WPS8243

POLICY RESEARCH WORKING PAPER   8243

FDI Spillovers and High-Growth Firms in Developing Countries

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Trade and Competitiveness Global Practice Group
November 2017

Abstract

This paper evaluates the heterogeneous impact of spillovers from multinational corporations (MNCs) to domestic enterprises in the developing world. It empirically investigates two transmission channels of knowledge spillovers. First, direct contractual linkages between indigenous firms and MNCs. Second, indirect demonstration effects accrued by domestic firms by imitating foreign technologies either through observation or by hiring workers trained by MNCs. The paper focuses on the impact of spillovers on high-growth firms, which are enterprises with high job creation rates and, therefore, assumed to have high absorptive capacities. The paper also evaluates spillovers stemming from MNCs with different motivations to invest in developing countries. Employing a survey of around 71,000 firms across 50 sectors in 122 developing countries, the paper shows that high-growth firms internalize spillovers through both avenues and that contractual linkages are the most powerful transmission channel. FDI embedded in global value chains generates larger spillovers to high-growth domestic firms than investment that seeks to serve the host economy. There is no evidence that natural resource-seeking FDI generates spillovers. The results have important implications for policy design, as public funding in developing countries is often directed to support programs that seek to connect domestic suppliers with MNCs.

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José-Daniel Reyes[*]

1. Introduction

Foreign Direct Investment (FDI) enables economic growth, job creation, and poverty reduction. Countries that are more open to trade and investment tend to be more productive and grow faster (Dollar 1992, Harrison 1996, and Frankel and Romer 1999). Policymakers seek to attract FDI to create jobs, bring in cutting edge knowledge and technology, connect to global value chains, and diversify and upgrade their economies' production capabilities. The potential transmission of knowledge between foreign firms and local enterprises is an additional benefit of FDI that can improve the productivity of domestic enterprises and, therefore, make economic growth more inclusive.

The effects of Multinational Corporations (MNCs) on the host economy are therefore a crucial element in a country's development strategy. These FDI spillovers can be positive or negative, depending on whether local firms improve or worsen their performance due to the presence of MNCs. The reason for this ambiguity is that FDI brings two opposite forces to the market. On the one hand, it brings foreign technology and frontier knowledge that, if successfully transmitted to the local firms, can improve their productivity. On the other hand, foreign firms may compete with local incumbents in input and output markets and, therefore, have a pro-competitive effect that can negatively affect some firms. The balance between these two forces determines the overall effect of MNCs on individual local enterprises. At the sectoral level, tougher competition results in the efficient reallocation of resources from less productive to more productive firms, thereby increasing sectoral productivity over the long run. See Alfaro and Chen (forthcoming) and Fons-Rosen et al. (2017) for an empirical evaluation of FDI spillovers and the efficient reallocation of factors created by the pro-competitive effect.

This paper evaluates two main channels through which horizontal FDI spillovers can be accrued by indigenous firms in the developing world. First, contractual linkages between MNCs and local suppliers could entail a formal transmission of foreign firms' knowledge and practices that may help domestic suppliers to upgrade their technical and quality standards–the linkages channel.[1]

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[1] There are at least three other channels through which linkages can also increase the productivity of domestic firms: First, greater demand for intermediates produced by domestic suppliers can increase the possibilities for scale economies. Second, domestic suppliers may face incentives to improve product quality and increase efficiency, due to

Second, domestic firms can imitate foreign technologies or managerial practices either through observation or by hiring workers trained by the foreign company–the demonstration channel. [2] The analysis employs firm-level information from 122 developing economies across 50 sectors from the World Bank Enterprise Surveys (WBES) to construct sectoral measures of these transmission channels and relates them to the performance of indigenous enterprises operating in the sector. The proxy for the linkages channel is the average share of inputs that MNCs source domestically; the proxy for the demonstration channel is the share of MNCs' output in total sectoral output.

The absorptive capacity of domestic firms explains their ability to capture knowledge spillovers and endure competitive pressures. Absorptive capacity is the ability to recognize the value of new information, assimilate it, and apply it to improve production processes (Jimenez-Barrionuevo et al. 2011). Because absorptive capacity differs across firms and countries, I estimate FDI spillovers for the average domestic firm and for a subset of firms that accounts for a significant share of job creation in each economy. The distinctive characteristics of these enterprises, henceforth called high-growth firms, have been the subject of study both from the perspective of individual firms, interested in sales and revenue growth, and from the perspective of policymakers, interested in job creation and economic growth (Coad et al. 2014). Additionally, I estimate FDI spillovers transmitted through linkages and demonstration channels separately for six regions of the world and for the manufacturing and services sectors.

This paper recognizes that the different motivations of MNCs to invest in the developing world have different implications for FDI spillovers. I employ the typology proposed by Dunning (1993) and implemented empirically by Perea et al. (mimeo) to test whether FDI motivated by access to natural resources (natural resource-seeking), the size of the host market (market-seeking), or global value chains considerations (efficiency-seeking) generates different FDI spillovers to high-growth firms in developing countries. Spillovers steaming from different types of investment may differ not only because the linkages and demonstration channels vary, but also because competitive pressures are likely to be different.

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more stringent requirements from the foreign firms. Third, competition from other local firms for foreign consumers may also spur productivity upgrading. The analysis in this paper focuses on the knowledge diffusion impact of linkages.
[2] See Alfaro et al (2006), Alfaro and Chen (forthcoming), Lipsey (2004), Barba Navaretti and Venables (2004) and Alfaro and Rodriguez-Claire (2004) for an overview of the empirical literature about the channels of FDI spillovers.

I find that there is a large heterogeneity of FDI spillovers across local firms in the developing world. In line with the literature, an average firm does not capture horizontal FDI spillovers. It is primarily the local high-growth firms that internalize FDI spillovers. The most powerful transmission channel is contractual linkages between MNCs and high-growth firms.[3] The results indicate that, on average across countries and sectors, a one percentage point increase in the share of inputs sourced domestically by MNCs (the linkages channel) is associated with a 0.515 unit increase in the measure of sales growth for high-growth firms. A one percentage point increase in the share of sectoral output accounted for MNCs (the demonstration channel) is correlated with 0.12 unit increase in sales. Linkages are the more effective channel for FDI spillovers in all regions of the world, except in Europe and Central Asia, where the demonstration channel is larger, and in Sub-Saharan Africa, where I do not find evidence of FDI spillovers. Contractual linkages as a vehicle to transmit spillovers are quantitatively larger for manufacturing than for services. Demonstration effects are meaningful only for services and quantitatively smaller than linkages. Finally, I find that high-growth firms capture FDI spillovers via the linkages channel for each type of investment, except for natural resources-seeking FDI. The results indicate that efficiency-seeking FDI generates larger spillovers than market-seeking FDI, likely because the competitive pressure of this type of investment in the host economy is smaller.

This paper is related to three prominent strands in the literature. First, it combines differences in the absorptive capacities of domestic firms with two transmission channels of FDI spillovers to provide evidence of positive horizontal FDI spillovers. Second, it contributes to the literature on high-growth firms by identifying and characterizing high-growth firms systematically in a cross-country fashion and by providing evidence about the benefits that the presence of MNCs entails for these enterprises. Third, it offers the first evidence, to the best of my knowledge, about how spillovers vary across different types of investments.

From a policy perspective, developing countries are interested in enhancing the benefits of FDI to the local economy. The evidence presented here shows that linkages programs to connect high-potential local suppliers with foreign firms provide a means of achieving this goal. The design of programs that identify and connect high potential suppliers with MNCs seems critical to create FDI

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[3] These findings are in line with Damijan et al. (2013), who employs a set of 10 transition economies to find positive effects of horizontal spillovers only on large and high productivity domestic enterprises.

spillovers. Manufacturing sectors with MNCs operating within regional or global value chains are more prone to generate knowledge transmission to the host economy, but the automatic creation of domestic linkages may be hampered by market failures, such as information asymmetries, low scale, and quality constraints.

The remainder of the paper is structured as follows. The next section discusses the data and presents summary statistics on the set of high-growth firms and the transmission channels of FDI spillovers. Section 3 presents the empirical strategy and results. Section 4 discusses the robustness checks. Concluding remarks are offered in section 5.

2. Data and Descriptive Statistics

I employ the WBES to characterize firm growth, identify high-growth firms, and measure the existence of channels to promote FDI spillovers across the developing world. The WBES is a collection of comparable firm-level surveys of a representative sample of the economy's private sector. The dataset contains information for 71,000 firms in 122 developing economies. The complete list of countries and the years when each survey was conducted are shown in Annex 1.[4] The surveys provide basic characteristics of the firms and cover a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and firm-level performance measures. Crucially, the surveys ask firms about their employment in the previous fiscal year and three fiscal years before.

a. Identification and Characterization of High-Growth Firms

There are at least three issues that need to be considered when characterizing firm performance: i) the indicator of growth; (ii) the measure of growth; and (iii) the period under study. The indicator of growth refers to the variable in which growth is observed. The most commonly used indicators in the high-growth firms' literature are sales and number of employees (Daunfeldt et al. 2013). Because I am interested in high-growth firms' contribution to job creation, I use the number of permanent, full-time employees of the firm as our growth indicator.[5]

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[4] The raw WBESD includes information for around 125,000 firms in 139 countries, including various waves of surveys for many countries. For the purposes of this analysis, we retain the latest survey conducted in each country and only economies classified as low- and middle-income countries by the World Bank Group.

[5] Permanent, full-time employees are defined as all paid employees and managers that are contracted for a term of one or more fiscal years and/or have a guarantee renewal of their employment contract and that work a complete shift or more per day.

The number of possible indicators for measuring firm-level employment growth is ample. The two most basic approaches are the absolute and relative changes in the indicator of growth. The former examines the simple difference in employment between two points in time while the latter presents this difference relative to the initial size of the firm. These two measures can lead to different results. Alums (2002) and Daunfeldt et al. (2013) show that measures of absolute growth are biased towards larger firms, while measures of relative growth favor small firms. To reduce these biases, I employ a measure proposed by Davis et al. (1998) that uses absolute changes relative to the *average* size of the firm across the period considered in the study. The mid-point growth rate for firm i ($g_{i,t}$) is formally defined as follows:

$$g_{i,t} = \frac{emp_{i,t} - emp_{i,t-2}}{\frac{1}{2}(emp_{i,t-2} + emp_{i,t})} \tag{1}$$

where $emp_{i,t}$ refers to total number of permanent, full-time employees that firm *i* reports in year t. By construction, this growth rate is symmetric around zero and bounded between -2 and 2. It is also monotonically related to the conventional growth rate measure ($G_{i,t}$), and approximates it for small growth rates. The two growth measures are linked by the following identity: $G_t \approx \frac{2gr_t}{(2-gr_t)}$. The underlying statistical properties of this growth rate are discussed in detail in Törnqvist et at (1985).

The period under study in our analysis is two fiscal years. The surveys ask firms about total employment in the last fiscal year and three fiscal years before the questionnaire was administered.[6] Three- or four-year periods are used in most studies examining high-growth firms, although some studies have used shorter periods (Coad et al. 2014).

High-growth firms are identified as locally-owned enterprises in the top 5th percentile of the distribution of mid-point growth rates within each economy.[7] By the symmetry of distribution of these growth rates, around 5 percent of the firms in each country are classified as HGFs. The key advantage of this method is that it establishes country-specific minimum growth rates required for firms to be classified as HGFs (HGF thresholds), thereby taking into account country-specific characteristics that support or hinder the performance of the private sector. This definition,

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[6] For 15 countries in the database, the surveys provided information for employment four fiscal year before the year in which the questionnaire was administered. These countries are marked with an asterisk in Annex 1.

[7] I do not consider foreign firms to be high-growth firms because I am interested in measuring spillovers from FDI to domestic enterprises. Therefore, all high-growth firms have 100 percent local ownership.

therefore, ensures that HGFs are present in each country. Figure 1 illustrates the identification of HGFs in Indonesia, where the Enterprise Survey was conducted in 2015. According to the criteria, firms are required to increase employment by at least 0.3 points in our measure of growth between 2012 and 2014, which corresponds to a standard growth rate of 35.3 percent. Out of the 1,320 firms surveyed, 70 enterprises (or 5.3 percent) met the criteria. These firms are located at the shaded right tail of the firm growth distribution. The median growth rate for HGFs is 76.5 percent, whereas for all surveyed firms it is 0 percent.[8]

Figure 1: Distribution of Mid-Point Growth Rates in Indonesia (2012-2014)
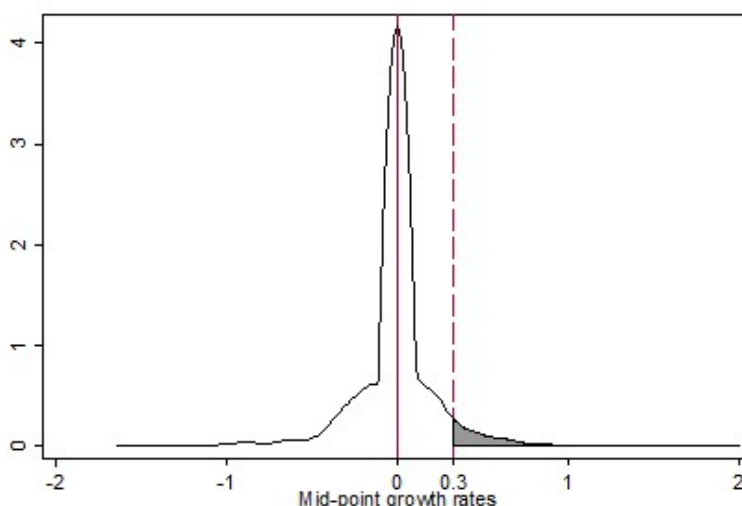
Note: This figure shows the distribution of firm-level mid-point growth rates for Indonesia between 2012 and 2014. The survey was conducted in 2015. Firms were asked about their total number of full-time employees the year before (2014) and three years ago (2012). The solid line indicates the median of the distribution. The dotted line indicates the 95th percentile. The shaded part of the distribution indicates the presence of HGFs.
Source: Author computation using data from the World Bank Enterprise Surveys.

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[8] While this methodology is based on previous literature, it is important to acknowledge that there is no general agreement in the literature on the definition of high-growth firms. Henrekson and Johansson (2010) provides a meta-analysis of the empirical literature on identifying HGFs. Growth rate thresholds have been employed by Schreyer (2000) and Davidsson and Henrekson (2002), among others. The Organization for Economic Cooperation and Development (OECD) employs a condition that mixes threshold growth rates and a minimum initial size of the firm as follows: HGFs are firms with 10 or more employees that have an average annualized growth rate higher than 20 percent for three consecutive years [Ahmad (2008) and OECD (2008 and 2010)]. We do not require a minimum initial size because firms in the developing world are much smaller than in the developed word. In fact, McKenzie (2017) reports that 95 percent of businesses in the developing world have nine or fewer workers.

On average, across the 122 countries in the dataset, firms must double their number of full-time employees in 2 years to be considered HGFs. However, there is a large variation in this requirement across countries and regions. The comparison of HGF thresholds provides an indication of the dynamism of the private sector across countries. Figure 2 presents the 2-year standard growth rate thresholds for all countries in the database. Sub-Saharan African (SSA) countries stand out due to their relatively high growth rate thresholds, likely indicating a less developed private sector. On average, HGFs in the region increased their employment by at least 160 percent. High HGF thresholds are driven by Nigeria and Tanzania, which display thresholds of around 600 percent and 500 percent, respectively.

There is a high heterogeneity of HGF thresholds across countries within regions. The largest disparity is also observed in Sub-Saharan Africa, where Nigeria's threshold is 600 percent while Sudan's is only 60 percent. The most homogeneous region is East Asia and the Pacific, where Vanuatu's threshold is 180 percent while Lao PDR's is only 30 percent. HGF thresholds are negatively correlated with the level of development: the richer the country, the smaller the HGF threshold.

Figure 2: High-growth Firm Thresholds
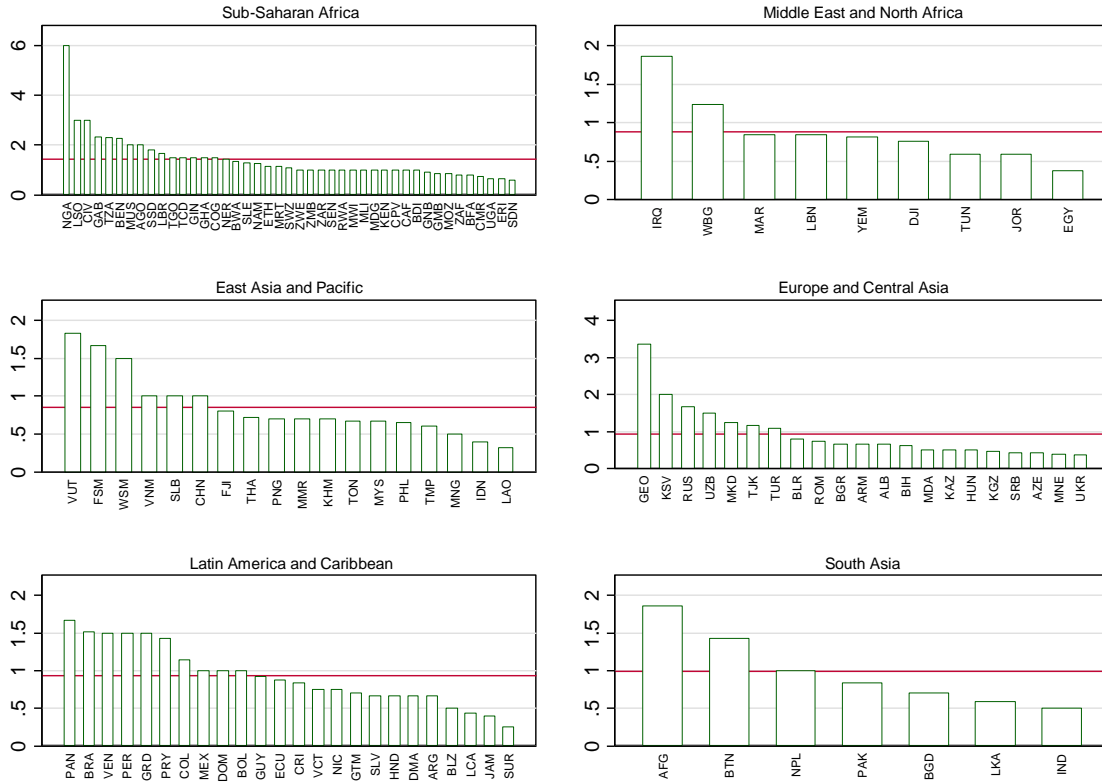
Note: This figure shows the standard growth rate thresholds for HGFs. Countries are labeled per their 3-letter ISO code. Countries are grouped into regions following the World Bank Group country classification. The red line represents the unweighted average threshold in each region. For the 15 countries with information for 3 years, the growth rates have been converted to 2-year growth rates as follows: $gr^{2y} = [gr^{3y} + 1]^{\left(\frac{2}{3}\right)} - 1$

Source: Author computation using data from the World Bank Enterprise Surveys.

A crucial characteristic of HGFs is that they tend to be small and young. In fact, most HGFs in the developing world have fewer than 20 employees. While the same is true of other firms in the developing world, HGFs are relatively more represented in the group of small enterprises (Figure 3). In total, there are 89 countries in our dataset for which the median size of HGFs is less than 10 employees. On average, HGFs are also younger than other businesses (Figure 4). In our set of 121 countries, the median age of HGFs is lower than that of other firms in 105 countries.[9]

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[9] Annex 2 presents the median size and age of HGFs in each country.

Figure 3: Size Distribution of Firms at the Beginning of the Period

Figure 4: Age Distribution of Firms at the Beginning of the Period
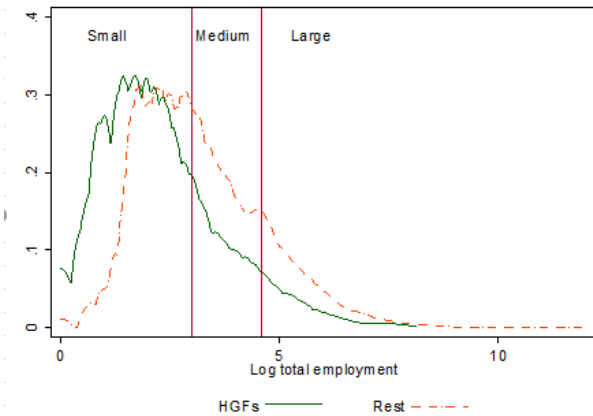
Note: This figure shows the size distribution of HGFs in developing countries (solid line) and the same distribution for other firms (dotted line) at the start of the period (3 fiscal years prior to the survey). The vertical lines indicate the standard size bins used by the survey as follows: Small firms have fewer than 20 employees; medium firms have between 20 and 100 employees; and large firms have more than 100 employees.
Source: Author computation using data from the World Bank Enterprise Surveys.

Note: This figure shows the age distribution of HGFs in developing countries (solid line) and the same distribution for other firms (dotted line) at the start of the period (3 fiscal years prior to the survey).
Source: Author computation using data from the World Bank Enterprise Surveys.

HGFs are found across all sectors of the economy, but they are relatively more common in services than in manufacturing. Table 1 shows the prevalence and characteristics of these enterprises across economic sectors. Information and communications technology (ICT) and the construction sector show the highest rates of high-growth firms, which account for 8.1 percent and 6.6 percent of firms in the sectors, respectively. In terms of output and employment growth, the performance of high-growth firms in services outperforms that of high-growth firms in manufacturing. Overall, high-growth firms in services increased employment by 133 percent and sales by 40 percent over the previous two years, compared to 127 percent and 38 percent in manufacturing, respectively.

Table 1: Prevalence of High Growth Firms across Economic Sectors

ISIC Codes - Sector	High-Growth Firms [1]	Other firms [2]	Share of high-growth firms in the sector [3]=1/(1+2)	High-Growth Firms		Other Firms	
				Employment Growth	Output Growth	Employment Growth	Output Growth
Manufacturing	**1,608**	**27,188**	**5.6%**	**127%**	**38%**	**0%**	**14%**
17-- Textiles	158	2,414	6.1%	124%	43%	0%	13%
29-- Machinery and equipment	123	1,972	5.9%	100%	33%	0%	15%
18-- Apparel and fur	226	3,574	5.9%	141%	40%	0%	14%
28-- Metal products	180	2,938	5.8%	150%	47%	0%	17%
15-- Food products and beverages	393	6,508	5.7%	133%	35%	0%	14%
36-- Furniture	114	1,927	5.6%	150%	52%	0%	15%
24-- Chemicals	150	2,789	5.1%	132%	35%	0%	17%
26-- Non-metallic mineral products	144	2,684	5.1%	130%	34%	0%	11%
25-- Rubber and plastic	120	2,382	4.8%	100%	33%	0%	14%
Services	**1,479**	**24,446**	**5.7%**	**133%**	**40%**	**0%**	**13%**
64 & 72-- ICT	116	1,319	8.1%	115%	53%	9%	17%
45-- Construction	173	2,463	6.6%	115%	53%	0%	12%
50-52-- Wholesales and retail trade	929	14,845	5.9%	133%	39%	0%	13%
60-63-- Transport and storage	109	2,251	4.6%	150%	34%	0%	11%
55-- Hotels and restaurants	152	3,568	4.1%	130%	33%	0%	9%

Note: This table shows the total number of firms by type and their associated median employment and output growth across economics sectors. Sectors with fewer than 100 enterprises are dropped. Sectors are ranked by the importance of HGFs (column 3). The data uses the revision 3.1 of the International Standard Industry Classification (ISIC). The table present the median standard growth rate within each cell.
Source: Author computation using data from the World Bank Enterprise Surveys.

b. Measuring Two Channels of FDI Spillovers

I construct measures of the linkages and demonstration channels at the country-sector level using information from the WBES. The *linkages* channel ($linkages_{jc}$) is defined as the average share of inputs that foreign firms in sector j acquire in the host economy. Foreign firms are identified as enterprises with at least 10 percent of foreign ownership. Specifically, this variable is constructed as:

$$linkages_{jc} = \frac{1}{n}\sum_{i=1}^{n}\frac{input_{ijc}^{dom}}{input_{ijc}^{tot}} \qquad [2]$$

where $input_{ijc}^{dom}$ represents the value of inputs sourced locally by foreign firm i in sector j in country c, and $input_{ijc}^{tot}$ corresponds to firms i's total value of inputs, regardless of their origin. The total number of foreign firms in country c, sector j is n. This approach, which focuses on the demand for inputs from foreign companies, is used in Sanchez-Martin et al (2015) and is complementary to that in Javorcik (2004) and Blalock and Gertler (2008), who adopt the perspective of the local supplying sector and look for foreign presence downstream in the supply chain.

The *demonstration* channel ($demonstration_{cjt}$) is defined by the share of foreign output as a percentage of total output at the sectoral level. This measure is standard in the literature on measuring intra-industry spillover effects. See Blalock and Gertler (2009) and Farole and Winkler (2015).

$$demonstration_{jc} = \frac{\Sigma_i \, output_{ijc}^{fgn}}{\Sigma_i \, output_{ijc}^{all}} \quad [3]$$

Where $output_{ijct}^{fgn}$ represents the sales of foreign firms exclusively, while $output_{ijct}^{all}$ accounts for the sales of all firms in each sector, country and year.

These measures represent the importance of the FDI spillovers channels within country-sector observations and, therefore, capture the potential for intra-industry spillover effects. Due to limitations with the level of sectoral disaggregation of the WBES, the channels for FDI spillovers are defined at a broad sectoral classification (2-digit ISIC codes). Consequently, in addition to horizontal spillovers, the measures are likely to capture some vertical spillovers. For instance, manufacture of leather and related products (classified under ISIC 15) includes both final footwear and the tanning and dressing of leather–an input for footwear. Thus, a foreign firm producing footwear could impact domestic final producers of footwear as well as domestic suppliers in upstream sectors.

The size of the transmission channels of FDI spillovers varies across sectors and countries. On average, linkages are more prevalent in manufacturing than in services. Table 2 presents the average size of the transmission of FDI spillovers across sectors and regions of the world. The data indicates that Asia shows the highest prevalence of linkages in manufacturing. In East Asia, for instance, foreign manufacturing firms source 70 percent of the inputs locally. The average for the rest of the world is around 60 percent. Demonstration effects are relatively balanced between manufacturing and services; foreign firms account broadly for 20-30 percent of sectoral output across sectors and regions.

Table 2: Average Size of Linkages and Demonstration Channels

ISIC codes - Sector	EAP		ECA		LAC		MENA		SA		SSA	
	Linkages	Demonstration	Linkages	Demonstration	Linkages	Demonstration	Linkages	Demonstration	Linkages	Demonstration	Linkages	Demonstration
Manufacturing	**0.7**	**0.3**	**0.6**	**0.2**	**0.6**	**0.3**	**0.6**	**0.2**	**0.8**	**0.1**	**0.6**	**0.4**
15 Food products and beverages	0.8	0.3	0.7	0.2	0.7	0.4	0.7	0.2	0.8	0.1	0.7	0.5
17 Textiles	0.8	0.3	0.7	0.2	0.6	0.3	0.7	0.1	0.8	0.1	0.5	0.5
18 Apparel and fur	0.6	0.4	0.5	0.2	0.7	0.2	0.4	0.3	0.6	0.0	0.6	0.2
24 Chemicals	0.7	0.3	0.6	0.4	0.5	0.4	0.5	0.2	0.8	0.1	0.4	0.4
25 Rubber and plastic	0.7	0.1	0.5	0.2	0.4	0.5	0.6	0.1	0.9	0.0	0.4	0.5
26 Non-metallic mineral products	0.8	0.4	0.7	0.3	0.7	0.2	0.8	0.2	1.0	0.2	0.7	0.4
28 Metal products	0.6	0.2	0.6	0.1	0.5	0.5	0.6	0.2	0.9	0.0	0.5	0.4
29 Machinery and equipment	0.8	0.2	0.6	0.2	0.7	0.5	0.6	0.4	0.9	0.1	0.6	0.3
36 Furniture	0.7	0.3	0.4	0.1	0.8	0.2	0.8	0.1	0.6	0.0	0.6	0.2
Services	**0.3**	**0.2**	**0.0**	**0.1**	**0.3**	**0.3**	**0.7**	**0.2**	**0.0**	**0.0**	**0.4**	**0.4**
45 Construction	-	0.1	0.0	0.1	0.7	0.2	0.7	0.2	-	0.0	0.7	0.4
50-52 Wholesales and retail trade	0.7	0.2	0.0	0.2	0.7	0.3	0.3	0.2	0.0	0.0	0.5	0.3
55 Hotels and restaurants	-	0.2	-	0.2	-	0.3	0.9	0.1	0.0	0.1	-	0.5
60-63 Transport and storage	0.7	0.2	0.0	0.1	-	0.3	1.0	0.2	0.0	0.0	0.6	0.3
64 & 72 IT and communications	0.2	0.1	0.0	0.2	-	0.4	0.6	0.2	-	0.1	-	0.3

Note: This table shows the average value of the linkages and the demonstration effects across economic sectors and world regions. Countries are allocated into six world regions according to the World Bank classification: MENA: Middle East and North Africa; LAC: Latin America and the Caribbean; SSA: Sub-Saharan Africa; EAP: East Asia and the Pacific; ECA: Europe and Central Asia; and SA: South Asia.
Source: Author computation using data from the World Bank Enterprise Surveys.

Although the WBES allows the systematic study of FDI spillover effects across a broad range of developing countries, four important caveats are in order. First, firm performance outcomes are available for just two points in time, separated only by 2 years, for most countries in the dataset. Second, the surveys are representative only at the level of the broader manufacturing and services sectors, not at the detailed 2-digit ISIC codes. Third, the data only includes firms that survived between the two points of time, not those that exited. Fourth, there may be some differences across countries in the minimum size of firms that are included in the surveys.[10]

3. Empirical Analysis

In this section, I explore the firm-level relationship between the two channels of FDI spillovers and the performance of domestic enterprises in host countries. I decompose the average impact of the linkages and demonstration effects for high-growth firms and for the rest of businesses. Specifically, I regress output growth of indigenous firm i operating in sector j and in country c (g_{ijc}) on the size of the linkages ($linkages_{jc}$) and the demonstration ($demostration_{jc}$) channels. I control for firm-specific attributes (X_{ijc}), including a log transformation of the firm age (defined as the years between the beginning of operations of the firm and the application of the survey), a log transformation of the labor productivity (USD sales per worker), and a dummy variable capturing exporter status, taking the value of one if direct exports account for more than 5

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[10] Details of the survey methodology are available here: http://www.enterprisesurveys.org/methodology.

percent of the firm's total sales. Country (γ_c) and industry (γ_j) fixed effects are included to account for unobservable variation that is common to all sectors but that varies across countries and for unobservable variation that affects specific sectors but that is common across countries. Sectors are defined as 2-digit codes of the ISIC (Rev 2) classification, the highest level of disaggregation available in the ESD. The base specification is presented in equation [4].

$$g_{ijc} = \beta_1 linkages_{jc} + \beta_2 demonstration_{jc} + \mathbf{BX_{ijc}} + \gamma_c + \gamma_j + \varepsilon_{ijc} \qquad [4]$$

The identification strategy captures the average impact of the FDI spillover channels on firm performance across domestic firms within country-sector cells. In other words, it examines if firms display higher growth rates in sectors that have greater potential for FDI spillovers as indicated by the size of the linkages and demonstration channels. The final sample size in the regression is 33,305 firms.[11] To test the impact that FDI spillovers have on high-growth firms, I include a dummy that indicates if the firm is a high-growth firm (using the criteria discussed above) and interact it with both channels of FDI spillovers as follows.

$$g_{ijc} = \beta_1 linkages_{jc} + \beta_2 demonstration_{jc} + \beta_3 HGF_{ijc} + \beta_4 HGF_{ijc} * linkages_{jc} +$$
$$\beta_5 HGF_{ijc} * demonstration_{jc} + \mathbf{BX_{ijc}} + \gamma_c + \gamma_j + \varepsilon_{ijc} \qquad [5]$$

The results indicate that there is a large amount of heterogeneity in the ability of indigenous firms to benefit from the presence of MNC. Table 3 presents the estimation of equations [4] and [5]. All control variables behave in the expected way: young firms and high productivity firms tend to have high growth rates. Export status of domestic firms does not appear to be related with firm growth, likely indicating that export-led growth is driven mostly by FDI firms which are not included in the sample. The average impact of linkages and demonstration channels on the average firm is not statistically different from zero (specifications 2-4). In other words, the average firm in the developing world is unable to benefit from the presence of foreign companies. There are two self-enforcing mechanisms explaining this finding: First, the increased competition that foreign firms

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[11] This number is smaller than the total number of firms shown in the descriptive statistics (table 1) because there are sector-country cells without FDI firms. Because I focus on intra-industry spillovers (at an aggregate industry level), the proxies for spillovers are not defined for these observations. Therefore, firms operating in these cells are dropped from the regression model.

bring to the domestic market counteracts the FDI benefits that the average firm is able to internalize. Second, the low absorptive capacity of the average firm prevents it from capturing FDI benefits.[12]

Table 3: FDI Spillovers and Firm Performance

VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Linkages Channel		-0.023		-0.028	-0.053		-0.053
		(0.051)		(0.052)	(0.050)		(0.051)
Demonstration Channel			0.010	0.011		0.002	0.006
			(0.015)	(0.019)		(0.019)	(0.019)
High-growth Firm					0.207***	0.207***	0.190***
					(0.019)	(0.021)	(0.021)
X Linkages Channel					0.678***		0.568***
					(0.190)		(0.201)
X Demonstration Channel						0.171***	0.109*
						(0.061)	(0.063)
Log Age	-0.068***	-0.068***	-0.068***	-0.068***	-0.061***	-0.061***	-0.061***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Exporter	-0.001	-0.001	-0.001	-0.001	-0.003	-0.003	-0.003
	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)
Log Labor Productivity	0.082***	0.082***	0.082***	0.082***	0.083***	0.083***	0.083***
	(0.005)	(0.005)	(0.002)	(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.783***	-0.784***	-0.785	-0.786***	-0.813***	-0.816***	-0.816***
	(0.059)	(0.059)	(0.551)	(0.059)	(0.060)	(0.059)	(0.059)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,305	33,305	33,305	33,305	33,305	33,305	33,305
R-squared	0.165	0.165	0.165	0.165	0.174	0.174	0.174

Note: The dependent variable is total sales. The sample excludes foreign firms. Standard errors (in parentheses) are clustered at the country-sector level.
*** p<0.01, ** p<0.05, * p<0.1
Source: Author computation using data from the World Bank Enterprise Surveys.

High-growth firms behave radically differently from the average firm in their ability to internalize FDI spillovers. Both channels are positively and statistically significantly related to the performance of these firms (specifications 5-7). The results indicate that an increase of one percentage point in the size of linkages (share of inputs sourced domestically by foreign firms) is associated with a 0.515 unit increase in the sales mid-point growth rate of high-growth firms. This impact is statistically significant at the 1 percent level. For the demonstration channel, the impact

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[12] The finding that intra-industry spillover effects are rarely accrued by domestic firms is standard in the literature. Meyer and Ninani (2009) and Gorg and Strobl (2001) provide two meta-analyses reviewing this literature.

is equivalent to a 0.12 unit increase. This impact is statically significant at 10 percent. These results imply that the direct interaction between the MNCs and domestic firms that occurs within supplier contractual arrangements is more powerful as a knowledge diffusion mechanism than the indirect effects captured by the demonstration channel.

The importance of FDI spillovers on the performance of local high-growth firms varies both across regions and sectors. I estimate equation [5] separately for six regions of the world, following the World Bank country classification, and for manufacturing and services. The estimated coefficients and 10 percent confidence intervals are depicted in Figure 5 and Figure 6. Regression results are reported in Annex 3. The analysis delivers three key messages. First, high-growth firms in Sub-Saharan Africa do not internalize FDI spillovers. Since the lion's share of FDI going to Africa is directed to natural resources, this result may indicate that the potential of this type of investment to generate positive spillovers is limited. Second, the Europe and Central Asia region is an outlier in that the demonstration channel outweighs the linkages channel. In fact, the role of the demonstration channel is the largest among the regions analyzed. Third, the linkages channel is the key engine for FDI spillovers to high-growth firms in Latin America and the Caribbean, South Asia, and the Middle East and North Africa.

Figure 5: FDI spillovers and High-growth Firms, by Regions.
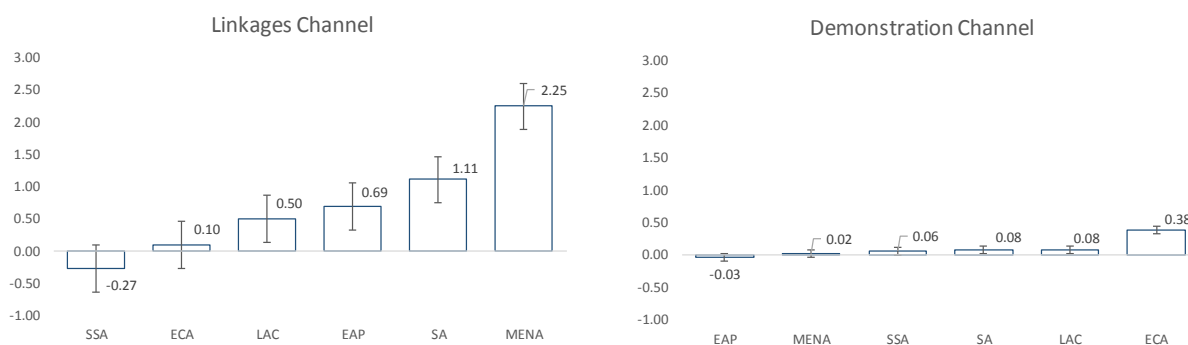
Note: These figures show the estimated coefficient of the role of the channel for FDI spillover effects on high-growth firms, by world region. Vertical lines capture 90 percent confident intervals. Regression results are presented in annex 3. The world regions are as follows: MENA: Middle East and North Africa; LAC: Latin America and the Caribbean; SSA: Sub-Saharan Africa; EAP: East Asia and the Pacific; ECA: Europe and Central Asia; and SA: South Asia.
Source: Author computation using data from the World Bank Enterprise Surveys.

High-growth firms in services capture FDI spillovers through both linkages and demonstration channels, while in manufacturing they internalize spillovers only through linkages. However, the

role of linkages is stronger in manufacturing (Figure 6). The results indicate that an increase of 1 percentage point in the share of inputs sourced locally by MNCs is associated with an increase of 0.7 units in the measure of sales growth of indigenous high-growth firms in manufacturing and 0.5 units in services. Yet, an increase of 1 percentage point in the demonstration channel is associated with an increase of 0.2 units in the measure of sales growth of domestic high-growth firms in services, while this impact is not statistically significant for manufacturing firms.

Figure 6: FDI Spillovers on High-growth Firms, by Sector
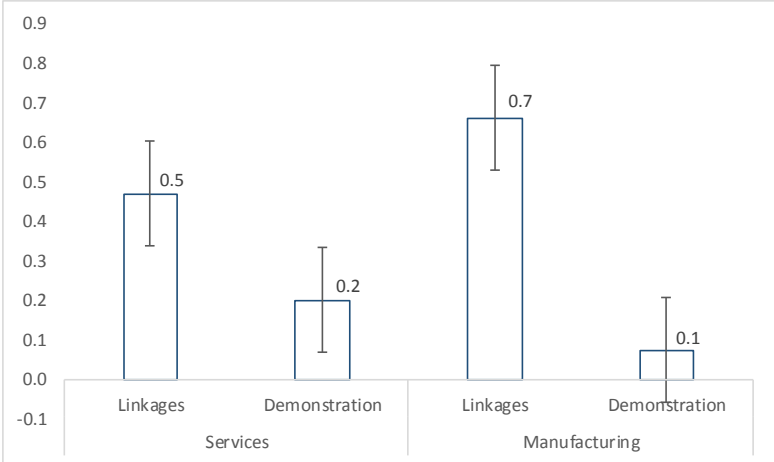
Note: This figure shows the estimated coefficient of the role of FDI spillovers on high-growth firms in manufacturing and in services. Vertical lines denote 90 percent confident intervals. Regression results are presented in Annex 3.
Source: Author computation using data from the World Bank Enterprise Surveys.

I also examine FDI spillovers across different factors that motivate MNCs' decisions to invest in developing countries. I employ the taxonomy suggested by the seminal work of Dunning (1993), where FDI motivation can broadly be categorized as (i) natural resource-seeking investment, which describes a situation where a foreign investor establishes an enterprise in the host country to access natural resources; (ii) market-seeking investment, which is driven by the foreign investor's intention to primarily serve the host country's market; and (iii) efficiency-seeking investment, in which the investor chooses a host country in order to take advantage of some competitive factor, such as a labor force, utilities, services, or geographic location. Because the relationship between the pro-competitive effect of FDI and the potential for knowledge diffusion is different across FDI

motivations, it is important to empirically determine what types of investment have more potential for FDI spillovers.

Allocating sector-country bins into FDI motivation is a daunting task. Fortunately, Perea et al. (mimeo) provide a methodological framework that combines two key pieces of information at the sectoral level: the export orientation of the sector and its relative detachment from the natural resource base of the country. The export orientation of the sector differentiates resources- and efficiency-seeking investments from market-seeking investments. Both resources- and efficiency-seeking investment occur in export-oriented sectors, while the purpose of market-seeking investment is to serve the host market. The relative proximity of a sector to the natural resource base of the country distinguishes resource-seeking FDI. The proximity is defined as the natural resource density around each sector, drawing from the product space methodology.[13] Annex 4 presents the number of countries by sector and FDI motivation.

To test how FDI spillovers vary across investment motivations and type of firms, I estimate equation [4] separately for all firms, for high-growth firms, and within each group for each type of investment. Results, shown in Table 4, indicate that high-growth firms capture FDI spillovers through linkages for all types of investment, except for natural resource-seeking FDI. Efficiency-seeking FDI generates more spillovers than market-seeking FDI. An increase of 1 percentage point in the share of inputs sourced domestically by foreign firms (linkages) in efficiency-seeking sectors is associated with a 2.95 units increase in the measure of sales growth of high-growth firms. This effect is statistically significant at the 5 percent level. The equivalent effect for market-seeking FDI is 0.59 units and is significant only at the 10 percent level. These results indicate that the pro-competitive effect of FDI in the host economy limits knowledge diffusion to domestic enterprises from market-seeking FDI more than from efficiency-seeking FDI.

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[13] I am grateful to the authors for providing me with the characterization of the investment motivation at the 2-digit ISIC level for all the countries in my database. The methodology focuses exclusively on agriculture, mining, and manufacturing. I allocated services sectors to market-seeking investment, except for services related to computer and related activities (ISIC 72), which are allocated to efficiency-seeking FDI. The reason is that this sector includes the standard business process outsourcing services, including hardware and software consultancy, data processing, and database activities.

Table 4: FDI Spillovers, by Investment Typology

VARIABLES	High-growth firms				All firms			
	ALL	ES	MS	RS	ALL	ES	MS	RS
Linkages Channel	0.592**	2.950**	0.583*	-1.317	-0.051	0.228	-0.046	0.242
	(0.256)	(1.447)	(0.347)	(2.065)	(0.051)	(0.175)	(0.064)	(0.401)
Demonstration Channel	0.161*	-0.033	0.216	0.322	0.004	-0.108**	0.010	-0.074
	(0.084)	(0.281)	(0.142)	(0.227)	(0.019)	(0.042)	(0.032)	(0.078)
Log Age	-0.121***	-0.084	-0.191***	-0.068**	-0.056***	-0.070***	-0.068***	-0.027***
	(0.023)	(0.070)	(0.049)	(0.033)	(0.005)	(0.017)	(0.009)	(0.009)
Exporter	-0.060	-0.190	-0.181**	0.041	-0.000	-0.011	0.016	-0.041**
	(0.042)	(0.122)	(0.090)	(0.074)	(0.011)	(0.024)	(0.024)	(0.017)
Log Labor Productivity	0.101***	0.086*	0.118***	0.022	0.082***	0.059***	0.099***	0.056***
	(0.013)	(0.049)	(0.022)	(0.018)	(0.005)	(0.010)	(0.008)	(0.012)
Constant	0.459	0.040	0.106	-0.456**	-0.816***	-0.212**	-0.979***	-0.278**
	(0.286)	(0.542)	(0.384)	(0.198)	(0.060)	(0.107)	(0.098)	(0.110)
Observations	1782	172	642	341	31523	3150	11414	5569
R-Squared	0.291	0.351	0.348	0.256	0.166	0.118	0.163	0.130

Note: This table shows the estimation of FDI spillovers by motivation, separately for high-growth firms and all domestic firms. 'All' indicates that the regression includes all types of investment. 'ES' includes only efficiency-seeking investment. 'MS' includes only market-seeking investment. 'RS' includes only natural resource-seeking investment. Standard errors (in parentheses) are clustered at the country-sector level.
*** p<0.01, ** p<0.05, * p<0.1
Source: Author computation using data from the World Bank Enterprise Surveys.

4. Robustness Checks

In this section, I analyze the robustness of my key result: that, on average across the developing world, high-growth firms are the main recipients of positive FDI spillover effects and that linkages are the more powerful transmission channel. I employ specification [7] in Table 3 to examine the robustness of the results to changes in the indicator of firm performance, measures of sales growth, and cut-offs to identify high-growth firms.

I first test the robustness of the results to an alternative indicator of firm performance. In addition to sales, the ESD provides information on employment growth during the last two years prior to when the survey was administered in each country. The results are reported in column 3 in Table 5. The finding that high-growth firms capture FDI spillovers from the linkages holds in this specification–the coefficient for the interaction term of the high-growth firms dummy and the linkages channel is positive and significant at the 1 percent level. The demonstration channel is not significant for any type of firm. While the coefficient of the impact of sectoral linkages for non-

high growth firms remains negative, it is now significant at the 10 percent level. Given the short window of 2 years for which we observe firm performance in our dataset, I prefer the sales variable as the indicator of firm growth, as enterprises adjust output more swiftly than employment in reaction to sectoral shocks.

I also test the robustness of the results to two different measures of sales growth. The first is the Birch index which, in the same spirit as the mid-point growth rate, seeks to reduce the impact of firm size on the growth indicator by combining both relative and absolute changes in firm-level sales (Birch 1987, Schreyer 2000, and Holz 2014).[14] The second measure is the standard log difference in sales, which is biased towards small firms. The results are reported in columns 4 and 5 in Table 5. Overall, the results are qualitatively the same. Both channels of FDI spillovers are unimportant for non-high-growth firms, while the linkages channel is positively and significantly related to the performance of high-growth firms. The sign of the coefficient for the impact of the demonstration channel on high-growth firms changes, but it is not significant. In the base scenario, this variable is positive and significant only at the 10 percent level.

My method to identify high-growth firms relies on the ad-hoc minimum threshold in employment growth, which is equal to the top 5th percentile of the distribution of firm-level mid-point growth rates in each country in the dataset. Columns 6 and 7 in Table 5 report the regression results using the top 10th and 20th percentiles, respectively. The results confirm that the linkages channel is the more powerful channel in which FDI spillovers are internalized by high-growth firms. The size of this effect is reduced when the cutoff is relaxed, indicating that sales growth is directed associated with firms' absorptive capacities. The impact of sectoral linkages on non-high-growth firms is negative and significant at the 10 percent level when using the top 20th percentile cutoff, which is also consistent with a positive association between sales growth and absorptive capacity.

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[14] The Birch index combines both relative and absolute growth rates as follows: $(S_t - S_{t-2})\left(\frac{S_t}{S_{t-2}}\right)$.

Table 5: Robustness checks

VARIABLES	Base	Firm Performance Indicator	Sales growth measure		HGF cut-offs	
		Employment	Birch Index	Log diff.	top 10th pctle	top 20th pctle
Linkages Channel	-0.053	-0.041*	-0.017	-0.075	-0.073	-0.088*
	(0.051)	(0.024)	(0.293)	(0.097)	(0.052)	(0.048)
Demonstration Channel	0.006	-0.016	0.156	0.011	0.003	0.006
	(0.019)	(0.010)	(0.096)	(0.037)	(0.019)	(0.020)
High-growth firm	0.190***	0.738***	0.679***	0.235***	0.179***	0.162***
	(0.021)	(0.028)	(0.079)	(0.044)	(0.016)	(0.012)
X Linkages Channel	0.568***	0.603***	1.496**	1.428***	0.442***	0.321***
	(0.201)	(0.173)	(0.738)	(0.518)	(0.148)	(0.092)
X Demonstration Channel	0.109*	0.093	-0.182	-0.030	0.077	0.019
	(0.063)	(0.062)	(0.227)	(0.144)	(0.048)	(0.041)
Log Age	-0.061***	-0.031***	0.151***	-0.102***	-0.057***	-0.054***
	(0.005)	(0.003)	(0.031)	(0.014)	(0.005)	(0.005)
Exporter	-0.003	0.016***	1.083***	0.048	-0.003	-0.004
	(0.010)	(0.005)	(0.067)	(0.033)	(0.010)	(0.010)
Log Labor Productivity	0.083***	-0.001	1.149***	0.173***	0.083***	0.083***
	(0.005)	(0.002)	(0.024)	(0.014)	(0.005)	(0.005)
Constant	-0.816***	0.336***	2.421***	-1.687***	-0.823***	-0.991***
	(0.059)	(0.019)	(0.302)	(0.158)	(0.060)	(0.065)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,305	36,893	21,848	33,305	33,305	33,305
R-squared	0.165	0.165	0.165	0.165	0.174	0.174

Note: Standard errors (in parentheses) are clustered at the country-sector level.
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's computation using the WBES.

5. Concluding remarks

Foreign investors bring a plethora of knowledge that has the potential to create positive spillovers to the host economy. These benefits, however, are not guaranteed. The key reason is that MNCs may also generate pro-competitive pressures in output and input markets in the host economy to the detriment of some local incumbents. The relationship between these two effects determines the overall impact of foreign presence on local enterprises. There are two main channels through which foreign knowledge and technology can be transferred to domestic firms. The first is backward linkages between foreign firms and domestic suppliers. The second is the demonstration channel, through which domestic firms imitate and replicate foreign technologies and management practices in their own production processes.

This paper evaluates the role of these two channels in supporting the performance of indigenous firms across the developing world. Employing a firm-level dataset for 122 countries, it finds that, on average, domestic firms do not capture FDI spillovers. This implies that the average firm does not have the required absorptive capacities to recognize the value of new information, assimilate it, and apply it to improve production processes. Therefore, the competition channel balances out the potential for knowledge spillovers. However, high-growth firms, identified as those enterprises with the highest job creation rates in each country, do capture FDI spillovers. The more powerful transmission channel is contractual linkages with MNCs. The base specification indicates that an increase of 1 percentage point in the share of inputs that are sourced domestically by MNCs in the sector is associated with a 0.51 unit increase in the measure of output growth of domestic high-growth firms. Investment in developing countries from MNCs embedded in global value chains creates larger FDI spillovers to high-growth indigenous firms than investment from MNCs that seek to serve the host economy. There is no empirical evidence that natural-resource seeking investment creates positive FDI spillovers.

These results have important implications for policy design as governments often direct public funding to support linkages programs to connect domestic suppliers with MNCs in the developing world. The evidence presented here indicates that these programs should include a targeting mechanism to identify high-potential domestic suppliers, rather than being directed to the whole group of small and medium-sized enterprises. Because some of these programs are very costly (e.g. supplier development programs), policy interventions have better odds to succeed if public interventions are aimed at indigenous firms with high absorptive capacities. More research is needed about the characteristics of these enterprises, as are rigorous impact evaluations about linkages programs.[15]

Regardless of the distributional impact of MNCs on domestic firms, countries open to multinational production tend to experience aggregate productivity gains. This paper shows that part of these benefits is accrued by local high-growth firms via the assimilation of positive FDI spillovers, which increase their sales and productivity. However, the increased competition that MNCs bring to the

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[15] Reyes (2017) reviews the economic rationality for public interventions and provides an overview of the different support programs to promote linkages.

host economy also implies that some less productive firms exit, which generates an efficient reallocation of factors that increases aggregate productivity.

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Annex 1: Countries Included in the Analysis

Middle East and North Africa	Latin America and Caribbean	Sub-Saharan Africa		East Asia and Pacific	Europe and Central Asia	South Asia
Djibouti (2013)*	Argentina (2010)	Angola (2010)	Mali (2010)	Cambodia (2016)	Albania (2013)	Afghanistan (2014)
Egypt (2013)*	Belize (2010)	Benin (2009)	Mauritania (2014)	China (2012)	Armenia (2013)	Bangladesh (2013)
Iraq (2011)	Bolivia (2010)	Botswana (2010)	Mauritius (2009)	Fiji (2009)	Azerbaijan (2013)	Bhutan (2015)
Jordan (2013)*	Brazil (2009)*	Burkina Faso (2009)	Mozambique (2007)*	Indonesia (2015)	Belarus (2013)	India (2014)
Lebanon (2013)*	Colombia (2010)	Burundi (2014)	Namibia (2014)	Lao PDR (2016)	Bosnia and Herzegovina (2013)	Nepal (2013)
Morocco (2013)*	Costa Rica (2010)	Cameroon (2009)	Niger (2009)	Malaysia (2015)	Bulgaria (2013)	Pakistan (2013)
Tunisia (2013)*	Dominica (2010)	Cape Verde (2009)	Nigeria (2014)	Micronesia (2009)	Macedonia, FYR (2013)	Sri Lanka (2011)*
West Bank and Gaza (2013)*	Dominican Republic (2010)	Central African Republic (2011)	Rwanda (2011)	Mongolia (2013)	Georgia (2013)	
Yemen (2013)*	Ecuador (2010)	Chad (2009)	Senegal (2014)	Myanmar (2014)	Hungary (2013)	
	El Salvador (2010)	Congo (2009)	Sierra Leone (2009)	Papua New Guinea (2015)	Kazakhstan (2013)	
	Grenada (2010)	Côte d'Ivoire (2009)	South Africa (2007)*	Philippines (2015)	Kosovo (2013)	
	Guatemala (2010)	DRC (2013)	South Sudan (2014)	Samoa (2009)	Kyrgyz Republic (2013)	
	Guyana (2010)	Eritrea (2009)	Sudan (2014)	Solomon Islands (2015)	Moldova (2013)	
	Honduras (2010)	Ethiopia (2015)	Swaziland (2006)	Thailand (2016)	Montenegro (2013)	
	Jamaica (2010)	Gabon (2009)	Tanzania (2013)*	Timor-Leste (2015)	Romania (2013)	
	Mexico (2010)	Gambia, The (2006)*	Togo (2009)	Tonga (2009)	Russian Federation (2012)	
	Nicaragua (2010)	Ghana (2013)	Uganda (2013)	Vanuatu (2009)	Serbia (2013)	
	Panama (2010)	Guinea (2006)	Zambia (2013)	Vietnam (2015)	Tajikistan (2013)	
	Paraguay (2010)	Guinea-Bissau (2006)*	Zimbabwe (2011)		Turkey (2013)	
	Peru (2010)	Kenya (2013)			Ukraine (2013)	
	St. Lucia (2010)	Lesotho (2009)			Uzbekistan (2013)	
	St. Vincent and Grenadines (2010)	Liberia (2009)				
	Suriname (2010)	Madagascar (2013)				
	Venezuela (2010)	Malawi (2014)				

Note: This table presents the countries included in the analysis using the World Bank Enterprise Survey data. The year in which the survey was implemented is in parentheses. An asterisk indicates that the growth period under consideration in the country is three years, not two. The information was accessed on September 8, 2016.

Annex 2: Median Size and Age of High-Growth Firms and Rest of Firms

	High-growth firms		Rest of firms			High-growth firms		Rest of firms	
	Employment	Age	Employment	Age		Employment	Age	Employment	Age
Afghanistan	6	7	12	9	Liberia	3	8	6.5	7
Albania	3	10	9	12	Macedonia, FYR	5.5	8	9	16.5
Angola	9	9	15	10	Madagascar	7.5	11	12	12
Argentina	10	15	36	28	Malawi	6	14.5	15	16
Armenia	6.5	8	18	13	Malaysia	13.5	18	32	17
Azerbaijan	10	15	16	12	Mali	4	12	10	10
Bangladesh	20	17	26	18	Mauritania	7	16	19.5	14
Belarus	8	8	17	15	Mauritius	5	5	15	16
Belize	9.5	20	16	15	Mexico	6.5	12	44	20
Benin	3	6	7	14	Micronesia	2.5	3.5	10	16
Bhutan	5.5	7	13	15	Moldova	8	13	15	13
Bolivia	8	15	35	23	Mongolia	10	10.5	15	12
Bosnia and Herzegovina	12.5	13	15	16	Montenegro	7	12	10	15
Botswana	6	7	20	14	Morocco	7.5	15	30	18
Brazil	5	16	25	18	Mozambique	3.5	7	10	12
Bulgaria	5	11	15	17	Myanmar	10	10	11	14
Burkina Faso	8	6	10.5	12	Namibia	3	6	12	9
Burundi	10	4.5	16	12	Nepal	3.5	10.5	12	15
Cape Verde	4.5	6.5	19.5	13	Nicaragua	6	18	24	19
Cambodia	3.5	14	15	13	Niger	4	6	14	11
Cameroon	10	12	20	16	Nigeria	4	14	9	14
Central African Republic	3	12	10	10	Pakistan	10	15	20	20
Chad	4	11	12	14	Panama	20	18	28.5	17
China	20	10	56	11	Papua New Guinea	79.5	41.5	44	25
Colombia	9	15	30	20	Paraguay	4	7	25	18
Congo, Dem. Rep.	4	6	9	9	Peru	9	11	30	16
Congo, Rep.	2.5	7.5	14	11	Philippines	20	14.5	35	19
Costa Rica	20	12	26.5	21	Romania	5	9	15	17
Côte d'Ivoire	3	6	7.5	9	Russian Federation	4	5	16	10
Djibouti	5	10	12	14	Rwanda	6	5	16	9
Dominica	3	9	13.5	10	Samoa	4	9	12	16
Dominican Republic	5	11	35	17	Senegal	3.5	10	10	14
Ecuador	12	11	30	22	Serbia	8	11	18	17
Egypt, Arab Rep.	11	13	28	18	Sierra Leone	2.5	14.5	10	14
El Salvador	15	12	35	20	Solomon Islands	8.5	5.5	19	18.5
Eritrea	15	8	16	13	South Africa	6	9	25	15
Ethiopia	5.5	9	16	12	South Sudan	3	5	7	6
Fiji	9	13	15	23	Sri Lanka	5	13	18	19
Gabon	5	7	10	12	St. Lucia	4.5	9	18	13
Gambia, The	8	6	9	9	St. Vincent and the Grenadines	3	11.5	9	18
Georgia	3	4.5	11	10	Sudan	10	11	15	11
Ghana	2	8	10	13	Suriname	34	17.5	20	18.5
Grenada	2	24	13.5	20	Swaziland	2	8	10	10
Guatemala	7	13	32	21	Tajikistan	6.5	9.5	17	10
Guinea	2	6.5	6	8	Tanzania	2	15	10	13
Guinea-Bissau	2.5	10.5	7	10	Thailand	15	16	27	19
Guyana	12.5	17.5	30	19	Timor-Leste	6	9	10	11
Honduras	4	17.5	20	20	Togo	3	6	13	11
Hungary	6.5	11	13	16	Tonga	3	4	7	10
India	15	13	30	16	Tunisia	10	10.5	35	20
Indonesia	20	15	30	19	Turkey	9	10	22	16
Iraq	3	12	9	10	Uganda	6	10	10	13
Jamaica	10	10	24	20	Ukraine	20	12	20	14
Jordan	7.5	9	22	15	Uzbekistan	6	7	25	14
Kazakhstan	10	8	17	12	Vanuatu	7	6	12	19
Kenya	9.5	13.5	20	18	Venezuela, BR	6	11.5	16	13
Kosovo	5	7	15	13	Vietnam	10	8	28	11
Kyrgyz Republic	20	10	22.5	15	West Bank and Gaza	3	11	10	16
Lao PDR	5	12.5	13	16	Yemen, Rep.	9	16	14	20
Lebanon	7	7	19	22	Zambia	7	8	12	12
Lesotho	4	11	15	10	Zimbabwe	13	19	40	31

Annex 3: FDI Spillovers and Firm Performance, by Region and Sector

VARIABLES	World Bank Regions						Economic Sectors	
	EAP	ECA	LAC	MENA	SA	SSA	Manufacturing	Services
Linkages Channel	-0.123	0.299	0.009	-0.092	0.349	-0.059	0.092	-0.111*
	(0.103)	(0.265)	(0.108)	(0.164)	(0.647)	(0.098)	(0.108)	(0.064)
Demonstration Channel	0.047	-0.051	0.042	-0.003	-0.086	-0.001	-0.003	-0.009
	(0.050)	(0.047)	(0.036)	(0.043)	(0.101)	(0.034)	(0.023)	(0.037)
High-growth firm	0.238***	0.171***	0.212***	0.241***	0.127***	0.294***	0.181***	0.235***
	(0.067)	(0.065)	(0.056)	(0.066)	(0.025)	(0.071)	(0.021)	(0.061)
X Linkages Channel	0.814***	-0.202	0.491	2.342***	0.764	-0.207	0.570*	0.581**
	(0.309)	(0.892)	(0.320)	(0.700)	(2.407)	(0.439)	(0.307)	(0.284)
X Demonstration Channel	-0.076	0.427**	0.042	0.019	0.163	0.059	0.078	0.211
	(0.118)	(0.192)	(0.127)	(0.208)	(0.201)	(0.147)	(0.077)	(0.145)
Log Age	-0.056***	-0.086***	-0.059***	-0.059***	-0.045***	-0.088***	-0.059***	-0.069***
	(0.015)	(0.016)	(0.011)	(0.012)	(0.006)	(0.017)	(0.006)	(0.012)
Exporter	-0.000	0.017	-0.065***	0.015	-0.009	0.064	-0.013	0.083*
	(0.023)	(0.029)	(0.019)	(0.021)	(0.014)	(0.045)	(0.010)	(0.043)
Log Labor Productivity	0.062***	0.086***	0.107***	0.099***	0.038***	0.122***	0.075***	0.108***
	(0.009)	(0.011)	(0.007)	(0.009)	(0.006)	(0.011)	(0.005)	(0.012)
Constant	-0.579***	-0.718***	-0.679***	-0.983***	0.062	-0.641***	-0.444***	-0.734***
	(0.100)	(0.171)	(0.089)	(0.128)	(0.104)	(0.131)	(0.078)	(0.119)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,876	2,749	5,557	4,086	9,155	5,882	26,398	6,893
R-squared	0.103	0.171	0.116	0.306	0.050	0.184	0.175	0.190

Note: The dependent variable is total sales. The sample excludes foreign firms. Countries are allocated into six world regions according to the World Bank classification: MENA: Middle East and North Africa; LAC: Latin America and Caribbean; SSA: Sub-Saharan Africa; EAP: East Asia and Pacific; ECA: Europe and Central Asia; and SA: South Asia. Standard errors (in parentheses) are clustered at the country-sector level.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Author's computation using the WBES.

Annex 4: Number of Countries that Receive FDI, by Sector and Motivation

2-digit ISIC	Natural-resources	Market	Efficiency
15	11	17	15
16	6	3	3
17	7	24	6
18	12	19	13
19	7	17	9
20	10	21	15
21	2	29	2
22	3	32	4
23	2	15	1
24	1	34	1
25	5	33	4
26	6	29	9
27	11	24	9
28	3	37	1
29	1	30	3
30	0	5	3
31	2	27	6
32	0	13	2
33	1	18	7
34	2	19	3
35	1	13	5
36	10	19	13
45	0	109	0
50	0	109	0
51	0	109	0
52	0	110	0
55	0	110	0
60	0	101	0
61	0	36	0
62	0	31	0
63	0	97	0
64	0	66	0
72	0	0	94
Rest	2	31	0

Source: Perea et al. (mimeo).