The Spillover effects of Foreign Direct Investment (FDI) inflow on the productivity of domestic firms:

A case of Ethiopian manufacturing firms

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List of Acronyms

CSA	Central Statistical Agency
EIA	Ethiopian Investment Agency
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
ISS	Institute of Social Studies
MNCs	Multinational Corporations
OLS	Ordinary Least Squares
TFP	Total Factor Productivity
TNCs	Transnational Corporations
UNCTAD	United Nations Conference on Trade and Development

Abstract

Many countries now strongly promote Foreign Direct Investment (FDI), through providing various incentive schemes and lowering barriers. Among the reasons for encouraging FDI inflows is the expectation of that they afford positive externalities (spillover effects) by transferring more productive technology to local firms and increasing competition. However, existing empirical studies provide mixed evidence - some conclude that FDI boosts the productivity of indigenous firms whereas others argue that the effect is either unclear or negative. Although studies have been conducted mainly in Asia, evidence concerning the impact of FDI in the African context is very scarce.

Hence, in an effort to partially fill this gap, this study explores FDI spillover effects on the manufacturing sector of Ethiopia. For the purposes of this research, firm-level cross-sectional data for the manufacturing sector of Ethiopia was collected and analysed from the Central Statistical Agency (CSA) of Ethiopia for the year 2009 for over 1,000 firms. The results suggest that domestic firms benefit, in terms of both Total Factor Productivity (TFP) and Labour Productivity, from foreign presence operating in the same sector, defined at the ISIC four digit level. On the other hand, the result failed to confirm the existence of geographical component in the productivity spillover. The spatial result suggested there are agglomeration effects in Addis Ababa generating positive spillovers towards the indigenous firms, suggesting that nearby firms reap more of the benefits than do distant firms.

There is some institutional evidence of co-operation between indigenous and foreign firms in the textile sector suggesting the existence of positive sectoral effect. To receive greater national gains from FDI presence appears to depend on encouraging more dispersion of FDI away from Addis as the primate city.

Relevance to Development Studies

Unlike many previous studies, this paper tries to disentangle the spillover effects of foreign investment in Africa in which many developing countries are located. As such, it investigates the spillover effects of FDI within the same sector at a national level and examines whether productivity spillovers are geographically bounded or not. Therefore, this paper has a paramount importance for a better understanding of the impact of FDI inflow on the total factor productivity of manufacturing firms in least developed countries. In short, the study attempts to contribute to the FDI spillover literature by providing empirical evidence from a context of least developed country - Ethiopia.

Keywords

FDI, spillover, total factor productivity, firm, sector, region, Ethiopia

Chapter 1: Introduction

1.1 Background of the study

Economic theory indicates that FDI can create positive spillover to local firms in the host country (Glass and Saggi 1999). Since Multinational Corporations (MNCs) are essential sources of international technology and capital, their existence in the host economy can pave the way for a better transfer of managerial skills and technical knowhow (Walz 1997). This may ultimately serve as a productivity enhancement tool to the domestic firms. Due partly to this belief, recently, most developing countries are increasingly giving more attention to the importance of FDI in their developmental strategies. Hence, they provide a number of investment incentives, such as lowering income taxes, import duty exemptions, tax holidays and subsidies for infrastructural facilities with the intention of attracting foreign investment (Waldkirch and Ofosu 2010, Aitken and Harrison 1999). As a result, the last couple of years have seen an increase in the inflow of FDI to most developing economies. There are several well-known channels through which FDI-induced externalities can transfer from foreign linked firms to indigenous firms (Blomstrom and Kokko 2003). These may include spillovers associated with:

- Demonstration effect which may help the domestic firms to imitate;
- Labour mobility from the foreign firms towards the domestic sectors;
- Enhancement of export capacity through the reduction of costs associated with entering the international market;
- Creation of competitive atmosphere in the host economy, and
- Backward and forward linkages with the domestic firms.

Despite the clear theoretical conception that foreign investment generates positive externalities, evidences from empirical studies are ambiguous (Görg and Greenaway 2001). For example Sjöholm (1999), using a firm level data on Indonesian manufacturing firms confirms the existence of spillover effects from foreign firms towards their domestic counterparts but he couldn't show the existence of regional productivity spillover. Aitiken and Harrison (1999), using a panel data for Venezuelan plants, were unable to support the existence of technological spillovers. They are also unable to confirm the presence of regional spillover effects. Furthermore, Kokko et al. (2001), employing micro level data on Uruguayan firms, are unable to find spillover effects from multinationals to local firms.

For the longest time, Ethiopia has experienced a considerable gap between its domestic saving and desired level of investment. The country's low level of income coupled with its hugely limited domestic saving is to blame for this shortfall. Hence, the government has been intent on encouraging FDI as a source of acquiring capital and obtaining entrepreneurs needed to fuel the nation's growth process while narrowing the gap. The present Investment Proclamation No. 280/2002 and its amendment (Proclamation No. 375/2003) are concerned with, among other things, the direct benefits of foreign investment in terms of acquiring capital. Besides, a variety of tax and other incentive schemes have been implemented targeted at facilitating the transfer of technology to Ethiopia through courtesy of FDI.

Although FDI may have a multi-dimensional spillover effect on different sectors of an economy, this research focuses on the spillover effects particularly on manufacturing firms of Ethiopia. Hence the purpose of this paper is two-fold. First, this study is aimed at analyzing the effect of FDI on total factor productivity within the same sector (intra-sectoral spillover). This means it tries to explore the horizontal spillover effects of foreign presence on the Ethiopian manufacturing sector. Second, it investigates whether the spillover effect is geographically bounded or not. By doing so, this study sheds light on the regional spillover effects.

The findings can be summarized as follows. The empirical result is consistent with the existence of positive externalities from FDI through horizontal linkage. However, the regional spillover effect could not be backed up by robust evidence in the Ethiopian manufacturing sector.

1.2 Statement of the Problem

Ethiopia, like many other developing countries, is confronting a host of problems that limited its economic growth. Hence, the government of Ethiopia engaged in the attraction of FDI in part with the expectation of positive spillover towards the local firms. New technology may spillover to the domestic firms as a result of the presence of foreign firms in the form of FDI. By 2010, the Ethiopian government formulated a five-year strategic plan called the 'Growth and Transformation Plan' (GTP) which is aimed at fostering the development of the country. The improvement of the technological capability of the different sectors is an essential aspect in the process of achieving the desired target of development. Among the sectors which are pivotal to the attainment of the GTP, the manufacturing sector can be cited. Nevertheless, there exists a financial and human capability constraint which inhibits indigenous investment activities. Thus, the government gives special attention to foreign investors which are assumed to provide benefits in the facilitation of the transfer of technology to the country.

However, the effect of inward FDI on the domestic firms appears to be controversial. In most circumstances, it is believed that FDI brings a significant positive spillover effect on the domestic firms enabling them improve their capacity ((Liu and Wang 2003)). On the contrary, some studies such as the empirical work of Aitken Harrison (1999) came up with the negative spillover effects from the foreign firms to the domestic ones.

In view of the above controversy, it is essential to examine the nature of spillover effect of FDI inflow on the domestic manufacturing firms which is expected to be vital in the process of development. Furthermore, this study seeks to contribute to the literature in FDI and FDI spillover by drawing on the unique context of a less developed country. Particularly, the paper looks in to investigate the spillover effect of foreign investment on the productivity of Ethiopian manufacturing firms.

1.3 Research Question

The **main question** of the research is**:**

❖ Does FDI inflow in the manufacturing sector induce improvement in the productivity of domestic manufacturing firms?

The **specific questions** that the research will try to address include the following:

✓ Does foreign presence in the manufacturing sector affect the productivity of domestic manufacturing firms in the same sector?
✓ Is productivity spillover in the Ethiopian manufacturing sector geographically limited? Or is there a regional spillover effect due to the presence of MNEs?

1.4 Objectives of the Study

The general objective of the study is to assess the spillover effects of FDI inflow in the enhancement of productivity in the Ethiopian manufacturing firms.

The specific objectives include:

➢ To analyse the intra-industry (horizontal) effect of inward FDI to the Ethiopian manufacturing firms.
➢ To examine the regional spillover effects of FDI inflow considering the manufacturing sector of Ethiopia.

1.5 Relevance and Justification

The study will have a paramount importance in capturing the possible effect of inward FDI by providing empirical evidence on a key sector of the Ethiopian economy. In addition, it will provide useful information to assist the policy and regulation guideline of FDI. Moreover, this study may serve as a reference for those who want to pursue their studies on the area of spillover effect of FDI, especially in the context of least developed countries.

1.6 Limitations of the Study

Since the data is available only for the manufacturing sector of Ethiopia, the study is the unable to consider the vertical integration of foreign firms with other sectors. As a result, the researcher is restricted to use only the manufacturing sector. Moreover, using a cross-sectional data aggregated at a sectoral level inhibits to control unobserved heterogeneity.

1.7 Organization of the paper

The remainder of the paper is organized as follows: In section two, literature regarding FDI spillover is reviewed in a detailed manner. In this section previous studies and theoretical underpinnings of FDI spillover are presented. In section three, an overview of the FDI in the Ethiopian context is discussed. Section four explains the data and methodology employed in this study. Sec-

tion five mainly focuses on the nature and mono-variate distribution of the indicators of the variables used in the econometrics analysis. In section six, an econometric analysis is employed to investigate the spillover effects of FDI inflow on manufacturing sector of Ethiopia. Conclusions and future research agenda are discussed in section seven.

Chapter 2: Literature Review

2.1 Overview of FDI

A foreign investment could be a direct or portfolio investment. A direct investment is an acquisition or construction of physical capital by a firm from one (source) country in another (host) country. FDI is, thus, an investment that involves a long- term relationship and control by a resident entity of one country, in a firm located in a country other than that of the investing firm (Duce 2003). There is more involved in the direct investment than only money capital, for instance, managerial or technical guidance. FDI is generally defined as resident firms with at least 10% of foreign participation (UNCTAD 2009).

MNCs are an important agent in host countries in so far as it is able to substantially affect their economic development. As a result, it is largely assumed to be a provider of technical knowhow, a creator of jobs, a supplier of foreign currency and stimulator of competition (Dunning 1992). Most host countries have liberalized their FDI regulations and have been encouraging the inflow of FDI by, for example, providing generous investment and/or tax incentives (UNCTAD 2003, Oxelheim and Ghauri 2004, Dunning and Gugler 2008). The main motivation for these policies is the assumption of spillover benefits to the host country, resulting in productivity growth (Liu and Wang 2003). However, Aitken and Harrison (1999) postulated that the presence of multinationals may not have positive effect rather FDI firms entering the same industry may take market share away from local companies. Accordingly, this could increase the average cost of domestic plants mainly due to aggressive competition from the foreign firms and eventually may drove them out of the market.

According to Bergman (2006), there are numerous ways a multinational can enter a foreign market. Different types of FDI, that involve different levels of control and risks, are the following. *Green field investment* is when a company establishes a subsidiary in a new country and starts its own production. Greenfield investment involves construction of a new plant, rather than the purchase of an existing plant or firm. This kind of investment involves large risk and set up costs since the foreign firm most likely does not have an existing distribution network, local management skills or enough legislation knowledge (Bergman 2006). But on the other hand the foreign firm has more control. *Brown field investment* is FDI that involves the purchase of an existing plant or firm, rather than construction of a new plant. *Joint venture* is an equity and management partnership between the foreign firm and a local entity in the host market. Many host countries encourage the formation of joint ventures, as a way to build international cooperation, and to secure technology transfer (Samli and Hill 1998). Typically, the foreign partner contributes financial resources, technology or products and the local partner provides the skills and knowledge required for managing a firm in the host country.

Generally, FDI effects can be seen in three different ways (Hill 2011). These are: Resource, competition, and product & process innovation.

Resource effect: resource-transfer effects can be divided into effects on capital, technology and management. These effects are brought in by FDI and would otherwise not be available for the host country's economy (Hill 2011). It

is obvious that for large multinationals it is easy to get money from the capital market. These resources are usually not available for local firms, but are often very welcome in developing economies and will help the local economy to develop. Capital is very welcome in less developed countries, as well as the new techniques which accompany these capital inflows. A foreign company which invests in a country sets an example which can be followed by other local and foreign companies. These countries also have to invest in order to sustain the competition. Foreign investments can be beneficial in many ways (Reisen 2001). They stimulate capital accumulation by adding to domestic savings and they raise the recipient economy's efficiency through improving resource allocation, competition, improving human capital, deepening domestic financial markets and reducing local capital costs. At the same time, foreign investments lower consumption risks through enlarging choices for portfolio diversification and by sharing risks more evenly between capital exporters and importers. Resource can also transfer through the medium of technology and management skills.

Competition effects: The injection of capital and technology stimulates competition in the local market. It will have impact on economic growth and will take place through increased productivity, human capital accumulation, R&D activity, and technological and productivity spillovers. Impact on economic growth can be greater if the types of FDI that the country receives crowd-in rather than crowding out the domestic investment activities (Blomström and Kokko 1996). However, host countries are not always able to benefit from MNEs. When the initial difference in technology between the foreign firm and the local firm is large and human capital is poor, the foreign firm will suffocate local unproductive competitors; this is called market-stealing effect (Leahy and Neary 1999).

Employment effects: Foreign investment occurs through different modes of entry. Each mode has different effects on employment. Jobs are created when an MNE sets up a new subsidiary and has a positive effect on employment. FDI can also be carried out through mergers or acquisitions. Then it is likely that there will be job losses, because the enlarged company wants to operate in more efficient manner (Hill 2011). However, it is difficult to know the real effect of FDI on employment.

Product and Process innovation: this describes the spillover effects of FDI. As such the introduction of MNCs may benefit the host country (Blomström and Kokko 1998). Thus host countries may get access to technologies that they cannot produce by themselves. FDI can also lead to indirect productivity gains for host countries firms through the realization of external economies. This may arise both horizontally and vertically and discussed in this chapter in detail.

Problems of attracting FDI in low income countries

Although the recipient country may benefit from the inward FDI, attraction of foreign investment may also entail adverse effects particularly in low income developing economies. Some scholars argue that entry of MNCs in low income countries may result in economic, humanitarian and environmental shocks (Fan 2002). As explained by Fan (2002), the dependency school theory suggests that foreign investment from the global North has a devastating impact to the long-term economic growth prospects of the low income developing

countries. This may indicate that low income countries are not sufficiently compensated for allowing foreigners to use their resources rather hinders their growth. The general problems associated with attraction of FDI by low income countries include the following:

- Remittances of excess profits by MNCs (by manipulating real prices) and restriction of international transactions inside their plants (Waldkirch and Ofosu 2008)
- Deterioration in balance of payment. This may occur due to transfer of profit and flight of capital by subsidiaries (OECD 2002)

2.2 Spillover and FDI: The Framework

FDI is often seen as a catalyst for a country's development and economic growth, which is the reason for attracting FDI to a country. The expectation of higher return from investment than domestic counterparts leads a plant to operate in a foreign country. Local firms could indirectly benefit from the presence of foreign firms if foreign firms could not prevent technological externalities. There is a comprehensive economic literature that stresses the importance of FDI and its spillover effects to the host economy (Görg and Greenaway 2004). Spillover effects may take place when the entry or presence of foreign firms leads to productivity and efficiency benefits in the host country's local firms (Blomström and Kokko 1998). Such benefits, however, may raise the productivity of indigenous plants without compensating the foreign firms.

The spillover effects of foreign firms to the local industries can be divided into two groups; Inter- and intra- industry spillover effects:

Intra- sectoral (horizontal) spillovers: This is the most researched topic in the literature as far as benefits of FDI are concerned. Horizontal spillover arises from the presence of MNCs in a particular sector and its influence on the host sector's competitors (Halpern and Muraközy 2007). According to Görg and Greenway (2004), there are four transmission channels through which horizontal spillover effects might occur. These are: (a) **imitation:** It is the classic way of technology spillover (Görg and Greenaway 2004, Wang and Blomström 1992). This mainly involves imitation of proprietary technology, management and marketing skills of the foreign firms (Halpern and Muraközy 2007). In other words, As such, imitation of new technologies may enhance the productivity of local firms. (b) **human capital and labour turnover:** when domestic workers trained by or having worked in MNCs' affiliates may decide to leave and join an existing domestic firm, or open up a new domestic firm, taking with them some or all of the MNC-specific knowledge (Fosfuri et al. 2001). As a result this can generate productivity improvement via two mechanisms (Görg and Greenaway 2004). First, a direct spillover to complementary workers, as skilled labour working alongside unskilled labour tends to raise productivity of the latter. Second, workers that move carry knowledge with them of new technology; new management techniques and consequently can become direct agents of technology transfer. Human capital is a very important factor for a company. Human capital is determined by the quality and equity of the domestic educational and training system. MNEs' main reason to go abroad is often because of low wages. At the same time they demand relatively

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skilled labour (ibid). This can be arranged through training. They create exposure of modern technology and management techniques. (c) **competition:** when the increase in competition that occurs as a result of foreign entry forces domestic firms to introduce new technology and/or increase their efficiency (Glass and Saggi 2002). However, the competition effect may entail adverse effects on the part of the domestic firms if their cost of production drastically increases as a result of the competition. (d) **export:** through cooperation, or most likely imitation, local firms can acquire penetration tactics which are deemed to be essential for the export market (Görg and Greenaway 2004). Hence, local firms may experience reduction in costs associated with exportation due to the presence of foreign firms.

Externalities may also be observed through industrial management. According to Blomström et al. (1999), when more foreign affiliates operate in a sector of the host economy, domestic firms enhance their productivity by imitating foreign production technologies. They will also invest more in product development and quality assurance, or simply allocate resources more efficiently to stay competitive. Likewise, domestic business partners of jointly-invested projects can apply management skills acquired from their foreign partners in projects of their own.

Other channels for the diffusion of information on foreign market conditions are trade associations and other industry organizations, of which MNEs are often a member. This kind of market access spillovers' may be most important where the indigenous resources are weakest, especially in developing countries (Blomström and Kokko 1996, Blomström and Kokko 1998).

However, spillover effects may depend on the technological gap between foreign and indigenous firms. It is believed that before technology is widely spread in the market, local companies have little information about the benefits of the technology (Blomström and Kokko 1996). This makes it risky to implement the technology, but when they come in touch with the existing users, more information will be available and uncertainty will be removed. Then it is likely that adoption or imitation of the technology by local companies increases. However, it is unlikely to anticipate spillover benefits having a huge technological gap between the foreign and domestic firms (Blomström and Sjöholm 1999).

MNC's may try to prevent the leakage of technology to the domestic firms. This mainly occurs when MNCs afraid to lose their intangible assets to a local partner, therefore they may abandon investing or bring technologies of low quality to their subsidiaries (Blomström and Kokko 1998). In other words, MNCs may try to internalize their intangible assets. Hence, in such circumstances, the possibility of acquiring positive externalities is will be low. In addition, leakages of the MNCs' technology do not occur automatically. Local companies have to be active to search for information, reverse engineering, personnel training for the new production methods, etc. This makes it costly and time consuming.

According to literatures, foreign subsidiaries are expected to be more productive than local firms (Blomström and Kokko 1996, Aitken and Harrison 1999). This is due to higher technology inputs and a more efficient production and distribution process. MNEs affiliates work on lower production and distribution costs than local firms, and are therefore able to compete more suc-

cessful. On the other hand, their knowledge of local markets and consumer preferences may be a disadvantage. Their higher productive efficiency helps to increase the productivity in their industries, which is beneficial for the general productivity of the host country.

Inter- sectoral (vertical) spillovers: occur through foreign companies' impact on the local suppliers/buyers. Vertical spillovers take place when the foreign firm and a local supplier/buyer, in different sectors[1], are engaged in a long- term relationship (Halpern and Muraközy 2007). Inter-sectoral spillovers appear through creation of linkages between the foreign company and domestic firms and it is a process that is mostly multi-sectoral (Javorcik 2004). There exists two types of linkages between the domestic and foreign firms, i.e, backward and forward linkages. Spillovers in the downstream sectors, which are known as backward linkages, occur when the local suppliers have to meet the demand from the foreign firm in the form of higher quality, price and delivery standards (Smarzynska 2003). Another implication of inter-industry spillover effects is the increased demand by the MNC for local intermediate inputs, thus increasing production possibilities in the host economy (ibid). Similarly, MNCs may provide new and better intermediate inputs with affordable prices to local customers. Hence, this interaction in the upstream sector may be vital for the transmission of technology. In support of these theories, there are case studies which show that knowledge is transferred from downstream foreign affiliates to upstream domestic suppliers through intensive monitoring, training, and assistance as well as supervision in implementation of new technologies (Moran 2001). Moreover, if there is a technology gap between the foreign and the domestic firms, there is potential for technological improvement in the host economy. The local firms must upgrade their products in order to meet the foreign firm's demand for advanced products. In summary, the lack of observed positive horizontal spillovers from FDI leads researchers to search for spillovers across industries through forward and backward linkages.

Regional Dimensions

Provided that imitation and human capital acquisition are the most important channels of technological diffusion, local firms that are located close to MNCs may benefit more than other firms (Görg and Greenaway 2004). Audretsch (1998), in support of the above idea, claims that geographical closeness plays a pivotal role for knowledge spillover indicating that transportation costs are assumed to rise with distance.

Spillovers may have regional dimensions for a number of possible reasons. First, backward and forward integration between local firms and MNCs may increase if there is geographical proximity. This may happen with an intention of reducing transport costs which will ultimately accelerate the communication between the suppliers/buyers and MNCs (Girma and Wakelin 2009). Second, demonstration effects may also increase when firms locate nearby FDI firms because closeness may create favourable situation for domestic firms to imitate the technology (Blomström and Kokko 1996). Third, spread of spillovers is more observed in the area near to the innovation. Moreover, technological

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[1] Sectors classification may depend on the ISIC classification (disaggregation of sectors).

transfer through labour mobility may also be strong in the same region in the form of obtaining skilled labour with previous MNCs experience (Girma and Wakelin 2009).

Alternatively, regional spillovers may not exist if MNCs are influenced by different incentive schemes rather than choosing based on location advantages (Girma and Wakelin 2009). This suggests that spillovers may not be observed regionally if foreign firms locate in an area influenced by the incentive schemes provided by the government. Furthermore, poor access of infrastructure and market can be considered as an obstacle for the attainment of spillovers.

Many researches were undertaken focusing on the impact of FDI to productivity of local companies(Aitken and Harrison 1999, Blomström and Kokko 1996, Görg and Greenaway 2004, Haddad and Harrison 1993). They researched this phenomenon in several countries and different industries and came to the conclusion that spillovers vary between countries and industries and are likely to change with the level of local capability and competition.

Marshallian Externalities

In 1890 Alfred Marshal introduced a theory of knowledge spillover which was later extended by Kenneth Arrow and Paul Romer. Hence, it is labelled as MAR externalities (Glaeser et al. 1992). According to this theory, concentration of firms of the same industry in a given location plays a significant role in the innovation and growth process. This is mainly due to the higher possibility of knowledge transfer among firms of similar type destined in a certain area (Henderson et al. 1995). To put it differently, the denser the concentration of employees in a similar sector in a given geographical location, the higher the possibility to exchange ideas that guides to key innovations (Lucas 2001). Hence, clustering in a given geographical place facilitates the flow of information among firms.

Localization economies, or what Glaeser et al. (1992) referred MAR externalities, are knowledge spillovers which are external to firms but internal to a given sector in a given location. This indicates that the existence of local industry agglomeration paves the way for the realization of an increase in innovation (Henderson et al. 1995). This may be realized with the provision of industry specific complementary assets or through the reduction of cost of supplies to the individual firms. The benefit may also be attained through the creation of specialization in both the factor and product markets (Feldman 1999). Thus, MAR externalities help to explore the common implications of the spatial distribution of production activities.

Pecuniary and Technical Externalities

According to Jordaan (2012), FDI-induced externalities or spillover can take two forms- technological and pecuniary. He claimed that technological externalities occur when FDI firms become contributors of new knowledge and technologies for the domestic firms. On the other hand, pecuniary externalities take place when the existence and operations of foreign firms lead the indigenous firms alter their behaviour in the host economy (Jordaan 2012).

In fact, as discussed above in this chapter, externalities can be transmitted to local firms via multiple channels indicating that the externalities comprises of pecuniary or/and technological.

For example, there is a traditional belief that the entry of foreign firms in a host economy fosters the level of competition and thereby lead the domestic firms enhance their level of efficiency. This may indicate the case of positive pecuniary FDI externality. Nevertheless, competition may also result in negative externalities (of pecuniary nature) when the foreign firm out-perform the local firms and drove them out of the market (Konings 2001).

On the other hand, indigenous firms may imitate technology of foreign firms as a result of FDI in to the local market. Unlike the competition effect, demonstration effects are purely technological by their nature (Jordaan 2012). To state it differently, spillover which emanates from imitation does not involve pecuniary nature.

Through the channels of labour turnover and vertical linkages, however, both pecuniary and technological externalities can occur. When labour moves from MNCs to domestic firms or to begin new firms can possibly provides productivity gains (Görg and Greenaway 2001). On the other hand, since the presence of foreign firms that pay higher wages may bring an increase in industrial wage levels, foreign presence will have an adverse affect on the profitability of indigenous firms (Jordaan 2012). Consequently, he claimed that foreign presence may induce local firms to enhance their level of efficiency leading to the occurrence of positive pecuniary externalities.

Similarly, inter-firm linkages are other mechanisms through which of technological and/or pecuniary externalities can occur. In technical terms, externalities mainly arise when FDI firms provide new technologies and technical knowhow to domestic input suppliers through the backward linkages (Javorcik 2004). She asserted that FDI firms may provide support in the areas of quality control process and prompt delivery, special equipments and tools and transfer of essential production technologies to the indigenous firms. However, if FDI firms pressurize input suppliers by demanding higher quality inputs or reduced prices, then the resulting alteration of the local firm's conduct (in favour of increasing efficiency) can be considered as a case of positive pecuniary externalities (Jordaan 2012).

2.2. Empirical Evidence on Spillovers

Most researchers conducted on the impact of FDI used TFP or labour productivity of domestic firms regressed on a variety of explanatory variables. To capture 'technological' spillovers, they adopted different measurements in order to define foreign penetration in to a host economy. For instance, the share of foreign employment over the total sectoral employment can be used by researchers (Aitken and Harrison 1999). As such, this is assumed to be crucial in examining the existence of positive spillover effects. If the regression result shows a positive and statistically significant coefficient on foreign presence variable, then we can say that there is a positive spillover effect.

While the theoretical literature suggests the existence of positive externalities arising from FDI, the empirical evidence could not lead us to make such generalizations. The findings, as such, are mixed suggesting the existence of positive, negative and neutral effects (Görg and Greenaway 2004).

The empirical evidence regarding the spillover effects of FDI was pioneered by Caves (1974). Caves was the first to indicate the existence of positive

spillover effect after scrutinizing the effect of foreign presence on manufacturing firms of Australia and Canada (Kien 2008). He claimed that productivity of indigenous firms improved due to the competition effect.

Several studies have been undertaken after the pioneering work of Caves (1874) in both developed and developing countries showing the presence of positive externalities. For instance, using firm-level data, Liu (2002) confirmed the existence of positive horizontal spillover effect and suggests that technological spillover with the aid of imitation plays a pivotal role. Similarly, Blomström and Sjöholm (1999) using an unpublished Indonesian firm-level data confirmed the existence of intra-sectoral spillover effect. They claimed that the presence of MNCs in the Indonesian manufacturing firms improves labour and there by enhances the productivity of the indigenous firms. Moreover, using the firm-level manufacturing firms in Ghana, Görg and Strobl (2005) found evidence for the presence of positive intra-sectoral externalities due to the channel of worker mobility. They concluded that owners of firms who worked for MNCs before starting up their new companies are more productive than other local plants. Furthermore, Chuang and Lin (1999) also found an evidence for productivity spillover from foreign to domestic firms after using a firm-level data for Taiwanese manufacturing sector. Likewise, Rattsø and Stokke (2003), using firm-level data for Thai manufacturing firms, obtained a result which indicates the existence of positive externalities. They clarified that imitation through the process of learning plays a great role for the indigenous firms' productivity enhancement.

Although the majority of the studies confirm the presence of beneficial FDI effect on the domestic firms, other empirical evidence may also show negative or neutral effect suggesting differences in various settings (Kien 2008). Foreign presence at the extreme case may affect domestic firms' productivity negatively (Konings 2001, Aitken and Harrison 1999). Using Venezuelan firm-level data, Aitken (1999), was unable to confirm the existence of intra-sectoral spillover effect. He claimed that the domination of the negative competition effect over that of the technological effect lead for the existence of adverse effect on the indigenous firms (Konings 2001). To put it differently, the entry of foreign firms in the Venezuelan economy exposed the local firms to face aggressive competition and eventually put them at the losing side. On the other hand, employing a firm-level data on Moroccan manufacturing sector Haddad and Harrison (1993) are unable to confirm the presence of positive spillover effects. They argued that technological gap becomes an obstacle for the transfer of technology from foreign to domestic firms.

The regional aspect of spillover is explored by few researchers and obtained results of mixed nature. Aiteken and Harrison (1999) employing the Venezuelan firm-level data were unable to confirm the existence of positive spillover form FDI to local firms instead they justified that geographical proximity in the Venezuelan manufacturing sector is unable to provide technological benefits. Similarly, Sjöholm (1999) is also unable to find geographical component for Indonesian manufacturing firms..

Chapter 3: FDI in the Ethiopian Context

3.1. Overview of the Ethiopian Economy

The Federal Democratic Republic of Ethiopia is a multi-national state in the horn of Africa where over 84million people live in harmony. It is a country with ancient historical glories and artifacts. The beauties of the cultural and ethnic diversities have always been the manifestation of its tolerance and respect. There are numerous facts that make Ethiopia a special country. To begin with, it is believed to be the origin of human kind with the discovery of Australopithecus Afarnesis (Lucy) and other fossils. Secondly, it is a country having enormous resource, 'hence the water tower of East Africa'. Moreover, it is the only African country not to have been colonized besides the fact that it has been home of ancient civilization. The various historical and natural attraction sites are to be mentioned as well. It has its own calendar and the country is also called the thirteen months of sunshine for its unique climatic conditions.

The total area of Ethiopia is 1.14 million square kilometres. Out of this, the arable land encompasses 513,000 square kilometres (45%) and the irrigated land covers only 34,200 square kilometres (3%).

As is the case for most of the developing countries, Ethiopia's economy is primarily based on Agriculture, which accounts, in2009/10, for about 42 percent of the gross domestic product (GDP), 90 percent of foreign currency earnings, and 85 percent of employment. Generally, the overall economic growth of the country has been highly associated with the performance of the agricultural sector. Among the main agricultural export items, coffee is critical. It earned US$ 528.3 million in exports in 2009/10. Other important export products include oil seeds, pulses, leather and leather products, meat and meat products, fruits and vegetables, live animals, flowers, chat, and gold (EIA 2012).

Despite the fact that agriculture is the base of its economy, Ethiopia is in an optimistic progress of developing the manufacturing and service sectors as well. As indicated in the in the report of EIA (2012), the industrial sector, which mainly comprises small and medium enterprises, accounts for about 13 percent of GDP. The economic sectors are generally showing auspicious growth process. According to the EIA report of 2012, GDP growth in major sectors (in %) is: 9 for Agriculture, 15 for industry, and 12.5 for Services. This indicates that the industrial sector is getting more attention in recent times.

3.3 Investment in Ethiopia

There are several reasons that make Ethiopia suitable for investment (UNCTAD 2004). The political and social stability that exists in the country and the peaceful working environment, the fact that crime is uncommon in the country, the macroeconomic stability; comfortable climatic condition and fertile soil are to be mentioned. In addition, the policy of the government is pro-investment. As mentioned previously, Ethiopia is the second most populous country in Africa; hence there exists abundant and trainable labour force. Finally, the strategic position of the country, its competitive incentive packages

and the fact that privatization is given high approval, allows the presence of fertile ground for individuals and companies to invest in Ethiopia.

The major investment opportunities in the agricultural sector include, food crops, Beverage Crops like coffee and tea, Horticulture, Cotton, Sugarcane plantation, Rubber and Palm Tree plantation, Bio-fuel production, spices, and livestock (EIA 2012).

Manufacturing: The manufacturing sector has various investment opportunities in Ethiopia. These include:

- ✓ Textile and Apparel,-Leather and Leather Products;
- ✓ Pharmaceuticals Industry;
- ✓ Metal and Engineering Industry;
- ✓ Chemicals and Chemical products Industry;
- ✓ Paper and Paper products Manufacturing, on Metallic Mineral Products Industry,- Building Materials, and Agro- Processing.(EIA 2013).

Although the manufacturing sector is still at its infancy level in the country, it has got untouched resources and ample manpower that can bring about fruitful results. In the year 2009/10, the sector contributed to 13% of Gross Domestic Product (GDP) growth (EIA 2012, EIA 2012). The sector, therefore, is witnessing an astonishing improvement through time in the country.

3.3.1 FDI in Ethiopia

Ethiopia is one of the developing countries in Africa where people live on lowest per capita income. This ultimately result in financial crisis in the majority of the households of the country; making it hard for them to save and accumulate capital. Hence it is imperative to fill the gap with investment from external bodies. Therefore, it is necessary to have suitable conditions that encourage foreigners to come and invest in the country. Out of these conditions, the country's stability and policy measures are most important(UNCTAD 2004).

There had been significant policy changes with respect to the regimes since the beginning of the 20th Century. As historical studies tell us, the Imperial regime during Emperor Haile Selassie used to implement more or less the free market economic system where privatization was encouraged. In addition the emergence of foreign investment was showing considerable progress. Moreover, the foreign policies as well as the general investment policies were extensively favourable which was why many investment projects flourished during the Imperial regime until it was replaced by the military regime of Derg in 1974.

The Derg regime (1974-1991) brought about a whole new policy reforms in the country. It followed the command economic system which was contrary to the economic, social and political policies of the past regimes. After the military leaders came to power, they substituted the more liberal policies of the past with the new centralized ones. Many of the private enterprises were nationalized by the government. Consequently, investment in general had been greatly discouraged.

Although in the later years of the regime, the policies were moderated to mixed economic system, the investment level particularly FDI had not displayed considerable improvement. This was mainly due to the political instability of the country. There had been frequent civil wars from inside in addition to the crisis of communism during the cold war era. In general, these years had been tortuous roads for the enthusiastic investors who were working on several sectors in the country during the feudal regime.

The current government of Ethiopia (EPDRF), the then TPLF, defeated the Derg Regime in 1991. It took several policy reforms to return back again to the free market system(Haile and Assefa 2006). As mentioned by Haile and Assefa (2006), these reforms include: Deregulation of domestic prices; devaluation of the national currency by 141.55 percent, liberalization of the foreign exchange market; elimination of export taxes except for coffee; lowering of Maximum import duties from 230 percent to 60 percent; simplification of export licensing regulation and procedure; provision of adequate incentives, strengthening and enhancing institutional support for the export sector.

Furthermore, the ADLI policy has been under implementation in the country so that the Agricultural sector can support the Industry for the sake of improvement of both sectors.

Trend of FDI in Ethiopia

The foreign investors which had been discouraged during the Derg regime began to flourish again due to the favourable policy reforms specially that of the privatization and pro investment strategies. On top of that, the political stability after the downfall of the communist government of Derg also created investment friendly environment in the country (UNCTAD 2004). Hence, the inflow of the FDI in the country is under continuous increase from time to time.

Figure 3.1: **The pattern of FDI inflow to Ethiopia (1992-2009)**

FDI Flows to Ethiopia (in Millions of Ethiopian Birr)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
FDI Inflow	154	88	315	167	555	2,463	971	537	1,342	2,516	1,642	2,668	5,674	4,722	40,37	16,87	60,28	56,06
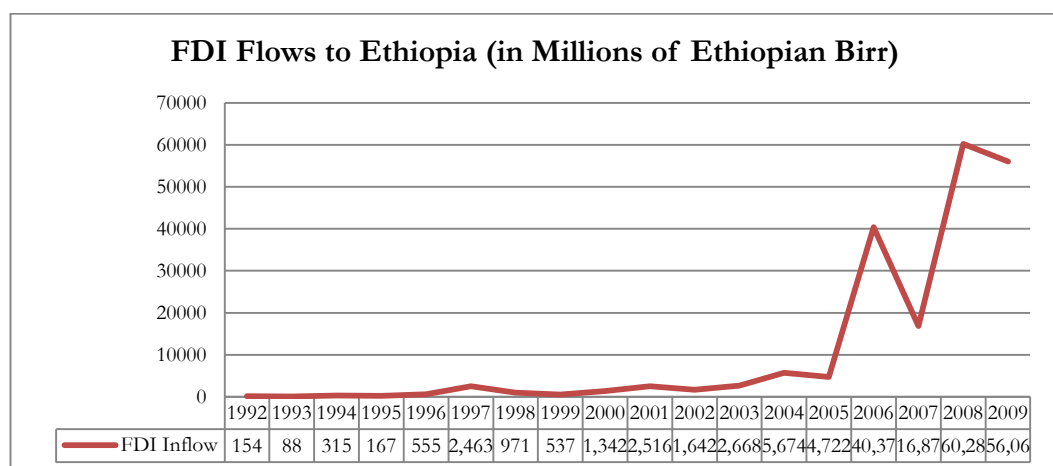
Source: Ethiopian Investment Agency, unpublished

As shown in the figure 3.1, there is a general increase in the inflow of FDI to Ethiopia even if there are fluctuations. FDI in Ethiopia has been heavily deteriorated during the Ethio-Eritrean war (1998-2000) suggesting the negative in-

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fluence of political instability on the inflow of FDI. Likewise, the election crisis of the year 2005 has also lead for the reduction of inward FDI to the country.

Regional Distribution of FDI

As indicated in table 3.1, the majority of FDI inflow is concentrated in three regions. These are Addis Ababa, Oromia and Amhara with 32%, 18% and 29%, respectively. Hence, the three regions accounted for 80% of the FDI inflow to Ethiopia.

Despite the continuous effort to attract FDI on the least developed regions (Gambella, Afar, Somali and Benishangul-Gumuz), FDI flow to these regions is extremely low. Addis Ababa attracts more FDI as the region has better infrastructural facilities, skilled manpower and possess stable environment.

Table 3. 0.1 Regional distribution of inward FDI to Ethiopia (1992-2009)

Region	No. of Projects	FDI Inflows (in Birr)
Addis Ababa	3,320	101,085,522
Afar	33	3,402,834
Amhara	248	57,108,633
B.Gumze	83	6,464,406
Dire Dawa	59	18,767,031
Gambella	40	12,976,000
Harari	10	1,003,400
Oromia	1,934	92,304,726
SNNPR	190	15,723,186
Somali	23	1,621,334
Tigray	81	3,686,075
Total	**6,021**	**314,143,147**

Source: Ethiopian Investment Agency, unpublished

Sectoral Distribution of FDI

The increasing importance of the manufacturing sector in the economy, as shown in figure 3.2, render the opportunity to attract more FDI than the other sectors. Till the end of 2009, the secondary (manufacturing) sector accounted for 49% of the FDI inflow whereas the other sectors share almost evenly.

Figure 3.2: The Distribution of FDI flow by Sector (1992 – 2009)

FDI Inflows
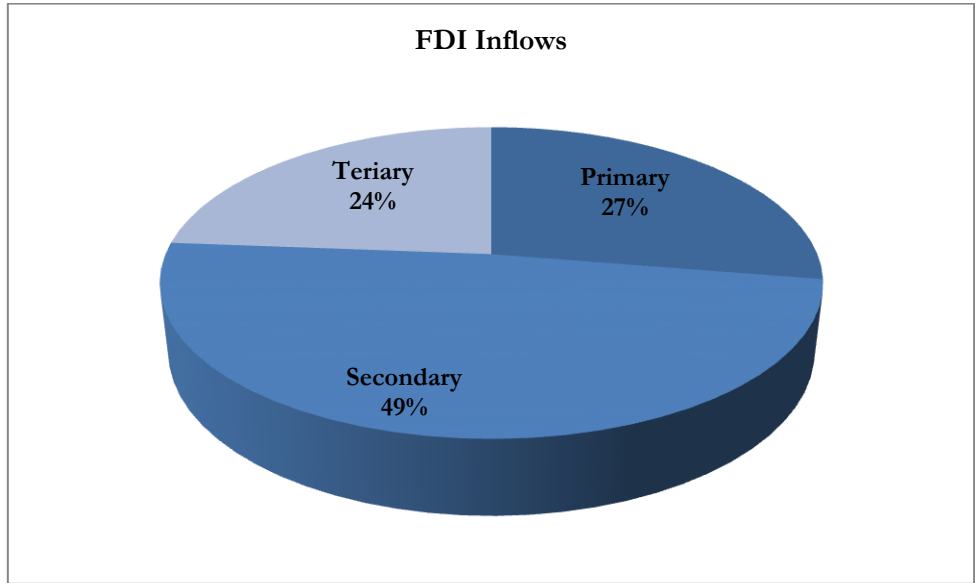
Source: Ethiopian Investment Agency, unpublished

FDI flows by source of origin

Recently, Ethiopia receives foreign investment from many countries due to the existence of investment friendly atmosphere (EIA 2012). As demonstrated in figure 3.3, Turkey is the largest source of foreign investment for the period which spans from 1992 to 2009 which is followed by India.

Figure 3.3: FDI flows by source of origin (1992 – 2009)

FDI Flows by Source of Origin
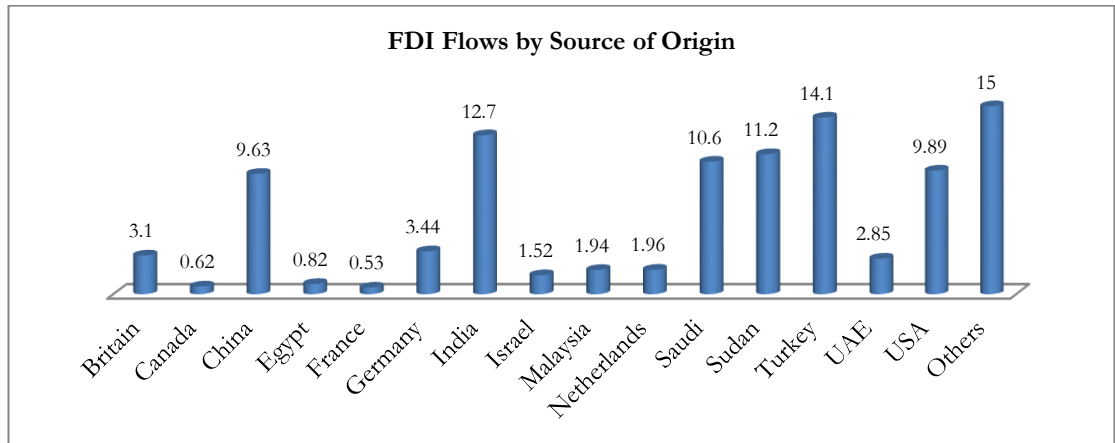
Source: Ethiopian Investment Agency, unpublished

As mentioned earlier, agriculture is the main economic backbone of the country. Yet, the manufacturing sector of the country remains untouched. There are ample investment opportunity areas. But the fact that the manufacturing sector is still limited in scope and the products not being competitive in the world market has its negative influence on its further development.

To the benefit of the domestic firms, the government of Ethiopia has limited the scope of privatization for some specific sectors(Haile and Assefa 2006). This discriminatory practice is undertaken for those sectors which are basically considered key and strategic. The restriction on privatization policy is clearly carried out for the banking sector, Ethiopian Telecommunication Corporation (ETC), the mining sector, insurance, energy and the transport sector of aviation and railway, and others (UNCTAD 2004) Out of these, Banking and Insurance are examples of areas reserved only for domestic investors. The above mentioned industrial sectors are considered vital for the development of the infant manufacturing industries in Ethiopia. Besides it is intentionally done for the sake of minimizing negative spillover effects towards them.

The government of Ethiopia argues that liberalizing the above strategic sectors could lead them to underperform due to the fierce competition that they face from the giant foreign competing firms. On the contrary it can result in positive externalities in the form of various transmission mechanisms. But it is also an undeniable fact that FDI has massive benefits towards taking the manufacturing sector one step ahead of its current stage.

Many standard models of MNCs assume that they possess superior assets such as knowledge, patents, trademarks and exclusive technology, which might "spillover" to the host economy and firms.

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Chapter Four: Data and Methodology

This part emphasises mainly on the explanation of the data and the empirical approach adopted. This part serves as a building block for the subsequent parts of the paper.

4.1 Data and Methodology

4.1.1 The Data

The data set indicates the annual survey of Large and Medium Scale manufacturing industries. These industries employ ten or more people and use power-driven machinery. The survey is a census of manufacturing firms conducted on both public and private enterprises in all the regions of Ethiopia.

The data gives information concerning number of proprietors / enterprises involved in manufacturing, employment, income obtained, volume and value of production and inputs, wages and salaries paid by the establishments, paid-up capital, costs of production, value added, distribution of manufacturing industries across the country, investment in manufacturing, and others in the sector.

The researcher used the most recent data, which is the data of 2009 obtained from the Central Statistics Agency (CSA). Moreover, the total number of observation was 1948. However, it has decreased by 318 due to missing values on important variables, like capital and labour among others. Hence, the final observation become 1630.

4.1.2 Methodology

Through adopting an econometrics methodology, this paper will emphasise on the effect of inward FDI on the productivity of local manufacturing industries. To investigate the impact of foreign presence on the domestic economy, the concept of productivity[2] is essential (Zhou et al. 2002). In most literatures (such as Haddad and Harrison 1993, Aitken and Harrison 1999) Gross Domestic Product (GDP) is employed at a macro level of analysis whereas total output of a firm at a micro level of analysis as the main indicator of productivity. On the other hand, capital and labour are used as inputs.

This study employed the Cobb-Douglas[3] production function so as to empirically test the productivity outcome since it assumes non-linear relationship between the factors of production and the corresponding outputs in the production process. Therefore, the production function will be stated as:

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[2] Spillover effects of FDI can be directly associated with the productivity measures of the local firms due to the existence of foreign firms (Blomström et al. 1999).

[3] Since production function indicates the technological relationship between inputs (especially labour and capital) and the corresponding outputs, the initial investigation of the spillover effects can be measured using the cob-Douglas production function.

$$Y = AK^{\alpha}L^{1-\alpha} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.(1)$$

Where, Y refers to value added; K and L are capital and Labour inputs, respectively; α and $1-\alpha$ indicate elasticity of K and L in the production process, respectively; and A indicates variables that affect productivity of firms. The production function can be transformed in to a linear function by taking the log on both sides.

$$\log Y = \log A + \alpha K + 1 - \alpha L \dots\dots\dots\dots\dots\dots\dots(2)$$

Change in A represent different total factor productivity (TFP) and may indicate the different factors that affect productivity of firms. Firm productivity is measured by the total factor productivity (TFP), which demonstrates the level of output that is not explained by inputs, shows efficiency in use & inputs by firms. Hence, from equation (2) it can be re-written in the following manner:

$$\log tfp = \log Y - (\alpha K + 1 - \alpha L) \dots\dots\dots\dots\dots\dots\dots. (3)$$

Then, we relate the total TFP to foreign presence variables and other control variables. The foreign presence variable may be described as: Foreign equity participation at a sector level (F_Sector), which indicates the existence of spillover effect on an industry level. And it is normally considered as the spillover variable. Hence, log of TFP will be:

$$\log tfp = \beta_0 + \beta_1 f\_sector + \beta_2 x + \varepsilon \dots\dots\dots\dots\dots\dots (4)$$

Similarly, the regional effect of FDI can be seen in the following manner:

$$\log tfp = \beta_0 + \beta_1 f\_region + \beta_2 x + \varepsilon \dots\dots\dots\dots\dots\dots\dots(5)$$

Description of the variables

Dependent Variable

In this study, Total Factor Productivity (TFP) is used as a proxy for productivity. Since technological improvement and efficiency are the two main components of TFP, the study employs TFP as a dependent variable.

Independent Variables

FDI_Sec- measures the presence of foreign ownership in the sector which shows the existence of spillover effects. Hence F_sector can be computed as:

$$\textbf{FDI\_sector} = \frac{\sum_{i=1}^{n} F\_firm * Employment}{\sum_{i=1}^{n} Employment}$$

FDI_regn- helps to look at a regional level; and its computation is similar to the F_sector.

The control variables for this particular study include the following:

- ✓ Labour quality
- ✓ Firm size
- ✓ Firm age
- ✓ Capital intensity
- ✓ Herfindahl Index (HI)-

Chapter Five: Exploratory Data Analysis

This part of the paper elaborates the nature and mono-variate distribution of the various indicators for the variables used in the next chapter. In addition, challenges related to data cleaning are also discussed.

4.1 Nature and mono-variate distribution of indicators of productivity

This sub-section is particularly devoted to the nature and mono-variate distribution of the indicators for the variables. The indicators are used in the analysis of the spillover effect of inward FDI on the Ethiopian firms.

The following table shows the uni-variate distribution of the variables used in the analysis:

Table 5.1: mono-variate distribution of the variables used in the analysis

Variables	Mean	Standard Deviation	Minimum	Maximum
TFP	-.0162774	1.328584	-7.992502	8.64135
FDI_sector_share	.0312553	.0514662	0	.3454282
FDI_region_share	.0479492	.04075	0	.1269977
Labour_quality	.2082728	.2803095	0	1
Firm_size	.0288875	.1028307	0.002	1
Firm_Age	18.42403	13.44796	8	95
Kper_labour	4.480069	1.814548	0	18.86561
H_index	.1127525	.1340562	.021212	1

Source: own computation from CSA data

Total Factor Productivity (TFP) basically measures the growth in output that is not due to increases in the factors of production like labour and capital. In other words, TFP indicates the change in output due to advance in technology and it is expected to increase production and reduce cost of production. Thus, the increase in TFP is an important source to profitability and development of manufacturing sector.

TFP of the firms can rise and fall for physical reasons. For instance, in technical terms, with the possible transmission channel of imitation (copying the technologies of neighbouring productive firms), an individual firm's productivity can increase. Nevertheless, blockage of information leakages, which are deemed to be vital in salient operations, may hamper the productivity of firms due to physical reasons.

Since the very essence of the paper is to explore the spillover effect of FDI inflow on domestic firms, TFP of the domestic firms is employed as a

dependent variable[4]. In this paper the value of TFP for domestic firms (in log terms) ranges from -7.99 to 8.64 with an average of -0.02. Hence, on average, the Ethiopian firms exhibit negative TFP. However, as shown in table 4.1, the mean of the variable TFP is not significantly different from zero.

In line with the definitions of United Nations Conference on Trade and Development (UNCTAD) and International Monetary Fund (IMF), this paper defined foreign firms as firms having foreign equity share[5] of at least 10% in the host economy.

Foreign presence in a given sector is the spillover variable which indicates foreign investment made in a given sector. In other words, it measures the presence of foreign ownership in a sector. The proxy for foreign share in this particular paper is employment[6].

The value of the variable 'foreign presence in a given sector' ranges from a minimum of 0 to a maximum of 0.35 with a mean value of 0.03. Thus, on average, foreign firms have an employment share of 0.03 in the manufacturing sector of Ethiopia. As such, with the 3% foreign employment share, it is expected for positive productivity spillover to occur towards the manufacturing firms of Ethiopia.

Foreign presence in a region represents the foreign investment made in a region. Since the proxy for the foreign share is employment, the variable demonstrates the proportion of employment in the region accounted for by multinationals. The variable can be referred to as a regional spillover.

The variable foreign presence in a region has a value that ranges from a minimum of 0 to a maximum of 0.13 with a mean value of 0.05. This implies, on average, foreign firms have a regional employment contribution of 5% as far as manufacturing firms of Ethiopia are concerned. The mean value of the variable 'foreign presence in a region' is significantly different from zero implying the existence of huge variations among regions. This suggests that the majority of FDI firms are concentrated in a very few regions.

The regional spillover variable controls for spillover effects through the location and proximity to foreign firms. In addition, this variable considers both intra-sectoral and supplier-buyer interaction inside the manufacturing sector of Ethiopia. Like the sectoral spillover variable, there is an anticipation of positive spillover effect from the regional spillover variable and even higher than that of the sectoral as the regional incorporates proximity to the suppliers and buyers which may facilitate the spillover in addition to the horizontal interaction.

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[4] TFP of domestic firms is calculated as the residuals of the value-added unexplained by the inputs of labor and capital (Banri etal. 2010). In this paper labor is captured by the number of permanent workers whereas capital is measured as the book value of fixed assets.

[5] It is measured by the ratio of the paid up capital of a non-Ethiopian investor to the total paid-up capital of each manufacturing firm in Ethiopia.

[6] Different authors used different proxies for the definition of foreign share. Besides the employment share, they can also be defined in terms of the output, capital and sales share. Examples are provided in the appendix.

Labour quality is the ratio of the number of skilled workers to the overall workers in each manufacturing firm. Skilled workers in this paper are defined as those workers who earn more than 800 birr[7] per month (This is in line with the minimum salary for a skilled labour in the Ethiopian firms). According to Buckley et al (2007), labour quality shows the average educational or skill level of the workers in a given firm.

In this study, the average share of skill level ranges from a minimum of 0 to a maximum of 1 with a mean value of 0.21. This may indicate that, on average, more than 21% of the workers in the manufacturing firms of Ethiopia earn greater than 800 birr per month. With the incorporation of qualified workers in the manufacturing firms, we may expect an increase in the productivity level. To put it differently, domestically owned plants productivity may be positively affected with a rise in the share of the skilled labour force.

Firm Size is defined in terms of the share of individual firm's sale in the overall sectoral sale. As the size of firms increase, there is a tendency for an increase in the subsequent productivity of domestic firms. To put it simply, it is expected that firm size will affect TFP of domestic firms positively.

Firm size ranged from 0.002 to 1, with a mean value of 0.03 suggesting the existence of a huge variation among the firms in terms of their contribution to the total sectoral sale. For example, there are 5 big firms which have an equal amount of sale with that of the rest of the sectoral sale. On the contrary, the majority of the firms have a small amount of the sectoral sale, for instance, 1460 firms with less than 5% of the sectoral sale.

Firm Age is controlled for measuring the manufacturing and business experience of firms. Javorcik (2004) claimed that productivity of firms may be altered due to the production and marketing exposure of firms over the course of time. Hence, he suggested that the age of firms should be controlled.

Manufacturing experience ranges from 8 to 95 years with an average firm age of 18 years. Basically as the age of firms increase, we anticipate an increase in the productivity of firms due to the increasing learning effect which may develop with the experience overtime. However, we may not expect productivity enhancement after the learning effect is fully materialised suggesting that firm age and productivity may exhibit a U-shaped relationship. .

Capital intensity is measured by the proportion of the fixed capital to the overall employees of a given firm. In undertaking impact analysis, controlling for capital intensity is crucial (Buckley et al. 2007).

In this paper, capital intensity of firms varies from a minimum of 0 to a maximum of 18.86 with an average of 4.48. This signifies that on average 4.5 machineries are employed per worker. In general, it is expected that an increase in the usage of machineries by workers has a tendency to enhance the productivity of firms.

Market concentration measured by Herfindahl Index (HI) is a good indicator of the extent of competition among firms. Two different industries may exhibit distinct productivity level even if they have similar technical efficiency because of the difference in the domination of the market (Blomström

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[7] Birr is the unit of currency in Ethiopia.

and Persson 1983). Increase in the HI generally implies a decline in market competition and a rise in market power, whereas decreases show the other way round. There are two distinct views regarding the effects of market concentration on innovation and productivity enhancement namely MAR and Jacob & Porter view (Sjöholm 1998). According to the MAR view local monopoly may facilitate productivity growth as the opportunity of imitation is reduced due to few neighbouring firms (ibid). In other words, Sjöholm (1998) clarifies that high concentration will provide high level of productivity. Since firms in more concentrated sectors may have an increased level of monopoly power, they are in a better position in terms of raising prices which may subsequently increase their productivity level (Blomström and Persson 1983). On the contrary, according to Porter and Jacob, strong competition may raise productivity level (Sjöholm 1999). Unlike MAR, they claim that the existence of fierce competition in the local economies; may render the neighbouring firms the opportunity to adopt innovations of the innovating firms (ibid). Hence, we would predict negative from Porter and Jacob whereas positive from MAR for the market concentration coefficient.

HI can be computed in the following manner:

$$HI = \sum_{i=1}^{n} \left(\frac{TR_{ij}}{TR_j} \right)^2$$

Where TR_{ij} is the total revenue of the ith firm in sector j and TR_j indicates the total revenue of the sector j in the year the study is conducted, i.e, 2009.

As far as the mono-variate distribution of the HI is concerned, the value ranges from a minimum value of 0.02 to a maximum value of 1 with a mean value of 0.11. Since the average value of the HI is somewhat low, it may signify that on average firms do not have a higher market power. To put it differently, it seems that there is a bigger room for high competition rather than the monopolizing nature of few firms. Considering the above fact, similar to the notions of Porter and Jacob, there is an expectation of negative relationship between the HI and productivity of local firms, as increase in market concentration stifles the introduction of new techniques and products.

Further description of variables

From table 5.2, we can understand that the average foreign firm has a higher output, sales and employs higher number of employees and makes a better compensation of employees as compared to the average domestic firm. On the other hand, on average domestic firms are better in terms of fixed assets investment. This might be attributed to the engagement of the foreign firms in outsourcing part of their production to the local firms.

Table 5.2: Description of the variables used in the regression

Variables	Observation	Av. Domestic Firm	Av. Foreign Firm
Output (in birr)	1630	8,199,770	23,800,000
Sales	1630	13,000,000	29,500,000
Employment	1630	59	109
Fixed Assets (in birr)	1630	5,040,852	1,000,000

As shown in table 5.3, we are unable to say that foreign firms use more capital intensive technology than their domestic counterparts due to variations across different sectors. For instance, FDI firms in the 'paper & paper products' sector, on average, use more capital intensive technology than local firms. On the contrary, local firms use more capital intensive technology in the 'chemicals' sector as compared to FDI firms. Foreign firms, however, produce more output in the majority of the sectors.

Table 5..3: Sample characteristics by ownership and sector.

Sector	Ownership	Number of firms	Average Number of workers	Average output ('000 birr)	Average Capital per worker
Food, Beverage & Tobacco	Domestic	341	83	18,400	4.27
	Foreign	9	118	8,278	4.04
Garment & Textiles	Domestic	119	169	11,200	3.98
	Foreign	11	163	11,900	3.85
Wood & Wood products	Domestic	318	23	1,215	4.47
	Foreign	1	47	3,225	3.73
Paper	Domestic	89	81	6,378	3.83
	Foreign	6	45	5,508	4.38
Chemicals	Domestic	50	112	24,900	3.19
	Foreign	9	104	41,100	3.77
Non-metallic minerals	Domestic	493	22	2,664	5.19
	Foreign	5	35	5,202	6.05
Rubber and Plastic	Domestic	59	122	14,300	3.74
	Foreign	9	138	23,700	3.70
Metals, equipment and Machinery	Domestic	102	56	8,952	9.20
	Foreign	9	100	61,700	4.79

As shown in table 5.4, there is a huge variation in terms of attracting FDI to the Ethiopian regions in which Addis Ababa region by itself generated more than 60 percent of the FDI inflow according to the data collected from CSA in the year 2009. Unlike other regions the concentration of FDI firms is manly due to better infrastructure and market opportunities. The value of production per worker is higher for foreign firms than the domestic firms in all the regions indicating their superiority as far as productivity is concerned.

Table 5..4: Sample characteristics by region and ownership

Region	Ownership	Number of firms	Average Number of workers	Average value of production per worker (in Birr)
Tigray	Domestic	191	30	10.42
	Foreign	-	-	-
Afar	Domestic	6	24	11.89
	Foreign	-	-	-
Amhara	Domestic	202	27	10.06
	Foreign	4	220	11.85
Oromia	Domestic	266	89	10.75
	Foreign	16	135	11.74
Somalie	Domestic	12	15	11.24
	Foreign	-	-	-
Benishangul	Domestic	7	15	10.24
	Foreign	-	-	-
S.N.N.P.R*	Domestic	260	26	10.20
	Foreign	-	-	-
Gambella	Domestic	6	14	10.38
	Foreign	-	-	-
Harari	Domestic	31	51	10.04
	Foreign	-	-	-
Addis Ababa	Domestic	553	82	10.41
	Foreign	39	87	11.28
Dire dawa	Domestic	37	78	10.64
	Foreign	-	-	-

Source: own computation based on the data obtained from CSA.

*S.N.N.P.R refers to Southern Nations, Nationalities and Peoples' Region

Although special incentives are granted to the 'least developed regions' of Ethiopia, FDI in the manufacturing sector of these regions was non-existent during 2009. This might be due to the poor infrastructural facilities and less market opportunities in these regions.

4.2 Data cleaning challenges

In order to undertake the econometrics analysis, the researcher obtained the data from CSA, a public agency tasked with the generation of statistical data associated with socio-economic condition of Ethiopia.

After obtaining the data, the researcher considered the appropriateness of the data and resolved some issues. For instance, the number of observations was inflated due to the inclusion of a single firm more than two times in most

of the independent data sets[8]. Hence it created a big problem concerning the identification of the redundancy. Eventually, the researcher tried to figure out the situation by giving due consideration on the whole data set. It was due to treating a single firm's characteristics in a separate fashion for some variables. However, with the help of the stata command 'RESHAPE' and manual effort, the challenge was resolved.

Data cleaning is a time-consuming process. The data cleaning activity per se took more than three weeks as it involved looking at each and every detail of individual firms. The most challenging part of the cleaning process was removing duplicates and invalid entries. Besides, examining those entries' having missing values on the critical variables was another data scrubbing challenge worth mentioning.

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[8] The format of the CSA data is not suitable for an easy usage of stata which ultimately leads to sluggish progress.

Chapter Six: Empirical Findings and Discussion

This section presents and discusses the different outcomes of the empirical approach which was explained in the previous section. It begins with the analysis of the bi-variate regression concerning the spillover effects of FDI for both the sector and region. Then, it extends with the analysis of sectoral spillover effects by introducing the vector of control variables. In line with multivariate analysis, multicollinearity and heteroscedasticity tests are presented. Finally, robustness checks are presented so as to confirm the validity of the results (using the aforementioned model).

6.1 The spillover effect of foreign direct investment

6.1.1 Bi-variate analysis

In this sub-section, the empirical relationship of the spillover variables and the total factor productivity is analyzed. This might be helpful in order to measure how the two variables simultaneously change together.

In order to examine the bi-variate analysis for the sectoral spillover effect, the following equation is used:

$$\text{tfp} = \beta_0 + \beta_1 \text{f\_sector} + \varepsilon \quad \text{...(6)}$$

Where: all notations are defined similar to the preceding equations.

From the regression result obtained using OLS, we can infer that the spillover variable and tfp are positively related. This might be a sign for the occurrence of positive externality from foreign firms towards their domestic counterparts inside the Ethiopian economy, particularly in the manufacturing sector. Hence, it may indicate that an increase in foreign presence by 10 percentage points results in 25 percent increase in the productivity of domestic manufacturing firms.

In a similar vein, the bi-variate analysis for the regional spillover effect[9], may indicate the empirical association of the regional spillover variable with the total factor productivity of the domestic manufacturing firms. The result, however, could not confirm the existence of empirical relationship between the regional spillover variable and total factor productivity of the local manufacturing firms in the Ethiopian economy. Hence, it may indicate that local firms are not influenced by the presence of foreign firms inside a region.

Nevertheless, the result from the bi-variate analysis could be inconsistent due to omitted variable which could relate with the foreign presence and explain the TFP of local firms. Considering this fact, the researcher conducted a multi-variate analysis below incorporating a number of observable variables which could influence the previous estimates.

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[9] The equation for the bi-variate analysis for a region is: $\text{tfp} = \beta_0 + \beta_1 \text{f\_region} + \varepsilon$

Table 6.1: The spillover effects of FDI on the productivity of Ethiopian manufacturing firms: looking at the bi-variate analysis

Dependent variable: TFP	Intra-sectoral (1)	regional (2)
FDI_EMP_share	2.516***	
	(0.658)	
Regn_emp_share		-0.492
		(0.784)
Constant	-0.092**	0.007
	(0.040)	(0.050)
Observations	1482	1482

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

6.1.2 Multivariate Regression Analysis

This part laid emphasis on the empirical analysis of the spillover effects of FDI on the productivity of Ethiopian manufacturing firms. Besides, it presents preliminary test results which are related to the regression.

Using the model adopted in the methodology part of this paper (recall equations 5 &6), the regression is conducted. That means by making the TFP of the local firms as a dependent variable; and foreign presence (captured by employment share) as a variable of interest along with vector of control variables (such as firm size and capital intensity) the model is estimated.

Test for Heteroscedasticity and Multicollinearity

Heteroscedasticity

A preliminary analysis test for heteroscedasticity is required so as to deal with the problem of biased variance of the estimated parameter. It will also help to address the problem of biased standard errors[10]. Since the explanatory variables used in this study, especially the variables of interest, are more likely lead the variance of TFP differ, two independent tests were conducted. These tests are Breush-Pagan and White's test in which both of them rely on the residuals of a fitted model.

The Breush Pagan test is a diagnostic test which assumes that the error variance changes with the set of variables. In this particular test, the null hypothesis is the existence of equal error variance against the alternative hypothesis of the error variance being the multiplicative function of one or more variables(Gujarati 2003). As shown in table 6.2, the result demonstrates a large chi-square value with a p-value of 0.0000 & 0.0001 for sectoral and regional spillover regression, respectively. Hence, the null hypothesis is rejected in favour of the alternative hypothesis. In other words, the test justifies the existence of heteroscedasticity.

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[10] Inability to incorporate the heteroscedasticity test may lead us to draw a wrong conclusion since it may affect the t-test and significance.

On the other hand, the White's general test is also employed to test for heteroscedasticity. In contrary to the Breusch Pagan test, the White's test is used for non-linear forms of heteroscedasticity (Gujarati 2003). With the null hypothesis of homoscedasticity[11] versus the alternative hypothesis of unrestricted heteroscedasticity, the test is carried out. Similar to the Breusch Pagan test, as clearly indicated in table 6.3, the result obtained from the White's test confirms the existence of heteroscedasticity.

Therefore, heteroscedasticity-robust standard errors are used so as to avoid the problems that might occur with the existence of heteroscedasticity. To put it differently, usage of heteroscedasticity-robust standard errors are found useful in the estimation of reasonable t-statistics.

Multicollinearity

Multicollinearity, which describes the existence of high correlation between two or more predictor variables (Wooldridge 2009), can cause problems in estimating the regression results[12]. The test for multicollinearity can be executed using the variance inflating factor (VIF)[13] which indicates how the existence of multicollinearity inflates the variance of an estimator (Gujarati 2003). Thus, he claimed that those explanatory variables with VIF more than 10 or tolerance closer to zero have a good indication for the prevalence of collinearity. With this in mind, from table 6.4, we can understand that the highest VIF registered in the regression analysis is 1.69 or tolerance of 0.59. Thus, the result can give an indication for the non-existence of multicollinearity.

To shed additional light on the multicollinearity issue, pair-wise correlation detection mechanism has been implemented. This may help to investigate the existence of correlation among all explanatory variables and scrutinize the strength of their correlation in a pair-wise manner. If two variables exhibit a correlation value of in excess of 0.8, then it might be a sign of pair-wise correlation (Gujarati 2003). However, table 6.5 indicates that multicollinearity is not a problem in the regression analysis since all the pair-wise correlation show values less than 0.8.

Estimation result

In this section regression results and discussions are presented based on the models set out in chapter four. Hence, the results for intra-sectoral and regional spillover effects is presented and discussed in detail.

Intra-sectoral productivity spillover

The regression model for the horizontal spillover effect is estimated based on OLS and the result is presented in table 6.6.

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[11] Homoscedasticity refers to the existence of constant error variance.

[12] For more elaboration, additionally refer Gujarati (2003).

[13] VIF can be computed as: $\text{VIF} = \frac{1}{tolerance}$, tolerance $= 1\text{-}R^2_j$, where $1\text{-}R^2_j$ indicates the coefficient of determination of a regression of explanatory j on all the other explanatory variables..

Table 6.6: The effect of FDI on the productivity of Ethiopian manufacturing firms

Dependent variable: TFP	
FDI_EMP_share	2.222***
	(0.644)
Lab_quality	1.110***
	(0.103)
kper_labour	0.043*
	(0.025)
H_Index	0.046
	(0.250)
Firm_Age	-0.003
	(0.003)
Firm_size	1.148***
	(0.347)
Constant	-0.513***
	(0.144)
Observations	1439
R-squared	0.08

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

For domestically owned firms, referring to the results of table 6.6, the estimated coefficient of the variable of interest (spillover variable), FDI_Emp_share, is positive and significant. A 10 percentage unit increase in the foreign investment ratio results in a corresponding increase of the productivity of domestic firms by around 22.2 percent. The result is consistent with previous findings of Chuang & Lin (1999) and Blomström & Sjöholm (1999). The former emphasised the existence of positive FDI spillover effect on productivity of domestic firms using Taiwanese firm level data. This might occur through the spillover transmission channels of imitation, export capacity enhancement, competition, and labour mobility from foreign firms to the local economy. Similarly, Blomström & Sjöholm (1999), using Indonesian firm level data, obtained positive FDI spillover effect through competitive pressure (enhancing efficiency).

On the other hand, the result is inconsistent with the works of Aitken and Harrison (1999) and Haddad and Harrison (1993). Considering the Venezuelan firms, Aitken and Harrison (1999) argue that competition may lead the domestic firms to lose market power which ultimately force them to be at the losing end. This may happen due to the superiority of the foreign firms in terms of firm specific advantages which makes them to have lower marginal costs compared to the domestic firms which operate in the same sector. Furthermore, Haddad and Harrison (1993), using a panel data analysis on Moroccan firms, claim that technological gap may be an obstacle for FDI spillover and hence foreign presence in a sector may not have significant effect on domestic firms.

In line with the regression outcome of this study, as explained by Blomström and Kokko (1998), productivity spillover that occurs as a result of the presence of multinational firms has a tendency to raise the efficiency or productivity level of domestic firms. With this in mind, the result obtained in the Ethiopian manufacturing sectors justifies the improvement of productivity (measured by TFP) of the Ethiopian firms due to foreign presence in the same sector.

In support of the findings, there are industrial associations in Ethiopia where both domestic and foreign firms are members. So, they held meetings regularly to solve industrial problems and claim their right from the government. Similarly, they also organize industrial fair/exhibition and share their experiences. Some of the firms also exchange different inputs and technical experts; for example, textile firms. Moreover, there exists cooperation of firms in the leather processing industries. Foreign firms assist domestic counterparts through the provision of technical experts that clearly creates an opportunity for productivity spillover in those industries.

Concerning the control variables, as expected, the coefficients for labour quality and firm size are positive and statistically significant at 1% significance level. The coefficient for capital intensity is also positive and statistically significant at 10% significance level suggesting that an increase in capital per worker results in a subsequent increase in the productivity of domestic firms. On the contrary, the coefficients for herfindahl index and firm age are insignificant suggesting that the variables do not have an effect on the total factor productivity of domestic firms. Although Herfindahl index is insignificant, its positive sign may indicate negative relationship between competition and productivity. Similarly, the coefficient for Firm_Age is insignificant but its sign may indicate the negative relationship between Firm_Age and productivity suggesting that after the learning process at the initial stage is materialized their productivity diminishes as age increases.

Regional spillover

Are spillovers geographically limited? This is the question that we are going to address in this section. Due to the closeness of domestic firms towards the foreign firms, the possibility of imitation and human capital acquisition is expected to increase. Hence, we may anticipate a higher productivity spillover whenever domestic firms locate nearby the FDI firms (Jordaan 2005). Furthermore, the eminent interaction of the MNEs with the local suppliers and customers[14] may strengthen the transmission of technology to these input buying and supplying firms. In support of the idea that geographical proximity is vital for knowledge spillover, Audretsch (1998) stresses that the cost of technological transmission is assumed to increase with an increase in the distance between domestic and foreign firms.

Empirical evidence concerning regional component of productivity spillover is mixed indicating variations from country to country. This might be attributed to differences in the technological characteristics of local firms and spillover channels. For instance, Tong and Hu (2003) confirmed the existence of regional spillover on local firms of China. On the contrary, Sjoholm (1999) is unable to confirm the presence of regional component in the manufacturing firms of Indonesia. He claimed that strong competition (arising from proximity of local firms to FDI firms) may slow down the productivity of the indigenous firms.

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[14] Only manufacturing firms are considered due to the non-availability of data for other sectors. Since the study is conducted using ISIC at the four digit level, the regional spillover considers the interaction of MNEs with suppliers and customers inside the manufacturing sector.

In this study, as shown in table 6.7, the effect of foreign presence on total factor productivity at regional level is insignificant. In a similar vein, the impact of foreign firms on the productivity of domestic firms is also insignificant for the same region and sector[15]. Hence, the result is unable to confirm the existence of a geographical component for productivity spillover in the Ethiopian manufacturing sector.

Table 6.7: The regional spillover effect of FDI on Ethiopian manufacturing firms

Dependent variable: TFP	Regional (1)	Region-Sector (2)
Regn_emp_share	-0.043	
	(0.758)	
FDI_Region_SectorLab		0.522
		(0.491)
Lab_quality	1.131***	1.131***
	(0.104)	(0.105)
kper_labour	0.037	0.038
	(0.025)	(0.025)
H_Index	0.136	0.116
	(0.253)	(0.251)
Firm_Age	-0.003	-0.003
	(0.003)	(0.003)
Firm_size	1.099***	1.111***
	(0.357)	(0.354)
Constant	-0.436***	-0.452***
	(0.143)	(0.142)
Observations	1439	1439
R-squared	0.08	0.08

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The lack of regional dimension in the spillover effect of foreign investment to domestic firms may be attributed to the spatial concentration of FDI activity. As indicated in table 6.8, Addis Ababa region, being the recipient of almost 66 percent of FDI, the positive spillover effect is concentrated there. In addition, the region dominates in terms the overall establishment of manufacturing firms in Ethiopia. As such, as expressed by the Marshallian externalities (1890), the region benefits from the agglomeration effect due to the higher spatial concentration of manufacturing firms. To put it differently, since the manufacturing firms desire to co-locate in the already existing clusters so as to reap the benefits of agglomeration, it may create a massive opportunity for the transfer of new knowledge. Thus, the location advantages especially associated with better infrastructure and accessibility to input supplying and buying firms render the transfer of externalities or spillover easy. This means agglomeration effect of concentration plays a pivotal role for the positive spillover effect which is only manifested in Addis Ababa region.

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[15] Same region and sector implies the intra-regional spillover. To put it differently, it shows the horizontal spillover with in the same region.

Table 6. 8: Table 6.8: Regional spillover effects FDI on the manufacturing firms of Addis Ababa and the rest of the regions.

Dependent Variable: TFP	Addis Ababa(1)	Rest regions (2)
AA_FDI_EMP	2.826***	
	(0.917)	
Rest_Regn_emp		-0.056
		(0.769)
Lab_quality	1.204***	1.065***
	(0.232)	(0.117)
kper_labour	0.064*	0.032
	(0.038)	(0.032)
H_Index	0.060	0.318
	(0.320)	(0.400)
Firm_Age	-0.003	-0.000
	(0.004)	(0.005)
Firm_size	0.850**	1.889***
	(0.406)	(0.611)
Constant	-0.697***	-0.448**
	(0.215)	(0.181)
Observations	520	919
R-squared	0.09	0.09

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
(2) indicates regions of Ethiopia except Addis Ababa. Besides, the regional estimation for Addis Ababa is computed based on those firms of the same sector.

On the other hand, as shown in table 6.8, the rest regions mainly Amhara and Oromia, are not influenced by the presence of foreign firms. Although the two regions, i.e, Amhara and Oromia, have a vast areal coverage in the country[16], the concentration of manufacturing firms is by far lower as compared to the Addis Ababa region. As discussed in the MAR externalities, lack of dense concentration on regions outside Addis Ababa, especially Amhara and Oromia prohibits them to get benefit from foreign presence. As such, the lack of significant effect in the regional spillover effect is mainly due to the absence of spillover effects in the regions outside Addis Ababa.

There are two crucial issues, therefore, worth mentioning for lack of agglomeration in the regions outside Addis Ababa. First, the problem of access to infrastructure can be an obstacle for the creation of clusters and there by reduces the benefits of locating nearby. Infrastructure, if poorly provided, may entail higher cost of communication and limits formation networks. Second, poor access to labour market may reduce the possibility of acquiring the necessary knowledge through imitation.

Although the coefficients for firm size and labour quality are positive and statistically significant, the rest control variables (capital intensity, firm age and herfindahl index) could not show significant effect on domestic productivity as far as regional spillover is concerned.

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[16] Based on CSA (2007), the area coverage of Oromia and Amhara is 298,164.29 and 154,708.96 square kilometers, respectively. On the other hand, the size of Addis Ababa is only 526.99 square kilometres.

6.1.3 Further Robustness Checks

In this study, different specifications were adopted in order to check the robustness of the results. Firstly, the researcher used two additional distinct proxies for the definition of the foreign presence (i.e value added and capital measured in terms of birr as stipulated in table 6.9). Adopting different proxies, however, did not bring differences in the estimation results for both the sectoral and regional spillover effects.

Table 6. 2: Spillover effects of FDI on the productivity of Ethiopian manufacturing firms using two distinct proxies (value added and capital share) of foreign presence: Robustness check

Dependent Variable: TFP	Value added Share (1)	Capital Share (2)
FDI_Valad_share	0.882*	
	(0.526)	
FDI_cap_share		1.548***
		(0.537)
Lab_quality	1.108***	1.084***
	(0.104)	(0.105)
kper_labour	0.038	0.038
	(0.025)	(0.025)
H_Index	0.109	0.148
	(0.253)	(0.253)
Firm_Age	-0.003	-0.003
	(0.003)	(0.003)
Firm_size	1.123***	1.149***
	(0.357)	(0.355)
Constant	-0.471***	-0.512***
	(0.143)	(0.144)
Observations	1439	1439
R-squared	0.08	0.08

Source: own computation from CSA data

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Secondly, as shown in table 6.10, labour productivity has also been employed as a proxy for the dependent variable. Interestingly, the model provides similar result with the one estimated using TFP.

Table 6. 10: The spillover effects of FDI on the productivity of Ethiopian manufacturing firms using value added per worker (labour productivity) as a proxy for productivity: robustness check

Dependent variable: Lprod	
FDI_EMP_share	6.524***
	(0.666)
Lab_quality	1.506***
	(0.126)
kper_labour	0.158***
	(0.025)
H_Index	0.040
	(0.289)
Firm_Age	-0.003
	(0.003)
Firm_size	2.460***
	(0.459)
Constant	9.130***
	(0.147)
Observations	1439
R-squared	0.21

Source: own computation from CSA data
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Lprod refers to labour productivity which is captured by the ratio of value added to total number of labour.

In support of the above result, as there is a shortage of skilled manpower especially in the Engineering and other technical areas in Ethiopia, some foreign firms bring trained workers from abroad. As such they may contribute by working in domestic firms or through sharing to the Ethiopian firms. So in this way, FDI may boost the labour productivity of domestic firms.

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Chapter Seven: Conclusion

The impact of inward FDI on developing countries has for long attracted the attention of many policy makers and academicians alike. Resulting in new knowledge or improvements in managerial skills, it is a common belief that MNCs provide productivity improvements through the so-called technological externalities (Walz 1997). However, productivity spillovers may be non-existent even if foreign firms exist in a host economy (Aitken and Harrison 1999, Haddad and Harrison 1993, Görg and Greenaway 2004). In fact, a comprehensive review of the extant literature on FDI spillover seems to indicate that effects may vary across regions, countries, and host economy as well as FDI characteristics.

Although several studies have been undertaken regarding the spillover effects of FDI in various countries (Görg and Greenaway 2004), the evidence in Africa is inadequate. A study of FDI spillover from the context of African countries potentially makes for a greater appreciation of the nuances in FDI spillover as it interacts with unique local circumstances. The main thrust of this paper is, therefore, to address this gap in literature and better understanding of the phenomenon in the context of least developed country.

Using a firm level cross-sectional data of 1630 manufacturing firms in Ethiopia for the year 2009, the paper examined two distinct effects of FDI on indigenous firms based on OLS. First, the result confirms the presence of spillover effects within the same sector (intra-sectoral) at a national level. The technological externalities seem to exist due to the cooperation of foreign and local firms. In other words, demonstration effect arising from the collaboration of FDI and domestic plants appears to influence the productivity of domestic firms. This finding is robust to different specifications. This result is similar to the works of Chuang and Lin (1999). Using a cross-sectional Taiwanese firm level data, they confirm the presence of beneficial productivity spillovers emanating from the presence of FDI. In a similar vein, Rattsø and Stokke (2003) found an evidence of positive spillover effect for Thai firms using a panel data analysis. This may suggest that firms are taking advantage of the technological spillover by learning (mainly in the form of imitation) from the foreign firms (Rattsø and Stokke 2003). Nonetheless, the result contradicts with Konings (2001) and Aiteken & Harrison (1999), who were unable to find evidence supporting the presence of technological externalities. The benefits seem to be internalized by most FDI firms (Aitken and Harrison 1999).

Second, this paper is unable to provide evidence for regional spillover effect. Although the result appears to be unexpected as geographical proximity is assumed to reduce transmission costs (Audretsch 1998), the unequal development of the regions of Ethiopia lead for the lack of spatial effect. Like the sectoral spillover effect, the result is robust to different specifications. Addis Ababa region, with better access to infrastructure and market opportunities, attracts the majority of FDI in Ethiopia. This may indicate that the positive spillover effects at the national level are concentrated in the region Addis Ababa. Thus, agglomeration effect seems to play a pivotal role for better interaction of firms and thereby for the presence of technological spillover in this region. However, firms in other regions apart from Addis Ababa, especially Amhara and Oromia could not benefit from the presence of FDI possibly due

to lack of agglomeration effect in these regions. Although the areal coverage of the two regions is by far greater than Addis Ababa, they attracted less FDI due to their low level of infrastructural facilities. As such, the result is similar to the idea of Marshall (1890), who introduced the notion that spatial concentration is a building block for the occurrence of agglomeration economies.

Geographical proximity between foreign and indigenous plants resulting from agglomeration may create an intriguing environment for the transmission of FDI-induced externalities (Jordaan 2005).Hence, this paper is consistent with the empirical study of Jordaan (2005), who attests the stimulating effect of agglomeration towards the local firms. After conducting investigation on Mexican industries, he highlighted that geographically concentrated industries benefit from FDI externalities whereas less concentrated industries do not experience these externalities.

Currently, there is an upward surge in the inflow of FDI which is attributed to the investment-friendly atmosphere of Ethiopia (EIA 2012). For this reason, there is a general increment in the annual investment made by foreigners which is coupled with capital stock of the Transnational Corporations (TNCs). In this particular study, with lack of geographical component in the spillover effects, it seems that little attention is given towards regions which are distantly located from Addis Ababa. Hence, this finding demonstrates the need to incorporate different issues through which 'underdeveloped' regions could get sustained benefit from foreign presence.

The findings, however, should be accepted with caution. First, this study used a cross-sectional data in which it prohibits to control the fact that foreign investment is attracted to more productive sectors. Second, the information contained in the dataset could not lead to undertake the backward and forward linkages with the other sectors of the economy, such as agriculture and service sector.

In support of the positive sectoral externalities, there is some institutional evidence indicating collaboration between foreign and domestic firms in the textile sector. To get national benefit from the existence of FDI appears to rely on the dispersion of FDI away from Addis Ababa from a primate city.

Therefore, using more detailed and panel data, future research will be expected to address on the existence of size/distance trade off in determining spillover effect. To have a full picture of the spillover effects, future research will be able to incorporate the competition effect in addition to the technological effects. In addition, future empirical studies will be able to identify the potential mechanisms through which agglomeration effects are stronger considering the presence of FDI, including backward and forward as well as horizontal linkages. Moreover, it will be an interesting area to investigate the spillover effect of FDI taking the current agenda of making industrial zones across the country – are these industrial zones facilitate the spillover effects of FDI? Surely, such study would make for a better understanding of FDI's importance in terms of transmitting technology.

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Appendix

Map 1 The Distribution of Domestic and FDI manufacturing firms in Ethiopia..
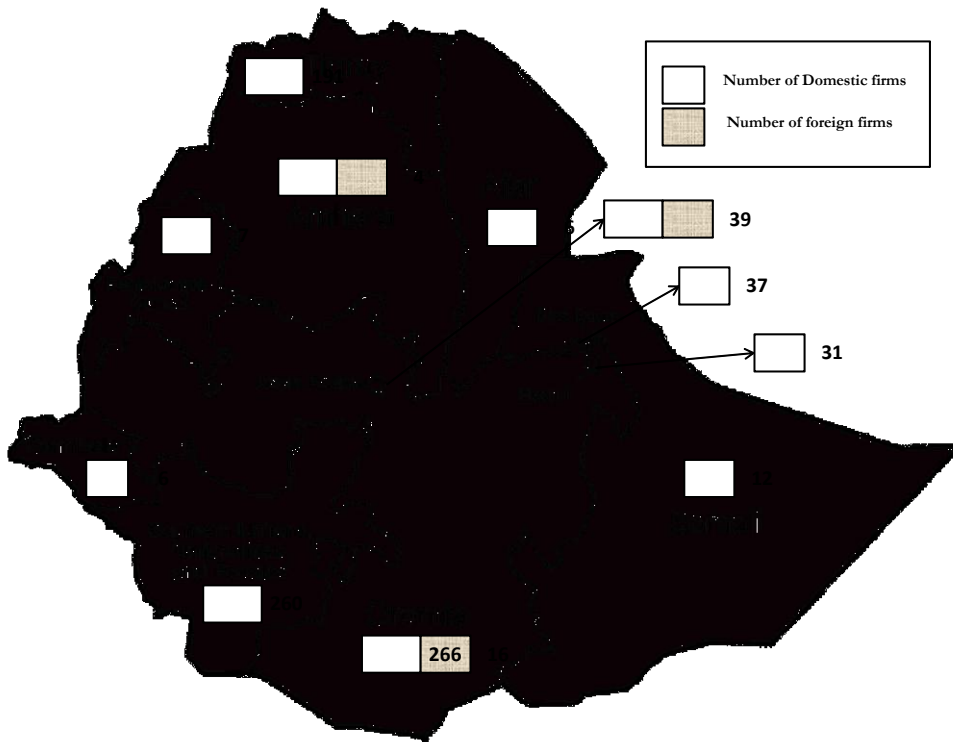
Appendix 1: Table 6.2 Breusch Pagan cook-weisberg test for Heteroscedasticity

Sectoral spillover effect	Regional spillover effect
Ho: Constant variance	Ho: Constant variance
Variables: fitted values of TFP	Variables: fitted values of TFP
chi2(1) = 18.07	chi2(1) = 14.85
Prob > chi2 = 0.0000	Prob > chi2 = 0.0001

Source: own computation from CSA data

Appendix 2: Table 6.3: White's General test for Heteroscedasticity

Sectoral spillover effect	Regional spillover effect
White's test for Ho: homoscedasticity	White's test for Ho: homoscedasticity
Against Ha: unrestricted heteroskedasticity	Against Ha: unrestricted heteroscedasticity
chi2(27) = 62.64	chi2(27) = 59.17
Prob > chi2 = 0.0001	Prob > chi2 = 0.0003

Source: own computation from CSA data

Appendix 3: Table 6.4: Variance Inflating Test for Multicollinearity

Variable	VIF	1/VIF
Firm_size	1.69	0.593225
H_Index	1.59	0.627991
Firm_Age	1.14	0.877865
Lab_quality	1.12	0.889963
kper_labour	1.10	0.911186
FDI_share	1.03	0.973631
Mean VIF	1.28	

Source: own computation from CSA data

Appendix 4:Table 6.5: Pair-wise correlation matrix of independent variables

Variables	FDI_Share	Lab_quality	kper_labour	H_Index	Firm_Age	Firm_size
FDI_share	1.0000					
Lab_quality	0.1012	1.0000				
kper_labour	-0.1105	-0.1215	1.0000			
H_Index	0.1216	0.1868	-0.1293	1.0000		
Firm_Age	0.0768	0.2003	-0.2425	0.2126	1.0000	
Firm_size	0.0818	0.2881	-0.1933	0.5906	0.2440	1.0000

Source: own computation from CSA data

Appendix 5: Table 6.11: The regional spillover effects of FDI on the labour productivity of Ethiopian manufacturing firms: robustness check

Lprod	
FDI_Regn_share	-0.400
	(0.821)
Lab_quality	1.566***
	(0.129)
kper_labour	0.141***
	(0.025)
H_Index	0.310
	(0.285)
Firm_Age	-0.002
	(0.003)
Firm_size	2.316***
	(0.478)
Constant	9.368***
	(0.147)
Observations	1439
R-squared	0.16

Source: own computation from CSA data

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%