



# The nature of foreign direct investment spillovers effects on domestic firms in Kenya

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## Abstract

During the recent years, it has been observed that countries compete with each other to attract foreign investment. This has been done owing to the notion that when foreign companies invest in a host country, productivity gains are assumed to accrue to domestic firms' from spillovers generated by foreign affiliates. Empirical studies have shown that spillovers from foreign to domestic firms depend mainly on the country and host firms' characteristics. Therefore, this study attempted to empirically examine the nature of FDI spillovers on domestic firms in Kenya. The study looked at the transmission mechanism, that is, both horizontal and vertical linkages. To achieve this objective primary data was collected from various firms in Kenya; this was from a sample of 204 firms from Nairobi, Nakuru, Mombasa and Kisumu cities. A panel of three years was taken, for the period 2010 to 2013. The data was captured using a structured questionnaire which was administered to various firms. A fact sheet was used to summarize the data collected before it was cleaned, coded and edited for completeness and accuracy. Thereafter analysis was done using descriptive statistics. The study found that foreign firms influenced domestic firm's productivity through both vertical and horizontal spillovers in Kenya. Foreign firms were found to channel horizontal spillovers through competition effect, demonstration effect and labor turnover effects. On vertical spillovers small firms were found to benefit most from selling of goods and services to foreign firms.

**Keywords:** FDI spillovers, Transmission mechanism; Domestic firms, Firms 's productivity

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## 1. Introduction

Since the mid-1980s, the rate of growth of worldwide outflow of FDI has substantially exceeded that of world GDP, worldwide exports and domestic investment. The developed countries have continued to attract the bulk of the inflows (UNCTAD, 1998), but recent evidence indicates that the flow of FDI to developing countries has increased substantially. According to UNCTAD (2010), developed countries received an average of 29% of the total global flow of FDI in 2007. Given that the economies of most developing countries are small, even a small amount of foreign inflow makes a big impact in these economies. The increase of FDI to developing countries is due to multiple factors. These include sustained economic growth being experienced by most of the less developed countries (LDCs) and continued liberalization and privatization that is taking place in these countries (UNCTAD, 2005).

Developing countries and emerging economies increasingly see FDI as a catalyst to the development of domestic firms. This development can be through spillover effects whose presence can affect development of business enterprises in the host economy. Theoretically, FDI in developing countries is perceived not only as a source of capital inflow, but also as a vehicle for acquiring modern technology and the necessary managerial know-how that these countries require for development. These are some of the reasons why most of the developing countries have continued to pursue domestic policies that encourage more FDI inflows. Many countries have gone further than simply removing barriers to inward foreign investment and have taken a more proactive approach towards attracting FDI through the use of fiscal and financial incentives.

The entry of any company with high productivity should naturally encourage other companies within the same sector to improve their performance and its competitiveness. Increasing the efficiency of production can happen by copying new technologies or by hiring trained workers and managers from foreign firms (Javorcik, 2004); these are called horizontal spillovers. On the other hand, those domestic companies that are not able to catch up with the increased performance of other companies within the sector may be crowded out of the market.

In addition, companies from other sectors may be affected by the presence of foreign companies. These include companies that supply or provide services to the foreign firms. Moreover, it is also likely that the higher standards provided by foreign companies to domestic firms might improve the domestic firm's efficiency and performance; these changes are called vertical spillovers. However many studies done especially after the mid-1990s, have revealed that the productive performance of domestic firms has been stagnating and most of the domestic firms are not able to meet their objectives due to competition from their foreign counterparts (Teal, 1999). This meant that with positive spillovers from foreign to domestic firms, the foreign firms would make a big impact on these sectors.

Borensztein et al. (1998) found that FDI had a positive effect on growth but the magnitude depended on availability of human capital in the host country. Hence, various factors have been considered to condition the effect of spillovers. A popular hypothesis is that negative spillovers in developing countries are due to the low "absorptive capacity" of domestic firms. It is argued that the larger the technology and the level of skill (human capital gap) between the domestic and foreign firms, the less likely the domestic firms are able to

exploit the potential of spillovers. The implication is that positive spillovers should be found in more technologically advanced firms, sectors or countries. On the other hand, Findlay (1978) and Haskel (2002), using micro data from UK firms, concluded that firms further away from technology and human capital, gained most from foreign presence. It appears therefore, that although the aggressiveness and effectiveness of the government's policies in prompting FDI growth have been unrefuted, the effects of FDI spillovers and their transmission mechanism on Kenya's domestic firms are far from clear

### 1.1. Potential spillovers to domestic firms

Theoretically, it is believed that suppliers' relationship with inward investors offer business opportunities to local firms. For developing countries, exploiting these opportunities can contribute to the growth of domestic firms in addition to opening up avenues for business enterprises. In terms of technology and knowledge, FDI in developing countries can potentially contribute to upgrading of local suppliers through technical assistance, training and transfer of knowledge. It may also contribute to increasing the rate of adoption of new technologies by local firms. This accounts for why the spillover effect from the FDI can broadly be classified as horizontal (within sectors) and vertical (Subash, 2006).

#### 1.1.1. Vertical spillovers

Vertical spillovers happen when the entry of a foreign firm leads to an increase in the productivity of a domestic enterprise in a different sector. This can arise due to interaction across industries. Notably, inter industry spillovers arise mainly by customer –supplier relationship between foreign firms and domestic enterprises (Subash, 2006).

According to Glass and Saggi (1999), foreign investors establish an inter-firm relationship with local suppliers and create demand for inputs from local suppliers in upstream industries. When these local firms supply certain raw materials, the high quality, reliability and speed of delivery that MNCs affiliates demand force them to enhance productivity. In some cases, local suppliers upstream receive technical and managerial training in the production of required inputs. This is likely to generate additional economic activity, income and transfer of technological and managerial skills to the host country.

#### 1.1.2. Horizontal spillovers

The entry of foreign firms may lead to an increase in the productivity of domestic firms in the same industry through various means. According to Crespo and Fontoura (2007), the domestic firms can benefit through horizontal spillovers through three channels. To begin with, we have demonstration effects, in which the local enterprises become familiar with superior technologies, marketing and managerial practices used in foreign affiliates. Thus, spillovers can take place in the form of imitating the foreign subsidiaries' technology. The local enterprise may learn simply by observing and imitating the multinationals (Subash, 2006).

Another channel of transmission of horizontal spillovers is labour turnover which occurs when employees from foreign affiliates leave multinationals to join local firms. Through this, knowledge and skills are passed from the foreign to local enterprises. Multinational investment may encourage the entry of international trade brokers, accounting firms, consulting companies and other professional services which then may become available to local enterprises as well. However, the entry may as well hurt the domestic enterprises through “brain drain” from domestic firms to foreign firms if foreign firms pay higher wages than domestic firms.

The last channel of transmission is competition effect, which occurs when the presence of a foreign firm exerts pressure on local firms to adopt more efficient methods. This can allow the domestic firm to survive successfully or even compete with foreign firms. Due to their nature of entry for example efficient management, heavy capital investment among others, foreign firms have an advantage over domestic enterprises (Subash, 2006). The stiff competition posed by foreign firms may lead to the crowding out effect in which domestic firms that cannot compete are forced out of the market. This argument about positive competition holds only if the technological gap between foreign firm and domestic firms is small. If an industry is characterized by weak firms then the entry of foreign firms will lead to exit of domestic enterprises (Gachino, 2007). Some studies such as (Rodríguez-Clare, 1996) and Pavel (2007) argue that vertical spillovers are more likely than horizontal spillovers in a host country. This is because the foreign firm can prevent the leakage of technology to its competitors, while it has no incentive to prevent the technology diffusion to its suppliers and clients. As such, determining the nature of FDI spillovers on domestic firms is the aim of this study.

## 2. Theoretical literature review

### 2.1. Theories on FDI

There is a significant body of economic theory on FDI. Most theoretical models on FDI and spillovers only started to emerge from early 1950s. In this section, a review of these theories is done. These theories try to explain why FDIs flow from one country to another, why they choose a particular mode of entrance and why some countries are more successful in attracting FDI than others.

#### 2.1.1. Dependency theory

Dependency theories appeared in 1970s as a critical reaction to the conventional approaches to economic development that emerged after World War II. Early theories on the impact of foreign capital and multinational corporations (MNCs) on host countries can be found in the writings of the “dependency school”. The theory was developed under the guidance of the director of the United Nations for Latin America, Raul Prebisch in 1949. The influential work of this school of thought includes ontology of dependency (Karl Marx in 1883) on development and underdevelopment; Andre Gunder Franks analysis of the development of

underdevelopment (Frank, 1966), Paul Baran's analysis of economic backwardness and economic growth (Baran, 1957); and Samir Amin on unequal development (Amin, 1976) .

The dependency school theory views foreign investment from the developed countries at the core of the world economic system as harmful to the long -term economic growth of developing nations out in the periphery. It considers that penetration to peripheral economies by large companies allowed them to control resources that might otherwise have been used for national development. It asserts that developed nations become wealthy by extracting labor and material resources from the Third World. This kind of capitalism perpetuates a global division of labour that causes distortion, hinders growth and increases income inequality in developing economies.

Dependency theorists argue that developing countries are inadequately compensated for their natural resources and are thereby sentenced to conditions of continuing poverty. Countries on the periphery cannot become fully modernized as long as they remain in the capitalist world system. To get out of this economically debilitating relationship, Third World nations must develop independently of foreign capital and goods.

Although the influence of dependency theory peaked in the 1970s, debate on its validity continues beyond this decade. Bornschieer and Dunn (1978), for example consider that flows of foreign investment have short-run positive effects on economic growth, but accumulated stock of foreign capital has a long term retardant effect on economic growth and is associated with greater income inequality. The dependency theory was adopted by various countries in the 1970s, most noticeably in Latin America. A number of them adopted an import substitution strategy and demonstrated a hostile attitude towards foreign investment. These inwardly oriented policies had harmful effects on Latin American economies (Hein, 1992). Consequently their experiences contrast with those of some East and Southeast Asian economies that were designed to actively attract foreign investment into their domestic economies. These policies were accompanied by a period of rapid economic growth in East Asia during the 1970s and 1980s (Hein, 1992). This reality largely curbed the popularity of the dependency theory, shifting attention to the study of FDI's contribution.

### *2.1.2. The differential rates of return theory*

This theory was postulated by Lizondo (1950). Differential rates of return theory represents one of the first attempts to explain FDI's flows. This hypothesis postulates that capital flows from countries with low rates of return to countries with high rates of return, a process that leads eventually to the equality of real rates of returns. The rationale for this hypothesis is that firms considering FDI behave in such a way so as to equate the marginal return on and the cost of capital. The hypothesis obviously assumes risk neutrality, making the rate of return the only variable upon which the investment decisions are based. Risk neutrality in this case implies the investors consider domestic and foreign direct investment to be perfect substitutes or in general that direct investment in any country including the home country is a perfect substitute for direct investment in any other country.

One problem with differential rates of return hypothesis is that it is not consistent with the observation that countries experience inflow and outflows of FDI simultaneously. This is because a rate of return

differential implies capital flows in one direction only, from the low rate country to the high rate country and not vice versa. There is obviously something missing in this theory. The validity of the differential rate of return theory can be questioned because MNCs may indulge in FDI for reasons other than returns. In general MNCs are faced with multiplicity of objectives for their international operations and these objectives are likely to change with the passage of time. More importantly though is that, risk aversion implies that the FDI decision does not only depend on return but also on risk. Instead of only maximizing the rate of return, the objective could be to maximize the rate of return per unit risk or minimize risk per unit of return. Finally, the differential rate of return theory does not explain why a firm indulges in FDI rather than portfolio investment. Some of these loopholes are plugged by the diversification theory.

### *2.1.3. The portfolio diversification theory*

Since expected returns did not appear to provide an adequate explanation of foreign direct investment, Markowitz (1952) came up with a theory whose attention was next focused on the role of risk. In choosing among the various available projects, a firm would presumably be guided by expected returns and the possibility of reducing risk. When the assumption of risk neutrality is relaxed, risk becomes another variable upon which the FDI decision is made. If this proposition is accepted, then the differential rate of return theory becomes inadequate, hence we resort to portfolio diversification theory to explain FDI.

The choice among various projects is therefore guided not only by expected rate of return but also by risk. Because of risk aversion, a rate of return differential will not induce capital flow in one direction until the differential disappears through arbitrage. Rather, capital mobility will be constrained by the desire to minimize or reduce risk, which is achieved by diversification. This theory is superior to the differential rates of return because, among others, it offers plausible explanation for cross investment between countries and industries (Agarwal, 1980). It is worth mentioning that various attempts to test these theories have been made.

One approach was to try to explain the share of FDI going to a group of countries by relating it to the average return on those investments as measured by the variance of the average returns. A variant of this procedure was to estimate first the optimal geographical distribution of assets of multinational firms based on portfolio consideration, and then to assume that firms gradually adjust their flow of FDI to obtain that optimal distribution. Another line of inquiry was to ascertain whether large firms with more extensive foreign activities shared smaller fluctuations in global profits and sales. The results from these tests offered only a weak support for the portfolio diversification theory as documented in Hufbauer (1975) and Agarwal (1980).

## 2.2. Selected empirical literature review

The earliest study on spillovers was done by Caves (1974). The study analysis was based on cross sectional data on Australian and Canadian industrial sectors for the year 1966. The study tested the spillover benefits in the manufacturing sectors of both countries. The study hypothesis was that if FDI has the virtue of increasing allocation efficiency, the profit rate of domestic firms should be inversely related to the

competitive pressure supplied by the foreign firms. The results indicated that profits in both countries' manufacturing industries did show a weak tendency to vary inversely with the competitive pressure of foreign firms. Caves also showed that labour productivities in domestic industries were positively correlated with the degree of penetration by foreign MNCs in each production sector. According to the study, multinational companies face disadvantages imposed by both geographical and cultural distance in comparison to domestic firms.

Globerman (1979) investigated the spillovers to Canadian manufacturing industries using a production function. This was among the earliest studies to investigate the existence of indirect benefits of FDI on domestic industries. According to Globerman, technological spillovers included all aspects resulting from the presence of multinational corporations in a host country which increases the productivity efficiency of locally owned firms. The author attempted to measure directly the impact of FDI presence on labour productivity employing simple cross sectional analysis. The results indicated a positive relationship between labour productivity of local firms and foreign firms. However, this study was not able to take into consideration the industry and time effects. The evidence of positive spillovers from foreign subsidiaries could have been due to the possibility that foreign companies tend to invest in high productive industries.

Following the same line of thought, (Blomstrom and Persson, 1983) used industry level data to investigate whether technical efficiency derived from spillover efficiency could be derived from FDI. The study used data collected from Mexican manufacturing industries for the same year. Assuming MNCs represented advanced knowledge and technologies, they questioned whether the same gets transferred to domestic firms owing to the presence of MNCs. Labour productivity was considered as a measure of technical efficiency. Spillovers of technical efficiency were found to exist and were responsible for the increase in productivity of local firms. Because of using cross sectional data the study could not capture time and industry effects and hence the results were not reliable.

Haddad and Harrison (1993) employed a comprehensive data set of firm-level manufacturing firms in Morocco over five years. The study used detailed information on the level of quota and tariff protection to investigate whether lack of spillovers stemmed from a tendency of foreign firms to gravitate towards protected sectors. The study's hypothesis was that when knowledge or new technology embodied in foreign firms is transmitted to local firms, it would result in higher productivity levels and growth rates for local firms in sectors with large foreign presence. Using the productivity dispersion technique, the study found dispersion to be smaller in sectors with many foreign firms. This was explained as competition which was induced by the foreign firms that caused domestic firms that could not approach the best practice frontier to exit the industry. Also the results further showed that foreign investment, as an output growth determinant in the sector was negative; hence the hypothesis that foreign presence accelerated productivity growth in domestic firms was thus rejected.

Aitken and Harrison (1999) using a panel of more than 4000 Venezuelan plants between 1976 and 1989 carried out a study to investigate whether domestic firms benefit from FDI in Venezuela. The study focused mainly on two areas. First, on the extent to which joint ventures or wholly owned foreign subsidiaries exhibited higher levels of productivity than domestic counterparts. Second, on whether there was any

evidence of technological spillovers from foreign firms to domestically owned firms. The study used annual census data of over 4000 Venezuelan firms in order to measure the productivity effects of foreign ownership. The study found that increases in foreign equity participation were correlated with increases in productivity of host recipient firms with less than 50 employees, suggesting that small sized firms benefit most from foreign firms. The study also observed that increase in foreign ownership negatively affected the productivity of wholly domestically owned firms in the same industry in that horizontal spillovers were negative. The study concluded that there were benefits from foreign investment but such benefits appeared to be internalized by joint ventures. There was no evidence supporting the existence of technology spillovers from foreign firms to domestically owned firms. Unlike previous studies, the use of panel data helped to capture the time lag involved in the absorption of spillovers by domestic firms. However, the use of cross sectional data and failure to take care of time invariant and industrial effects could have affected the robustness of the results. In addition, the use of log of output as a proxy for TFP was also wrong, the study could have calculated TFP instead and hence results may not be reliable.

Subash (2006) attempted to examine the spillover effects of Foreign Direct Investment in Indian manufacturing industries. The study used a log- linear production function to verify whether foreign ownership had a positive association with increased productivity of domestic enterprises. The log of output was regressed on a vector of inputs and a share of foreign ownership. Using pooled Ordinary Least Squares (OLS), the study investigated if FDI had positive spillovers on Indian manufacturing firms. For this purpose, affirm- level data of Indian manufacturing industries during the period 1994-2002 was analyzed to investigate both horizontal and vertical spillovers. The study found that there were significant positive vertical spillovers but not horizontal ones. This was also consistent with Aitken and Harrison (1999). However the study used log of output as a proxy for TFP which is different from calculating TFP from output. In addition, using pooled OLS for estimation produces inefficient results hence the robustness of the findings could be doubted.

Gachino (2007) undertook a critical review of existing spillover analysis in the manufacturing sector in Kenya. The study used firm- level survey data of Kenyan manufacturing sector specifically to examine the significance of FDI and firm- level capabilities in human capital development. The research undertook a detailed descriptive composition of human capital and other firm- level capabilities generated by both foreign and locally owned firms. The results of the study showed that foreign firms generally enjoyed high human capital development and firm- level capabilities than local firms. It is worth stating that empirical evaluation of human capital determinants revealed a statistically significant role played by FDI in determining human capital development in the firms. The study used value added as a proxy for TFP instead of calculating TFP from Solow residue as the study indicated. This could have affected the robustness of the results and hence the results may not be reliable.

Juraj (2007) analyzed the effects of foreign direct investment on the sales growth rate of domestic companies in the Czech Republic. Using firm- level panel data from 1995 to 2003, Juraj studied both horizontal and vertical spillovers, that is, the FDI indirect effects on supplying or purchasing domestic companies from other sectors. The study allowed the possible endogeneity of FDI with respect to future industry growth. Contrary to the arguments supporting the subsidization of FDI, the study found that foreign



investors contributed negatively to the performance of domestic companies. The study found out that there were negative backward and horizontal spillover effects from FDI. A one percent increase in foreign capital in a downstream sector caused a decrease in the growth rate sales of supplying domestic companies by more than 1.8 percent. On the other hand, horizontal effects were statistically insignificant while there were no forward spillovers effects. This implied that domestic companies could not maintain the great competition coming from the foreign firms and their sales decreased. However the study used value added as proxy for total productivity of the firm instead of calculating TFP from each firm, hence the result could be inaccurate.

Havranek and Irsova (2011) estimated vertical spillovers and why the results vary and the true effects on Cze Republic firms. He found that average spillovers to suppliers are economically significant, whereas spillovers to buyers were statistically significant but small. Greater spillovers were received by countries that had under developed financial system and were open to international trade.

Gorodnichenko et al. (2014) Using a rich firm-level data and national input-output tables from 17 countries over a period between 2002- 2005, tested new and existing hypothesis about the impact of foreign direct investment on efficiency of domestic firms in the host countries. The study estimated the backward spillovers of MNEs on the firms that sell to MNEs, in addition to estimating the usual –industry level spillovers. The study using Cobb-Dougllass baseline regression with pooled data for all 17 countries provided the support for the findings of recent single –country studies that there are positive backward spillovers on efficiency among virtually all the categories of firms.

Munteanu (2015) analyzed the role of FDI in sustainable development in terms of increasing technological level of the economy. The study did an evaluation of knowledge spillovers effects on economic activity in host countries. Using ethnocentric model and agent based modeling; the study found that the positive effect generated by FDI in terms of increasing technology is often offset by negative effects on the competitiveness of national firms. However, the study found that spillovers and propagation effect, especially in terms of technological knowledge and know-how enabled the creation of robust innovation growth both horizontal and vertically.

### 2.3. Overview of literature

From the literature on the effect of FDI on domestic enterprises, it can be seen that the results have been mixed, some producing positive and others negative results. The studies that do exist restrict themselves to a very small number of countries. In particular, most studies have examined horizontal spillovers and few on vertical spillovers. In addition very few studies have been done in developing countries. In Kenya, Gachino (2007) was limited only to spillovers in the manufacturing sector. However, in the past two decades, the sector composition of FDI has shifted sharply away from extractive industries and manufacturing and towards services (UNCTAD, 2004). In 1990, some 47 percent of outward FDI stock was in service industries. By 2003, this figure increased to 67 percent (UNCTAD, 2004). The shift to service is being driven by the general move in many developed economies away from manufacturing and towards service industries. Therefore, we cannot ignore the investment in this sector that is growing at such a high rate. This shows that

it is important to do a study that cuts across all the sectors in Kenya before drawing a conclusion on how spillovers have affected domestic firms.

### 3. Methodology

#### 3.1. Theoretical framework on FDI spillovers

The study used a modified model by Koizumi and Kopecky (1977) to show that FDI is beneficial to host country by increasing technology spillovers and hence increasing country's social welfare. Any policy intended to slowdown or diminish foreign penetration into the national economy will give rise to a reduction in social welfare. The theory began by assuming that FDI spillovers increase the technological knowledge of domestic firms and the capital stock of the subsidiary of foreign firms ( $K_f$ ) is a good proxy for transfer of technology by these firms. The aggregate production function of resident firms was represented as:

$$Q = \varphi \left( \frac{K_f}{L} \right) \cdot G(K_f + K_d, L) \quad (3.1)$$

Where  $Q$  denotes output by all firms in the country,  $L$  is labour,  $K_d$  is the stock of capital owned by domestic firms and  $K_f$  is the stock of capital owned by foreign firms. The function  $\varphi \left( \frac{K_f}{L} \right)$  identifies the technological spillovers.

Assume further that technological spillovers are directly proportional to the foreign presence i.e.

$$\frac{d\varphi}{dK_f} > 0 \quad (3.2)$$

Differentiating equation 3.1 with respect to  $K_d$  and  $K_f$ , we get marginal social return on domestic capital ( $MSR_d$ ) and foreign capital ( $MSR_f$ )

$$MSR_d = \frac{d\varphi}{dK_d} = \varphi G_K \quad (3.3)$$

$$MSR_f = \frac{d\varphi}{dK_f} = \left( \frac{d\varphi}{dK_f} \right) G + \varphi G_K \quad (3.4)$$

Where the term  $\left( \frac{d\varphi}{dK_f} \right) G$  measures spillovers (Horizontal and Vertical) associated with FDI. Since  $MSR_f > MSR_d$  (any policy intended to slow down or diminish foreign penetration into the national economy will give rise to a reduction in social welfare).

### 3.2. Data collection and sources

There is no comprehensive study of firm productivity that has been based in Kenya hence the total number of foreign and domestic firms are unknown. In addition, not all firms are registered with Kenya Investment Authority (KIA) and hence the population of the firms is unknown. However, the study used a list of registered firms from KIA combined with another list from Kenya Institute for Public Policy Research and Analysis (KIPPRRA). The total number of firms was 1140 as represented in Table 3.1. To get a representative sample, the study used a formula developed by (Cochran, 1977).

$$n = \frac{z^2 p(1-p)}{e^2} \quad (3.5)$$

Where  $n$  is the desired sample size,  $z$  is standard normal deviate at the required confidence level which was 1.96 at 95% level of significance,  $p$  was the proportion in the target population that was estimated to have the characteristic being estimated. According to Fisher et al. (1943), if there is no estimate available of the proportion in the target population assumed to have the characteristic of interest, 50 percent should be used. Hence in this study  $p$  was assumed to be 0.5 and  $e$ , is the level of precision and for this study, it was taken to be 5 percent. Applying this formula, the desired sample size was;

$$n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = 385 \quad (3.6)$$

Therefore the target sample size was 385 firms. Sampling was done from the total number of firms in each city i.e. Nairobi, Nakuru, Mombasa and Kisumu. The four cities were chosen because, from the list obtained, they hosted most of the foreign and domestic firms. The Table 3.1 shows the total number of firms listed, the targeted sample and the achieved target of firms in the four cities.

**Table 3.1.** Number of Firms as per list from KIA and KIPPRRA

Location	Total Number of Firms.	Targeted sample	Percentage	Achieved Target
Nairobi	812	193	50	100
Mombasa	148	97	25	46
Kisumu	120	57	15	30
Nakuru	60	38	10	28
Total	1140	385	100	204

Source: Constructed From the List of Firms at KIA and KIPPRRA

As evident in Table 3.1, since Nairobi had the highest number of registered firms, 50 percent of the targeted firms were from Nairobi; Mombasa took 25 percent as it was the second largest host of firms, Kisumu 15 percent and Nakuru 10 percent. From the list of the firms in the four cities, stratified sampling

was done whereby each city acted as a stratum. Then from each stratum, simple random sampling was done according to the required number of firms in each stratum. The selected firm had to have more than 20 employees since the study targeted small, medium and large firms (Ngugi and Musengele, 2008). However from the targeted firms, only 204 firms had complete information required for the three years, therefore firms with incomplete questionnaire were discarded. Since a panel data of three years was used, equivalent to 612 observations, the achieved sample was a good representative of the total number of firms. The firms targeted were from three different sectors i.e. manufacturing, agricultural and service sectors. Firm- level primary and secondary panel data were collected for the period 2010 to 2013 using specified research instruments. This was done by trained research assistants. A structured questionnaire was administered to both domestic and foreign firms from different sectors. The target respondent was the director, human resources managers or financial directors of each firm.

### 3.3. Data entry and analysis

The collected data was cleaned, coded, entered in the data sheet and then analyzed. Descriptive statistics was then used to find out the nature of spillovers.

## 4. Study findings

To analyze the nature of spillovers effect in domestic firms, the study adopted the channels of spillovers transmission as discussed in the literature review. Some of these channels included labour turnover, competition effect, and value of goods and services bought by foreign firms from domestic firms. All these are believed to be the avenues through which spillovers can pass from foreign to domestic firms

### 4.1. Vertical Spillovers

Vertical spillovers occur due to interaction across industries through customers –supplier linkages. The study measured vertical spillover through the value of goods and services sold to foreign firms by domestic firms who are in different sectors.

#### 4.1.1. Supply of goods and services

Gao (2005) established that, literature on FDI impacts suggest that the host economies are quite uneven, both across and within countries. It noted that the host country policies are an important factor for the distribution of these benefits, on the commercial environment, institutional quality and supply-side capabilities in particular. The number of domestic firms that had supplier relationship with foreign firms was recorded in each category as illustrated by Table 4.1

**Table 4.1.** Firms that had supplier linkages with foreign firms

Type	Employees	No of Total Domestic Firms Sampled	No of Domestic Firms that Supplied Goods and Services to Foreign Firms.	
			No	Percent
Small firms	20-50	40	21	53
Medium firms	50-100	36	12	33
Large firms	100 and above	38	7	18
	Total	114	35	30

Table 4.1 shows that, most of the domestic firms that had linkages with the FDI firms in the sample were small or medium firms. Of the total sampled, domestic firms, 53 percent of small firms had linkages with foreign firms, followed by medium firms at 33 percent and finally large firms at 18 percent. Of the total sampled firms, 30 percent of domestic firms had supplier linkages with foreign firms. This could imply that most domestic firms which are small and medium were mainly involved in the non-core business of the FDI firms, especially the suppliers.

Further analysis was done across the sectors to find out which of the three sectors benefited most from foreign supplier relationship. Table 4.2 shows the number of domestic firms that had supplier relationship with foreign firms in the three different sectors.

**Table 4.2.** Domestic and Foreign Firms Supplier Relationship

Sector	No. of Domestic Firms with Foreign Linkage	Percent
Manufacturing	9	26
Agriculture	8	23
Service	18	51
Total	35	100

Among the sampled firms, the Service sector had the highest percentage of firms that had a supplier relationship with foreign firms at 51 percent. This arose from the observation that most of the foreign

companies sourced most of their services from domestic firms. Some of the services outsourced from domestic firms included cleaning, servicing of machines and advertising. Service sector was followed by manufacturing sector which had 26 percent. This showed that some of the foreign firms outsourced their raw materials from domestic firms, an indication of backward linkages with domestic firms. Finally in agriculture, 23 percent of domestic firms in the sector had foreign supplier linkages. In conclusion, from the above analysis, it is evident that a number of domestic firms had supplier relationship with foreign firms and this affected their productivity.

## 4.2. Horizontal spillovers

These are the benefits that a domestic firm derives from a foreign firm in the same sector. These can occur through labour effect, competition effect and demonstration effect as discussed in literature review.

### 4.2.1. Labour mobility

According to Subash (2006) and Crespo and Fontoura (2007), another channel of spillovers is related to the possibility of domestic firms hiring workers who, having previously worked for foreign firms, know about the technology and are able to implement it in the domestic firms (Glass and Saggi, 1999). The questionnaire sought to find out whether domestic firms obtained some of their employees from foreign firms in each sector; it was evident from the interviews that labour mobility existed between the domestic and foreign firms. Table 4.3 shows the mobility of workers from foreign to domestic firms.

**Table 4.3.** Labour Mobility between Firms

Sector	Total Numbers of Sampled Domestic Firms	Domestic Firms that had Gained Employees from Foreign Firms.	
		No.	Percent
Manufacturing	58	20	34
Agriculture	11	4	36
Service	45	15	33
Total	114	39	34

Table 4.3 shows that Agricultural sector had the highest percentage of firms who had indicated that they had received employees from foreign firms. The sector had 36 percent, followed closely by manufacturing sector with 34 percent. Lastly, service sector had 33 percent of its firms receiving workers from foreign sectors.

According to Crespo and Fontoura (2007), Compared with domestic firms, foreign firms spend a lot of money in training its employees. Hence due to this training and high exposure, foreign firms' employees are more efficient and more productive. According to Ngugi and Musengele (2008) the Kenya government has imposed an understudy programme for each expatriate employee recruited by foreign investors, with the aim of replacing the expatriate with a Kenyan employee in the medium term (UNCTAD, 2004). Foreign firms have often gone beyond the legal requirements and provided training to their employees on a wider basis. Many give a high level of responsibility to local staff by providing ongoing training programmes in order to allow them to occupy top management positions.

Multinationals in the country are reputed as having only a few posts, often managing director and finance director, staffed by expatriates. The study sought to compare the average amount of money used by firms to train their employees per year. Table 4.4 shows the average amount of money foreign and domestic firms spent to train their employees yearly (during the period under study).

**Table 4.4.** Average expenditure on labour Training

<b>Sector</b>	<b>Foreign Firms Millions (Ksh)</b>	<b>Domestic Firms Millions (Ksh)</b>
Manufacturing	3.3	0.6
Agriculture	0.8	0.05
Service	1.5	0.1

From Table 4.4, it is evident that foreign firms had more expenditure on training their workers than domestic firms. On average foreign firms spent Kshs. 3.3 millions in manufacturing sector compared to only Ksh. 0.6 million by domestic firms. Agricultural sector had the least amount of money spent (an average of Ksh.0.8 million by foreign firms and only Ksh.0.05 million by domestic firms). This clearly shows that foreign firms train their employees more than domestic firms.

Further analysis was conducted in order to find out the contribution of workers who moved to domestic firms from foreign firms. This was done by giving the firms various options on which they were supposed to rank the various contributions of workers who had moved from foreign firms to their firms. Table 4.5 shows how various firms ranked contributions received by employees from foreign firms.

Assisting in development and improvement of new products was the option that was ranked most by many firms that is 55 percent. 20 percent of the firms ranked assisting in processing activities, raw material and quality control as the contribution of workers who moved to their firms. Clearly it was evident from the analysis that the mobility of workers from foreign to domestic firms created opportunities of knowledge spillovers to the domestic firms. Consequently this helped the domestic firms to increase their productivity.

**Table 4.5.** Contribution of Workers from Foreign Firms

<b>Contribution to the firm</b>	<b>Ranking by contribution (%)</b>
Assisted in development, improvement of new products	55
Assisted in the processing activities, raw materials and quality control	20
Strengthened market department in new ideas and skills and knowledge of existing local and foreign markets	25

#### 4.2.2. Competition effect

The study sought to find out the percentage of domestic firms whose main competitor in selling their product was foreign firms and how this competition had affected their productivity. This was done by asking the firms to indicate by way of putting a tick from the options given, their main competitor. The firms whose main competitors were foreign firms were then asked to tick from the options given, how competition had affected their productivity. Table 4.6 shows the percentages of domestic firms whose main competitor was foreign firms and how this affected their productivity.

**Table 4.6.** Competition of Firms from Different Sectors

<b>Sector</b>	<b>% of domestic firms whose main Competitor was foreign firms</b>	<b>Effect of Competition</b>	
		<b>Increase in productivity</b>	<b>Decrease in Productivity</b>
Manufacturing	65	41.02	58.98
Agriculture	32	38.04	61.96
Service	17	15	85

Majority of the domestic firms interviewed stated that their main competitors were foreign firms. This was because foreign firms were dominant due to their large scale production and technological capability. Among the three sectors studied, it was evident that manufacturing sector was the most affected by competition from foreign firms. 65 percent of the firms interviewed from this sector indicated that their main competitors were foreign firms, but among these firms 41 percent, said that competition from foreign firms had helped them to increase productivity. 59 percent of the manufacturing firms indicated that competition from foreign firms had made them to decrease their productivity.

In the service sector, only 17 percent of the firms indicated that their main competitors were foreign firms. This can be explained by the fact that in Kenya, foreign firms in the service industry target high income



groups in the country, but, based on their local market intelligence, domestic firms have been able to target the middle income group with relatively cheap brands and hence they have been able to withstand competition from foreign firms. However, 85 percent of these firms said that competition from foreign firms had made them to decrease their productivity. In conclusion, it is clear from the three sectors that there has been some evidence of spillovers from foreign to domestic firms through competition effects which has made some firms to increase productivity and others to decrease their productivity.

#### 4.2.3. Demonstration effect

According to Wang and Blomstrom (1992), Subash (2006), Crespo and Fontoura (2007), demonstration / imitation is the most evident channel in transmission of spillovers from foreign to domestic firms. The introduction of a new technology into a given market may be too expensive and risky for a domestic firm to undertake, but if a technology is used successfully by a foreign firm, this will encourage firms to adopt it (Crespo and Fontoura, 2007). The study sought to find out if demonstration effect is evident in Kenya domestic firms in various sectors. This was done by asking if the domestic firms had ever introduced new products or new technologies observed from foreign companies. Table 4.7 shows the responses of sampled firms in different sectors.

**Table 4.7.** Demonstration Effect of Domestic Firms in Different Sectors

Sector	Total no of Sampled Firms	No of Domestic Firms who said Yes	Percentage
Manufacturing	58	23	40
Agriculture	11	4	36
Service	45	14	31
Total	114	41	36

It is clear from Table 4.7 that demonstration effect is evident from domestic firms in Kenya. Firms in manufacturing sector benefited most from imitation of foreign firms as 40 percent of firms in this sector had copied technology from foreign firms. Agriculture had 36 percent, while service sector had 31 percent. On average, 36 percent of all domestic firms had adopted new products and new technologies from foreign firms.

## 5. Conclusion

In conclusion, it was evident that domestic firms have benefited from foreign firms through both vertical and horizontal spillovers. Through vertical spillovers it was evident that on average over 35 percent of domestic firms in all sectors had benefited in supplier customer relationship. In addition it was found that horizontal

spillovers were also passed through labour mobility, demonstration effect and competition effect. All these spillovers helped the domestic firms to increase productivity. On vertical spillovers, the results showed that 53 percent of small firms in Kenya had linkages with the foreign firms while 18 percent of large domestic firms had linkages with foreign firms. Of all the sampled firms 30 percent of domestic firms had supplier linkages with foreign firms. This implied that foreign firms had a big impact on domestic firms especially the small domestic firms that were mainly involved in the non – core business of FDI firms. In addition service sector had the highest percentage of domestic firms that had a supplier relationship which showed that most of the foreign firms outsourced most of their services from domestic firms. These services included security, cleaning, servicing of machines and advertising among others. It was also evident that domestic firms which were small in size benefited most from foreign firms unlike big firms.

For horizontal spillovers, it was evident that domestic firms benefited through various channels of transmission for example through labour mobility. From the three sectors labour mobility was evident from foreign firms to domestic firms which helped the domestic firms to increase their productivity. This was because from the analysis it was evident that workers in foreign firms were found to have more exposure and to be more trained than domestic firms' workers.

The study also found out that domestic firms benefited from competition channel. Some domestic firms from across the three sectors indicated that competition from foreign firms had helped them to increase productivity. Finally, it was also evident that some domestic firms especially in manufacturing sector benefited from imitation of technology from domestic firms.

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## References

- Agarwal, J. (1980), "Determinants of Foreign Direct Investment: A survey", *Weltwirtschaftliches Archiv*, Vol. 116, pp. 739–773.
- Aitken, B.J. and Harrison, A.E. (1999), "Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Venezuela", *American Economic Review*, Vol. 89, pp. 605–618.
- Amin, S. (1976), "Unequal development: an essay on the social formations of peripheral capitalism", *Marxist Theory and Contemporary Capitalism.*, p. 440 p.
- Baran, P. (1957), "On the roots of backwardness", *The Political Economy of Growth*, pp. 134–162.

- Blomstrom, M. and Persson, H. (1983), "Foreign investment and spillover efficiency in an underdeveloped economy: Evidence from the Mexican manufacturing industry", *World Development*, Vol. 11 No. 6, pp. 493–501.
- Borensztein, E., Gregorio, J. De and Lee, J.-W. (1998), "How does foreign direct investment affect economic growth", *Journal of International Economics*, Vol. 45 No. 1, pp. 115–135.
- Bornschiefer, V. and Dunn, C. (1978), *Transnational Corporation and Underdevelopment*, Praeger, New York.
- Caves, R. (1974), "Multinational Firms, Competition and Productivity in Host Countries Markets", *Economica*, Vol. 41 No. 162, pp. 176–193.
- Cochran, W.G. (1977), *Sampling Techniques*, New York: John Wiley and Sons.
- Crespo, N. and Fontoura, M.P. (2007), "Determinant Factors of FDI Spillovers - What Do We Really Know?", *World Development*, Vol. 35 No. 3, pp. 410–425.
- Findlay, R. (1978), "Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: a Simple Dynamic Model", *Quarterly Journal of Economics*, Vol. 92 No. 1, pp. 1–16.
- Fisher, R.A., Corbet, A.S. and Williams, C.B. (1943), "The Relation Between the number of Species and the Number of Individuals in a Random Sample of an Animal Population", *Journal of Animal Ecology*, Vol. 12 No. 1, pp. 42–58.
- Frank, A.G. (1966), "The Development of Underdevelopment", *Monthly Review*, Vol. 18, pp. 17–31.
- Gachino, G. (2007), *Foreign Direct Investment and Firm Productivity: Evidence from Kenyan Manufacturing*, UNU-MERIT Working Paper Series UNU-2006-014.
- Gao, T. (2005), "Foreign direct investment from developing Asia: Some distinctive features", *Economics Letters*, Vol. 86 No. 1, pp. 29–35.
- Glass, A.J. and Saggi, K. (1999), "FDI policies under shared factor markets", *Journal of International Economics*, Vol. 49 No. 2, pp. 309–332.
- Globerman, S. (1979), "Foreign direct investment and ' spillover ' efficiency benefits in Canadian manufacturing industries", *Canadian Journal of Economics*, Vol. 12 No. 1, pp. 42–56.
- Gorodnichenko, Y., Svejnar, J. and Terrell, K. (2014), "When does FDI have positive spillovers? Evidence from 17 transition market economies", *Journal of Comparative Economics*, Vol. 42 No. 4, pp. 954–969.
- Haddad, M. and Harrison, A. (1993), "Are there positive spillovers from direct foreign investment?. Evidence from panel data for Morocco", *Journal of Development Economics*, Vol. 42 No. 1, pp. 51–74.
- Haskel, J.E. (2002), *Does Inward FDI Boost the Productivity of Domestic Firms?*, NBER Working Paper, 8724.
- Havranek, T. and Irsova, Z. (2011), "Estimating vertical spillovers from FDI: Why results vary and what the true effect is", *Journal of International Economics*, Vol. 85 No. 2, pp. 234–244.
- Hein, S. (1992), "Trade Strategy and the Dependency Hypothesis: A Comparison of Policy, Foreign Investment, and Economic Growth in Latin America and East Asia", *Economic Development and Cultural Change*, Vol. 40 No. 3, p. 495.

- Hufbuer, G. (1975), "The Multinational Corporation and Direct Investment", in Kenae, P.B. (Ed.), *International Trade and Finance Frontier for Research*.
- Javorcik, B.S. (2004), "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In research of Spillover Through Backward Linkages", *The American Economic Review*, Vol. 94 No. 3, pp. 605–627.
- Juraj, S.C. (2007), "Horizontal and Vertical FDI spillovers: Recent Evidence from the Czech Republic", *American Economic Review*, Vol. 94 No. 3, pp. 604–625.
- Koizumi, T. and Kopecky, K.J. (1977), "Economic growth, capital movements and the international transfer of technical knowledge", *Journal of International Economics*, Vol. 7 No. 1, pp. 45–65.
- Lizondo, S. (1950), *Determinants and Systematic Consequences of International Capital Flows*, IMF occasional paper no 77, Washington D.C.
- Markowitz, H.M. (1952), "Portfolio selection", *The Journal of Finance*, Vol. 7 No. 60, pp. 77–91.
- Munteanu, A.-C. (2015), "Knowledge Spillovers of FDI", *Procedia Economics and Finance*, Vol. 32, pp. 1093–1099.
- Ngugi, R.W. and Musengele, B. (2008), *South-South Link, Third World Multinationals and Development*, Unpublished paper.
- Pavel, V. (2007), *Panel Data Evidence on Productivity Spillovers from FDI: Firm- Level Measures of Backward and Forward Linkages*, University of Alberta, Discussion Paper No 3077.
- Rodríguez-Clare, A. (1996), "Multinationals, Linkages, and Economic Development", *American Economic Review*, Vol. 86 No. 4, pp. 852–873.
- Subash, S. (2006), *Foreign Direct Investment and Technology Spillovers: Evidence from the Indian Manufacturing Sector*, UNU-MERIT Working Paper UNU-2006-010.
- Teal, F. (1999), "The Ghanaian manufacturing sector 1991–95: Firm growth, productivity and convergence", *The Journal of Development Studies*, Vol. 36 No. 1, pp. 109–127.
- UNCTAD (1998), *Investment Policy Review*, United Nations, New York and Geneva.
- UNCTAD (2004), *World Investment Report*, United Nations, New York and Geneva.
- UNCTAD (2005), *Investment Policy Review Kenya*, United Nations, New York and Geneva.
- UNCTAD (2010), *Investment Policy Review Kenya*, United Nations, New York and Geneva.
- Wang, J.-Y. and Blomstrom, M. (1992), "Foreign Investment and Technology Transfer. A simple Model.", *European Economic Review*, Vol. 36, pp. 135–175.