

# Foreign direct investment as a catalyst for domestic firm development: the case of Sri Lanka

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Foreign direct investment (FDI) carried out by multinational enterprises (MNEs) is recognized as a mechanism through which domestic firms can learn and improve competitiveness. Unlike the extant literature, which tends to focus on the aggregate effects of FDI in Sri Lanka, we investigate the role of FDI for domestic firm development at the firm level. Using World Bank Enterprise Survey data supplemented by industry data, preliminary investigation reveals that, compared with domestic firms, MNEs are larger, more productive, more profitable and more active in research and development (R&D). MNEs hire higher proportions of skilled workers and undertake more in-house training programs. They are also more export-oriented but rely more on inputs of foreign origin. The gaps between foreign and domestic firms indicate the potential that Sri Lankan firms can learn from MNEs and from FDI. The econometric study on firm-level productivity indicates positive direct effects and negative spillover effects of FDI on domestic firms. The findings have important policy implications.

**Key words:** foreign direct investment, multinational enterprises, Sri Lanka, productivity, spillovers

## 1. Introduction

In recent decades, countries around the globe have been competing to attract foreign direct investment (FDI) with the view that FDI is an engine of economic growth and FDI and its agent, multinational enterprises (MNEs), exert positive effects on domestic firms in a host country (Wei & Balasubramanyam, 2004). MNEs possess firm-specific assets such as advanced technologies, knowledge and know-how which are much desired by domestic firms, particularly those in developing countries. FDI is seen as the fastest and most efficient way to access these assets because domestic firms can be in direct contact with MNEs in the host country, which makes learning easier.

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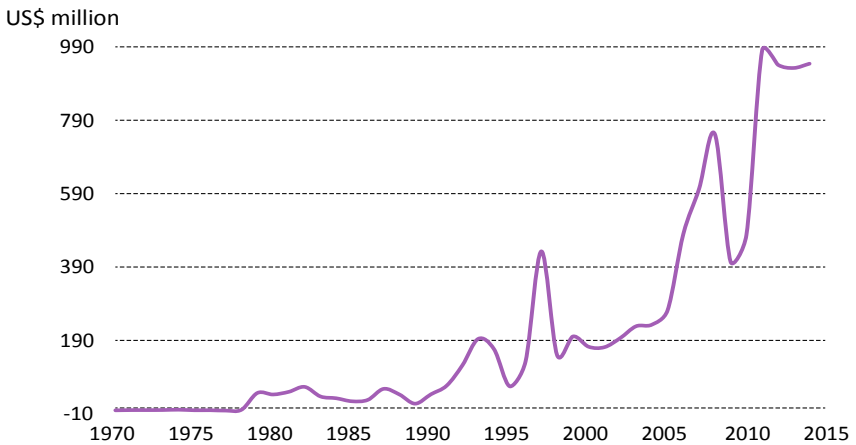
FDI can potentially improve the productivity of domestic firms through direct effects on MNE's local affiliates and through indirect or spillover effects on other domestic firms. However, this interest is not without concern that MNEs and FDI may negatively impact on domestic firms (Nam and Young, 2004). A number of reasons have been put forward, including that MNEs extort high rents; generate negative competition and monopoly effects; and bring resources, assets and practices into the host country that are inappropriate in the country context (Moosa, 2002).

There has been vibrant empirical investigation of the effects of FDI on domestic firms (see survey articles such as Iršová and Havránek (2013), Meyer and Sinani (2009) and Wooster and Diebel (2010)). The studies have produced a mixed bag of results. This has been partially attributed to different country contexts. Host-country-specific characteristics including the size of the country, its history, its stage of development, the quality of institutions and organizations, and the structure and quality of resources and capabilities embrace the gamut of characteristics affecting the role of FDI in domestic firm development. It is therefore essential to place the study of FDI in a specific country context. Against this background, we investigate FDI in Sri Lanka using firm-level data. The paper aims to answer the following question: to what extent do domestic firms differ from MNEs' local subsidiaries and benefit from FDI conducted by MNEs in Sri Lanka? Though a handful of studies have looked at FDI in the context of Sri Lanka, there is no study that compares foreign and domestic firms and examines the impact of FDI on domestic firms in Sri Lanka using firm-level data. This paper aims to fill that research gap.

Sri Lanka has long been considered, a country with excellent prospects for economic development. Post-independence, Sri Lanka was one of Asia's most promising new nations (UNCTAD, 2004). It was one of the early liberalizers in the developing world, embarking on an economic liberalization process in 1977 after a period of implementing inward-oriented policies (Athukorala, 2012; Athukorala and Rajapatirana, 2000). The reforms are fairly comprehensive, ranging from the dismantling of trade and foreign investment barriers, the unification of the exchange rate, the liberalization of interest rates and the removal of price and investment controls, to the restructuring of the tariff system and the tax system (UNCTAD, 2004). Thanks to these

outward-oriented policies, the situation of FDI was turned around from a period of slow growth or even divestment during 1966-1976, according to data published by UNCTAD (figure 1). In the 1980s, FDI jumped to an average of about US\$40 million per year. This further increased to US\$158 million in the 1990s. Unfortunately, the liberalization process suffered a significant setback when the Sri Lanka Freedom Party (SLFP) came to power in 2004 and started to follow statist economic policies advocating more state involvement in economic activities (Athukorala, 2012). In 2011, the Sri Lankan Government passed a controversial law in the parliament – the Revival of Under Performing Enterprises or Under Utilized Assets Act of Sri Lanka – and a few MNEs were expropriated (The Economist, 2011). This has clearly undermined Sri Lanka as an attractive location of FDI and may suggest that discomfort with and suspicion of MNEs and FDI are regaining place in policy circles. It is therefore paramount to evaluate the role of MNEs and FDI in domestic firm development in Sri Lanka and to draw policy implications based on empirical investigation.

**Figure 1: FDI in Sri Lanka, US\$ million**



Source: UNCTAD.

The rest of the paper is organized as follows. The next section provides an overview of FDI in Sri Lanka. This sets up the context for the descriptive and econometric analysis in sections 3 and 4. The final section offers a discussion and conclusions.

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## 2. FDI in Sri Lanka – an overview

At the time of independence in 1948, Sri Lanka compared favourably with many of today's East Asian high performers (Hossain, et al., 1999). It had and still has rich natural resources which are favoured by manufacturing industry, tourism and related services. It had a vibrant export sector, good physical infrastructure and a broad-based and efficient administrative apparatus. To this day, Sri Lanka has maintained its high level of education with an adult literacy rate of over 90 per cent, indicating a potential supply of highly trainable workers. However, following a period under an inward-looking regime and with pervasive Government intervention in business activities, Sri Lanka faced slow economic growth and negligible FDI inflows. At times, there was even divestment by MNEs. In response to this dismal economic outcome, in 1977 the administration of Janius Jayawardena explicitly committed to reintegrating Sri Lanka into the world economy. Overall Sri Lanka has since taken a fairly liberal approach towards FDI, particularly in comparison with its South Asian neighbours (Pravakar, 2006). However, this economic liberalization process has not been smooth and has been experiencing setbacks in recent years.

During the first wave of liberalization between 1977 and the early 1980s, an impressive list of measures was adopted, including restructuring the financial system, removing trade and investment barriers, lifting price controls, opening up the economy to FDI and setting up export processing zones (EPZs) (Athukorala, 2012; Athukorala and Rajapatirana, 2000). What is particularly important to MNEs and FDI was the constitutional guarantee given to foreign investors against expropriation of foreign-owned assets without compensation (Athukorala, 1995), a privilege which foreign investors enjoyed until the Government expropriated 37 private enterprises (some of which are foreign owned firms) in 2011 under the Revival of Underperforming Enterprises and Underutilized Assets Act. These outward-oriented policy initiatives played a crucial role in attracting export-oriented FDI, helping Sri Lanka broaden its export profile in light consumer goods such as garments, footwear and sports goods, and cutting and polishing imported diamonds. However, the process lost momentum in the early 1980s (Athukorala, 1995).

The second wave of the liberalization package, implemented in the 1990s, focused more on export expansion and included further tariff

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cuts, simplification of the tariff structure, opening up of the current account and privatization of large State-owned enterprises (Athukorala, 1995; Athukorala and Rajapatirana, 2000; World Bank, 2007). These reforms, for example, which abolished tariffs on textiles and substantially reduced the tariffs on clothing in 1997, were instrumental for the expansion of the export-oriented garment industry, a sector that subsequently expanded to account for more than 50 per cent of exports by the 2000s (Central Bank of Sri Lanka, 2001). A new Investment Policy Statement was announced which included the set-up of a new Board of Investment (BOI), the principal government authority responsible for foreign investment. The BOI approves FDI projects, with the exception of major investments such as infrastructure projects, which still require permission from the Cabinet. The BOI has extensive authority for tax relief and administrative discretion in all matters related to FDI and can grant these concessions to firms that fulfil stipulated eligibility criteria on minimum investment, exports and employment. The establishment of the BOI helped to facilitate and speed up investment approval within a unified policy framework.

The liberalization process suffered another setback with the change in government to Sri Lanka Freedom Party leadership in 2004. There was a tendency to revert back to a dirigiste regime (Athukorala, 2012). The government espoused a shift to a mixed economy and called for re-emphasizing the role of the State and the protection of agriculture and small and medium-sized enterprises (SMEs). State control of strategic enterprises was advocated, and the role of the State was expanded by revitalizing previously closed State-owned enterprises (SOEs), imposing fresh nationalization and setting up new ventures by the Government (Athukorala, 2012; U.S. Department of State, 2015). The government also halted some of the privatizations that were in process and reversed several previous privatization projects by renationalizing them (Bureau of Economic Energy and Business Affairs, 2011). Privatization was ruled out in such industries as banking, power, energy and transportation. Finally, it is also worth mentioning the new regulations prohibiting the sale of State-owned and private-owned land to foreigners passed in February 2013 (Reuters, 2013). Until then, foreign investors could purchase land from private sellers subject to a 100 per cent tax,<sup>1</sup> although the Government, which owns about 80 per

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<sup>1</sup> This tax is applicable if the foreign stake of a venture is not less than 25 per cent.

cent of the land in Sri Lanka, usually leased land on 50-year terms or on 99-year terms on a case-by-case basis (Bureau of Economic Energy and Business Affairs, 2012). These are obviously very concerning to foreign investors when making FDI decisions.

Against this policy framework for FDI, we can examine the pattern of FDI in Sri Lanka. According to data published by UNCTAD, FDI inflows between 1970 and 1976 were negligible or even negative. Performance has improved steadily since 1977, and the growth in FDI is considerable relative to the pre-liberalization era (figure 1). In the broader context, however, Sri Lanka’s performance in attracting FDI has been low by the standards of the best performers in Asia (table 1) and the country has yet to regain the “investment centre in Asia” image that prevailed in the aftermath of the 1977 reform (Athukorala, 1995). For example, Malaysia, a country with a population comparable to that of Sri Lanka, attracted 12 times as much FDI inflows as Sri Lanka in 2011. Its FDI stock in that year was more than 19 times that of Sri Lanka.

**Table 1. Comparative FDI Performance by Asian Country, 2011**

Country	FDI Inflow (US\$ million)	FDI Inflow per capita (US\$)	FDI Inflow as % of GCF	FDI Stock (US\$ million)	FDI Stock per capita (US\$)	FDI Stock as % of GDP
<u>South Asia</u>						
Sri Lanka	981.10	46.62	6.12	5989.50	284.60	10.12
India	36190.40	29.15	5.90	206434.60	166.28	10.88
Pakistan	1327.00	7.51	5.54	20916.00	118.34	10.01
Bangladesh	1136.38	7.55	4.33	6165.81	40.97	5.81
Nepal	95.49	3.13	2.43	348.10	11.42	1.88
<u>East Asia</u>						
China	123985.00	92.01	3.72	711802.00	528.21	9.88
Hong Kong	96125.39	13496.61	180.51	1184511.36	166312.87	486.85
Korea, Rep.	10246.50	211.74	3.35	133660.00	2762.06	11.97
<u>Southeast Asia</u>						
Malaysia	12197.58	422.66	19.14	115063.98	3987.09	39.96
Singapore	55922.66	10779.37	91.89	625744.75	120615.43	240.81
Thailand	7778.68	111.89	8.39	150517.17	2165.14	40.71
Viet Nam	7430.00	83.68	20.44	64162.30	722.61	51.91
Philippines	1816.00	19.15	4.18	28230.00	297.62	12.56
Indonesia	19241.25	79.40	7.10	185803.73	766.75	21.94

Sources: World Development Indicators, 2013 and UNCTAD, 2013.

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In the case of sectoral distribution, a majority of sectors are now open to FDI. However, Sri Lanka also maintains a list of sectors in which FDI is completely restricted<sup>2</sup> or is allowed only with minority stakes<sup>3</sup> (Bureau of Economic Energy and Business Affairs, 2012). Furthermore, FDI in several strategic sectors<sup>4</sup> is regulated and subject to approval by the BOI and other Government agencies (Bureau of Economic Energy and Business Affairs, 2012). Table 2 shows the sectoral distribution of FDI in selected years published by the Central Bank.<sup>5</sup> FDI dominated manufacturing in the initial phase of the post-liberalization era. By 1983, more than 90 per cent of realized foreign investment in BOI-registered enterprises was concentrated in manufacturing. FDI in services started picking up in 1990s, largely due to privatization (UNCTAD, 2004), and services has now become the most prominent sector. By 2011, services accounted for more than 70 per cent of total FDI stock. Agriculture, by contrast, remains largely unexplored by foreign investors.

Within manufacturing, FDI is narrowly concentrated in a few sectors. As per the ISIC Rev. 3 technology intensity definition (Economic Analysis and Statistic Division, 2011), a large share of FDI<sup>6</sup> took place in either medium-low-tech or low-tech industries. Furthermore,

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<sup>2</sup> Areas of non-bank money lending, pawn-brokering, retail trade with a capital investment of less than \$1 million and coastal fishing are completely restricted for foreign investments.

<sup>3</sup> Foreign investments in growing and processing of primary commodities, production for export of goods are subject to international quotas. Timber-based industries using local timber, deep sea fishing, mass communications, education, freight forwarding, and travel agency and shipping agency businesses are partially restricted, i.e. foreign investors are allowed to invest up to 40 per cent or a higher percentage if approval of the BOI is granted.

<sup>4</sup> These sectors are air transportation, coastal shipping, large-scale mechanized mining of gems and lotteries, as well as manufacture of military hardware, military vehicles and aircraft; dangerous drugs; alcohol, toxic, hazardous or carcinogenic materials; currency; and security documents.

<sup>5</sup> We thank a reviewer for pointing out to us an issue related to FDI statistics reported by the Central Bank of Sri Lanka. From about 2005, the Central Bank has included bank loans by foreign firms as part of reported FDI. In other words, though UNCTAD's FDI statistics include only equity capital, reinvested earnings and intracompany loans, those published by the Central Bank also include bank loans. For example, UNCTAD reported that Sri Lanka's FDI inflows in 2014 were US\$944 million, but the Central Bank reported US\$1,685 million, of which US\$740 million were bank loans. Therefore, we interpret the Central Bank's FDI data with caution.

<sup>6</sup> The only exception is the chemical sector, which is categorized as a medium-high-tech industry. However, FDI in the chemical sector is not reported separately, but as part of petroleum, coal, rubber and plastic products.

export-oriented manufacturing FDI is largely concentrated in low-tech, labour-intensive industries. A majority was in the textile, garments and leather industry, which accounted for about one third of total realized manufacturing FDI in 2011, followed by the food, beverages and tobacco industry (15 per cent). However, it is worth noting here that the UN factor intensity classification is based on product nomenclature and does not take into account the production process involved.<sup>7</sup> Some industries that are traditionally considered to be low-tech increasingly need advanced technologies for production. A case in point is the garment industry. The Sri Lankan garment industry has made a shift from producing low value added garments to producing specialized, high-quality, up-market garments by investing in machinery and equipment and adopting new and efficient technologies (Dheerasinghe, 2003; Kapuge and Smith, 2007).

**Table 2. Sectoral Distribution of Realized FDI in BOI-registered Enterprises in Sri Lanka**

Sector	1983		1991		2001		2011	
	US\$ million	% of total	US\$ million	% of total	US\$ million	% of total	US\$ million	% of total
<b>Manufacturing</b>	<b>54.3</b>	<b>92.4</b>	<b>210.3</b>	<b>77.3</b>	<b>581.1</b>	<b>36.8</b>	<b>1760.9</b>	<b>29.6</b>
Food, beverages, and tobacco products	0.3	0.6	2.3	0.8	56.6	3.6	262.5	4.4
Textile, wearing apparel, and leather products	27.2	46.3	76.5	28.1	246.3	15.6	568.7	9.6
Wood and wood products	0.4	0.7	0.1	0.0	14.5	0.9	76.0	1.3
Paper products, publishing and printing	0.0	0.0	1.9	0.7	5.8	0.4	38.9	0.7
Chemical, petroleum, coal, rubber, and plastic products	10.8	18.3	67.5	24.8	113.9	7.2	355.8	6.0
Non-metallic and mineral products	2.0	3.4	11.7	4.3	34.9	2.2	115.0	1.9
Fabricated metal products, machinery and transport equipment	2.6	4.5	29.2	10.7	42.8	2.7	142.5	2.4
Manufactured products (nec)	11.0	18.7	21.2	7.8	66.3	4.2	201.6	3.4
<b>Services</b>	<b>4.5</b>	<b>7.6</b>	<b>61.6</b>	<b>22.7</b>	<b>999.6</b>	<b>63.2</b>	<b>4187.5</b>	<b>70.4</b>
<b>Total</b>	<b>58.7</b>	<b>100</b>	<b>271.9</b>	<b>100</b>	<b>1580.7</b>	<b>100</b>	<b>5948.4</b>	<b>100</b>

Source: Central Bank annual reports, various years.

<sup>7</sup> We thank a reviewer for suggesting this point.



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In terms of entry mode, wholly owned subsidiaries have been preferred to other forms. According to Investment Policy Review of Sri Lanka by UNCTAD (2004), between 1979 and 2000, wholly owned subsidiaries accounted for about 60 per cent of estimated FDI by value and 45 per cent by number of projects. This pattern may influence the benefits that domestic firms can derive from FDI. It is generally believed that domestic firms benefit more from joint ventures (JVs) than from wholly owned subsidiaries. JVs are considered a more efficient mechanism for the transfer and learning of technology and knowledge, particularly for knowledge that is organizationally embedded and tacit (Wei and Balasubramanyam, 2004). JVs enable local and foreign partners to work together and exploit each other's strengths, with local partners usually contributing local knowledge and foreign partners providing advanced knowledge-based assets. The close interactions between the two parties and the transfer of knowledge-based assets from MNEs give rise to mutual learning between foreign and domestic firms.

### **3. A preliminary investigation of foreign versus Sri Lankan firms**

Data used in this empirical study came from the Sri Lanka 2011 Enterprise Survey dataset published by the World Bank.<sup>8</sup> The sample frame used is the database of firms obtained from the Department of Census and Statistics of Sri Lanka, covering the non-agricultural economy and comprising manufacturing (group D); construction (group F); services (groups G and H); transport, storage, and communications (group I); and information technology, or IT (subsector 72 of group K).<sup>9</sup> For the survey, firms were randomly selected from the population of registered businesses on the basis of a stratified random sampling approach at three levels: industry, size and region. Thereafter, private contractors visited the chosen sample firms and collected a range of quantitative and qualitative information through the administration of questionnaires. This dataset therefore is expected to have the characteristics of representativeness and reliability.<sup>10</sup> However, there is criticism that some local private contractors simply covered only the

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<sup>8</sup> <http://www.enterprisesurveys.org/data>

<sup>9</sup> Group classification is based on ISIC Revision 3.1.

<sup>10</sup> <http://www.enterprisesurveys.org/methodology>

“easy to approach” foreign firms whose head offices are in and around the central business district of Colombo.<sup>11</sup> This weakens the World Bank’s claim regarding sample representativeness. We do not have evidence about whether the sample biases systematically affect the results. Due caution is needed in this regard.

This dataset contains information on 610 firms in both the manufacturing and the services sectors. In the questionnaire, the firms are asked to self-identify whether they are domestic or foreign firms. For certain objective questions, such as sales and employment, firms are asked for information for 2007/2008 (three fiscal years before the sampling period). Although the time dimension is short, there is abundant information at the firm level, which gives us an opportunity to compare and contrast the characteristics of foreign and domestic firms. Table 3 presents the breakdown of foreign and Sri Lanka firms in each sector. One salient limitation of this sample is that only a few foreign firms are included in some sectors, particularly in the textile, garments and leather products industry. Available evidence shows that although the number of foreign firms is low in this industry, they account for a large share of output (Kelegama and Foley, 1999).

**Table 3. Distribution of Foreign and Domestic Firms by Sector**

Sector	Number of Firms		
	Total firms	Domestic firms	Foreign affiliates
<b>Manufacturing</b>			
Food, beverages, and tobacco products	130	124	6
Textile, wearing apparel, and leather products	130	129	1
Wood and wood products	34	34	0
Paper products, publishing and printing	6	5	1
Chemical, petroleum, coal, rubber, and plastic products	20	17	3
Non-metallic mineral products	30	28	2
Fabricated metal products, machinery and transport equipment	4	4	0
Manufactured products (nec)	2	2	0
<b>Services</b>	246	229	17
<b>Total</b>	602	572	30

Source: World Bank Enterprise Survey, Sri Lanka, 2011.

<sup>11</sup> We thank a reviewer for drawing our attention to this point.

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Table 4 lists firm characteristics differentiated by foreign and domestic ownership. In order to observe the differences between foreign and domestic firms, we regressed each characteristic on a dummy variable (FOR) that identifies whether a firm is an MNE affiliate or a domestic firm and sector-specific dummy variables that account for sector-specific differences. When the dependent variable was a binary variable, Probit estimation was used. When the dependent variable was a continuous variable, ordinary least squares (OLS) estimation was used. A statistically significant FOR variable indicates the differences between foreign and domestic firms. The test results are reported in the last column of table 4.

Foreign firms were considerably larger than domestic firms, whether measured by sales or employment. They also enjoyed substantially higher labour productivity and profitability. In terms of factor inputs, capital intensity, measured as energy consumption per employee,<sup>12</sup> was higher in foreign firms than in domestic firms, though the difference was not statistically significant. Whereas only a quarter of domestic firms undertook formal training programs, more than 83 per cent of foreign firms did so. For the aspect of staff turnover, however, foreign firms have a lower mean value than domestic firms, but the difference is not statistically significant. In terms of wage rate and human capital, foreign firms paid a higher nominal wage rate and employed a higher percentage of educated employees than domestic firms. However, the effective wage rate as measured by skill-adjusted wage rate was lower for foreign firms, though the difference between the two groups of firms was not statistically significant, suggesting foreign and domestic firms pay a similar level of wage for a given level of human capital.

Of the foreign firms, 30 per cent engaged in exporting and 26.7 per cent in importing, respectively, in comparison with about 8 per cent

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<sup>12</sup> Net assets per worker – a popular measure of capital intensity in previous studies – cannot be computed, as a majority of firms have not reported the value of their net assets. Energy consumption per worker is chosen as an alternative measure. This is because capital and energy are complementary inputs in manufacturing (Globerman, et al., 1994) and energy consumption per worker has been used in several studies as a measure of capital intensity (Globerman, et al., 1994; Lipsey and Sjöholm, 2004a, 2004b, 2004c). Energy consumption is taken as the total cost of fuel and electricity for the manufacturing sector and the cost of electricity for the services sector.

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and 10 per cent of domestic firms. On average, foreign firms' export intensity and import intensity were noticeably higher, indicating that foreign firms were more export-oriented and relied more on imports of foreign inputs for local production. Considering both direct and indirect exporting, foreign firms significantly outperformed local firms, with 47 per cent of foreign firms, in contrast to 16.6 per cent of domestic firms, engaged in exporting directly or indirectly. As foreign firms were active in both direct and indirect exporting, it might be the case that foreign firms exported through other foreign firms. This speculation, coupled with the higher import propensity of foreign firms, might suggest that foreign firms sourced a large proportion of their inputs either abroad or from other foreign firms in the host country. However, this speculation cannot be confidently ascertained without observing the dyadic sourcing relationships between sourcing and supplying firms.

Foreign firms tend to engage in R&D activities much more than domestic counterparts. Some 41.4 per cent of foreign firms incurred R&D expenditures compared with 11.2 per cent of domestic firms. Foreign firms also displayed a higher propensity to introduce new products or services, new or significantly improved methods, new or significantly improved logistical or business support processes, new or significantly improved organizational structures or management practices, and new or significantly improved marketing methods.

Our results are largely consistent with empirical studies conducted of other countries (Chudnovsky, et al., 2008; Domes and Jensen, 1998; Yasar and Paul, 2007). However, it is important to highlight one limitation of these comparisons. Except for sector-specific effects, we do not separately account for other factors that might be relevant to explaining each type of characteristic observed. For example, differences in labor productivity may be due to other factors, such as capital intensity and the skill intensity of the workforce. Bearing this caveat in mind, we shall investigate whether gaps between foreign and domestic firms translate to direct and spillover effects that benefit the productivity of firms in Sri Lanka.

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#### **Table 4. Comparison of Characteristics of Foreign and Domestic Firms**

*Notes:* FOR is a dummy variable reflecting whether a firm is an MNE affiliate or a domestic firm. Standard errors in parentheses in the last column. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

<sup>a</sup> Regressions with sector-specific dummies included as control variables.

<sup>b</sup> Indirect exporting is about selling the products domestically to a third party that then exports these products to foreign countries.

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#### **4. Direct and spillover effects of FDI on labour productivity**

How FDI affects the productivity of firms in a host country has been widely studied (see survey articles such as Iršová and Havránek (2013), Meyer and Sinani (2009), Wooster and Diebel (2010) and Blomström and Kokko (1998)). The effects of FDI can materialize as direct effects (or own-firm effects) or indirect (or spillover) effects (effects on other domestic firms in the host country). Direct effects capture the direct results arising from the MNE's ownership of its affiliates in the host country. MNEs, through their active role in R&D, produce, own and control a majority of the world's advance technologies, knowledge and know-how. Therefore, FDI can be a major channel through which technology transfer from advanced countries to developing countries takes place. Local MNE affiliates can enjoy higher productivity thanks to the resources, technology, and management know-how transferred from the MNE headquarters and other subsidiaries. Local affiliates can also benefit from employee training provided by MNEs and the support they receive in undertaking local R&D.

The presence of MNEs and FDI in the host country can also have an impact on other domestic firms. Positive indirect and/or spillover effects on productivity can take place through channels such as demonstration and imitation effects (foreign firms demonstrating the use of new products or processes, organizational innovation and superior management practices to other domestic firms and other domestic firms reverse-engineering from foreign firms' R&D results), competition effects (foreign firms competing against other firms, which leads to a reduction in X-inefficiency and faster adoption of new technology, knowledge and know-how), and labour turnover effects (other firms recruiting former employees of foreign firms, and the former employees of foreign firms setting up their own domestic firms) (Blomström and Kokko, 1998).

However, there are concerns about the negative effects of FDI and MNEs on domestic firms (Nam and Young, 2004). Unlike demonstration and labour turnover effects, which are presumably positive, MNEs' presence in a host country may affect competition negatively. Increased competition from foreign firms may compel domestic firms to operate

on less-efficient scales of production, which has implications for productivity for at least two reasons. First, when domestic firms lose market share, lower productivity can result from spreading fixed costs over smaller output or diseconomies of scale (Aitken and Harrison, 1999; Lipsey, 2004). Second, larger and profitable firms are in a better position to undertake R&D (Blomström and Kokko, 1998), so shrinking profits would inhibit firms from undertaking R&D to gain competitive advantages. MNEs that undertake import-substituting FDI, which occurs because of tariff and non-tariff barriers, may increase their lobbying efforts to maintain such barriers for their own advantages and survival (Loungani and Razin, 2001); as a result, domestic firms may see their productivity decrease. Overall, whether spillover effects are positive or negative is an empirical question.

Direct and spillover effects of FDI on firm level productivity are usually estimated based on the production function. In line with the previous literature (e.g. Aitken and Harrison (1999) and Vahter (2004)), we estimate the effects of FDI on labour productivity<sup>13,14</sup> using the following model:

$$LP_{ij} = \beta_0 + \beta_1 FOR_{ij} + \beta_2 FOR*FP_j + \beta_3 DOM*FP_j + \beta_4 SIZE_{ij} + \beta_5 SIZE_{ij}^2 + \beta_6 WAGE_{ij} + \beta_7 TRADE_{ij} + \beta_8 STATUS_{ij} + \beta_9 EC_{ij} + \beta_{10} RD_{ij} + \varepsilon_{ij} \quad (1)$$

where  $LP_{ij}$  is the labour productivity of firm  $i$  that belongs to industry  $j$ ,  $FOR_{ij}$  is a dummy variable identifying whether firm  $i$  is a foreign affiliate,  $DOM_{ij}$  is a dummy variable identifying whether firm  $i$  is a domestic firm,  $FP$  is foreign presence in industry  $j$ ,  $FOR$  assesses direct effects and  $FP$  spillover effects of MNEs.

<sup>13</sup> Owing to data limitations for input costs and capital employed, total factor productivity cannot be accurately measured; therefore, labour productivity was chosen as the measure of productivity.

<sup>14</sup> The linkage effect of FDI to downstream and upstream sectors could not be investigated owing to the unavailability of input-output data. However, this study uses a broad sectoral classification, i.e. a classification that is largely based on two-digit sectoral classification, and some of the two-digit sectors are grouped into broader categories; therefore some vertical relationships between three-digit or more disaggregated sectors are included within each of the two-digit sectors (Vahter and Masso, 2006). For example two-digit sectors 17 to 19 – i.e. textiles (17), garments (18) and leather (19) – are considered as one category, and therefore, vertical relationships among these three are included within the considered category. Thus, although the measured spillover effects largely represent horizontal effects, they may capture some vertical effects.

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FP is interacted with both FOR and DOM in order to differentiate the spillover effects of MNEs on other foreign firms and other domestic firms, respectively. This approach was used in several previous studies; see for example Smarzynska (2002) and Chudnovsky, et al. (2008). To ensure the appropriate assessment of FDI effects, we also include a few firm- and industry-level control variables. Appendix A presents the rationale for including control variables.

SIZE and SIZE<sup>2</sup> are firm size and its squared term. WAGE is the average wage rate. TRADE is a dummy variable indicating whether firm *i* carries out international trade (both export and import). STATUS differentiates firms by whether they are 1) a shareholding company or a sole proprietorship or 2) a partnership company. EC and RD are capital intensity and R&D respectively. Also included as control variables are industry dummies for the following 21 sectors: food (15), tobacco (16), textiles (17), garments (18), leather (19), wood (20), paper (21), recorded media (22), chemicals (24), plastics and rubber (25), non-metallic mineral products (26), medical and optical precision instruments (33), transport machines (34), furniture (36), recycling (37), construction (45), sales, repairs, and service of motor vehicles (50), wholesale (51), retail (52), hotel and restaurants section H (55), transport (60) and IT (72). Detailed information on variable measurements and data sources is provided in table 5.

Non-random selection of FDI recipients is a major concern in estimating equation 1 (Vahter, 2004). It is often noted that MNEs tend to acquire stakes in domestic firms that have better performance or better assets or capabilities,<sup>15</sup> or to be drawn towards more productive industries (Smarzynska, 2002). Also, it is generally recognized that only the most productive firms can engage in FDI (Helpman, et al., 2004). Many studies have indicated the existence of this self-selection bias (Vahter and Masso, 2006). Assuming an MNE's decision to enter into FDI is dependent on certain characteristics of the firm, the following dichotomous-choice model can be formulated:

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<sup>15</sup> This applies only for acquisitions; however, foreign firms also engage in greenfield investments when they set up new firms from scratch.



$$\text{FOR}_{ij} = 1 \text{ if } \text{FOR}^*_{ij} > 0$$

$$\text{FOR}_{ij} = 0 \text{ otherwise}$$

$$\text{where } \text{FOR}^*_{ij} = \alpha_0 + \alpha_1 \text{L3.LP}_{ij} + \alpha_2 \text{L3.SIZE}_{ij} + \alpha_3 \text{EXP\_FIRM}_{ij} + \alpha_4 \text{SKILL}_{ij} + e_{ij} \quad (2)$$

L is the lag operator. The prefix L3 indicates that the variable is lagged by three years. Using lagged variables helps mitigate the endogeneity problem (see appendix A). EXP\_FIRM identifies whether firm i exports or not. SKILL captures the skill intensity of workforce.

**Table 5. Variable Measurement and Data Sources**

Variable	Measurement
LP (Labor productivity)	Output per employee in millions of rupees
FOR (Foreign firms)	Whether or not a firm has foreign ownership: 1 if the firm's foreign equity is more than 10 percent, 0 otherwise.
DOM (Domestic firms)	Whether or not a firm is domestically owned: 1 if the firm's foreign equity is less than 10 percent, 0 otherwise.
SIZE (Firm size)	Categorical variable representing how large the firm is: 1 if a firm is a micro-firm, employing fewer than 5 employees 2 if a firm is a small firm, employing between 5 and 19 employees 3 if a firm is a medium firm, employing between 20 and 99 employees 4 if a firm is a large firm, employing more than 99 employees
WAGE (Wage rate)	Average wage rate in thousands of rupees
SKILL (Skill intensity)	Percentage of full-time permanent workers who completed secondary school education
TRADE	Whether a firm engages in international trade: 1 if the firm either exports or imports, 0 otherwise
STATUS	Firm's status: 0 if a firm is a sole proprietorship or a partnership, 1 if a firm is a shareholding company
EC (Capital intensity)	Energy consumption per employee in millions of rupees
EXP_FIRM	Whether a firm exports or not: 1 if the firm exports, 0 otherwise
RD (R&D)	Whether a firm undertakes R&D or not: 1 if the firm has spent on formal R&D activities during the last three years, 0 otherwise
FP (Foreign presence in the industry)	Cumulative realized FDI stock in each sector as of the end of 2010 in US\$ million. Different measurements of foreign presence have been used in the literature including the share of the capital, employment, and output and sales of foreign firms in the sector. Many studies use the sample to calculate FP (Havranek & Irsova, 2012). We choose to use the cumulative realized FDI stock, which should capture all foreign firms, not a sample of foreign firms in a sector.

Sources: World Bank Enterprise Survey Dataset, 2011 and Central Bank of Sri Lanka, 2010.

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$FOR_{ij}^*$  is a latent variable that measures MNEs' underlying propensity to invest in firm  $i$  that belongs to industry  $j$ .  $FOR_{ij}$  is a dichotomous variable indicating whether the firm received FDI or not, taking the value of 1 if the latent variable  $FOR_{ij}^*$  is positive and taking 0 otherwise. Although the latent variable  $FOR_{ij}^*$  is not directly measurable, the indicator variable  $FOR_{ij}$  can be directly measured. Disregarding the selection model (equation 2) when the outcome model (equation 1) is estimated can lead to biased estimates of direct effects and spillover effects. To account for the selection issue, a two-stage Heckman selection model is used.

This procedure involves two steps. First, equation 2 is estimated using a Probit estimation to obtain an estimate of  $\alpha$ s and compute the inverse Mills ratio (INVMILLS), which is thereafter included as an additional regressor in equation 1 to control for selection bias and obtain an estimate for  $\beta$ s. Equation 1 is estimated using OLS.<sup>16</sup> The residuals of equation 1 were tested for heteroskedasticity. As the results indicate heteroskedasticity, robust standard errors are employed.

Table 6 presents the descriptive statistics and correlation coefficients for the variables used in the estimations. The correlation coefficients are low among the variables in equation 1 and those in equation 2; therefore, multicollinearity is unlikely to be an issue of concern. Tables 7 and 8 show the results of the selection model (equation 2) and the outcome model (equation 1), respectively. Table 7 reveals that labour productivity is not the main factor driving the decision to enter into FDI; skill intensity, firm size and export orientation are more important.

Table 8 presents the results that are of particular interest to us. Columns 1 and 2 show the results without accounting for the self-selection issue for comparison. In columns 2, 3 and 4, industry-specific and/or region-specific fixed effects are included to control for unobserved industry-specific and/or region-specific effects. Note that the estimated coefficients of inverse Mills ratio are negative and significant in columns 3 and 4, indicating that self-selection is prevalent and highlighting the importance of correcting for the selection bias. Previous studies – for example, Aitken and Harrison (1999) and Marin

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<sup>16</sup> For further explanations about this procedure, see Heckman (1979) and Smarzynska (2002).

and Bell (2006) – have warned that when FDI takes place in highly productive sectors, there can be a positive association between foreign presence in the sector and the productivity of domestic firms in the same sector. Our results, thus, reiterate the importance of controlling for industry-specific effects and addressing the self-selection issue. Comparing columns 3 and 4, which present results without and with regional dummies, the results are qualitatively similar. This is unsurprising because Sri Lanka is a relatively small country. Therefore, firms are likely to consider all of Sri Lanka as one market and pay little attention to regional differences.

**Table 6. Descriptive Statistics and Correlation Matrix**

Variable	Descriptive Statistics				Correlation Matrix										
	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	
1 LP	2.58	6.98	0.025	80											
2 FOR	0.05	0.22	0	1	0.15										
3 FP	1494.97	1443.11	35	3221.9	0.08	0.06									
4 SIZE	1.67	0.77	1	3	0.06	0.23	-0.02								
5 SKILL	53.08	34.09	0	100	0.08	0.07	0.24	0.08							
6 WAGE	220.72	407.60	5.455	5333.3	0.22	0.20	0.08	0.08	0.04						
7 TRADE	0.16	0.37	0	1	0.11	0.20	-0.22	0.40	0.05	0.11					
8 EXP_FIRM	0.09	0.29	0	1	0.06	0.18	-0.09	0.36	0.08	0.12	0.72				
9 STATUS	0.20	0.40	0	1	0.20	0.22	0.03	0.39	0.08	0.18	0.25	0.20			
10 EC	110.92	836.14	0	18157.8	0.25	0.03	-0.06	0.04	-0.07	0.16	0.13	0.02	0.01		
11 RD	0.13	0.33	0	1	0.15	0.22	0.02	0.36	0.05	0.12	0.20	0.22	0.21	0.14	

**Table 7. Results of the Probit Estimation of the Selection Model for FDI**

Dependent Variable: FDI	
L3.LP	0.00542 (0.00485)
L3.SIZE	0.291** (0.133)
EXP_FIRM	0.552* (0.289)
SKILL	0.00717** (0.00339)
Prob > chi2	0.0003
Pseudo R-squared	0.1177
Number of observations	476

Note: Standard errors in parentheses; \*\*\* p = <0.01, \*\* p = <0.05, \* p = <0.1

**Table 8. Results of the Outcome Model for Labor Productivity**

	(1) OLS	(2) OLS	(3) Heckman	(4) Heckman
FOR	7.407** (3.336)	7.950** (3.399)	8.537* (4.449)	8.709* (4.306)
FOR*FP	-0.00219* (0.00113)	-0.00386*** (0.00104)	-0.00420*** (0.00135)	-0.00425** (0.00173)
DOM*FP	0.000503* (0.000248)	-0.00105*** (0.000116)	-0.00140*** (0.000212)	-0.00134** (0.000523)
SIZE	3.507 (3.270)	3.236 (3.816)	4.117 (3.833)	3.975 (3.884)
SIZE <sup>2</sup>	-1.096 (0.942)	-1.035 (1.108)	-1.598 (1.112)	-1.513 (1.088)
WAGE	0.00259** (0.000953)	0.00274** (0.00111)	0.00309 (0.00182)	0.00263 (0.00190)
TRADE	1.141 (0.894)	1.284 (1.086)	0.406 (1.141)	0.218 (1.204)
STATUS	2.480** (0.888)	2.431** (0.974)	2.991** (1.168)	2.423* (1.253)
EC	0.00170*** (0.000187)	0.00168*** (0.000189)	0.00188*** (0.000138)	0.00188*** (0.000135)
RD	1.402 (0.991)	1.517 (0.932)	1.691** (0.803)	1.536* (0.749)
INVMILLS			-3.990*** (1.379)	-3.795** (1.521)
Industry fixed effects	NO	YES	YES	YES
Regional effects	NO	NO	NO	YES
R-squared	0.165	0.192	0.216	0.235
Number of Observations	525	525	454	454

Notes: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

FOR is positive and significant in all specifications in columns 1 through 4, indicating the direct effects of FDI. The finding is consistent with previous studies of other countries (Chudnovsky, et al., 2008; Domes and Jensen, 1998; Lipsey, 2004; Yasar and Paul, 2007). Given the importance of technological progress to individual firms for their competitiveness and to the country for its development, it might be cost-effective for Sri Lankan firms to use existing technologies in the

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developed world. Through working directly with MNEs, firms in Sri Lanka are exposed to foreign technologies, and their productivity improves as a result.

FDI\*FP is negative and significant in all specifications, indicating negative intra-industry FDI spillover effects on other foreign firms. This result is broadly consistent with the findings of past empirical studies. For example, Chudnovsky, et al. (2008), on the basis of firm-level data on Argentina, find that foreign firms have negative spillovers on other foreign firms. Chuang and Lin (1999) also show weak spillovers on other foreign firms using Taiwanese firm-level data. DOM\*FP is positive and significant for the specifications that do not control for self-selection and industry fixed effects (column 1). In contrast, when industry fixed effects are included (columns 2, 3 and 4), this interaction term turns negative and highly significant. Given the significance of INVMILLS, we infer that foreign firms have a negative spillover effect on the productivity of domestic firms.

We now turn our attention to control variables and summarize our findings briefly. As expected, SIZE is positive and SIZE<sup>2</sup> is negative in all specifications; however, they are statistically insignificant. WAGE and R&D are positive and significant in some specifications, indicating the importance of firm-level labour quality and R&D activity on productivity. TRADE is positive in all specifications but statistically insignificant. EC and STATUS are both positive and statistically significant in all specifications. Thus, capital-intensive firms are more productive. Shareholding companies are more productive than sole proprietorships or partnerships.

Some of the recent studies on productivity spillovers have emphasized the importance of accounting for the non-normal distribution of firm productivity in the sample (Damijan, et al., 2013; Dimelis and Louri, 2002; Girma and Görg, 2007). If firm productivity in the sample is not normally distributed, which is usually the case because there is large and persistent heterogeneity in labour productivity across firms even within narrowly defined sectors (Girma and Görg, 2007), quantile regression that allows the examination of FDI's effects at different points of the conditional distribution of labour productivity would be preferred to standard least squares. In other words, quantile regression permits the investigation of the relative importance of

explanatory variables across the whole distribution of the labour productivity variable in comparison with the central tendency of the variable by taking into account the large and persistent heterogeneity in productivity across firms. Formal testing for normality using the Shapiro-Wilk normality test and the Shapiro-Francia normality test leads to a rejection of the null hypothesis of normality. Quantile regressions were estimated and the results are reported in table 9.

**Table 9. Results of the Quantile Regressions with Heckman Treatment Effects**

	(1)	(2)	(3)	(4)	(5)
	10 <sup>th</sup> quantile	25 <sup>th</sup> quantile	50 <sup>th</sup> quantile	75 <sup>th</sup> quantile	90 <sup>th</sup> quantile
FOR	-0.0330 (0.144)	0.0228 (0.450)	1.844** (0.871)	0.626 (1.523)	71.50*** (2.515)
FOR*FP	-0.00003 0.00006	-0.000129 (0.000144)	-0.00105*** (0.000338)	0.000323 (0.000627)	-0.0239*** (0.000843)
DOM*FP	-0.00002 0.00003	-0.00004 0.00004	-0.000353*** (0.000136)	-0.000437*** (5.58e-05)	-0.00152*** (0.000534)
SIZE	0.0656 (0.0681)	0.102 (0.178)	0.0599 (0.331)	0.832 (0.808)	6.209 (4.018)
SIZE <sup>2</sup>	-0.0277 (0.0202)	-0.0573 (0.0602)	-0.0789 (0.0715)	-0.334 (0.227)	-2.016* (1.082)
WAGE	0.00103*** (0.000394)	0.00166*** (0.000307)	0.00260*** (0.000582)	0.00391** (0.00160)	0.0101 (0.0106)
TRADE	0.0111 (0.0345)	-0.0211 (0.0718)	0.161 (0.200)	0.325 (0.430)	-0.273 (1.337)
STATUS	0.0487 (0.0526)	0.125 (0.103)	0.681* (0.357)	1.367 (1.288)	4.080** (2.047)
EC	0.00184*** (0.000318)	0.00196*** 0.00002	0.00189*** 0.00002	0.00177*** (0.000115)	0.00136** (0.000543)
RD	0.0207 (0.0518)	0.00859 (0.0898)	0.188 (0.283)	0.795 (0.872)	1.176 (1.202)
INVMILLS	-0.0387 (0.0588)	-0.185 (0.120)	-0.388 (0.334)	-0.781 (0.518)	-3.827** (1.799)
Industry fixed effects	YES	YES	YES	YES	YES
R-squared	0.084	0.098	0.140	0.159	0.119

Notes: Sample size = 454; Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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The results largely remain intact except for a few minor differences in some quantiles. FOR remains positive for all quantiles except the 10<sup>th</sup>, where the coefficient estimate is negative but insignificant. This is unsurprising because MNEs' participation is likely to be low in industries with very low productivity. Those who do participate in such industries are unlikely to be superior to their domestic counterparts. Compared with other quantiles, the coefficient estimate of FOR for the 90<sup>th</sup> quantile is very large and highly significant. This shows that foreign firms enjoy high productivity relative to domestic firms in the upper end of the distribution.

In line with the results in table 8, FDI\*FP remains negative for all quantiles except for the 75<sup>th</sup> quantile, where the coefficient estimate is positive but insignificant. DOM\*FP is negative in all estimations. However, the negative coefficients are significant in the median and higher quantiles but insignificant in lower quantiles. This clearly indicates that negative spillovers are stronger in higher quantiles. With respect to control variables, all results remain consistent with those in table 8. The inverse Mills ratio is negative in all quantiles, but only significant in the 90<sup>th</sup> quantile. This implies that self-selection is more prevalent in the upper end of the distribution.

## **5. Discussions and conclusion**

With regard to the role of FDI in developing host countries, broadly speaking, there are three perspectives: the “Washington Consensus” enthusiasm, academic scepticism and dirigisme resurrected (Moran, et al., 2005). The first considers FDI as a major channel for host-country development and, therefore, holds the view that host-country governments should attract and incorporate FDI into their development strategies. To academic sceptics, the nature of FDI is no different to other kind of investments; therefore, there is no point in devoting scarce domestic resources to FDI promotion. The third perspective sees that “host-country development objectives can be achieved only by imposing performance requirements on multinational investors” (Moran, et al., 2005). According to Athukorala (2012), recent developments in the Sri Lankan policy scene shows a pattern of reverting to dirigisme. It is therefore timely to empirically assess FDI in Sri Lanka.

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In line with previous empirical studies conducted on other countries (e.g. Yasar and Paul, 2007; Chudnovsky et al., 2008; and Domes and Jensen, 1998), comparison of foreign and domestic firms in Sri Lanka reveals that foreign firms are distinct from domestic firms. Foreign firms are larger, more productive, more profitable and more active in R&D. Foreign firms tend to hire higher proportions of skilled workers and undertake more in-house training programs. They are more export-oriented but rely more on inputs of foreign origin. These findings therefore indicate the potential that firms in Sri Lanka can learn from MNEs, challenging the validity of academic scepticism.

The results of an econometric study based on the World Bank's Enterprise Survey data provide strong evidence of positive direct effects of FDI but negative spillover effects on domestic firm productivity. Given the Sri Lankan context, this might not be surprising, for several reasons. First, the literature on productivity spillovers recognizes that the extent of spillovers depends on the degree to which foreign affiliates are technologically active in the host country (Marin and Bell, 2006). As shown in section 2, FDI in Sri Lanka has primarily taken place in low-tech sectors. Therefore, the potential for spillovers may be limited.

Second, the extent of spillovers depends on the degree to which foreign affiliates expose their technologies (technology leakage) to other domestic firms (Marin and Bell, 2006). Available evidence on the textiles and clothing industry shows that domestic firms' linkages to MNEs are weak (Kelegama and Foley, 1999). Moreover, the higher import propensity of foreign firms and higher import content of the inputs used by foreign firms, as shown in section 3, could limit the opportunities for domestic suppliers to learn from MNEs and benefit from potential positive spillovers.

Third, the literature on productivity spillovers recognizes that spillover effects depend on the level of absorptive capacity of domestic firms (Damijan, et al., 2013; Marin and Bell, 2006). The industrial structure in Sri Lanka is narrowly concentrated in a few sectors, with little participation in technology-intensive sectors, which indicates that the overall technical knowledge of domestic firms is low. Available evidence also demonstrates that, although Sri Lanka enjoys very good human capital indicators (e.g. secondary education attainment and literacy), only a few technical graduates are produced and retained in the



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country. There is a mismatch between the skills needed by employers and the education provided by the secondary school system and public universities (Ganegodage & Rambaldi, 2011). Our discussion in section 3 shows that compared with foreign firms, only a smaller percentage of domestic firms undertake R&D or in-house training programs. These factors indicate a low absorptive capacity of local firms. Finally, the discussion in section 3 also reveals that foreign firms experience low staff turnover, which again lessens the extent to which foreign affiliates expose their firm-specific assets to domestic firms.

In summary, given the Sri Lanka context, it is unsurprising to see that MNEs help improve the productivity of their affiliates in Sri Lanka but exert competition effects on other domestic (and foreign) firms, while generating limited positive spillover effects through the channels of demonstration, linkage and labour turnover. As the result of the dominance of negative competition effects over other spillover effects, we observe the negative impact of FDI on productivity of other domestic firms.<sup>17</sup>

The findings of this study have important implications for the development of domestic firms. Foreign firms, through their distinctive characteristics, are likely to bring much-needed expertise and skills that could help to overcome the structural deficiencies of the country's industrial structure. However, Sri Lanka's mediocre performance in attracting FDI, particularly FDI in technology-intensive sectors, and the absence of positive spillovers from MNEs to domestic firms may all have resulted in poor performance by domestic firms in upgrading firm-specific capabilities. The goals of the national FDI policies are twofold. First, a country should attract the right type of FDI. Second, a country should devise appropriate policies to extract benefits from the presence of foreign MNEs. It appears that Sri Lanka has performed poorly in both of these aspects, and this has, in turn, deprived the country of much-needed skills and technologies and decelerated its development.

Despite its merits, this study is not without limitations, mainly owing to a few issues inherent in the Enterprise Survey data. We relied largely on cross-sectional data owing to the unavailability of panel

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<sup>17</sup> The negative coefficient on FP could also be interpreted as the result of self-selection. However, the lack of panel data with longer time dimension prevents us from further testing the idea.

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data. However, using responses received from respondents about past data, several tactical measures were taken to minimize endogeneity and self-selection bias, and thereby, largely minimize the well-known limitations of using cross-sectional econometrics. Second, the number of foreign firms is limited and for some, survey data may be collected because they are “easy to approach”; therefore, foreign firms might not be well represented in some of the sectors. We tried to minimize the effect of this limitation by measuring foreign presence by cumulative realized foreign investment instead of calculating foreign presence based on the sample. Another limitation is that there seems to be an underrepresentation of exporting firms in the sample for some industries; for example, only 9.2 per cent of firms were exporting firms in the textile, wearing apparel and leather products industry, which is largely export-oriented. Therefore, the findings of this study might have more relevance to import-substitution (market-seeking) FDI than to export-oriented FDI.

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## Appendix A. Control Variables in Outcome and Selection Equations

Previous literature guided our choice of the control variables in the outcome equation (equation 1) and the selection equation (equation 2).

SIZE and SIZE<sup>2</sup> are included in equation 1 as economies of scale can affect productivity positively and diseconomies of scale can affect productivity negatively; thus, the relationship between SIZE and productivity can be non-linear (Ganotakis and Love, 2012). WAGE is a proxy for the skill intensity of a firm's workforce and is commonly used as a measure of labour quality (Blomström, 1988). TRADE is included because technology transfer and diffusion can take place through not only FDI but also international trade linkages (Smarzynska, 2002). This is because firms that export and import come into contact with new technologies. Exporting firms have to compete with firms with world-class practices and therefore need to be more efficient. Exporting firms may also have a better opportunity to achieve economies of scale and to better utilize internal capacity, which could lead to increase in productivity (Makki and Somwaru, 2004). In contrast, firms that solely depend on the domestic market may not be able to achieve optimum productive efficiency because of the small market size of Sri Lanka. Importing firms can acquire intermediate goods of high quality, which in turn improve their productivity. Importing firms can also carry out reverse engineering of technologies that they come across when interacting with foreign suppliers. As existing research shows that ownership structure can have implications on firm productivity (Barth, et al., 2005; Hill & Snell, 1989), we include STATUS. The rationale for including EC is that, as capital available for each unit of labour (capital intensity) increases, labour productivity increases (Hill and Snell, 1989). R&D activities contribute to the firm's stock of accumulated knowledge and thus contribute to improvements in product or service quality and to reductions in the production and/or operation cost of the firm, thereby improving the productivity of firms (Hill and Snell, 1989).

In line with previous studies (e.g. Vahter (2004)), four explanatory variables are included in equation 2: L3LP, L3SIZE, SKILL and EXP\_FIRM. Foreign firms are inclined to invest in local firms that are more productive

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ex ante, which is commonly referred to in the literature as the cherry-picking phenomenon (Hanousek, et al., 2011). However, some studies tend to use the same variables in both the outcome and the selection equations. For example, Vahter (2004), studying the effects of FDI on labour productivity, uses the same labour productivity measure in both the selection equation and the outcome equation. This can create an endogeneity issue. The World Bank's Enterprise Survey includes two questions that ask respondent firms for the amount of sales generated and the number of workers employed in 2007/2008 (three fiscal years before the sampling period). Using this information, L3.LP, i.e. three-year lagged labour productivity, is constructed and used in the selection equation, instead of contemporaneous labour productivity. This approach can help mitigate the endogeneity problem. Along similar lines, instead of including the variable SIZE in the selection equation, L3.SIZE is included. Some studies point out that foreign firms can also self-select into more capital-intensive firms or industries (e.g. Domes and Jensen (1998)). Therefore, energy consumption per worker (EC) was initially used in equation 2. However, EC was statistically insignificant, so it was subsequently dropped from the selection equation.

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