

Foreign Direct Investment Spill over's on Domestic Firms: a Case of Kenya's Domestic Firms

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Abstract

Many developing countries, Kenya included have instituted many measures in order to attract more foreign direct investment (FDI). These measures sometimes have been at the expense of domestic firms. This is done with is a general belief that FDI has direct and indirect benefits to the economy. It is believed that foreign firms act as a catalyst in the development of local firms through positive spillovers effects. This may be through increased efficiency due to competition from foreign firms, imitation of technology, upgrading of local suppliers through technical assistance and transfer of knowledge from foreign to domestic firms. But drawing on the vast technical and managerial resource of its parent, a foreign firm may crowd out domestic investment. By borrowing locally it may also deprive domestic firms the main source of capital. In addition, foreign firms may take over domestic firm's best employees by offering high wages and this reduces efficiency which eventually decreases the productivity of the domestic firms. Therefore the study empirically evaluates if domestic firms have benefitted from foreign firms in Kenya. Primary data was collected from three main cities Nairobi, Kisumu and Mombasa. Panel of three years between 2011 to 2014, was used and FGLS method of analyses was employed. It was evident that domestic firms benefitted from foreign firms through both horizontal and vertical spillovers. Other variable that affected productivity also included, technological gap, research and development and level of skills.

Key words: Foreign firms; horizontal spillovers; Vertical spillovers; domestic firm's productivity.

1.1. Background to the Study

Foreign direct investment (FDI) can be defined as long term investment that involves the injection of foreign funds into an enterprise that operates in a different country of origin from the investor. The investor has a significant degree of influence on the management of the enterprise and for operational purposes the investor must have 10% of the level of ownership of the enterprise (UNCTAD, 2009). FDI can take several forms. The first is a Greenfield investment which involves establishment of a new operation in a foreign country. The other forms are mergers and acquisition (M &A) with an existing firm in the foreign country, a start up project, a joint venture with local partner, or partial acquisition through licensing (UNCTAD, 2009).

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.

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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).

In addition, developing countries and emerging economies increasingly see FDI as a catalyst to the development of domestic firms. This development can be through spill over 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 counter parts (Teal, 1999). In contrast, Yuriy (2007) observed that foreign firms may have negative effects on domestic firms' output and efficiency if they take over their market or take over their best skilled employees. If the best employees leave for foreign firms, efficiency in the domestic firms declines, which eventually affects the productivity of the domestic firms. In addition, if domestic firms cut back production in the face of foreign competition, they may experience a higher average cost as fixed costs are spread over a small scale of production (Aitken and Harrison, 1999).

Borensztein and Lee (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 *et al.* (2002), using micro data from UK firms, concluded that firms further away from technology and human capital, gained most from foreign presence.

1.2 Kenya National Policy on Foreign Investment

Kenya has made good progress in modernizing the legal regime in certain key areas over the past decade. Parliament enacted the Kenya Investment Act of 2004 that created the Kenya Investment Authority (KIA), which superseded the Investment Promotion Centre (IPC) Act of 1986. The purpose of the Act was to promote and facilitate investment by assisting investors in obtaining the licenses necessary to invest and by providing other assistance and incentives. The KIA mandate was extended to include issuance of investment certificates and advising the Government on issues related to investment improvement environment. According to the Act, for foreign direct investors to operate in Kenya, they must invest an amount not less than \$500,000 or equivalent in another currency. In addition the investment must be deemed by KIA to be for the benefit of Kenya in terms of: creation of employment for Kenyans; the acquisition of new skills or technology by Kenyans and the contribution to tax revenues or other government revenues (UNCTAD, 2005).

Kenya Investment Act of 2004 has provisions on incentives that are obtained through the granting of an investment certificate by KIA. These are twofold: the granting of temporary business licenses; and the entitlement to six work permits for expatriates. Under the Act, an investment local certificate entitles the holder to the “deemed” issuance of a wide range of licenses, as specified in the certificate, for an initial period not to exceed 12 months. Special incentives are also given for enterprises operating in Export Processing Zones (EPZs) under the Export Processing Zones Act of 1990, (with subsequent amendments). Other fiscal incentives granted include, exemption from all existing and future taxes and duties payable under the Customs Act, exemption from registration under the VAT Act; exemption from the payment of income tax for the first ten years from the date of first sale, followed by a rate of 25 percent for the subsequent 10 years and the standard rate thereafter.

1.3 Problem statement

The Kenya Government has instituted many measures in order to attract more foreign direct investment (FDI). This follows from a general belief that FDI acts as a catalyst in the development of local firms through positive spillovers effects. This can be through increased efficiency due to competition from foreign firms, imitation of technology, upgrading of local suppliers through technical assistance and transfer of knowledge from foreign to domestic firms. But drawing on the vast technical and managerial resource of its parent, a foreign firm may crowd out domestic investment. By borrowing locally it may also deprive domestic firms the main source of capital. In addition, foreign firms may take over domestic firm’s best employees by offering high wages (Koen and Bartoldus, 2002) and this reduces efficiency which eventually decreases the productivity of the domestic firms.

Empirical studies that have been conducted in both developed and developing countries have produced mixed results. Some studies for example, Haddad and Harrison (1993), Aitken and Harrison (1999), Haskel *et al.* (2002), Koen and Bartoldus (2002) have found no spillovers of FDI to domestic firms. Other studies like Globerman (1979) and Subash (2006) have found positive spillovers from FDI to domestic firms. Hence, it is still unclear how FDI affects the domestic firm’s productivity. The extent to which potential spillovers from FDI are absorbed by domestic firms in practice differs from country to country (David, 2007). Therefore there is a need to assess the benefits of any foreign direct investment by analyzing the nature of spillover on domestic firms. This would justify the aggressiveness by the government towards attracting FDI inflow sometimes at the expense of domestic firms.

Literature Review

2.1 Theoretical Literature Review

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 Product Life Cycle (PLC) Theory

Vernon (1966) developed a model that described internationalization pattern of organization. He looked at how US companies developed into Multinational Corporations at a time when these firms dominated global trade and per capita income in the US was by far the highest of all developed countries. Based on data obtained from US corporate activities, Vernon (1966) tried to explain when, why and where foreign direct investment took place. The theory was developed to provide a framework to explain the increasing FDI from US and its influence on trade flows. The theory described an internationalization process whereby a local manufacturer in advanced countries begins selling a new technologically advanced product to high income consumers in its market. As demand for consumers in other markets rises, producers increasingly shift abroad enabling the firm to maximize economies of scale and to bypass trade barriers. As the product matures and becomes more of a commodity, the innovator from the advanced nation becomes challenged in its own home market making the advanced nation a net importer of the product.

This is produced either by competitors in lesser developed countries or innovator has developed into multinational manufacturer by its foreign based production facilities. According to Vernon (1966), most products follow a life cycle that is divided in three stages.

The first stage is known as innovation stage. The product life cycle theory begins when a company in a developed country wants to exploit a technological breakthrough by launching a new innovative product on its home market. Notably, such a market is more likely to start in a developed nation because more high income consumers are able to buy and are willing to experiment with expensive products (low price elasticity). The product is manufactured in the home country primarily to meet the domestic demand. The production is also likely to start locally in order to minimize risk and uncertainty; in a location in which communication between the markets and the executives directly concerned with the new product is swift and easy, and in which a wide variety of potential types of input that might be needed by the production units are easy to come by. Export to other industrial countries may occur at the end of this stage allowing the innovator to increase revenue and to increase the downward desires and incomes making exporting the easiest first step in an internationalization effort. Competition comes from a few local or domestic players that produce their unique product variations.

The second stage is known as maturing product stage. At this stage the demand for the new product in other developed countries grows substantially and it becomes price elastic. The product design and production process becomes increasingly stable. Exports to markets in advanced countries further increase through time making it economically and sometimes politically necessary to start local production. Rival firms in the host country itself begin to appear at this stage to supply similar products at a lower cost owing to lower distribution cost, whereas the cost of the innovator is often higher as it involves the transportation cost and tariff that is imposed by the host country. Thus, in order to compete with the rival firms, the innovator decides to set up a production unit in the host country itself to eliminate transportation costs and tariff. This leads to internalization.

In the final or standardized product stage, a standardized product and its production techniques are no longer the exclusive possession of the innovating firm; the principal markets become saturated. The firm begins to focus on the reduction of process cost rather than addition of new product features and as a result, the product and its production process become increasingly standardized.

Rival firms from the home country itself or from other developed countries put up stiff competition. At this stage; price competitiveness becomes even more important and in view of this fact the innovation shifts the production to a low cost location, preferably a developing country where labor is cheap. Labor can start to be replaced by capital. The product manufactured in a low cost location is exported back into the home country or other developed countries. The product cycle theory clearly explains the early Post –Second World War expansion of firms from developed countries like US and UK to other countries. However, with changes in international environment, different stages of the product cycle did not necessarily follow in the same way.

The strengths of the theory are handful. To begin with, that the model helps organizations that are beginning their international expansion or are carrying products that initially require experimentation to understand how the competitive play ground changes over time and how their initial internal workings need to be refitted. The model can be used for product planning purposes in international marketing. Secondly, new product development in a country does not occur by chance; a country must have a ready market, an able industrial capability and enough capital or labor to make a new product flourish. No two countries exist with identical local market conditions. Countries with high per capital incomes foster newly invested products. Countries with lower per capita incomes will focus on adapting existing products to create lower priced version. In addition, the life cycle product model was widely adopted as the explanation of the ways industries migrated across borders overtime, for example the textile industry. Furthermore, Vernon was able to explain the logic of an advanced, high income country such as USA that exports slightly more labor intensive goods than those that are subject to competition from abroad. Lastly, the model is best applied to consumer oriented physical products based on a new trade technology at a time when functionality supersedes cost considerations and satisfies universal need.

Notwithstanding the above strengths, the theory has also some limitations. The first is that Vernon's assumption that the diffusion process of a new technology occurs slowly enough to generate temporary differences between countries in their access and use of new technologies. By the late 1970s, the author recognized that this assumption was no longer valid. Income differences between advanced nations had dropped significantly, competitors were able to imitate a product at much higher speed than previously envisioned and MNCs had built up an existing global network of production facilities that enabled them to launch products in multiple markets simultaneously. Investment in an existing portfolio of production facilities made it harder to relocate plants.

In addition, the model assumed that integrated firms begin producing in one nation, followed by exporting and then building facilities abroad. The business landscape had become much more interrelated since 1950s and early 1960s. The tradeoff between export or foreign direct investment was too simplistic; more entry modes exist. Also the model assumed that technology can be captured in capital equipment and standard operating procedures. This assumption underpinned the discussion on labour intensity, standardization and unit cost.

The relative simplicity of the model makes it difficult to use as a predictive model that can help anticipate changes. In general, it is difficult to determine the phase of a product life cycle. Furthermore, an individual phase reflects the outcome of numerous factors that facilitate or hamper a product's rate of sales, making it difficult to see what is happening. Lastly, foreign markets are not just composed of average income consumers, but contain multiple segments.

2.1.2 Industrial Organization Theory

Hymer (1976) developed the industrial organization theory, which was extended by Kindleberger (1969), Caves (1982) and Dunning (1988). According to this theory, when a firm establishes a subsidiary in another country, it faces several disadvantages in competing with local firms. These disadvantages emanate from differences in language, culture, legal system and other inter-country differences. For example, a foreign firm may have to pay higher wages in the host country than do the local firms because employment with them is regarded by local workers as being more risky. If in spite of these disadvantages the firm engages in FDI, it must have some advantages arising from intangible assets such as a well known brand name, patent protected technology, managerial skills and other firm specific factors.

According to Kindleberger (1969), the comparative advantage has to be firm specific. It must be transferable to foreign subsidiaries and it should be large enough to overcome these disadvantages. It is this firm specific advantage that explains why a firm can compete successfully in a foreign market. This approach has been used by Graham and Krugman (1991) to explain the growth of FDI in the US. One problem with this approach, however, is that it fails to explain why the firms do not utilize their advantages by producing in home country and exporting abroad, which is an alternative to FDI. Moreover, while the industrial organization theory explains why firms invest in foreign countries, it does not explain why firms choose to invest in country A rather than country B.

2.2 Some Selected Empirical Literature

Kugler (2005) investigated whether FDI in a developing country generated positive externalities on local producers. The study contributed to an estimation framework that measured both intra industry and inter industry spillovers of FDI and based estimations on the Columbian manufacturing sector. The study used the production function for each atomistic producer with headquarters in home or abroad in each sector i given by:

$$Y_{it} = \xi_{it} E_{it} K_{it}^{\alpha} H_{it}^{1-\alpha} X_{it} \dots\dots\dots 2.7$$

Where Y_{it} is total output of industry i , ξ_{it} is technology shock, E_{it} is fixed effect, K_{it} and H_{it} are stocks of capital of physical and human capital respectively, X_{it} captured technological spillovers that was specified as in the Arrow-Romer model which was given by:

$$X_{it} = \prod_{j=1}^n (K_{jt})^{\gamma_{jt}} + \prod_{j=1}^n (H_{jt})^{\gamma_{jt}} \dots \dots \dots 2.8$$

Where the matrix $\gamma \equiv \gamma_{ij} \geq 0$ and it is a measure of technological spillovers emanating from investment in sector j to productivity in sector i . X_{it} captures technological spillovers. The findings of the study were that there was outsourcing relationships of MNCs with local upstream suppliers hence vertical spillovers were found to be positive. However, the study did not take care of endogeneity problem hence the results could be biased. Pin and Kamal (2005) constituted a model that incorporated both horizontal and vertical technology transfer in a two tier oligopolistic structure. This model captured both competition effect and the demand effect of the FDI. The authors used the model to find out the effect of the multinational's entry on the degree of backward linkages in the economy. The equilibrium model that was derived was:

$$q_i^f = \left[(n+u)(\alpha - \lambda) - \theta H(n,u) \sqrt{[(m+1)(n+2)]} \right] \dots \dots \dots 2.9$$

The degree of backward linkages under FDI was calculated using

$$BL^f = \left[m(n+u)(\alpha - \lambda - \theta H(n,u)) \sqrt{[(m+1)(n+2)]} \right] \dots \dots \dots 2.10$$

Where n are number of local firms denoted by $j=1,2,\dots,n$, m is local suppliers, u are units of intermediate goods, λ are units of labour q_i^f units of output of foreign firm, BL^f is backward linkages from foreign firm and θH is the cost of intermediate goods. The author tested the above model using firms from China manufacturing industries and found that although multinationals have a negative impact on their local competitors, they had a positive impact on their local suppliers especially if they transfer technology to them.

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, a firm 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.

Pavel (2007) conducted a study on whether foreign direct investment increased the productivity of manufacturing firms in the Czech Republic, testing the proposition that local firms benefited from supplying to multinationals (backward linkages) and by purchasing inputs from multinationals (forward linkages) using panel data collected from various firms in the country. The study found evidence of the existence of spillovers through backward linkages for 1995 to 2004. However, the study did not find any evidence in favor of spillovers through forward linkages hence providing an argument in favor of policies to attract FDI. Poole (2007) using a novel matched establishment worker data base from Brazil, explored labour turnover mechanism for the transmission of spillovers from multinational to domestic firms. The study investigated where spillovers occur and how they were absorbed in local firms. The results of the study suggested that the magnitude of wage spillovers from multinational establishments depended on the sector and workers under consideration. The results provided supports for the hypothesis that higher skilled workers are better able to absorb information from multinationals. Therefore, the study found strong evidence of positive spillovers through worker mobility channel. However the study failed to control for industry and time effects and hence results obtained may be spurious.

3.0 Methodology

3.1 Theoretical Model

According to Koizum and Kopeck (1977), the aggregate production function of resident firm (domestic and the affiliates of foreign multinationals) is written as

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

Where Q denotes output by all firms in the country, L is labour, K^d is the stock of capital owned by domestic firms. K^f is capital stock of subsidiary of foreign multinational company, ϕ and G are parameters that measures spillovers and returns on capital respectively. The function $\phi\left(\frac{K^f}{L}\right)$ identifies the technological spillovers and assumes values greater than one for $K^f/L > 0$

Assuming further that technological spillovers are directly proportional to the foreign presence $\frac{d\phi}{dK^f} > 0$ 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).

$$MSR^d = \frac{dQ}{dK^d} = \phi G_K \dots\dots\dots 3.3$$

$$MSR^f = \frac{dQ}{dK^f} = \left(\frac{d\phi}{dK^f}\right)G + \phi G_K \dots\dots\dots 3.4$$

Where the term $\left(\frac{d\phi}{dK^f}\right)G$ measures spillovers associated with FDI, ϕG_K is return on capital.

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.

Findlay (1978) on catching up process among nations at different stages of development hypothesized that as long as the disparities are not so great that they impede any learning process at all, the greater the technological gap between the foreign and domestic firms, the greater will be the opportunities for technological advancement enjoyed by the domestic firm. This means that the wider the technological gap between the foreign subsidiaries and domestic firms, the greater the possible technological spillovers.

Using A(t) to denote the total productivity of foreign firm and assuming that it increases at a constant rate n, we have:

$$A(t) = A_0 e^{nt} \dots\dots\dots 3.5$$

If B(t) denotes the total productivity of domestic firm, Findlay hypothesis is stated as:

$$B = \lambda [A_0 e^{nt} - B(t)] \dots\dots\dots 3.6$$

Where λ is a positive constant dependent on exogenous parameters. This equation states that the wider the technological gap between MNCs and domestic firms, the greater convergence type spillovers will be. Using Gap to indicate technological gap between MNCs and domestic firms and Fo, for foreign presence, we have:

$$\frac{\dot{B}}{B} = f(\text{Gap}, \text{Fo}) \dots\dots\dots 3.7$$

$$\frac{df}{d\text{Gap}} > 0 \text{ and } \frac{df}{d\text{Fo}} > 0$$

3.3 Empirical Model

From equation 3.7, the study regressed total productivity against several other factors that affect productivity in addition to technological Gap and foreign presence. The study assumed that productivity of the firm reflected its own technology. In most of the studies on spillovers, the use of production function has predominantly been used (Harrison and Aitken 1999; Gachino, 2006; Barrios, 2009). We therefore used a Cobb Douglas function, where firm output was regressed against various inputs that affect productivity.

The first stage was where the Cobb Douglas function was used in order to get the Solow residue which is in this case is TFP. We start by regressing the total firm output with various inputs.

$$Y_{ijt} = A_{ijt} K_{ijt}^\alpha L_{ijt}^\beta \dots\dots\dots 3.8$$

Where Y_{ijt} is firms total output that is regressed against the firm inputs which are capital (K_{ijt}) and labour (L_{ijt}), i denotes the firm, j the industry and t is the year. K_{ijt} is firm's physical capital, proxied by total firm's investment.

Introducing natural logarithm on both sides of the equation becomes

$$\ln Y_{ijt} = \ln A_{ijt} + \alpha \ln K_{ijt} + \beta \ln L_{ijt} \dots\dots\dots 3.9$$

Where A_{ijt} is total factor productivity (TFP), which was a component that was assumed to vary across firms and at the same time fluctuate with time. A lot of significance is attached to this component as an indicator of certain characteristics in a firm. α and β represent elasticity of capital and labour respectively.

Making TFP specified as A, the residual, the equation 3.9 becomes

$$\ln A_{ijt} = \ln Y_{ijt} - \alpha \ln K_{ijt} - \beta \ln L_{ijt} \dots\dots\dots 3.10$$

In the second step, the TFP is regressed against various firms' characteristics that affect productivity of the firm. These factors include foreign presence (FP), SKL, Technological Gap (TG), Research and Development (R&D), Horizontal spillovers (HS), Vertical spillovers (VS). These can be represented as

$$\text{TFP} = f(\text{FP, SKL HS,VS, TG, R \& D}) \dots\dots\dots 3.11$$

Where FP was foreign presence which was a dummy variable, takes the value of one if the firm has more than 10% ownership by foreigners and zero, otherwise. The coefficient of this variable will show whether firms' productivity depends on ownership characteristic. On horizontal spillovers the study looked at whether there is movement of labour from domestic firms to foreign firms. This showed whether domestic firms were benefiting from foreign firms through gaining of trained workers from foreign firms. Therefore horizontal spillovers was represented by Hfd. Then combining all these factors, the equation becomes:

$$TFP_{ijt} = \beta_0 + \beta_1 FO_{ijt} + \beta_2 SKL_{ijt} + \beta_3 Hfd_{ijt} + \beta_4 VS_{ijt} + \beta_5 TG_{ijt} + \beta_6 R \& D_{ijt} + \varepsilon_{ijt} + \varepsilon_{ijt} \dots\dots\dots 3.12$$

The log of TFP was regressed on log of other variables.

3.4 Definitions of the variables

a) Capital (K) is capital of the firm. It will be measured by the value of the capital that was invested by the firm.

b) Labour (L) is classified into skilled (SKL) and unskilled (UNSKL) workers. Both of them will be measured in absolute numbers for each firm.

c) Technological Gap (TG): According to Isabel et al. (2001), Technological gap can be measured by productivity of domestic firms divided by highest productivity level of the foreign firms in the industrial sector of firm i. The percentage difference between the highest average productivity of the foreign firm in the sector and that of the domestic firm in the industry can be expressed as:

$$\left[\frac{Y}{L} \right]_{For} - \left[\frac{Y}{L} \right]_{Dom}$$

Where $\frac{Y}{L}$ standards for average productivity of foreign firm and domestic firms respectively in that industry

The size of the variable might be positively or negatively related to spillovers.

d) Horizontal spillovers (Hfd): This is the increase in productivity of domestic firms that is brought about by entry of the foreign firm in the same industry. This can be through various means as discussed earlier. We assume that horizontal spillovers increase with foreign presence in sector j at time t. Potential for spillovers is proxied by the share of multinational firms in total activities.

e) Vertical spillovers (Vs): This happens when the entry of a foreign firm leads to an increase in the productivity of the domestic firms in different sectors. This can arise due to interaction across industries (customer /supplier relationship). The indicator will be captured as follows

$$Vertical_j = \sum_{i \neq j} \alpha_{ij} X^j$$

$$X = \frac{\sum Y^f_{jt}}{\sum Y_{jt}}$$

Where X= (Measures the extent of foreign presence in the sector weighted by each firms share in the sector output). The share of a firms output sold to foreign firms will be proxied by the share of an industry output sold to foreign firms in different downstream industries. α_{ij} is the proportion of output sector i supplied to sector j. We will exclude the input sold within the sector since this effect is captured by the horizontal spillovers variable.

F) Foreign presence (FP): This will be captured using a dummy variable (D_i) that takes the value of one if the company has more than 10% shares owned by the foreigners and takes a value zero if the company is owned by Kenyans.

3.5 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 (KIPPRA). 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.

4.0 Results and Conclusion

After conducting all the needed diagnostic tests, the model in equation 3.12 in chapter three was then estimated after the diagnostic tests. FGLS method of estimation was used. Table 4.1 shows the FGLS results of the regression analysis for all the firms sampled that is both domestic and foreign.

TFP	Coefficient	Robust Std. Err.	Z	P> z
Foreign ownership	0.3545**	0.3196	1.11	0.027
Skills	0.0136***	0.019	0.715	0.000
Hfd	0.0011** (0.018)	0.0009	0.2643** (0.041)	0.0872
VS	0.0176** (0.023)	0.0059	0.0734*** (0.000)	0.6919
R & Devpt	0.0028**	0.0011	2.25	0.015
Technological Gap	-0.0966**	0.036	-2.66	0.008
Size	9.48e-06**	3.74e-06	2.66	0.008

Table 4.1: FGLS Results of Effects of Firm Ownership on Productivity.

***, ** and * Significant at 1%, 5% and 10% respectively

Source: Constructed from survey

Data

The foreign ownership variable was a dummy variable where foreign firms took the value of one and domestic firms took the value of zero, thus domestic firms acted as the control or the bench mark. From Table 4.1, it can be observed that the coefficient of foreign ownership was positive and significant at 5 percent level. This meant that the productivity of foreign firms was higher by 35.6 percent than that of domestic firms. As expected, the analysis showed that foreign firms were more productive than domestic firms. According to Industrial Organization Theory, when foreign companies invest in another country they face several disadvantages in competing with local firms and for them to be able to overcome these disadvantages, they must be large enough, use patent protected technology and better managerial skills (Kindlerberger, 1969). In addition, according to Hymer (1976), employment in foreign firms is regarded by locals as risky hence they pay higher wages in the host country. These high wages attract the most skilled workers and hence higher productivity, according to H-O ring theory.

Therefore, these results are consistent with other studies done by Aitken and Harrison (1999), Koen and Bartoldus (2003), Subash (2006) and Gachino (2007). As expected and consistent with many studies, the coefficient of skills was positive and significant, meaning it is a factor that determines firm productivity.

From Table 4.1, increasing firms' skills by one unit, increases firms' productivity by 0.0136. Skilled workers are expected to be more innovative and able to work efficiently and hence their productivity is higher in comparison with the unskilled workers. In addition, skilled workers are able to adopt new technology from rival companies more easily and were normally eager to learn. This helped the firm to be more productive. The results are consistent with those studies by Kokko (1993), Lazear (1999) and Alesina and Ferrara (2002). The coefficient of both vertical and horizontal spillovers are both significant at 5 percent level of significance. This shows that the domestic firms significantly benefit from foreign firms in terms of supply of goods and services to the foreign firms. In addition, the movement of skilled workers from foreign to domestic firms has also helped to increase productivity.

The coefficient of research and development was positive and significant. An increase in expenditure on research and development by one unit increased total productivity of the firm by 0.0028 units. This showed that firms that spent more money on research and development had higher productivity. This was in support of Griliches (1979) who was the first to consider R&D as a factor of production, arguing that R&D activities add to the existing stock of accumulated knowledge of the firm leading to higher productivity. Wang and Tsai (2004) also found that R & D was a major determinant of firm's productivity using data from 136 manufacturing firms in Taiwan. The study also found out that, the coefficient of technological gap was negative and significant at 5 percent level. From Table 4.1, an increase in technological gap between the foreign and domestic firm by one unit, would decrease firm's productivity by 0.096 units. This meant that domestic firms that had low technological gap with foreign counterparts were more productive. This meant that high technology firms were able to produce more. This supports the economic theory that technology increases efficiency and hence more firm's productivity. Finally, the coefficient for Size was also found to be positive and significant at 5 percent level. From Table 4.16, an increase in the firm's size by one unit would increase productivity by a small margin of 0.000095, but this could make an impact with large volume of firm's production. This implied that size had an influence in the firm's productivity. Baldwin (1997) found that large manufacturing firms are more likely than small firms to introduce both product and process innovation. Boothby, Lau and Songsakul (2008) also showed that the level of R&D rises with firm size.

4.1 Conclusions of the Study

From the study, it is clear that FDI plays a major role in the Kenyan economy. In addition to the direct benefits of FDI, the study established that indirect benefits also existed through horizontal and vertical spillovers. This means that foreign firms which are supplied or provided with other services by domestic firms have helped the latter to improve their productivity. This indicated the outsourcing of multinational from local firms. In addition, it was also evident that domestic firms benefited from foreign spillovers through horizontal spillovers. The study also found out that foreign firms were more productive than domestic firms. This confirms the theory that foreign firms have massive capital investment, better management and better technology hence their productivity is higher than that of domestic firms. Foreign ownership at firm level which was observed to have significant influence on total factor productivity suggested productive benefits accrued from foreign owners. This was supported by evidence of both vertical and horizontal spillovers. Finally, in order for domestic firms to maximize benefits from foreign firms they should have more skilled labour which increases their absorption capacity. They should also invest more in research and development as this leads to innovation and adoption of foreign technology.

4.2 Policy Implications

From the empirical findings, a number of policy implications can be drawn. In light of the research findings, it is clear that FDI spillovers positively affect domestic productivity both through vertical and horizontal spillovers in Kenya. From the nature of spillovers, the channels of spillovers transmission from foreign to domestic firms in Kenya identified were labour movement, demonstration effect, competition effect and sales of goods and services to foreign firms. Domestic firms should be encouraged to employ more skilled employees who are able to imitate technology from foreign firms. Through labour mobility, domestic firms should also be encouraged to pay competitive wage in order to attract more workers from foreign firms. This is because movement of workers from foreign to domestic firms was found to increase productivity. In addition, the Kenyan government needs to pay attention to the broader business environment, and create conditions that are conducive to both FDI and domestic investment. This can be done through increasing macroeconomic stability, democracy and a commitment to economic reforms.

This would help to attract more FDI and hence more spillovers, which will facilitate the Kenya government to achieve development programme covering period 2008 to 2030 (Vision 2030). Furthermore, the Government should also facilitate the linkages between foreign and domestic firms. This can be realized through improving the flow of information about suppliers to potential purchasers. It can also be done through development of national websites or business directories. The success of such initiatives can be enhanced if they are introduced in cooperation with appropriate business support agencies and actively disseminated through various channels. In addition, policy makers should develop capacity building programmes in order to facilitate the linkages and other spillover effects from foreign firms. It is imperative to state that such programmes need to pay attention to quality management, training and management development programmes.

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