PRODUCTIVITY SPILLOVERS FROM FOREIGN DIRECT INVESTMENT IN KENYA

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DECLARATION

This project is my original work and has not been presented either wholly or in part for the award of a degree in any other university

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ONJALA BERYL ATIENO DATE

This project paper has been submitted for submission with my approval as University supervisor

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DR BETHUEL KINYANJUI KINUTHIA DATE

DEDICATION

To my parents, Dr. and Mrs. Onjala, who have seen me through so and much, and without whom this project would not have been made possible

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ABSTRACT

There has been a degree of ambiguity surrounding the effect of FDI in literature. While a few studies report positive effects from FDI at the microeconomic level, there are those that find that FDI yields negative effects. The Kenyan case is especially curious in regards to this, given the persistently poor performance of the manufacturing sector, despite heavy foreign presence in the country.

Using firm-level panel data from Enterprise Surveys, the study examines the spillover effects of foreign direct investment (FDI) in the Kenyan manufacturing industry. The analysis considers the endogeneity of input choices and clustering errors, which have the potential to cause biased estimations. The ensuing results suggest that negative spillovers from FDI arise from horizontal linkages, and that there are positive spillovers from backward linkages. The extent to which domestic firms benefit from FDI differs based on firm characteristics such as size.

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1. INTRODUCTION

1.1. Background of the Study

Attracting foreign direct investment (FDI) has become an integral part of the development strategies of different economies. This is especially true for developing countries. FDI to recipient countries is a means to increase employment, exports, foreign exchange and financing balance of payment deficits and savings gaps (Liu, 2008). In addition to these, there are studies showing FDI to be a channel through which technology transfer occurs, where technology transfer encompasses introduction of new production and management methods into the recipient country. Haskel, Pereira, and Slaughter (2007), in a study of domestic firms in the United Kingdom, find a positive correlation between the total factor productivity of domestic firms and the foreign-affiliate share of activity in that plant's industry. This and other studies that report the presence of productivity spillovers from FDI point out that domestic firms are able to gain insights from foreign firms by forming partnerships with them, observing their operations, or by having employees from foreign firms move to domestic firms.

On the other hand, there are studies that have demonstrated that FDI could cause a reduction in the productivity of domestic firms. According to Oteng-Abayie and Frimpong (2006), multinational corporations have the competitive capacity to force smaller domestic firms out of the market, given their cost-effective production techniques. Apart from this, it has been argued that FDI is static, such that it can integrate into the existing economy and begin to operate in low-level technological capabilities. In this case, FDI fails to stimulate technological growth and the industrial capacity of the host country. FDI could also assume undue control over the local firms if unregulated. When the government of the host country has low regulatory and bargaining power, FDI can gain control over inputs like capital and skilled labour. This leaves local firms at a disadvantage when it comes to entry into the market, growth, and development.

There is decidedly some degree of ambiguity surrounding the spillover effects of FDI. The paper sets out to find out how FDI affects the productivity level of domestic firms. Theoretically, it is expected that a higher magnitude of inflows will lead to increased productivity of firms in the recipient country. However, in the case of Least Developed Countries, it is possible that the

arguments put across by Oteng-Abayie and Frimpong (2006) hold true. The study will examine the spillover effects of FDI as applies to the Kenyan scenario.

While there is an array of research studies on the spillover effects of FDI in the world over, Productivity spillovers from FDI in Kenya have not been scrutinized enough. Research by Phelps et al. (2008) and Kamau et al. (2009) scrutinized spillover effects within the Kenya textile industry. A study by Managi and Bwalya (2010) analyzes the significance of productivity externalities from FDI, on an intra-industry and inter-industry front in Kenya and Zimbabwe. Most recently, Kinuthia (2013) conducted an empirical study comparing technology spillovers from FDI in Kenya and Malaysia. Other than these, little else has been done on the Kenyan front.

This study will serve to fill the existing research gap on the link between FDI and productivity spillovers. Previous studies, while they have served to demonstrate the spillover effects of FDI in Kenya, are not up to date in terms of the period the data analyzed covers. In this paper, there is an investigation into whether the presence of FDI affects the productivity level as well as the rate of productivity growth of domestic firms, as well as the mechanisms through which spillovers are transmitted. Data sets for analysis will include observations that are more recent.

The rest of the paper is organized as follows. There will be a brief look into trends in FDI and the manufacturing sector. Chapter 2 presents a detailed review of literature on FDI and productivity spillovers. Chapter 3 contains a description of the data and key variables used in the empirical estimations. The results are presented in Chapter 4. Chapter 5 concludes.

1.2. Trends in FDI and Manufacturing in Kenya

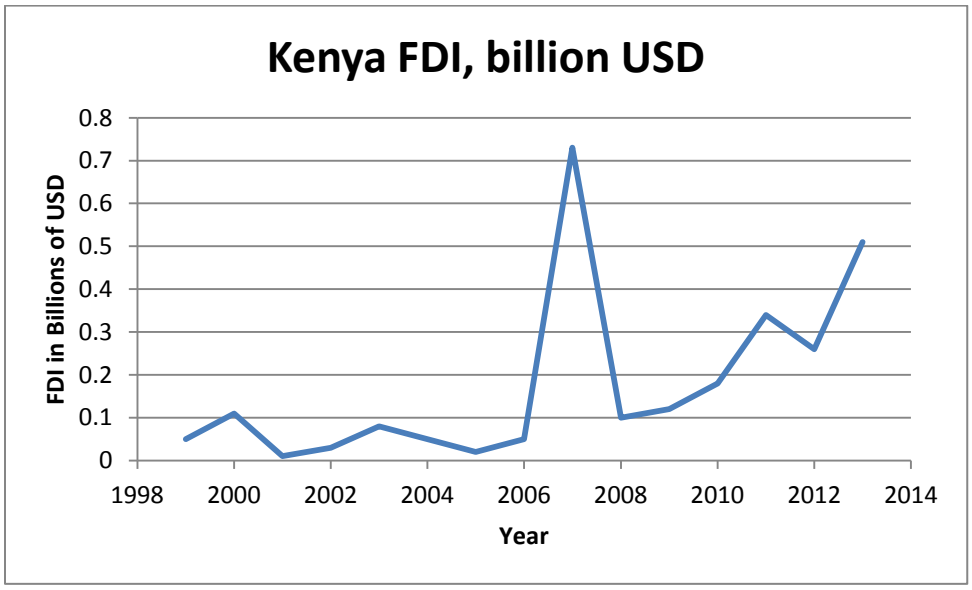
1.2.1. Trends in FDI

Kenya is the most industrialized country in East Africa and is ranked among the best- performing countries in Sub-Saharan Africa. The Kenyan market is diverse in terms of goods produced. Some of these products include horticultural goods, tea, apparel, coffee, soda ash, plastics, fish, iron, and steel. This renders the country one of the best investor destinations. In addition to this is the fact that the country is known for its sophisticated and computerized port system, the cold storage facilities, and the availability of an inspired labour force. Foreign investors to Kenya are also motivated by the fact that being a member of the East African Community (EAC), the

Kenyan market is set to be open to citizens of Uganda, Tanzania, and Kenya. With such factors at play, the motivation behind countries and international companies investing in Kenya is clear.

Even though the Kenya has one of the most diversified economies in Sub-Saharan Africa, FDI to the country has been consistently lower than those of its neighbor countries. Between 1999 and 2013, certain years have brought about sharp increases in the level of FDI inflows to Kenya. The year 2003 saw to a considerable upturn of FDI inflows to the country from 2002, as FDI inflow shot up from USD 28 million to USD 82 million. FDI to Kenya was highest in 2007, owing to France Telecom's acquisition of a 51% stake in state-run Telkom and Helios Investment's purchase of a 25% stake in Equity Bank, which pushed up FDI to USD 729 million. This was however short-lived as post-election violence in 2008 saw to the plunging of FDI inflows to USD 96 million only. 2013 witnessed the second highest (after 2007) FDI inflow. The Central Bank of Kenya (2014) attributes this to a relatively trouble-free transition to a new political regime following the March elections coupled with regional integration within the EAC, gradual regulation, and a brisk growth in consumer spending. Figure 1.1 is a summary of trends in FDI inflows of 1999-2013.

Figure 1.1 FDI Inflows to Kenya 1999-2013



Source: World Bank National Accounts Data (2014)

Fluctuations in FDI can be accounted for in a number of ways. The rise in FDI in the year 2000 was due to new investments by mobile phone companies. In addition, private companies increased their offshore borrowing in order to finance the generation of electricity following a drought (Mwega, 2009).The 2007 upsurge is attributed to the entry of a new mobile phone operator along with the privatization of Telkom Kenya. Ocharo et al. (2014) attribute the latest increase in FDI to increased interest by the Chinese in the construction, manufacturing, and communications industries in Kenya. Apart from this, there have been oil exploration activities in Turkana and the mining of Titanium in Kwale.

The main sources of FDI to Kenya are India, China, Germany, and the United Kingdom. Most of this FDI is directed towards food and beverage processing, the textile industry, the apparel sector, horticultural goods, shared services such as banking and telecommunications, and tourism (KIPPRA, 2013). In order to encourage further investment into Kenya, the government implemented reforms in the legal framework for FDI. One of these reforms has to do with abolition of import and export licensing except for in the case of a few specified import commodities. In addition to this is allowing the opening of foreign currency accounts with domestic banks by residents and non-residents, rationalizing and reducing import tariffs, removing restrictions on borrowing by foreign and domestic companies, freeing the Kenya Shilling exchange rate, and revoking all export duties and current account restrictions.

1.2.2. Trends in Manufacturing

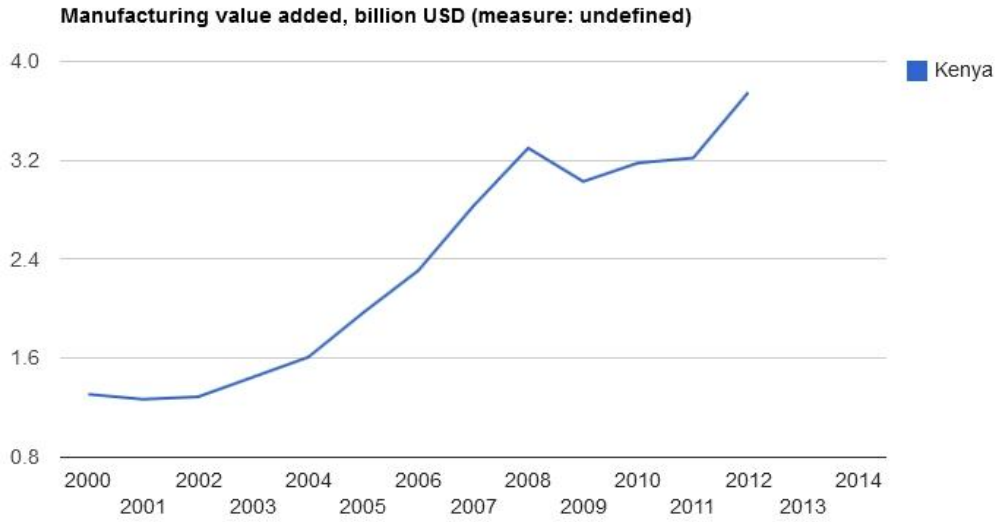
The country has a large manufacturing sector that serves both the domestic and international markets. The sector, which is mainly comprised of Multi-national Corporations (MNCs) contributes significantly to the overall Gross Domestic Product (GDP). For Example, in 2012, the manufacturing industry contributed to 9.44% of GDP. From the appendix chapter, table 1 and 2 provide a summary of the output throughout major subsectors making up the manufacturing sector between 200-2014.

The growth of the manufacturing industry in Kenya is largely repressed. This is because of the rising levels of poverty continues to inhibit growth in demand of locally manufactured goods (Bigsten and Durevall, 2008). There has been a shift in effective demand, such that relatively cheaper imported goods are favoured over locally manufactured commodities, which tend to be

highly priced in some instances. The prices of locally manufactured goods are high because of the high cost of inputs and poor transport infrastructure.

The government, in a bid to improve the performance of the manufacturing sector, has seen to the implementation of favourable tax reforms and tax incentives for manufacturing companies. In addition to this is the introduction of more vigorous export promotion and liberal trade incentives to take advantage of the expanded market outlets through AGOA, COMESA and East African Community (EAC) arrangements, measures towards ensuring an increased supply of agricultural products for agro processing, and improved power supply, aimed at making power more accessible and cheaper to manufacturing plants. All these measures have seen to a modest expansion of the manufacturing industry in recent years, made evident by figure 1.2, which illustrates the upward trend in value added up to 2012.

Figure 1.2: Manufacturing Value Added in Billion USD, Kenya 2000-2012



Source: The Global Economy, The World Bank (2014)

1.3. Statement of the Problem

Several empirical studies have found a positive correlation between FDI and productivity at the microeconomic level in both industrialized and developing economies. As such, it is expected that in Kenya, where many Multi-National Corporations are thriving, the value added within the manufacturing industry should be significant. In developing countries and Kenya, in particular, there should be significant effects from FDI. Ideally, the effects from FDI should translate to a decline in unemployment levels and a rise in productivity at the macro and microeconomic levels.

Despite the upward trend in the value added to manufacturing demonstrated on figure 2, the figures remains stubbornly low in the manufacturing industry within the Kenyan context. This, as compared to the value added within the manufacturing industries of countries whose economies act as model economies. Apart from the poor value added levels is the fact that domestic manufacturing companies do not seem to be doing as well as those owned by foreign entities. As can be deduced from table 3, a large percentage of small enterprises in the manufacturing industry are domestic, while most medium and large firms are foreign owned. The implication is that there is little, if any, growth among domestic firms, even as foreign firms thrive.

Apparently, in the case of manufacturing, FDI has failed to yield results. This paper is studies productivity spillovers in Kenya, and sets out to explain why FDI does not affect domestic firms, as it should.

1.4. Purpose of the Study

This study sets out to determine whether FDI leads to productive spillovers for firms in Kenya and the mechanisms through which spillovers are transmitted to domestic firms.

1.5. Objectives of the Study

1.5.1. Main Objective

The main objective of the study is to determine whether Foreign Direct Investment leads to productive spillovers for domestic firms

1.5.2. Specific Objectives

- To establish the extent to which the presence of foreign manufacturing firms in Kenya influences the productivity of domestic manufacturing firms
- To find out the mechanisms through which spillovers lead to productive spillovers for domestic firms
- To examine how different firm characteristics influence productive spillovers
- To make policy recommendations based on the findings of the study

1.6. Justification of the Study

Though it is important to policy issues at both the macro-economic and micro-economic level in the country, there is very little knowledge around the effect of foreign firms on domestic firms in developing countries. It is evident that the country has been a hotspot for investment by major foreign entities, especially in the manufacturing sector. However, little has been done to find out the indirect effect that the entry of these firms has on domestic firms. The study will be important in painting a picture on the effect of this relationship, even as the country works towards industrialization.

Apart from this, the study uses Enterprise Survey data to determine the effect that the entry of foreign manufacturing firms has on domestic firms. This dataset has not been used in a study of this caliber before. The study is therefore going to contribute to literature, using firm level data on the manufacturing sector.

2. LITERARTURE REVIEW

2.1. Theoretical Framework

One of the strongest factors for the growth of productivity in an economy is technological advancement. To this effect, it is important to consider the role of FDI in developing countries. Foreign entities, MNCs included, investing in developing countries serve to bring about proprietary and firm-specific knowledge and technology. This enables them to compete favourably with domestic firms that are privy to information on domestic markets, local factors of production, and the domestic business climate (Blomström and Kokko, 1998).

Literature identifies different types of FDI that seek to exploit their technological expertise to compete favourably with domestic firms. An example of this is natural resource seeking FDI, where foreign entities invest in a host country with the hopes of tapping into its resources, for example minerals and agricultural produce (Dunning and Lundan, 2008). Dunning and Lundan (2008) identify market seeking as another form of FDI. Firms that make decisions to invest abroad do so to adapt their products to the culture and preferences of their clients within the host country. In addition to this, investing overseas minimizes the costs of transporting commodities to other regions. Recent studies on the spillover effects of FDI on the host country find that foreign enties may invest in new a country in order to tap into the superior technology of domestic firms. This is known as technology-sourcing FDI. In contrast to other forms of FDI, which require MNCs to have a technological advantage over domestic firms within the host country, this type of FDI seeks to gain from the technological prowess of firms within the host country. The success of technology-sourcing FDI hinges largely on the existence of technological externalities that flow from domestic firms to foreign-owned firms (Driffield, Love, and Taylor, 2009).

MNCs can have economies of scale, owing to firm-specific advantages. The entry of foreign players into the market brings about externalities in the host countries, resulting in productivity spillovers, both horizontal and vertical. Cuyvers et al. (2008) reports that MNCs could bring about

- Higher productive efficiency within domestic firms due to the use of better technology

- A transfer of skilled labour from MNCs to domestic firms, which also improves operations in the latter
- Increased competition, which forces domestic firms to improve their production processes in order to retain their customers
- A transfer of technology to other firms that supply the MNC with factors of production clients of the MNC

On the other hand are reports that MNCs may bring about negative externalities to firms in the host country. Navaretti and Venables (2004) argue that FDI could replace imports by raising local production. Domestic firms that were producing close substitutes of previously imported goods are crowded out of the market, forcing them to reduce sales or exit the market altogether. Negative spillovers, in addition, come about in the case of an imperfectly competitive market in the host country, coupled with fixed production costs. The entry of foreign firms with lower marginal costs leads to a fall in demand of goods produced within domestic firms owing to the higher prices of these commodities (Cuyvers et al., 2008). This leads to higher unit costs of production in domestic firms since the market has to bear the fixed production costs. Demand therefore shifts further in favour of goods produced by foreign owned firms. Aitken and Harrison (1999) refer to this as the "market-stealing effect" of the entry of foreign firms. Barry, Gorg, and Strob (2005) argue that this is a short-term effect of MNC entry and could be offset in the long run, when domestic firms invest in more efficient technology that will lower their marginal costs of production and enable them to maintain their share of the market. In the event that a firm is unable to bear the burden of a rise in the unit costs of production and is forced to exit the industry, this still serves to enhance industry efficiency as the most inefficient firms are sifted out.

There are different theories on the mechanisms through which spillover effects from MNCs are generated. Theoretical literature presents four channels of productivity spillovers. They are demonstration effect, worker's turnover, competition, and linkages.

2.1.1. Demonstration effect

Demonstration effects are achieved when MNCs expose domestic firms to modern technologies, inducing the latter to adopt these new technologies and hence upgrade their production processes. This makes the latter more efficient (Sawada, 2010). Adopting these new

technologies, for domestic firms, involves costs. Sawada (2010) argues that when the rate of technology spillovers is high, then the cost of imitating the technology is lower. A study done by Glass and Saggi (1998) on the relationship between the quality of technology transferred and the technology gap between domestic firms and MNCs finds that the quality of technology transferred is higher where there is greater incentive to imitate. They argue that to ensure the transfer of high quality technology, the government has to undertake activities that encourage innovation and imitation, for example, by taxing entities that use poor quality technology.

MNCs, however, have been found to put in place mechanisms that limit the transfer of technology in some instances (Onyekwena, 2012). For example, MNCs avoid leakages by enforcing intellectual protection of property rights, encouraging trade secrecy, and setting up operation in countries that lack high absorptive powers.

2.1.2. Labour Turnover

Also known as workers' mobility, this channel takes is whereby workers move to domestic firms from MNCs. It may also take the form of workers from MNCs breaking away to set up their own firms. MNCs, according to ILO (1981) and Sousa (2001) tend to offer training that is more rigorous to their employees in comparison to their domestic counterparts. The management in domestic firms view workers in MNCs as would-be assets and make efforts to acquire tis caliber of labourers. This, given that having such labourers would help with a transfer of knowledge on effective operations to domestic firms, leading to a rise in efficiency in production.

As with the demonstration channel, MNCs may put in place measures to curb the diffusion of labour into local firms (Fosfuri et al., 2001). They do this by raising the wages of workers in their firms. A study conducted by Gorg et al. (2006) finds that workers in MNCs earn higher wages and experience faster wage growth than those in domestic firms.

2.1.3. Competition

In the case of horizontal spillovers through the promotion of competition, authors argue that this may occur in various forms. First, foreign entrants into the market tend to intensify competition within the domestic market, leading to higher productivity, lower commodity prices, and subsequent efficiency in allocation of resources (Jordaan, 2010). Foreign entrants, on the other hand, may establish a position of market power when they are large enough. This has the effect of reducing competition within the domestic market (Onyekwena, 2012). The risk of the latter,

according to Onyekwena (2012) is made higher by several factors. It could occur when the market in the host country is small, the entrant is important in the international market, the laws of competition laws in the host country are weakly enforced, or when entry barriers into the industry are high.

2.1.4. Linkages (Vertical Spillovers)

Linkages refer to the formal contracts between MNCs and their clients or suppliers. There is an incentive for MNCs to transfer their skills and technology to their associates, given that their improved performance benefits the MNC (Javorcik and Spatareanu, 2008). Because of the symbiotic nature of this type of spillover, there has been argument that this is a more likely channel for spillovers resulting in benefits for the economy (Du et al., 2011). Vertical spillovers result from backward linkages and forward linkages.

Backward linkages constitute contractual arrangements between MNCs and local suppliers of intermediate inputs. A spillover may ensue when the MNC engages in the direct transfer of technology by the MNC to the local supplier in order to ensure that the quality of supplies is high (Le and Pomfret, 2011). Gorg and Greenaway (2004) argue that because MNCs require that the quality of intermediate input be high, they often provide technical assistance to these suppliers to facilitate their efforts to adopt the new knowledge. It is, however, possible that the MNC may decide to source intermediate outputs from overseas, in which case they forego the need to transmit technology to domestic firms. In the event of this, backward spillovers fail to materialize (Gorg and Greenaway, 2004).

Forward linkages are the relationships between MNCs and their customers. As is the case with backward linkages, MNCs stand to benefit from a higher efficiency achieved by its customers since it would raise their demand for MNC products (Javorcik and Spatareanu, 2008). As such, MNCs have an incentive to transmit their knowledge on methods of production to their customers.

2.2. Absorptive Capacity

Absorptive capacity refers to the aptitude of domestic firms for identification, assimilation, and exploitation of foreign technology (Blalock and Gertler, 2008). Throughout literature, absorptive capacity is measured as the technology gap between an MNC and domestic firms.

There is ambiguity as to what size of a technology gap, whether large, small, or moderately sized is most conducive for ensuring positive spillovers from FDI. Holstein at al. (2010), in considering that entities with a lower technology stock have a larger backlog of knowledge they could use to assimilate, argues that there is higher potential for positive spillovers where there is a large technology gap. On the other hand, Nicolini and Resmini (2010) argue that the larger the technology gap, the least likely it is that the host firm will be able to adapt. He points out that in instances of a large technology gap the host firm most likely lacks the physical infrastructure, human capital, and networks of distribution to support any inward investment. This has an influence on the firm's decision to invest. This is in consistence with Todo (2006) who reports that for a domestic firm to utilize new technology competently there has to be prior related knowledge.

2.3. Empirical Literature Review

Recent empirical literature presents varied results on spillover effect from FDI. This section reviews some of these works as relate to channels of spillovers and estimation techniques employed within the various studies. Jordaan (2010) studied the overall effect of FDI on manufacturing industries in Mexico conducting estimations using the instrumental (IV) variable technique. This study used overall FDI to manufacturing industries in Mexico as a measure for foreign presence and found that there were positive spillovers. In another study, Hong and Sun (2010) used the spatial dynamic model. This, they based on the assumption that the 23 provinces are arranged spatially and attempt to control for spatial interdependence. They reported that FDI yields positive spillovers in China. In contrast, a study conducted by Khawar (2004) on 2,362 Mexican firms reported no evidence of intra-industry spillovers. Similar results from the United Kingdom (Driffield et al., 2009) in an analysis involving 20 firms.

Aside from studies on intra-industry spillovers, there are studies that have attempted to unearth other forms of spillovers, for example inter-regional spillovers, which reports on the impact of MNC presence on domestic firms in the same region. Studies on inter-regional spillovers could either examine spillovers amongst firms in the same region and industry or amongst firms from the same region but different industries. An example of such a study is by Mullen and Williams (2007), investigating on the presence of intra-regional spillovers in the U.S. They reported no

evidence of spillovers. In a similar study in the UK, using the regional share of employment by foreign firms as a measure for foreign presence, Haskel et al. (2007) also reported no evidence of regional spillovers following a study of 13000-23000 firms in the UK. In the same study, the authors reported the existence of positive intra-industry spillovers.

Lileeva (2010) examined intra-industry and inter-industry (forward and backward spillovers) spillovers in Canada. Using panel data on 8,088 firms in Canada, there were contrasting results between intra-industry and inter-industry spillovers. There was evidence of negative intra-industry spillovers, positive forward spillovers and no evidence of backward spillovers. In a more robust study involving a data set of 134,130-169,810 firms, Xu and Sheng (2011) reported negative intra-industry spillovers, positive forward spillovers, and negative backward spillovers in China. Their analysis involved a data set of 134, 130-169,810 firms and is estimated using the Levinsohn and Petrin technique. Du et al. (2011), on China, using panel manufacturing firm-level data reported the existence of spillovers through vertical linkages and none through horizontal linkages. Jarkovic and Spatareau (2011), using firm level data from Romania to examine backward linkages found positive vertical spillovers, especially where MNCs from America where concern. The results were insignificant in the case of linkages between European MNCs and domestic firms in Romania.

Markusen and Trofimenko (2009) in investigating spillovers from FDI via the labour turnover channel in Colombia found positive results from the labour turnover channel; there is a positive effect on wages and value added per worker within domestic firms. Using panel firm-level data, they used value added per worker within domestic firms as the measure of labour productivity. Estimation was conducted using fixed effects and nearest neighbor matching estimators. An analysis by Yasar and Paul (2007) also reported positive results from the labour turnover channel. Their study sample comprises of 437 firms in Kyrgyz Republic, Moldova, Poland Tajikistan, and Uzbekistan. The estimation, which employed ordinary least squares, found that there are positive intra-industry spillovers. Fillat and Woerz (2011) study the effects of FDI on labour productivity using industry level data. The study was conducted across 35 countries over a period of 17 years. Using the GLS estimation system, they reported positive spillovers from workers' mobility. According to Jordaan (2008), studying the trend in Mexican firms, positive spillovers from labour turnover are enhanced by large technology gaps between domestic firms

and MNCs. Ruane and Ugar (2005), on the other hand, in their study of 4,600 firms from Ireland, find no relationship between the presence of foreign firms and the productivity of labour over a period of 1991 to 1998.

There exists comprehensive literature on investigations into the spillover occurrence in African countries as well. For instance, Gorg and Strobl (2005) studied the incidence of FDI spillovers via labour mobility in Ghana manufacturing firms. Their investigation controlled for the capabilities of domestic entrepreneurs by literacy and years of experience to eliminate the possibility of causality between labour mobility and productivity (MNCs hire better trained workers. The level of training is measured by years of schooling an experience level). Analysis of the data found for positive spillovers via labour turnover. Ayanwale and Bamire (2004) examined companies in Nigeria and found positive intra-industry spillovers using panel data. Bwalya (2006) examined 154 firms in Zambia over the period 1993- 1995 using firm- level data. The study reported that there was no evidence of intra-industry spillovers. However, there was evidence of positive backward spillovers and positive regional spillovers. The analysis was done using a combination of OLS fixed and random effects and GMM techniques. In another study, Waldkirch and Ofosu (2010), analyzing 200 firms in Ghana using the Generalized Method of Moments (GMM) estimation technique, reported that there is a negative relationship between the presence of MNCs and the value added per employee.

Managi and Bwalya (2010) conducted an analysis on a data set of 727 manufacturing firms in Kenya Tanzania and Zimbabwe. Using GMM techniques, there was evidence of positive intra-industry spillovers and positive backward spillovers. Kinuthia (2013), using firm level panel data for both Kenya and Malaysia, found negative spillovers in productivity from the competition channel. Phelps et al. (2008) also examined the manufacturing industry in Kenya. They conducted a survey that covered 23 firms in the textile industry. The results showed that there were no productivity spillovers from vertical linkages between MNCs and domestic firms within the cloth-manufacturing sector. In a different study, Kamau et al. (2009) reported evidence of spillovers through labour turnover from MNCs to domestic firms. Table 4 provides a summary of recent studies of productivity spillovers globally.

3. METHODS AND DATA

3.1. Data

The study uses firm-level data on Kenyan manufacturing firms, derived from the World Bank Enterprise Survey (ES) for the period 2007 and 2013. The Enterprise Survey collects data on different characteristics of the firm, inclusive of performance, research, development, and innovation, number of employees, inputs that go into the production process, the distribution of equity, among others. While the World Bank has been conducting surveys at firm level since the early 1990s, it is only since 2005 that efforts in data collection were standardized in order to capture information on different economies for purposes of comparison. The firms are sampled randomly, to come up with a robust sample of firms that vary by size, age, sector, and market share, and they are taken from various geographical locations. Respondents include managers and business owners from 713 firms and businesses. Even so, the study focuses on manufacturing firms only, narrowing the sample down.

For this study, the statistics required for each firm have to with output, capital, intermediate inputs, foreign equity in the firm, the firm's age, size, and research and development activities. Table 3.1 provides a breakdown of the characteristics of the firms. Here observations from both 2007 and 2013 are combined. For purposes of this section, a domestic firm is defined as one in which there is less than 10% foreign equity in the firms. Hence, a foreign firm is one in which foreign entities hold at least 10% of the firm's equity.

There is a further breakdown of the data in the appendix chapter. Table 5 gives summary statistics for the domestic and FDI firms by region. Data is available on five key regions: Nairobi, Mombasa, Central Kenya, Nyanza and Nakuru. Finally, the data is broken down by to scrutinize the number of FDI and domestic firms by sector and to find out how much foreign equity exists in each. The results of this are displayed on in the appendix section, table6. Data is available on a limited number of sectors within the manufacturing industry.

Table 3.1 Summary statistics for domestics and FDI firms in Kenya 2007 and 2013

	All Firms			Domestic Firms			FDI Firms		
Variable	Total	Mean	Std. Deviation	Total	Mean	Std. Deviation	Total	Mean	Std. Deviation
Sales (million USD)	7578.83	10.11	65.91	4789.12	7.21	45.26	2789.78	32.44	147.42
Capital (million USD)	1182.14	1.58	7.22	1049.65	1.581	7.58	133.33	1.55	3.35
Labour	92129	122.86	333.55	69022	103.97	240.40	23112	268.74	710.82
Intermediates (million USD)	1322.07	1.76	9.89	1009.40	1.52	8.15	312.70	3.64	18.46
Exports (million USD)	3438.36	4.58	50.03	1763.69	2.66	23.90	1674.67	19.47	131.72
Foreign share	-	11.30	28.97	-	1.43	6.91	-	87.49	19.65
Firm Size	-	1.97	0.79	-	1.93	0.79	-	2.30	0.72
Firm Age	-	24.99	17.85	-	24.58	17.81	-	28.14	17.90
Horizontal	0.56	0.001	0.01	0.04	0.00	0.00	1.83	0.02	0.06
Backward	0.02	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.01
Number of Firms		750			664			86	

Source: Author's calculation based on the dataset

3.2. Empirical Estimation and Variables

The model specification as per the works of Javorcik (2004) and Xu and Sheng (2012) is:

$$\ln Y_{ijrt} = \alpha_0 + \beta_1 \ln K_{ijrt} + \beta_2 \ln L_{ijrt} + \beta_3 \ln M_{ijrt} + \beta_4 FDI\_Horizontal_{jt} + \beta_5 FDI\_Backward_{jt} + \beta_6 FirmAge + \beta_7 FirmAge^2 + \beta_8 R\&D + \beta_9 FirmSize + \beta_{10} CR8 + \alpha_t + \alpha_r + \alpha_j + \varepsilon_{ijrt} \quad (1)$$

Where Y is output, K and L are the capital and number of employees respectively, table 3.2 describes and defines the variables that are used in equation 1 and subsequent equations in detail. *FDI_Horizontal* is the measure of FDI presence in the manufacturing industry, *FDI_Backward* is the proxy for foreign presence in industries whose inputs are being supplied by a given sector. R&D is the measure of research and development, and CR* gives the concentration ratio in the manufacturing industry.

To control for industry, region, and time- specific effects, the dummy variables α_j for the industry-specific effect, α_r for the region-specific effect, and α_t for the time-specific effect.

Table 3.2 Description of variables used

Variables	Description
ln Y	Measured as the value of sales
ln K	This is the net book value of the fixed assets of the firms, computed by finding the total value of machinery, vehicles, and equipment and the value of land and buildings
ln L	This is the number of employees in the firm
ln M	This is the value of raw materials and intermediate goods that are used in production.
lnTFP	This is estimated by finding the difference between the log of actual output and the residual from estimating the relationship between output and inputs (capital , labour and intermediate goods)
FDI_Horizontal	This is the measure FDI presence in an industry, found by calculating the weighted sum of foreign capital, with the weight being the firm's share of industry input
FDI_Backward	This is a proxy for the foreign presence in industries being supplied by sector *j*. It captures the extent of potential contrast between domestic suppliers and multinational customers.
R&D	This measures whether the firm has undertaken ventures to acquire information about new developments in technology or new innovations
Firm Size	This is the firm size. Firms are classified as either small, medium, or large.
CR8	This is the eight-firm concentration ratio, which is the sum of market share of the eight largest firms across the dataset. Firm size is measured by number of employees.

The horizontal and backward linkages of FDI, $FDI\_Horizontal_{jt}$ and $FDI\_Backward_{jt}$ are computed as follows:

$$FDI\_Horizontal_{jt} = [\ \sum_{i\ for\ all\ i \in j} Foreign\ Share_{it} * Y_{it}\ ] / \ \sum_{i\ for\ all\ i \in j} Y_{it} \qquad (2)$$

$Foreign\ Share_{it}$ is given by percent of the firm held by private foreign individuals, companies, or organizations while Y_{it} is given by the value of sales. The value of the variable rises with the output of foreign investment enterprises and the share of foreign equity within these firms.

$FDI\_Backward_{jt}$ is a proxy for the foreign presence in industries being supplied by sector *j*. It captures the extent of potential contrast between domestic suppliers and multinational customers. It is defined as follows.

$$FDI\_Backward_{jt} = \sum_{k \text{ if } k \neq j} \alpha_{jk}\ FDI\_Horizontal_{jt} \qquad (3)$$

Where α_{jk} is the proportion of sector *j*'s output supplied to sector *k.* It is calculated excluding products supplied for final consumption but inclusive of imports of intermediate goods. For this study, α_{jk} is given by the percentage of an establishment's total sales that comes from selling intermediate products and services used as inputs in purchasers' production processes

3.2.1. Econometric Issues

The correct identification of the effects of FDI on domestic productivity warrants a look into several econometric issues.

3.2.1.1. The omission of unobserved factors at the industry level

These factors take the form of region-, firm-, and time-specific factors that are unbeknown to the researcher but exist to the firm, which have an effect on the correlation between the productivity of the firm and foreign presence. Some of these unobserved variables include the existence of high-quality management in the firm, or superior infrastructure in a region (Javorcik, 2004). In addition, there could be an industry-wide implementation of new technologies which could have an effect on domestic firms and still be correlated with FDI in the manufacturing industry, or changes in the business-cycle conditions (Xu and Sheng,2012). FDI could for some reason flow into industries with higher productivities. Bias ensues from the failure to account for these omitted variables.

3.2.1.2. Endogeneity of Input Choices

According to Olley and Pakes (1996) and Levinsohn and Petrin (2003) production inputs like capital and labour ought to be considered endogenous because they are chosen by the firm based on their productivity and cost as observed by the producer and not the econometrician. The Ordinary Least Squares (OLS) method has been faulted for being inappropriate for the estimation of the impacts of these inputs, since it treats capital and labour as exogenous. Failure to consider endogeneity leads to bias throughout the estimated coefficients.

To address the issue, a semi-parametric estimation procedure, as suggested by Levinsohn and Petrin (2003) is adopted. This method allows for firm-specific productivity differences. The production function estimated using the LP method is provides estimates of input coefficients, from which the total factor productivity at firm level can be derived

Using this method, production function estimates can be obtained and be used in the estimation of domestic productivity a follows:

$$\ln TFP_{ijrt} = \ln Y_{ijrt} - \beta_l \ln L_{ijrt} - \beta_k \ln K_{ijrt} - \beta_m \ln M_{ijrt} \quad (4)$$

where, $\beta_{l,}\beta_{k,\,and}\beta_m$ are LP estimates of the production coefficients for labour, capital, materials.

Using this derived productivity as the dependent variable, the impact of spillovers from FDI in an industry on the productivity of domestic firms is estimated as follows:

$$\ln TFP_{ijrt} = \alpha_0 + \beta_4 FDI\_Horizontal_{jt} + \beta_5 FDI\_Backward_{jt} + \beta_6 FirmAge + \beta_7 FirmAge^2 + \beta_8 R\&D + \beta_9 FirmSize + \beta_{10} CR8 + \alpha_t + \alpha_r + \alpha_j + \varepsilon_{ijrt} \quad (5)$$

3.2.1.3. Cluster Effect

In studies that perform regressions on micro unites but include aggregated industry variables, it is possible to underestimate the standard errors from OLS. This, overlooked, leads to causes downward bias in the estimated errors. This leads to unauthentic findings of statistical significance for the variables under scrutiny.

To address this, the standard errors are clustered for all observations in the same industry, region, and year.

4. ESTIMATION RESULTS

4.1. Baseline Specification

In order to get a general picture of spillover effects from FDI, we begin with a discussion on the regression results of equation 1. Table 4.1 outlines the estimation results with lnY as the dependent variable. In this case, the coefficient on horizontal linkages is negative, while that of backward linkages is positive. Both are statistically significant at the 1% level of significance. Other control variables, ln K, ln L, And ln M are also found to have a positive and significant relationship with output.

Table 4.1 Regression results with lnY as the dependent variable

	Coefficients	**Robust Standard Errors**
Dependent variable: lnY		
ln K	0.10***	0.03
ln L	0.84***	0.25
ln M	0.34***	0.04
FDI_Horizontal	-0.16***	0.05
FDI_Backward	0.11***	0.04
FirmAge	-0.00	0.02
FirmAge^2	0.00	0.00
R&D	0.34	0.38
firmsize	-0.25	0.43
CR8	-0.15	0.68
Region Dummy		yes
Industry Dummy		yes
Year Dummy		yes
Constant	7.60***	0.58
F-statistics (weak instrument identification test)		65.96
Prob > chi2		0.0000

Note: Clustered robust standard errors are used in estimation

legend: * Significance at 10%, ** Significance at 5%., *** Significance at 1%.

In table 2, we report the estimation results of equation 5. The dependent variable is lnTFP, the natural logarithm of total factor productivity, whose computation is outlined in detail in the previous chapter. Although we believe that results from the estimation of equation 1 are biased due to endogeneity of the firm's input decisions, qualitatively, the estimation results of equation 5, given in table 2, are similar to those of equation 1. Using pooled regressions, random effects, and fixed effects, we find negative and statistically significant coefficients on horizontal linkages, and positive and statistically significant coefficients on backward linkages. Notably, the

Table 4.2 Productivity spillovers from FDI for All Firms

	Pooled		Random effects		Fixed effects	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**	**Coefficient**	**Std. error**
Dependent variable: lnTFP						
Horizontal	-0.15***	0.04	-0.16***	0.04	-0.16***	0.05
Backward	0.08**	0.04	0.09***	0.03	0.11***	0.04
CR8	0.12	0.53	-0.06	0.58	0.09	0.62
Firm size	-0.25	0.23	0.22	0.22	-0.17	0.22
Firm Age	0.01	0.02	0.00	0.02	-0.00	0.02
Firm Age^2	0.00	0.00	0.00	0.00	0.00	0.00
R&D	0.44	0.39	0.40	0.40	0.37	0.40
Nairobi	-0.79	0.58	0.64	0.43	0.00	0.00
Mombasa	-0.87	0.56	0.45	0.50	0.00	0.00
Central	0.00	0.00	0.59	0.80	0.00	0.00
Nyanza	-2.16**	0.88	-0.53	0.70	0.00	0.00
Nakuru	-1.34**	0.60	0.00	0.00	0.00	0.00
Food	0.82	0.70	0.29	0.51	0.00	0.00
Garments	0.48	0.64	0.24	0.50	0.00	0.00
Textiles	0.58	0.69	0.04	0.59	0.00	0.00
Machinery	0.00	0.00	-0.48	0.76	0.00	0.00
Chemicals	0.09	0.64	-0.18	0.59	0.00	0.00
Non-metallic minerals	-0.03	1.02	-0.95	1.12	0.00	0.00
Wood prdcts	0.33	0.61	-0.12	0.38	0.00	0.00
Metal prdcts	0.99	0.69	0.43	0.56	0.00	0.00
Other manu.	0.62	0.63	0.00	0.00	0.00	0.00
2007	-0.80***	0.28	-0.56*	0.29	0.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0.66	0.96	-0.23	0.57	-0.12	0.42
F-statistics (weak instrument identification test)	3.90				3.92	
Wald chi2	-		72.17		-	
Prob > chi2/ Prob > F	0.0000		0.0000		0.0011	

Note: Hausman tests are ran on the fixed and random effects, determining that fixed effects are best suited for the model. Clustered robust standard errors are used in estimation. Domestic firms are those with less than 10% private foreign ownership

legend: * Significance at 10%, ** Significance at 5%., *** Significance at 1%.

coefficients on spillovers from fixed effects estimation in table 4.2 are similar to those in table 1. Based on the results from Hausman tests conducted at this stage, we proceed using fixed effects estimations.

Table 4.3 Productivity spillovers from FDI for Domestic Firms

	Domestic (<10%)		Domestic (<30%)		Domestic (<50%)	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**	**Coefficient**	**Std. error**
Dependent variable: lnTFP						
Horizontal	0.05	0.07	-0.15**	0.07	-0.17***	0.06
Backward	0.00	0.00	0.21***	0.07	0.19***	0.07
CR8	-0.65	0.48	-0.08	0.64	0.00	0.67
Firm size	-0.17	0.21	-0.22	0.19	-0.22	0.19
Firm Age	-0.00	0.02	0.00	0.02	0.01	0.02
Firm Age^2	0.00	0.00	0.00	0.00	0.00	0.00
R&D	0.34	0.40	0.34	0.42	0.26	0.40
Region Dummy	yes		yes		yes	
Industry Dummy	yes		yes		yes	
Year Dummy	yes		yes		yes	
Constant	-0.07	0.43	-0.09	0.43	-0.13	0.42
F-statistics (weak instrument identification test)	2.30		12.90		3.92	
Prob > F	0.0433		0.0000		0.0011	

Note: Clustered robust standard errors are used in estimation. In column 1, domestic firms are defined as firms with less than 10% private foreign ownership. In column , domestic firms are defined as firms with less than 30% private foreign ownership. In column 3, domestic firms are defined as firms with less than 50% private foreign ownership.

legend: * Significance at 10%, ** Significance at 5%., *** Significance at 1%.

Table 4.3 gives results from estimating spillovers to domestic firms. We examine productive spillovers on three different fronts. First, we define a domestic firm as one in which foreign entities hold less than 10% stake in the firm. Here, we report a positive but statistically insignificant value on the coefficient of horizontal spillovers. In addition, there are no backward spillovers reported. Secondly, a domestic firm is defined as one in which foreign entities hold less than 30% stake in the firm. Here, the results indicate a negative and significant coefficient on horizontal linkages at 5% level of significance. Using 50% as the foreign stake threshold, there are qualitative similarities between results obtained using the 50% threshold and those obtained using the 30% threshold. In both cases, there are significant and negative spillovers to firms within the manufacturing sector and positive and significant spillovers to upstream firms (backward linkages). Evidently, coefficients on the other control variables in the model, competition, research and development, the age of the firm, and firm size included are statistically insignificant

Table 4.4 Productivity spillovers by firm size

	Small Firms		Medium Firms		Large Firms	
	Coefficient	**Std. error**	**Coefficient**	**Std. error**	**Coefficient**	**Std. error**
Dependent variable: lnTFP						
Horizontal	-0.06	0.05	-0.17**	0.08	-0.30**	0.11
Backward	0.10	0.06	0.08	0.05	0..21	0.12
CR8	-1.22***	0.11	0.52	0.44	0.00	0.00
Firm Age	0.08*	0.04	-0.00	0.04	-0.1	0.04
Firm Age^2	-0.00	0.00	0.00	0.00	0.00	0.00
R&D	0.25	0.44	-0.28	0.57	1.06*	0.63
Region dummy	yes		yes		yes	
Industry dummy	yes		yes		yes	
Year dummy	yes		yes		yes	
Constant	-1.06*	0.47	-0.32	0.62	-1.08	1.17
F-statistics (weak instrument identification test)	0.04		2.38		2.61	
Prob > F	73.30		0.0492		0.0377	

Note: Clustered robust standard errors are used in estimation. A firm is classified as small when it has 5-19 employees, medium when it has 20-99 employees, and large when it has at least 100 employees.
legend: * Significance at 10%, ** Significance at 5%., *** Significance at 1%.

Finally, we estimate productivity spillovers by the size of the firm. In order to explore the significance of the size of the firm for spillover effects, the study splits the firms into three subsamples: small, medium, and large. Classification is based on the number of employees. A firm is classified as small when it has 5-19 employees, medium when it has 20-99 employees, and large when it has at least 100 employees. Table 4.4 lays out the results of the estimation. Results suggest that there is a significant difference in how small, medium, and large firms respond to foreign presence. In the case of small firms, we find that coefficients on spillover channels are statistically insignificant. In addition, the age of the firm is important at 10% significance level, implying that with age comes a rise in the TFP of small firms. Note that the coefficient for the market concentration ratio, CR8, is negative and significant. Where medium and large firms are concerned, there are negative coefficients on the horizontal channel and positive coefficients on the backward linkages. However, the coefficients on backward linkages

are statistically insignificant. For large firms, engaging in research and development ventures has a positive effect on the productivity of the firm.

4.2. Interpretation and Discussion

The findings generally indicate that there are negative horizontal spillovers to domestic manufacturing firms from FDI presence. In addition, while backward spillovers do not exist in all instances, there is plenty of evidence to suggest that backward linkages have a positive and significant relationship with the productivity of firms in Kenya. This section discusses the variations in the findings comprehensively, embedding them to existing literature on spillovers.

As we adjust the definition of a domestic firm, shifting the foreign-ownership threshold from 10% to 30% and finally to 50%, there is a parallel shift from negative and insignificant coefficients on the horizontal variable to positive and significant effects. Horizontal spillovers to domestic firms remain negative. Based on the results from the 30% and 50% thresholds, it is expected that a 1% rise in the share of foreign firms in the manufacturing sector will bring about a corresponding drop in the productivity of domestic manufacturing firms by an average of 0.16%. These results are in congruence with the findings of other studies (Khalifah and Adam, 2009: Waldkirch and Ofosu, 2010; Xu and Sheng, 2011), in which negative intra-industry spillovers are reported.

Worth recalling, is the fact that horizontal spillovers capture both spillovers in knowledge from foreign entities and competition effects (Haskel et al., 2007). The nature of the *horizontal* variable renders it impossible to distinguish between effects that come about due to knowledge spillovers and those that arise from competition. Like Aitken and Harrison (1999), we conclude that while there may be spillovers in knowledge from FDI firms, these spillovers are counterbalanced by the market-stealing effect of FDI, leading to an overall negative intra-industry effect.

The *backward* variable tests for the vertical/inter-industry spillovers. Where they exist, there are positive and statistically significant spillovers from the foreign firms to upstream firms that supply intermediate goods to manufacturing firms. For example, in column 2 of table 3 (assuming a 30% threshold in foreign stake), a 1% increase in the share of foreign firms leads to, approximately, a corresponding 0.21% rise in the productivity of domestic firms in upstream

industries. This is similar to the findings of Managi and Bwalya (2010), who find that there are positive and significant backward spillovers to firms from foreign direct investment in Kenya.

The study also explores spillovers in firms of different sizes. Existing literature suggests that in the case of small firms, it is possible to have any of two opposite effects. First, they may have limited resources to facilitate their improving their facilities, and hence fail to benefit from FDI. On the other hand, they could be more flexible, allowing them to adjust faster to foreign entry. (Imbriani et al, 2014). Our results suggest that in the case of Kenyan firms, low absorptive capacity overrides flexibility. Small firms, whether in the manufacturing industry or in upstream industries, do not benefit from the presence of foreign firms. This is similar to findings by Aitken and Harrison (1999). Turning to the concentration ratio coefficient, the positive and significant value suggests that, as per theory, that a higher market concentration leads to lower productivity at firm level (Lin et al., 2009; Xu and Sheng, 2011). Specifically, a 1% rise in market concentration in the manufacturing industry lowers the TFP of small firms in Kenya.

Medium and large firms stand to lose from a rise in foreign entity entry in the market. A 1% point rise in the share of foreign firms in the manufacturing industry brings a corresponding 0.17% and 0.30% fall in the total factor productivity of medium and large firms respectively. From the results, there is a marked increase in the fall of total factor productivity as we go from small to medium to large firms. To the best of our knowledge, there are limited studies that have reported similar results, however, the phenomenon is explained by the competition effect (Xu and Sheng, 2012), which shifts demand from goods manufactured by large domestic firms to those manufactured by FDI firms.

5. CONCLUSION

5.1. Summary

Like many other developing economies, Kenya relies heavily on foreign direct investment for growth. While existing literature on productivity spillovers emphasize its general importance, there is limited knowledge on its effects to domestic firms in Kenya. Using firm-level panel data from Kenya for the years 2007 and 2013, the paper scrutinizes various channels of spillovers from FDI, namely horizontal linkages and backward linkages.

Controlling for the endogeneity of the input decisions of the firm, we use total factor productivity to estimate the impact of FDI on the productivity of domestic firms. The paper finds that FDI generally has a negative and significant impact on the productivity of domestic firms within the manufacturing industry and positive effect on upstream industries. This holds true, even as we alter the definition of domestic firms to use thresholds of 10%, 30%, and 50%.

The study also tests for differences in spillovers to firms of different sizes. The findings from this are interesting, as we find that while small firm do not benefit from foreign presence, they are sensitive to market concentration. In addition, reports indicate that large manufacturing firms lose the most from the entry of foreign entities in the manufacturing industry.

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5.2. Recommendations

Recently, in Kenya, here has been an increased interest in the implementation of a series of reforms, aimed at improving the ease of conducting business. This has come in the form of improving on infrastructure and security in the country. Based on the findings, the efforts of the Government of Kenya towards attracting foreign investors so far have had negative connotations for the economy. This, given the lack of structures that can facilitate the absorption of spillovers from the presence of foreign manufacturing firms.

Clearly, there is need for reforms in the manufacturing industry that will improve the capacity of firms to reap benefits from foreign presence. This should come about through improved management, human capital and technology in domestic manufacturing firms. Similar reforms are of importance to firms upstream to the manufacturing industry. This is to ensure that inputs supplied are of superior quality, facilitating partnerships between FDI firms and local suppliers

of raw materials and inputs, which will see to an increased incidence of backward spillovers to upstream firms.

Areas for Further Research

Data-related limitations prevented the study from scrutinizing spillovers from forward linkages. This would, as more data becomes available, be an interesting variable to factor into future research.

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APPENDIX

Table 1 Output from major subsectors making up the manufacturing sector between 2007-2013

	2007	2008	2009	2010	2011	2012	2013
Subsectors in the Manufacturing Industry							
Total food products	195,278	191,682	268,848	300,844	361,990	367,667	394,930
Beverages and Tobacco	43,527	47,701	60,450	68,097	80,022	89,881	97,827
Clothing and Textiles	22,543	23,964	30,842	32,943	33,420	35,524	35,537
Leather and Related Products	13,428	14,687	13,530	18,396	25,174	25,497	29,837
Paper and Paper Products	28,749	41,334	26,352	25,347	25,528	31,578	38,871
Coke, refined petroleum products, Chemicals and Chemical Products	104,838	146,982	128,866	162,833	213,923	158,906	132,549
Non-Metallic Mineral products	33,484	47,423	40,169	43,179	50,413	53,139	57,890
Basic Metals	21,366	22,698	40,169	43,179	50,413	53,139	57,890
Electrical equipment	6,642	5,888	8,696	8,854	9,569	9,441	8,413
Transport equipment	19,577	24,923	11,042	9,570	11,951	14,793	17,519
Other Manufacturing	295,187	318,471	537,106	306,000	331,204	392,519	406,550
Micro and small enterprises	57,882	70,847	84,424	90,622	106,134	120,308	130,327
Total	603,696	717,217	995,270	1,109,864	1,299,741	1,352,392	1,408,140

Source: Source: Kenya National Bureau of Statistics (2013), Economic Survey

Table 2 Manufacturing Sector Performance 2005- 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacturing, value added (current million US$)	1974.24	3277.09	4087.59	4341.80	4428.22	4502.13	4929.74	5554.29	5893.02	6111.35
Chemicals (% of value added in manufacturing)	5.43	5.22	5.14	5.08	5.51	5.94	5.44	..	..	..
Machinery and Transport equipment (% of value added in manufacturing)	2.13	4.08	3.27	2.79	2.86	2.52	2.46	..	..	..
Textiles and clothing (% of value added in manufacturing)	4.69	5.18	4.93	4.40	3.72	4.10	4.32	..	..	..
Food, beverages and tobacco (% of value added in manufacturing)	29.03	29.40	30.29	28.06	31.62	30.55	32.34	..	..	..
Other manufacturing (% of value added in manufacturing)	58.72	56.12	56.37	59.67	56.30	56.89	55.44	..	..	..
Manufacturing, value added (% of GDP)	11.82	14.32	14.46	13.58	13.39	12.62	13.08	12.26	11.93	11.11
Manufacturing, value added (annual % growth)	4.66	6.27	6.28	1.14	-1.05	4.50	7.24	-0.56	5.60	3.41

Source: World Development Indicators, World Bank, 2015

Table 3 Enterprise ownership by ethnic origin, Manufacturing Industry Kenya 2012

	Kenyan		Indian (Asian)		Middle Eastern		Other Asian		European		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No	%	No	%	No	%
Micro	282	87.31	31	9.6	0	0	7	2.17	1	0.31	2	0.61	323	41.36
Small	134	54.47	94	38.21	4	1.63	6	2.44	6	2.44	2	0.81	246	31.5
Medium	20	22.47	49	55.06	1	1.12	6	6.74	9	10.12	4	4.49	89	11.4
Large	14	11.38	76	61.79	5	4.07	15	12.2	10	8.13	3	2.44	123	15.75
Total	**450**	**57.62**	**250**	**32.01**	**10**	**1.28**	**34**	**4.35**	**26**	**3.33**	**11**	**1.41**	**781**	**100**

Source: Computed from World Bank (2013).

Table 4 Studies on the Occurrence of Spillovers

Author	Country	Estimation Technique	Results
Akulava and Vakhitova (2010)	Ukraine	Pooled OLS Fixed/Random Effects	Positive horizontal spillovers in secondary sector; No spillovers in primary and services sector
Blalock and Gertler (2008)	Indonesia	Fixed Effects Olley-Pakes estimation	Large tech gaps enhance positive spillovers
Bwalya (2006)	Zambia	OLS Fixed/Random Effects GMM	No intra-industry spillovers Positive backward spillovers Positive regional spillovers
Driffield et al. (2009)	UK	GMM estimator	No intra-industry spillovers Positive forward spillovers Negative backward spillovers
Du et al. (2011)	China	OLS IV	Positive intra-industry spillovers Positive backward linkages Positive forward linkages
Fan and Hu (2007)	China	OLS Fixed Effects	Positive R&D spillovers
Fillat and Woerz (2011)	35 countries	GLS System-GMM	Positive spillovers in labour and resource intensive industries
Haskel et al. (2007)	UK	OLS IV	Positive intra-industry spillovers No regional spillovers
Hong and Sun (2010)	China	Spatial Dynamic Model, GMM	Positive intra-industry spillovers
Jarkovic and Spatareau (2011)	Romania		Positive intra-industry spillovers Positive backward linkages
Jordaan (2010)	Mexico	OLS IV	Positive intra-industry spillovers
Khalifah and Adam (2009	Malaysia	OLS Fixed Effects/Random Effects	Negative spillovers from wholly foreign owned firms
Le and Pomfret (2011)	Vietnam	OLS	Large tech gaps enhance negative spillovers; Majority foreign owned firms diminish positive spillovers; Negative spillovers in low-tech industries
Lileeva (2010)	Canada, Australia	Fixed effects	Negative intra-industry spillovers No backward spillovers Positive forward spillovers
Managi and Bwalya (2010)	Kenya, Tanzania and Zimbabwe	GMM	Positive intra-industry spillovers Positive backward spillovers
Mariotti et al. (2011)	Italy	Levinsohn and Petrin (2003) Fixed Effects	Positive spillovers through co-location
Monastiriotis and Alegria (2011)	Bulgaria	OLS Fixed Effects IV-FE	Positive spillovers from Greek MNCs
Mullen and Williams (2007)	U.S.	OLS	No spillovers
Sun (2010)	China	OLS	No spillovers
Todo et al. (2011)	China	GMM	Large tech gaps enhance positive spillovers
Vahter (2010)	Estonia	2SLS- IV Fixed Effects TFP is estimated with Levinsohn-Petrin (2003) method	No effect of tech gaps on spillovers
Waldkirch and Ofosu (2010)	Ghana	OLS Levinsohn and Petrin (2003) System GMM	Negative intra-industry spillovers (level effect) Positive intra-industry spillovers (growth effect)
Wang and Hu (2007)	China	OLS	Negative in labour-intensive industries; No spillovers in technology-intensive industries
Xu and Sheng (2011)	China	Levinsohn and Petrin (2003); GMM	Negative intra-industry spillovers Positive forward spillovers Negative backward spillovers
Yasar and Paul (2007)	Poland, Moldova, Tajikistan, Uzbekistan, and Kyrgyz Republic	OLS	Positive intra-industry spillovers

Table 5 Summary statistics for domestics and FDI firms in Kenya by region

	Nairobi		Mombasa		Nakuru		Nyanza		Central	
	Total	Mean	Total	Mean	Total	Mean	Total	Mean	Total	Mean
Variable										
Sales (million USD)	4908.78	12.00	1914.28	17.25	420.15	5.84	235.97	3.03	99.72	1.25
Capital (million USD)	774.91	1.90	188.58	1.70	24.70	0.34	160.08	2.05	34.71	0.43
Labour	56892	139.10	19533	175.97	4340	60.28	9309	119.35	2074	25.93
Intermediates (million USD)	903.82	2.2	289.626	2.61	25.71	0.36	90.27	1.16	12.60	0.16
Exports (million USD)	2297.46	5.62	930.121	8.38	137.09	1.90	30.96	0.40	42.73	0.53
Foreign share	-	10.73	-	10.37	-	26.11	-	5.5	-	7.81
Firm Size	-	2.06	-	2.14	-	1.69	-	1.83	-	1.68
Firm Age	-	23.57	-	27.34	-	24.46	-	27.08	-	27.45
Horizontal	0.49	0.00	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00
Backward	0.00	0.00	0.01	0.00	0.00	0.00	0	0	0	0
Number of Firms	409		111		72		78		80	

Source: Author's calculations

Table 6 The share of FDI by industry in Kenya: 2007–2013

	2007			2013		
	FDI share	Number of FDI Firms	Number of Domestic Firms	FDI share	Number of FDI Firms	Number of Domestic Firms
Sector Name						
Food	5.45	5	105	11.67	10	131
Garments	8.40	9	73	2.00	2	15
Textiles	7.75	7	22	2.60	3	20
Leather		-		0	0	5
Wood, wood products and furniture	4.49	4	27	1.90	3	33
Chemicals	4.84	6	20	4.75	5	33
Electronics		-		0	0	4
Non-metallic minerals	3.50	4	8	0	0	10
Machinery and equipment	4.30	4	5	0	0	11
Metal and metal products	5.59	6	24	2.73	3	22
Plastics & rubber		-			3	14
Publishing, printing, and Recorded media		-		1.30	1	13
Other manufacturing	9.20	11	56		-	

Source: Author's calculations