, in section 4 the empirical findings are presented, while section 5 concludes and suggests policy recommendations.

2. Literature review

Considering the importance of FDI flows at the macro level, there have been a number of studies to assess the impact of foreign ownership on firms at the micro level in both developed and developing countries. Although earlier literature on this subject focused more on the former, there is a growing stream of research in this field that includes developing countries too. Broadly, the literature points towards a positive association between foreign ownership and firm performance, both in developed and developing countries. However, a deeper investigation especially at more recent studies, shows that the literature is not completely unanimous in this regard. Not only is there some evidence that foreign ownership does not translate into substantial improvements in firm performance, there is even research that indicates the opposite. Moreover, some studies paint a mixed picture where the positive association between foreign ownership and firm performance is limited to certain select measures of firm performance or contingent upon specific conditions.

Of the literature that suggest a positive correlation between foreign ownership and firm performance, there are a variety of studies from both developed and developing countries. For instance, Willmore (1986) compared 282 pairs of foreign and domestically-owned Brazilian firms, using information about their sales and their four-digit manufacturing industry classification. He observed large differences between these firms across a diverse range of performance indicators, including that foreign-owned firms had a higher ratio of value added to outputs, greater exports, higher labour productivity and greater capital intensity. Bentivogli and Mirenda (2017) tested the foreign ownership premium by comparing Italian firms with and without foreign ownership using propensity score matching methodology with panel data. Their results demonstrated a premium for the size, profitability, and financial soundness of firms with foreign ownership which increased over time, was concentrated in the service sector, but disappeared if the foreign investor was based in a fiscal haven. Certain studies have showed a positive correlation between foreign ownership and firm performance but only in terms of particular indicators. For example, Gunduz and Totaglu (2003) conducted a comparison of group-affiliated and independent firms in Turkey. As part of this study, they also compared the financial performance of foreign-owned firms and domestic firms. With a one-way analysis of variance (ANOVA) test confirmed by a non-parametric test, they were able to demonstrate that foreign-owned firms performed significantly better than local firms but only in terms of return on assets and not with other financial indicators.

Majumdar and Chhibber (1999) examined the influence of foreign ownership on the performance of firms in India, measured by return on sales and return on investment. Their results showed that firms with foreign ownership performed better than local ones when controlled for a variety of firm and environment-specific factors. However, these results only became apparent when ownership levels were 51 per cent or higher, and thereby meant foreign owners had unambiguous management control. On the other hand, Gurbuz and Aybars (2010) studied the financial performance of firms according to degree of foreign ownership in Turkey and found the opposite result. They concluded that foreign ownership improved firm performance up to a certain level, beyond which additional foreign ownership did not add to firm profitability, and for some indicators could actually be detrimental.

Bentivogli and Mirenda (2017) outlined two sets of mechanics prevalent in the literature that explain the performance advantages foreign-owned firms have over local firms. These include intra-sectoral heterogeneity in productivity between firms that engage in FDI and those that do not. Intra-sectoral heterogeneity in productivity entails existing productivity and performance advantages that some firms have over others in the same sector. The rationale is that only highly productive firms can afford to engage in foreign investment, therefore the transfer of technology, skills and capital from these firms will have a positive effect on the firms that they invest in. The other stream highlights the ex-ante selection bias of investors. Put simply, foreign investors only choose well-performing firms to invest in, so the superior performance can be attributed to selection bias (for example, Guadalupe et al., 2012).

As mentioned earlier there is also considerable research that indicates a negative or neutral relationship between foreign ownership and firm performance, especially in developing countries, For example, Amin and Hamdan (2018) evaluated the relationship between ownership structure and firm performance measured by return on assets in 171 Saudi firms from all sectors between 2013 and 2014. They concluded that foreign ownership had a negative and statistically significant relationship with firm performance. Mihai (2013) investigated the relationship between foreign ownership and firm performance in Romania using data from 261 manufacturing companies. Firm performance was proxied by return on assets, return on equity and return on sales. Linear regression analysis showed that the link between foreign ownership and firm performance was not significant.

Considering the wide array of results distilled from studies analysing the effects of foreign ownership and firm performance, the purpose of this study is to shed further light on this issue from the perspective of both developed and developing countries. To our knowledge, no study has looked at the impact of foreign ownership on the performance of firms of different sizes. Our methodology, by looking at small (fewer than 20 employees), medium-sized (20 to 99 employees) and large (more

than 100 employees) firms takes the important aspect of firm size into account. In addition, selecting firms for analysis based on propensity score matching aims to eliminate extraneous factors that might affect the analysis. It is hoped that not only will this study add to the existing literature but also add clarity in the context of both developed and developing countries on how foreign ownership affects the performance of firms of different sizes. Based on our results, a few practical guidelines for policymakers are derived in terms of promoting FDI openness and developing targeted FDI promotion policies, issues which are likely to be of paramount importance in the post-COVID recovery phase of the global economy.

3. Data and methodology

Our preliminary empirical strategy is to employ the ordinary least square estimator over a sample of pooled cross-country firm-level data from 144 countries in the period between 2010 and 2019 with country, location (within-country), industry and year fixed effects and clustered standard errors. In addition, regional and country-level estimations are conducted following the same specification with industry and location (within-country) fixed effects. Specifically, the following empirical specification is estimated:

$$\theta_i = \alpha + \beta_1 \text{foreign}_i + \beta_2 \text{size}_i + \beta_3 \text{foreign}_i \times \text{size}_i + \beta X_i + \mu_i + \gamma_i + \varepsilon_i \quad (1)$$

where θ_i represents three firm performance indicators including real annual growth in employment, sales and labour productivity in firm i. All performance variables are constructed in annual average terms covering the last fiscal year completed and a previous period. Inevitably, some observations are lost owing to missing information from the previous period, often three fiscal years before the survey. *Foreign* represents the shares of firms owned by foreigners and is measured by three alternative proxies. The first measure captures majority ownership with a dummy variable that equals 1, if the share of firms owned by foreigner is over 50 per cent and 0 otherwise. Second measure captures participation with a dummy variable that equals 1 if the share is over 10 per cent and 0 otherwise. Finally, the share of foreign ownership is used as a continuous variable ranging from 0 to 100 per cent. *Size* represents a set of dummy variables proxying the size of the firm including small, medium and large following the definitions adopted by the Enterprise Surveys with small firms having five to 19 employees, medium-sized firms having 20 to 99 employees and large firms having over 100 employees. Our main variable of interest is the interaction between foreign and size variables, which captures the impact of foreign ownership on firm performance by size. When foreign ownership is measured in continuous form, firm size enters numerically and both measures enter the equation in quadratic form. X is a matrix of standard control variables, including firm age, exporter status, active credit line, having a website and,

finally, industry, country and year dummies. Given the stratified random sampling with stratification based on sector of activity, firm size and geographical location, equation 1 is estimated with weights following Friesen and Konstantin (2019).

The baseline strategy cannot establish causality because of endogeneity problems. The main variable of interest – that is, the extent of foreign participation in firm ownership – is a highly strategic variable, far from exogenous. There is also room for reverse causality between foreign ownership and firm performance. The cross-sectional nature of data employed unfortunately cannot control for time-invariant firm-specific factors exposing the baseline results to omitted variable bias. In an effort to limit the threats imposed by these issues, we also employ propensity score matching to compare firms that are similar on observable characteristics and estimate the average treatment effect on the treated, using several matching algorithms following Caliendo and Kopeinig (2008).

We expect that foreign ownership will have a positive impact on all performance indicators. This could be through various channels. Foreign ownership can lower financial constraint of domestic firms, improve their market access through global value chains and also expose them to higher levels of technology, thereby improving firm productivity and performance. Since small and medium-sized enterprises face more significant challenges on this score, we also expect that foreign ownership will improve the firm performance of small and medium-sized enterprises relative to large enterprises.

Our data source is the Enterprise Surveys collected by the World Bank across the developed and developing world between 2010 and 2019, which yields a sample of over 80,000 formal enterprises in 144 countries. Regional coverage of the sample is as follows: there are 47 countries in Africa, 32 countries in Asia, 31 countries in Latin America and the Caribbean and 17 countries in Europe. In addition, there are 17 countries classified as transition economies of Eastern Europe and Central Asia (See Table A4 in Appendix). An important limitation of this study is that the surveys only capture formal enterprises in the non-agricultural urban economy. On average, over 600 firms per country are surveyed, albeit with significant variation, with only 65 firms surveyed in Papua New Guinea at a minimum and 9,281 firms surveyed in India at a maximum. Table 1 below presents the descriptive statistics pertaining to the main variables used in the estimation.

In our sample, around 3.1 per cent of firms report that over 50 per cent of their shares are held by foreigners. Firms in Africa lead the way with 6.5 per cent of firms reporting foreign ownership followed by Latin America and the Caribbean at 4.2 per cent. In Asia and the Pacific region and among transition economies, around 2 per cent of firms are foreign owned while in Europe about 1.5 per cent of firms are owned by foreigners. Lowering the threshold to 10 per cent to capture foreign participation, there is a slight increase in the share of firms with foreign participation.

The regional pattern remains the same with 11 per cent of firms in Africa having foreign participation. Two-thirds of our sample are small-sized enterprises employing fewer than 20 people, while 6 per cent are large, employing over 100 people. In Africa and Asia and the Pacific some 60 per cent of firms are small while in Latin America and the Caribbean this figure increases to 65 per cent and reaches 70 per cent and 82 per cent in transition economies and Europe, respectively. Firms in our sample are well established with an average 17 years in operation. One-third have a line of credit or a loan from a financial institution. About half of the firms operate

Table 1 Descriptive statistics

Variable	N	Mean	Min	Max
Annual employment growth (%)	61,528	4.358	-100	100
Annual real sales growth (%)	73,386	2.472	-100	100
Annual labour productivity growth (%)	59,628	-1.668	-100	100
Foreign owned (>50%)	79,990	0.031	0	1
Foreign participation (<10%)	79,958	0.045	0	1
Foreign share (%)	79,915	3.416	0	100
Small	81,060	0.662	0	1
Medium	81,060	0.262	0	1
Large	81,060	0.076	0	1
Manufacturing	80,879	0.381	0	1
Construction	80,879	0.101	0	1
Wholesale and retail trade	80,879	0.374	0	1
Hotels and restaurants	80,879	0.060	0	1
Transport, storage and communication	80,879	0.056	0	1
Real estate, renting and business activities	80,879	0.000	0	1
Firm age	79,593	17.3	0	340
Existing loan	78,303	0.336	0	1
Exporter	79,496	0.010	0	1
Having a website	85,625	0.539	0	1
Africa	81,060	0.255	0	1
Asia and the Pacific	81,060	0.275	0	1
Europe (developed)	81,060	0.104	0	1
Latin America and the Caribbean	81,060	0.204	0	1
Transition economies	81,060	0.164	0	1

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Sampling weights are used to account for stratified random sampling methodology.

in the services sector, particularly in wholesale and retail trade. About 10 per cent of firms are categorized as exporters, while more than half use information and telecommunication technologies.

4. Empirical results

4.1 Main findings

Table 2 below presents the global regression results from estimating equation (1) for three performance indicators with a baseline regression with only key variables of interest followed by a second regression that includes a variety of control variables. Before interpreting the results, it should be noted that, given the configuration of variables and their interactions, the coefficient on foreign ownership variable captures firm performance among foreign-owned small firms relative to domestically-owned small firms. Medium and large capture the performance of medium-sized and large domestic firms relative to small domestic firms. Interaction variables capture the differential impact of foreign ownership for medium and large firms. However, calculating the relative performance of foreign medium firms relative to benchmark category (domestic small) requires the sum of the coefficients associated with foreign, medium and the relevant interaction term. The sample applies to foreign large firms.

The first two columns in Table 2 focus on real annual average sales growth. Although the results in both specifications, with and without controls, indicate some positive association between foreign ownership and firm performance, the association cannot be statistically verified and is can vary substantially by context, in particular by different firm types. Older firms report lower sales growth at a decreasing pace while firms that communicate with their clients over their websites show some evidence of positive sales growth. Interestingly, having a loan or exporting is not significantly associated with sales growth even though the association is positive, as expected.

In the next two columns, we focus on annual employment growth and find that foreign-owned small firms are not significantly different from domestic small firms in terms of annual employment growth. Domestic medium-sized and large firms, however, respectively grew approximately 1.5 and 1.4 percentage points faster than domestic small-size firms. There is no other statistically significant differential in employment growth. Older firms experienced faster employment growth than younger firms, but at a varied pace, as this growth tapers off when they get older still. Having a loan is positively associated with annual employment growth whereby firms with credit grew on average 0.7 percentage points faster than firms without credit.

Our third performance indicator is annual labour productivity growth between the last fiscal period and three fiscal years before, where labour productivity is sales divided by the number of full-time employees. Consistent with the first four columns, we observe that that although there is some positive association between foreign ownership and labor productivity growth, the difference is limited to foreign small and medium firms and is not at a statistically verifiable level across the board. There is also some evidence for growth differentials in labour productivity between domestic medium-sized and domestic small firms. Notably, we lose the maximum number of observations in the last two columns where almost one-third of the sample has missing data.

Table 2 Foreign ownership and firm size on performance

	Sales growth		Employment growth		Productivity growth	
Foreign (>50%)	1.543	1.110	0.299	-0.051	0.645	0.371
	(1.729)	(1.770)	(1.271)	(1.280)	(2.283)	(2.369)
Medium	-0.648	-0.651	1.182**	1.465**	-2.132***	-2.215***
	(1.139)	(1.290)	(0.563)	(0.623)	(0.563)	(0.744)
Large	0.357	0.679	0.830	1.442**	-0.825	-0.926
	(0.594)	(0.610)	(0.549)	(0.666)	(0.716)	(0.769)
Foreign x medium	0.246	-0.025	-1.856	-1.929	2.374	2.554
	(3.435)	(3.370)	(1.565)	(1.923)	(4.027)	(4.336)
Foreign x large	-1.890	-2.731	-1.090	-1.299	-0.332	-0.986
	(1.820)	(1.778)	(2.555)	(2.655)	(2.893)	(3.143)
Age		-0.212***		-0.234***		-0.004
		(0.046)		(0.039)		(0.048)
Age-squared		0.001***		0.002***		0.000
		(0.000)		(0.000)		(0.000)
Exporter		0.195		-0.276		0.223
		(0.730)		(0.402)		(0.563)
Line of credit		0.084		0.734**		-0.765
		(0.662)		(0.300)		(0.874)
Website		1.061*		0.042		1.090
		(0.567)		(0.474)		(0.754)
Observations	**60,940**	**58,824**	**72,550**	**69,023**	**59,146**	**57,252**
R-squared	**0.066**	**0.071**	**0.054**	**0.068**	**0.057**	**0.056**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

We complement these global results with regional level regressions, paying specific attention to developing regions[1]. In Africa, we find that large domestic firms record significantly faster employment growth than domestic SMEs. We also observe that domestic small-sized enterprises exhibit faster annual employment growth relative to foreign small-sized enterprises. The regional findings echo global results for domestic firms, with medium-sized and large firms recording faster employment growth than small firms. We find no evidence of a differential in labour productivity between foreign and domestic firms. In Asia, we find significantly slower growth in annual employment by foreign medium-sized and large firms. There is some evidence for slower productivity growth among domestic medium-sized firms relative to domestic small firms. In Latin America and the Caribbean, we find foreign small firms surpassing domestic small firms in sales growth. Notably, we find differentials among foreign firms with small firms outperforming large foreign firms in sales growth. In annual employment growth, only significant differentials are found among domestic firms similar to the global results. In labour productivity, again domestic medium-sized and large firms underperform relative to domestic small firms. Among transition economies in Eastern Europe and Central Asia, we find similar results in employment growth but also observe some evidence of domestic small-sized firms outperforming small foreign firms, as well as domestic medium-sized and large firms in labour productivity growth.

Table 3 reports the main results from the second measure of foreign direct investment where firms with foreign participation in their shares above 10 percent are under investigation. On all three performance indicators, the differentials are quantitatively and qualitatively very similar to Table 2. Notably, we observe a significant positive differential in labour productivity growth between domestic small and medium-sized enterprises.

Focusing on developing regions, we find strong evidence for larger differentials in employment growth among domestic medium-sized and large firms in Africa relative to domestic small-sized firms. In Asia, we find that small-sized firms with foreign participation exhibit lower sales growth while medium-sized firms with foreign participation experience higher sales growth. However, small-sized firms with foreign participation recorded larger growth in annual employment than domestic small-sized firms. Among domestic firms, only large firms outperform small firms in annual employment growth while among firms with foreign participation, small-sized firms outperform medium-sized and large firms. Consistent with these results, we observe that labour productivity growth is slower among small-sized firms with foreign participation but higher among medium-sized firms with foreign

[1] Our global sample includes a few developed economies in Europe where we do not find any significant differentials.

Table 3 Foreign participation, firm size and performance

	Sales growth		Employment growth		Productivity growth	
Foreign (>10%)	0.067	-0.219	1.134	0.946	-1.627	-1.779
	(1.143)	(1.253)	(1.021)	(1.035)	(1.808)	(1.943)
Medium	-0.902	-0.898	1.129*	1.443**	-2.321***	-2.448***
	(1.184)	(1.324)	(0.573)	(0.620)	(0.564)	(0.763)
Large	0.261	0.579	0.888	1.511**	-1.004	-1.095
	(0.521)	(0.578)	(0.556)	(0.676)	(0.710)	(0.777)
Foreign x medium	4.725	4.779	-0.734	-1.383	5.692*	6.728*
	(2.949)	(2.977)	(0.988)	(1.464)	(3.227)	(4.021)
Foreign x large	0.247	-0.079	-1.911	-2.080	2.834	2.346
	(1.904)	(1.489)	(1.839)	(1.971)	(2.414)	(2.522)
Age		-0.211***		-0.233***		-0.004
		(0.046)		(0.039)		(0.049)
Age-squared		0.001***		0.002***		0.000
		(0.000)		(0.000)		(0.000)
Exporter		0.056		-0.352		0.177
		(0.713)		(0.385)		(0.560)
Line of credit		0.093		0.750**		-0.771
		(0.649)		(0.298)		(0.857)
Website		1.062*		0.032		1.105
		(0.570)		(0.477)		(0.758)
Observations	**60,932**	**58,819**	**72,519**	**68,998**	**59,139**	**57,247**
R-squared	**0.066**	**0.071**	**0.054**	**0.068**	**0.058**	**0.057**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

participation. In Latin America and the Caribbean, there is some evidence of relatively higher sales growth among small-sized firms with foreign participation relative to domestic small-sized firms. Large firms with foreign participation underperform relative to domestic small-sized firms. Among domestic firms, medium-sized and large firms grow faster in annual employment but slower in labour productivity relative to small-sized firms. Among transition economies, a notable result is that large firms with foreign participation exhibit strong growth performance in annual employment growth.

Finally, Table 4 below reports our main results from the last proxy of foreign direct investment in firm performance by firm size. As noted earlier, the percentage of firm shares owned by foreign firms enter in continuous form along with the number of full-time employees. To capture non-linearities, both variables enter in quadratic form along with an interaction variable in linear form. We find that as the shares owned by foreigners increase, there is a positive impact on all three indicators of performance including sales, employment and labor productivity growth. For every 1 per cent increase in foreign shares, we find a 0.13 percentage point increase in sales growth and 0.9 percentage point increase in employment growth. In other words, switching from no FDI to minimum FDI could boost sales and employment growth by around 1 percentage points. Given the average annual real sales and employment growth in our sample at below 5 per cent, the results hint at a substantial increase in firm performance when there is foreign participation. The negative coefficient on the quadratic form indicate growth at a slower rate by shares. Similarly, there is a positive correlation between increasing foreign share and labour productivity growth, although the magnitude is lower than the other two variables. Interestingly, firm size has no significant association with any of the performance indicators along with the interaction term. We interpret this finding as potentially positive for SMEs if they can attract FDI.

Our regional analysis finds that foreign shares are positively and significantly associated with sales growth in Africa, sales and employment growth in Latin America and the Caribbean, and employment growth among transition economies. We often observe that the quadratic form of foreign shares has a negative sign hinting at a slowdown after a certain share is reached. Firm size on the other hand is positively associated with sales and employment growth in Africa and among transition economies. In Latin America, as firm size increases so does employment growth but labour productivity falls. The interaction terms between size and foreign shares is insignificant across all regions and performance indicators.

The results presented thus far indicate that although in general there is a positive association between FDI and firm performance, the magnitude of the correlation varies significantly across regions and firm types. However, the positive results are more evident across the board when looking at increasing shares of foreign ownership and how they impact firm performance.

Table 4 Foreign shares and firm performance by size

	Sales growth		Employment growth		Productivity growth	
Foreign share (%)	0.141**	0.133**	0.118**	0.090***	0.027	0.062
	(0.057)	(0.056)	(0.050)	(0.029)	(0.045)	(0.041)
Firm size	-0.000	0.000	0.001	0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Foreign x size	-0.000**	-0.000	-0.000**	-0.000**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Foreign share)-squared	-0.001**	-0.001**	-0.001**	-0.001***	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Size-squared	0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm age		-0.214***		-0.229***		-0.011
		(0.047)		(0.040)		(0.048)
Firm-age-squared		0.002***		0.001***		0.000
		(0.000)		(0.000)		(0.000)
Exported		0.034		-0.215		-0.001
		(0.720)		(0.405)		(0.565)
Credit		0.013		0.864***		-0.972
		(0.613)		(0.271)		(0.805)
Website		1.008*		0.186		0.845
		(0.524)		(0.418)		(0.689)
Observations	**60,739**	**58,686**	**72,486**	**68,993**	**59,112**	**57,247**
R-squared	**0.066**	**0.071**	**0.053**	**0.067**	**0.056**	**0.055**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

4.2 Alternative specifications and robustness checks

We subject our main results to several robustness checks with alternative samples and specifications. In the next four sub-sections we report the main highlights.

4.2.1 Restricting the sample by firm size

Across many developing countries, SMEs are defined partly by the number of their employees which is expected to be under 250. When we restrict our sample to fewer than 250 employees, we maintain about 90% of the firms in the sample. Our main findings are robust to this sample restriction, both quantitatively and

qualitatively. In the specification with foreign ownership, domestic medium-sized and large firms still growth faster than small domestic firms, while they record slower labour productivity growth. Foreign participation plays a crucial role for labour productivity growth for medium-sized enterprises which experience much faster growth in productivity compared to small firms. Foreign shares are again positively and significantly associated with sales and employment growth, albeit at a larger quantity in the former, reaching 0.16 percentage points for a 1 per cent increase in foreign shares. We also find that in this restricted sample annual labour productivity growth is accelerated by 0.10 percentage points following an increase in foreign shares by 1 per cent (See Table A1 in the Appendix). While firm size is positively associated with annual employment growth, for labour productivity growth it is negative. There is again no evidence of a significant differential impact of foreign share by different firm sizes.

4.2.2 Re-defining the size dummies

Next, we re-define size dummies leveraging the continuous measure of firm size and add micro-enterprises in our equation. When we focus on foreign ownership, we find significant results on all types of firms. Specifically, foreign-owned micro-sized firms grew employment by 22 percentage points less than domestic microenterprises, while domestic small, medium and large enterprises grew employment by respectively 5.2, 6.5 and 6.5 percentage points faster than domestic microenterprises (See Table A2 in Appendix). While we observe significant productivity differentials – up to 14 percentage points – among domestic firms in favour of domestic micro firms up to 14 percentage points, there is no evidence of any productivity differentials among foreign-owned firms. This is an interesting result that could be related to foreign ownership levelling the productivity differentials across differently sized firms. We find no significant deviations from this picture when we employ the foreign participation proxy.

In our regional estimates, we find that in Africa foreign-owned micro firms exhibited substantially faster annual real sales growth and labour productivity growth than their domestic equivalents – by up to 40 percentage points. As firm size increases, labour productivity growth decreases for both domestic and foreign firms. In Asia, foreign small-sized firms grew faster than foreign micro enterprises. In terms of labour productivity, foreign microenterprises grew 2.7 percentage points faster than domestic micro firms. Among domestic firms, labour productivity growth increases by size while the opposite holds among foreign-owned firms. In Latin America, domestic SMEs and large enterprises are growing employment faster than domestic microenterprises. Foreign microenterprises grew 12 percentage points faster than domestic micro firms. Among transition economies, foreign microenterprises are the worst performers, both in relation to larger foreign firms and all domestic firms.

4.2.3 Widening the sample with multiple years from countries with available data

Between 2010 and 2019, Enterprise Surveys were collected multiple times in several countries. By including those additional years in our sample, we bring an additional 30,000 firms to our sample. Our global estimates remain robust regardless of the sample expansion. In employment growth, domestic medium-sized and large firms grew about 1.7 and 1.9 percentage points faster, respectively, than domestic small-sized firms. In terms of productivity growth, we see that domestic medium-sized firms grew 2.2 percentage points slower than domestic small firms (See Table A3 in Appendix). In Africa and among transition economies, we observe that foreign-owned small-sized firms grew 3.7 and 8.7 percentage points slower, respectively, than domestic small-sized firms in sales growth. In Asia and Latin America and the Caribbean, however, foreign-owned small firms grew 4.2 and 7.6 percentage points faster, respectively, than domestic small-sized firms. We find similar results for global estimates in employment and productivity growth with significant differentials in the same direction among domestic firms.

Re-estimating the equation in this new sample with foreign participation does not qualitatively change our results at the global level although some differences show up at regional level. In foreign shares, we again find a positive association – by similar margins – between the extent of foreign participation and sales and employment growth. In employment growth, the positive impact of foreign participation decreases as the firm size increases. These findings are largely replicated across regions.

Table 5 Summary of results

Type	Size	Performance indicators: Annual employment growth	Annual real sales growth	Annual labour productivity growth
Foreign ownership	Micro	Negative globally, especially in AP and among TEs	Positive, only in Africa	Positive in Africa, AP and in LAC
	Small	Negative, only in Africa	Positive, only in LAC	Negative, only among transition economies
	Medium	Negative, only in Asia	Negative, only in LAC	No significant difference
	Large	Negative, only in Asia	No significant difference	No significant difference
Foreign participation	Micro	Negative globally, especially among TE	Positive, only in Africa	Positive, only in Africa
	Small	Negative (weakly) in Africa but positive (weakly) in AP	Positive in LAC	Negative in AP
	Medium	Negative in AP	Positive in AP	Positive globally, especially in AP
	Large	Negative in AP	Negative in LAC	Positive in AP
Foreign share	All	*Positive:* 1 per cent increase in foreign ownership accelerates employment growth by 0.9 percentage points	*Positive:* 1 per cent increase in foreign owership accelerates sales growth by 0.13 percentage points	*Positive:* 1 per cent increase in foreign ownership accelerates labour productivity growth by 0.06 percentage points compared to the sample mean of -1.6 per cent annual change.

Source: The authors
Note: The benchmark category is small domestic firms, except in the case of micro firms where the benchmark category is domestic micro firms. LAC refers to Latin America and the Caribbean. AP refers to Asia and the Pacifc. TE refers to transition economies in Europe and Central Asia. Regional estimates are available upon request.

4.2.4 Propensity score matching with firms with fewer than 250 employees

Following Caliendo and Kopeinig (2008), we employ a different econometric specification to improve the identification of the relationship between foreign direct investment and firm performance. With an identification strategy of selection on observables, propensity score matching offers an opportunity to compare firms that are similar across several observable characteristics and estimate the average treatment effect on the treated, where treated refers to foreign-owned firms or firms with foreign participation of at least 10 per cent. We impose common support and employ three alternative matching algorithms including nearest neighbour, fifth neighbour and radius matching.

We find qualitatively and quantitatively similar results across different matching algorithms. First, we find no evidence of statistically significant differentials in annual real sales growth. Second, and consistent with our earlier results, we find that foreign firms experience slower growth in employment than domestic firms. There is an important distinction here between foreign ownership and foreign participation. While the employment growth differential is greater than 1 percentage point when foreign-owned firms (3.9 per cent) are compared to similarly sized domestic firms (5.1 per cent), the magnitude of the differential is reduced by half if we compare firms with foreign participation of at least 10 per cent (4.3 per cent) and domestic firms (4.9 per cent). Finally, we find some weak evidence for labour productivity differentials between foreign and domestic firms in favour of the former group. While both types of firms experience negative annual labour productivity growth, the figure for foreign firms is more tempered. Interestingly, the differential in negative productivity growth is twofold when foreign-owned firms (-1.45 per cent) are compared with domestic firms (-2.9 per cent) and reaches threefold when firms with at least 10 per cent foreign participation (-0.6 per cent) are compared with domestic firms (-1.8 per cent).

5. Conclusion and policy implications

In the last three decades, FDI flows have grown at a rate significantly higher than both global trade and GDP and have become one of the pivotal economic forces in developed and developing countries alike. Not only have FDI flows been instrumental for the transformation of international production but they have also made a central contribution to domestic production and consumption, especially in developing countries. However, FDI inflows do not necessarily translate into positive performance dividends compared to other modes of international production, including arms' length trade and non-equity modes. It is thus crucial for firms as well as policymakers in developing countries to be cognizant of how FDI affects firm performance and how the performance impact depends on firm characteristics, such as size. Although

the findings cannot be generalized, and there caveats as with any empirical study, there are some useful policy recommendations based on the results. For example, policymakers could tailor investment policies to specific firm's characteristics, while at the same time be cognizant of the specific dynamics – national or regional – that affect the interplay between FDI and firm performance. This research also identified future research areas that can advance insight into the effects of FDI and firm performance, including the specific channels through which the former affects the latter. These include, for example, analysing data on the performance of the same firms before and after receiving FDI as well as the specific considerations guiding the investment decisions of MNEs. Further research will delve into these critical areas with a specific focus on developing deeper and more targeted investment policy recommendations on innovation, market access and financial constraints. This is particularly relevant in the COVID-19 environment. While FDI is expected to decline sharply in the face of the pandemic, post-crisis recovery will largely dependent on foreign investment driving both international production and domestic economic activities.

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Appendix

Table A1. Alternative specification – firms with <250 employees (SMEs)

	Sales growth	Employment growth	Labour productivity growth
Foreign share (%)	0.159***	0.085**	0.094**
	(0.057)	(0.033)	(0.041)
Firm size	-0.034	0.064***	-0.094***
	(0.029)	(0.020)	(0.014)
Foreign x size	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
(Foreign share)-squared	-0.002***	-0.001***	-0.001*
	(0.001)	(0.000)	(0.000)
Size-squared	0.000	-0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Observations	**53,750**	**63,749**	**52,760**
R-squared	**0.073**	**0.069**	**0.059**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

Table A2. Alternative specification – redefining size dummies

	Sales growth	Employment growth	Productivity growth
Foreign (>50%)	9.038	-21.645**	18.173
	(20.271)	(8.826)	(16.404)
Small	-6.716	5.243***	-12.186***
	(5.977)	(1.752)	(4.363)
Medium	-7.368	6.538***	-14.228***
	(5.638)	(2.095)	(4.040)
Large	-6.003	6.543***	-12.958***
	(5.743)	(2.259)	(3.959)
Foreign x Small	20.895**	-8.151	-18.324
	(9.150)	(20.986)	(16.790)
Foreign x Medium	18.354**	-7.874	-15.248
	(8.961)	(20.361)	(16.611)
Foreign x Large	19.090**	-10.626	-18.810
	(9.189)	(20.479)	(16.589)
Observations	**72,550**	**58,691**	**57,252**
R-squared	**0.059**	**0.073**	**0.063**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

Table A3. Alternative specification – widening the sample size

	Sales growth	Employment growth	Labour productivity growth
Foreign (>50%)	1.188	0.348	0.238
	(1.582)	(1.049)	(1.965)
Medium	-0.428	1.733***	-2.229***
	(1.163)	(0.620)	(0.653)
Large	0.887	1.848***	-1.212
	(0.581)	(0.703)	(0.737)
Foreign x Medium	-0.419	-2.229	2.290
	(3.048)	(1.599)	(3.703)
Foreign x Large	2.065	-2.101	4.401
	(4.416)	(1.852)	(4.276)
Observations	**77,178**	**94,103**	**75,040**
R-squared	**0.073**	**0.064**	**0.057**

Source: Enterprise Surveys. Enterprise Surveys (http://www.enterprisesurveys.org), The World Bank
Note: Industry and country dummies included. Standard errors clustered at country level. *** p<0.01, ** p<0.05, * p<0.1

Table A4. List of economies

Africa	Asia and the Pacific	Latin America and the Caribbean	Europe	Transition economies
Angola	Afghanistan	Antigua and Barbuda	Bulgaria	Albania
Benin	Bangladesh	Argentina	Croatia	Armenia
Botswana	Bhutan	Bahamas	Cyprus	Azerbaijan
Burkina Faso	Cambodia	Barbados	Czech Republic	Belarus
Burundi	China	Belize	Estonia	Bosnia and Herzegovina
Cameroon	Fiji	Bolivia	Greece	Georgia
Cape Verde	India	Brazil	Hungary	Kazakhstan
Central African Republic	Indonesia	Chile	Italy	Kyrgyz Republic
Chad	Iraq	Colombia	Latvia	Moldova
Congo, Republic	Israel	Costa Rica	Lithuania	Montenegro
Cote d'Ivoire	Jordan	Dominica	Malta	North Macedonia
Congo, Democratic Republic	Lao, PDR	Dominican Republic	Poland	Russia
Djibouti	Lebanon	Ecuador	Portugal	Serbia
Egypt	Malaysia	El Salvador	Romania	Tajikistan

Table A4. List of economies (Concluded)

Africa	Asia and the Pacific	Latin America and the Caribbean	Europe	Transition economies
Eritrea	Micronesia	Grenada	Slovak Republic	Ukraine
Eswatini	Mongolia	Guatemala	Slovenia	Uzbekistan
Ethiopia	Myanmar	Guyana	Sweden	
Gabon	Nepal	Honduras		
The Gambia	Pakistan	Jamaica		
Ghana	Papua New Guinea	Mexico		
Guinea	Philippines	Nicaragua		
Guinea-Bissau	Samoa	Panama		
Kenya	Solomon Islands	Paraguay		
Lesotho	Sri Lanka	Peru		
Liberia	Thailand	St. Kitts and Nevis		
Madagascar	Timor-Leste	St. Vincent and the Grenadines		
Malawi	Tonga	Suriname		
Mali	Turkey	Trinidad and Tobago		
Mauritania	Vanuatu	Uruguay		
Mauritius	Vietnam	Venezuela		
Morocco	West Bank and Gaza			
Mozambique	Yemen			
Namibia				
Niger				
Nigeria				
Rwanda				
Senegal				
Sierra Leone				
South Africa				
South Sudan				
Sudan				
Tanzania, Republic of				
Togo				
Tunisia				
Uganda				
Zambia				
Zimbabwe				