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| **FDI AND ECONOMIC TRANSFORMATION IN AFRICA: Quantifying Multinational Companies’ spillovers in the SSA region** |
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# ABSTRACT

Foreign direct investment (FDI) is widely considered an essential element for achieving sustainable growth. This has resulted in a pervasive stampede, by both the developed-to- developing countries as well as countries whose economies are in transition, to attract more FDI envisaged to backstop their development strategies. Alongside this is the most celebrated growth trajectory in Africa, whereby in the International Monetary Fund (October, 2014) language ‘the world is in a mess, but not Africa’. This paper seeks to establish how much of the FDI activities in Sub-Saharan Africa (SSA) has been translated into economic benefit for the host countries. It extends the analysis of aggregate FDI- growth relationships[[1]](#footnote-1)to intra and inter-sector spill-over effects, thereby reconciling the often inconclusive evidence on the growth[[2]](#footnote-2) impact of FDI in SSA.

An interrogation of the figures in an econometric estimation of the FDI-growth relationship reveals that while FDI may seem like the *flavor* of the century when measured by the rate it has been growing in Africa, this international interest in the region is yet to be translated into generation of livelihood and growth opportunities for recipient countries.

# SECTION 1: INTRODUCTION

There has been a world-wide surge in FDI flows, with the financial crisis of 2008 presenting the only major hiccup to this process in the recent past. According to UNCTAD (2014), developing countries at a new high of $778billion accounted for 54% of global FDI inflows in 2013 and, although the bulky of it went to Asia and South America (attracting about 30% and 20%, respectively), investment into Africa also grew by an additional 4% in 2013 to a total of $57billion. Matter-of-factly, Africa was the only region to enjoy a year-on-year increase in FDI inflows since 2010. This is an important fact, but without establishing *how much of this FDI has infiltrated into economic activities of the host countries for long-term benefits,* these statistics remain meaningless.

The increased importance of FDI in developing countries is based on the presumption that in addition to the direct impact of job-creation, technology transfer and direct capital injections, it also potentially contributes to the development process in these countries indirectly. In Africa FDI assumed a prominent place in the strategies of economic revival advocated by policy makers at the national, regional and international levels as the best alternative for international financing for long-term development UNCTAD (2005) and much of the rationale according to Wade (2003: xlviii) lies in the hope that the success story of countries in East and South-East Asia will be replicated in the case of Africa.

It is still, however, far from obvious that FDI in developing countries, particularly in Africa, will render the desired growth effects. There is a notable controversy in the available literature on the growth-inducing hypothesis of FDI with some researchers arguing, for instance, that in many developing countries MNCs have often been accused of taking unfair advantage of low wages and weak labour standards and of violating human and labour rights in countries where governments fail to enforce such rights effectively.

'Adding salt to the injury' is the fact that empirical evidence of FDI generating positive spillovers for host countries is gloomy at both the micro and macro levels-even for the developed countries. Hanson(2001) argued that evidence that FDI generates positive spillovers for host countries is weak and Gorg and Greenaway (2002) concluded that the effects are mostly negative. Whilst Lipsey (2002) concluded that there is evidence of positive effects from analyzing the micro literature, he also found no association (from the macro empirical researches) between the sizes of inward FDI flows relative to growth.

A further review of the available literature shows that although the topic of FDI and growth has been widely researched at aggregate (macro) levels and fairly less at disaggregated (micro) levels, majority of the work focused on analyzing the direct impact of FDI on growth. Quite a few studies have tried to quantify its impact beyond the direct benefits, that is, putting into consideration the indirect influence through spillovers. Even fewer have attempted to isolate the contribution of FDI to growth through its spillovers at sector-level[[3]](#footnote-3). This is a very important dimension given the studies by the neo-classical economists such as Solow (1957) and Krugman (1994) which confine the impact of FDI on growth to the short-run, arguing that FDI does not contribute to sustainable growth due to diminishing returns to physical capital.

A major caveat in the literature that tried to analyse the spill-over effect is that it concentrates only on spillovers taking place within a given industry, whereas, according to Javorcik (2004) and Blalock & Gertler (2008); it is more likely that FDI spillovers would take place within[[4]](#footnote-4) the sector and across. Kugler (2006) also argued that the degree of the within-sector benefits is generally limited by the fact that a rational MNC will try as much to hide the source of its advantage and limit profit losses due to leakage of technical information to its competitors[[5]](#footnote-5), and noted that FDI substitutes within-sector domestic investment but complements it across sectors.

This paper contents that, despite the observation by Krugman and Solow, FDI can still work for the economic good of the host countries in both the short and long-run through the increasing returns to production via externalities or productivity spill-overs within and across sectors. It interrogates the different methodologies used by the researchers in available empirical literature and postulates an estimation framework for measuring spillovers from FDI to test the hypothesis that *'FDI, through its spillovers, induces the growth of countries in the sub-Saharan Africa region'.* In so doing the paper contributes tremendously to the existing literature[[6]](#footnote-6). The paper also gives a cross-examination of FDI benefits in the ASEAN[[7]](#footnote-7) region to give a careful and comprehensive evaluation of the contribution of FDI to the development process for lessons and for the benefit of policymaking in Africa.

Using data from the UNCTAD statistics database for the period 1980-2012, the results show weak evidence of FDI contributing positively to growth in the ESEAN region. In the case of the SSA, evidence was established for a positive direct contribution and for indirect contribution through productivity spillovers only but not technological spillovers. This partly agrees with some previous researchers who have concluded that the growth-inducing hypothesis of FDI only holds for other developing-country regions but not Africa. However, based on the varying degrees of productivity spillover effect at sector level, this study postulates that sectoral, rather than aggregate, policies are necessary for developing-country regions to maximize the benefits from FDI. It empahsises the importance of domestic and foreign firm connections as an important channel for spillover absorption and concludes by giving specific action points for consideration by African governments in their FDI liberalization regimes.

## 1.2 Structure of the Paper

The remainder of the paper proceeds as follows; Section 2 presents the general theoretical framework within which the linkages of FDI and growth can be studied and outlines the vehicles through which FDI promotes knowledge and technology transfers. It also interrogates available literature on the magnitude of FDI spillover-effect on growth and their methodologies. Section 3 introduces the empirical analysis of FDI as a vehicle for productivity growth for the SSA region and analyses statistics of the ASEAN region as a control process. Section 4 examines the magnitude of spillovers at aggregate and sector level. Section 5 presents and analyses the regression results and Section 6 concludes.

# SECTION II: LITERATURE REVIEW

## 2.1 Theoretical Background

There are different ways in which FDI can be expected to affect growth in theoretical models. Economically, the rate of factor accumulation is positively related to the rate of savings and the level of FDI in an economy where, according to Cohen (2007) FDI is regarded as ‘the single major source of financing for domestic investment’. Given the market clearance principle equation; **Y= C+I+G+(X-M)** where ‘Y’ is the output level, ‘C’ is total consumption, G is government expenditure and ‘I’ represents domestic investment, If “I,” because of FDI, increases then ‘Y’ goes up, more jobs are created presenting a wider tax base for higher tax revenue[[8]](#footnote-8).

Solow (1957) used the Cobb Douglas production function[[9]](#footnote-9) to disintegrate the individual factor effects of capital, labor and the residual- TFP, on Economic Growth in the US[[10]](#footnote-10). He discovered that an increase in investment increases physical capital (K) which in turn has two major effects of;

1. Increasing the level of actual investment, and at the same time,
2. Increasing the required investment, replacing amount of capital eroded by depreciation.

This implies that an increase in investment will have a positive effect on economic growth as long as the actual investment is higher than the required investment. However, due to diminishing returns to factors, increases in capital per worker lead to smaller and smaller increases in output per worker, the amount of capital per worker will eventually be driven to steady-state equilibrium. Thus, as also observed by Perkins (2006), it can be concluded that investment has a temporal effect in the growth rate but no effect on the long run growth rate of output per worker.

The flip-side to this analysis reveals that an increase in population growth rate causes an increase in break-even investment thereby making less capital available, reducing income level per worker and eventually leading to a lower steady-state level. Therefore, this paper propagates that there are two ways through which FDI or investment can impact on growth;

1. Through increases in capital per worker (or productivity spillovers) and,
2. Improvements in the state of technology (technological spillovers).

Capital accumulation by itself cannot sustain growth as sustained growth requires sustained technological progress.

This view is in line with Krugman (1994), and Aghion, P. and Aghion &Howitt (2009) who have shown that TFP is the single most important source of economic growth. According to Krugman, 'there are only two sources of economic growth – increases in inputs on one hand and then increases in output per unit of inputs on the other'. From this point of view it is ascertained that sustainable growth can only arise if there is an increase in output per unit of input.

Boopen et al (2009) decomposed the sources of growth in selected countries in the Common Market for East and Southern Africa (COMESA) region and discovered that, contrary to previous studies on African growth, TFP contributed a certain percentage to growth in these countries.‘ Thus TFP growth became synonymous with long-run growth, reflecting the potential for growth’, as argued by Mahadevan (2003).

Summing all this up, TFP can be said to represent allocative efficiency; technical efficiency; technological change as well as the adoption of improved techniques. Jorgenson and Griliches (1967) and Hulten (2001) talk of these as the ‘free lunches’ or externalities of FDI and are referred to in this paper as the 'spillovers' of FDI.

## 2.2 Spillover channels and sector level evidence from literature

UNCTAD (2001, pg131) defines spillovers as the demonstration effects of FDI in unrelated firms which is characterized by spillover on processes (incl. Technology), Spillover on product design, spillover on formal and on tacit skills (shop floor and managerial), effects due to mobility of trained human resources, enterprise spin-offs as well as competition effects.

Most research work has been directed into the channels through which FDI can be expected to promote growth in the long run Mello(1997). Major channels identified in the theoretical literature include (i)*imitation* which involves adoption of new production methods and adoption of new management practices;(ii) *skills acquisition* through increased productivity of complementary labour and acquirement of tacit knowledge[[11]](#footnote-11); (iii) *competition* involving reduction in X-inefficiency[[12]](#footnote-12) and faster adoption of new technology; (iv)*enhanced export propensity* or *market access* involving economies of scale and the exposure to technology frontier.

The intensity of these spillovers in different sectors has also been debated in some of the literature. Alfaro et al (2003) found that while total FDI has an ambiguous effect on host country economic growth; FDI inflows into primary sector tends to have a negative effect on growth whilst manufacturing sector has positive spillovers. This can be justified/supported by [UNCTAD (2001, p. 138)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib74)which observes that the manufacturing sector comprises a broad range of linkage-opportunities and Wang & Blomstrom (1992) who claim that contagion from such linkages can take the form of imitation of processes or organisational innovations and increased competition that pushes other firms to adopt new technologies and modernize. Employee training and subsequent workers’ turnover can help disseminate a foreign firm’s superior know how. Likewise, [Aykut and Sayek (2007)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib8) suspect that technology and knowledge spillovers in manufacturing are most likely if FDI is motivated by efficiency-seeking reasons, unless FDI is located in enclaves such as export-processing zones.

In contrast, the potential for linkages is typically considered limited in the primary sector ([UNCTAD, 2001, p. 138](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib74)). Resource-seeking FDI in this sector often takes place in economic enclaves that are largely isolated from the local economy. Moreover, FDI in this sector tends to be volatile as it is linked to the international commodity prices. According to [Lensink and Morrissey (2006)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib53), the volatility of FDI has a negative impact on growth. Nonetheless, the typically high export orientation of FDI in the primary sector may counterbalance negative factors.

Compared to the primary sector and the manufacturing sector, the growth effects of FDI in the services sector also appear to be more ambiguous a priori. [Alfaro et al (2003](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib4)) and [UNCTAD(2001](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib74)) suspect that the services sector resembles the primary sector with regard to the limited potential of linkages and spillovers.

[Görg and Greenaway (2002)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib34) concluded that robust empirical support for positive spillovers is hard to find. However, as reckoned by Kokko (1994) spillovers should not be expected in all kinds of industries because foreign companies sometimes operate in “enclaves” that offer little scope for the local firms to benefit. Kugler(2006) argues that foreign companies will try to minimise technology leakages to within-sector.[Kumar (2003, p. 27)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib51)also points out that foreign companies in India’s software industry operate as “export enclaves”, suggesting that technological spillovers played a minor role as a transmission mechanism through which FDI may have promoted the development of IT services in post-reform India.

Notably, almost all studies focus on intra-industry effects[[13]](#footnote-13). This leads to the subject area of this paper with the aim of analysing the effects of the cross-sector FDI spillovers on overall growth as well as productivity growth of each sector. Not much research has been done in this area as noted by (Hall, R., and C. Jones,, 1999)[Lipsey (2002, p. 42)](http://www.sciencedirect.com/science/article/pii/S0305750X0800051X#bib56). If inter-industry spillovers are addressed at all, the analyses are typically confined to effects within the manufacturing sector of host countries. Therefore, this paper considers the available methodologies to examine this new angle/twist in the African context.

Two methodologies used in most papers on productivity growth have been growth accounting based on the Cobb Douglas function and econometric estimation based on the market clearance principle of production function. Growth accounting generally search for additional determinants of growth beyond the basic factors of production, thus treating all determinants of total output as inputs and then try to identify the contribution of each factor per given period*.* However, many of the included determinants may only indirectly affect the efficiency of the real inputs; physical capital, labor and possibly human capital thereby rendering this methodology conceptually inaccurate. Literature also reveals that the components may not be independent thereby complicating the interpretation of results and render the methodology as providing limited policy-relevant insights. Moreover, increasing returns to scale- as found in endogenous growth models; is inconsistent with constant returns to justify the use of income shares as the weights for input contributions. These weaknesses have jeopardized the popularity of this methodology among growth researchers.

The econometric estimation, which is just a development of Solow’s model, uses panel data and regressions to identify major growth factors.The methodology assumes constant rates of change in all the variables, and regress on the data to find the best estimate of these rates in the historical data available using Ordinary Least Squares (OLS). This is achieved first taking the natural log of their equation; logging both sides of this production function produces a simple linear regression model with an error term, ε:

ln[Y(t)] = αln[K(t)] + 1- {ln[L(t)]} + (1 - α ){ln[A(t)]} + ε(1)

In regression analysis, the equation one would estimate is; y= C + βk + γl + εwhere: *y* is (log) output, ln(Y), *k* is capital, ln(K), *l* is labor, ln(L). *C* can be interpreted as the co-efficient on log (*A*), that is, the rate of technological change less 1 − *α*. With a regression equation of this form the coefficients can then be interpreted as elasticities.

# SECTION III: METHODOLOGY

This study employs an econometric estimation with a superior approach from previous researchers. This is because it modifies the Cobb- Douglas production function to include other variables which have always been omitted by researchers. The expanded aggregate production function avoids the problem of missing variables. Level equations are also used rather than growth rates or percentages, which is very important for taking into account the potential non-stationarity in the data series.

This study chooses to make use of level equations, rather than growth rates or first difference equations. This approach was used by Hall and Jones (1999) when they focused on institutions as the determinant factors of country differences in TFP levels. However, unlike in the Hall and Jones (1999) approach; this study uses panel data so as to eliminate the problems of omitted variables and simultaneous biases well known for causing exaggerated elasticity estimates in time-series growth accounting estimates.

Abdelhak (2000) also used levels of GDP in a growth accounting methodology to study the contribution of TFP in the ‘ASEAN miracle’. The major difference with Abdelhak’s (2000) approach is that this study uses econometric estimations instead of growth accounting. Econometric estimations were used recently by Ndulu et al (2008) and Atardi&Sala-i-Martin (2004) when they studied drivers of economic growth in different regions of Africa. However, even these researchers’ methodology differs from the one this study employs because they used percentages rather than levels of GDP.

Time series data for the period 1980- 2012 is used for the regression analysis.

## Hypothesis 1

As the first step, the study calculates the impact of overall FDI stock on aggregate output as a benchmark.

The following regression equation is used as an analysis technique:

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|  | **logGDP i = β0 + β1logFDI i + β2logCapform i + β3logHC i + β4logCapform i\* FDI i+ β5logHC i\* FDI i+ β6logΩ i+ε i (2)** |
|  |  |

Where**: i**indexes the region and;

* GDP = Total output (current prices)
* FDI = Foreign direct investment, stock ( current US$)
* Capform= Net gross fixed capital formation (Current Price US$)
* HC = Human capital or economically active population
* Ω = other measurable ancillary variables
* Β = vector for other policy and control variables
* ε = Error Term or spillover effect.

**β1** represents the effect of foreign stock or direct FDI effect on output of the sector and (**β4** + **β5** ) represents the total indirect effects.

The equation includes the interaction of FDI and domestic investment/ capital formation to capture the technological spillovers of FDI. The stock of human capital in a host country is also critical for embracing foreign knowledge and is an important determinant of whether potential spillovers will be realized. The interaction of FDI and human capital is included in the equation to capture the productivity spillovers. The estimated coefficients of FDI as well as the spillover variables should be positive in promoting economic growth.

## 3.0.2 Hypothesis 2

Upon establishment of the importance of FDI and the impact of spillovers in the region, the study disaggregates the impact of FDI to sector-specific[[14]](#footnote-14) levels in the region by estimating the equation **(2)** above with **i** representing the specific sector and FDI representing the foreign share in the sector.

The objective isto establish the strength of FDI-growth relation at the sector level through isolating the magnitude of the spillover-effect to growth of indigenous enterprises in the same value chain with the MNC affiliates.

The following model is employed for sectors *i* and *t* years

**GYict = β0 + β1iForenshare + β2iDemandict + β3iΩict + εict(3)**

Where the output level in the current year depends among other things on the foreign investment share, demand and other sector specific variables such as employment and capacity utilisation, among others

**Ωic** is the individual sector and country-specific error component and **εict** is the basic error component.

## 3.0.3 Hypothesis 3

To quantify the amount of cross-sector spillovers; cross-sector pairs of model **3** above is repeated with (i) Agriculture sector output versus Industry sector FDI and vice versa (ii) Industry output versus Services sector FDI and vice versa (iii) Services sector output versus Agriculture sector FDI and vice versa.

The objective is to isolate the magnitude of the spillover-effect to growth of indigenous enterprises due to FDI activities in other sectors.

## 3.1 Empirical Results

The discussion above leads to the following testable hypotheses:

* Hypothesis 1: FDI has a direct effect on economic growth in recipient countries,
* Hypothesis 2: The direct effect is be stronger in ASEAN countries than in Africa
* Hypothesis 3: FDI has an “indirect effect” on economic growth because of the synergy between FDI and the level of human capital,
* Hypothesis 4: The indirect effect is be stronger in in ASEAN countries than in Africa
* Hypothesis5: FDI spillovers have a direct effect on within-sector growth in the recipient country.
* Hypothesis6: FDI spillovers have an indirect effect on across-growth in the recipient country.

This study performs an OLS regression analysis using equation **(2)** to test hypotheses 1-4 estimated for the two developing-country regions. The regressions are based on panel data for the period 1980-2012[[15]](#footnote-15) for Sub-Saharan Africa countries (selected on the availability of data and on their ability to attract FDI over the period under study) and members of the ASEAN region.

Overall, as long as country-specific effects affect the aggregate production function, panel data analysis allows for the differentiation of an otherwise universal production function according to the specific conditions of the environment in which it is applied. As a result, the analysis benefits from greater realism. To test for temporal causality, the Granger-causality is employed.

To test hypotheses 5-6 an OLS regression analysis is performed using disaggregated statistics whereby gy in equation **(3)**is be taken to represent growth at sector level.

## 3.2 Regression Diagnostics

In order to ensure that the results are not misleading, the study examines the distribution of the variables, verifying that the data met the Gauss-Markov assumptions underlying OLS regression.  The Stata package is employed to check how well the data meet the following assumptions;

* **Checking Normality of Residuals[[16]](#footnote-16)-** The study accepts that the residuals are normally distributed if a normal-distribution curve is observed using the **kdensity** command or the p-value from the **swilk** test is larger than 0.05.
* **Serial correlation[[17]](#footnote-17)** - The regressions test and correct for serial correlation of the error term as needed using the [Breusch-Godfrey](http://en.wikipedia.org/wiki/Breusch%E2%80%93Godfrey_test) Test[[18]](#footnote-18).The test's null hypothesis is; there is no first-order autocorrelation of errors and the decision rule (i) using the Durbin- Watson Test was to reject the hypothesis if d <dL= 1.088; not reject the hypothesis if d> dU=1.939 and if 1.088 ≤ d ≤ 1.939, then the test would be inconclusive.

(ii) using the [Breusch-Godfrey](http://en.wikipedia.org/wiki/Breusch%E2%80%93Godfrey_test) Test, the study rejects the hypothesis when p-vale is less than 0.05.

* **Model Specification[[19]](#footnote-19) (**using the **ovtest** command)**-** the null hypothesis that the model is specified correctly. The null hypothesis cannot be rejected if the p-value is greater than 0.05**but**, a p-value of less than 0.05 is significant and indicates that there are omitted variables.
* **Test for heteroscedasticity** (using the **hettest**’s Breusch-Pagan test) - the null hypothesis that the variance of the residuals is homogenous. Therefore, if the p-value is very small (less than 0.05), the study will have to reject the hypothesis and accept the alternative hypothesis that the variance is not homogenous.
* **Test for Multicollinearity (**using the **vif** command after the regression)- the null hypothesis is that there is no multicolleniary among the variables. A variable whose VIF values are greater than 10 or a tolerance value lower than 0.1could be considered as a linear combination of other independent variables and merits further investigation[[20]](#footnote-20).

# SECTION IV: Statistical analysis

4*.* 0 Summary of Findings

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| --- | --- | --- | --- | --- | --- | --- |
|  | **FDI impact of growth** | | | |  |  |
| **Region/ Sector** | **Direct effect** | **Technological Spillovers** | **Productivity spillovers** | **Evidence of cross-sector spillovers** | | |
| **SSA:** | positive but very weak | negative and weak | positive and strong |  |  |  |
| Primary |  |  | negative and strong | positive and statistically significant spillovers from other sectors, at 10% | | |
| Industry |  |  | positive and strong | evidence of negative productivity spillovers at 10% significance level | | |
| Services |  |  | negative effect significant at 5% | strong and positive spillovers from the Industry sector at 5% significance level | | |
|  |  |  |  |  |  |  |
| **ASEAN:** | positive but weak | positive but weak | positive but weak |  |  |  |
| Primary |  |  | negative and strong | positive cross-spillovers from the services sector | | |
| Industry |  |  | positive and strong | positive cross-spillovers from the services sector | | |
| Services |  |  | negative strong | no evidence of positive cross-spillovers | | |

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## 4.2 Interpretation of results

A positive, but weak, direct FDI- growth relationship was evident in both regions. The indirect effects through productivity spillovers were also shown to be positive in the two regions, and even more favourable (at 10% significance level) in Africa. However, there was no evidence of technological spillovers at this aggregate level in SSA. At sectoral level technological spillovers were weak and negative in the region. This shows that FDI into the region over the years has not brought about the requisite technological advancements and the region is still lacking in terms of production of sophisticated products. According to literature, this non-performance of FDI technology in SSA can be attributed to a number of factors including the lack of absorptive capacity by the indigenous firms, but this paper argues that this is mainly due to limited scope for domestic-foreign firm linkages in host countries’ strategic sectors.

There was evidence of intra and cross-sector productivity spillovers in both regions. Intra-sector spillovers in both regions were shown to be strong in the industrial sector[[21]](#footnote-21), but significantly negative in the primary and services sectors. In the case of SSA, investment into the primary sector has maintained a downward trend at a low of less than 18% of total investments into the region for the past decade. UNCTAD statistics reveal a continued decline in greenfield investments in African resources sector and this, coupled with the outside-greenfield divestments recorded for the year 2012, can be used to explain the negative spillover effect in the sector. The negative effect in the services sector was, however, not expected. The services sector is one sector that is becoming significantly important in terms of FDI movements. According to the UNCTAD statistics for the year 2012 the value of greenfield investments in this sector in Africa was $18,6 billion (about 37,2% of the total investments into the region for the year) and rose to a high of over $34 billion (about 65%) in 2013. The negative statistic, therefore, suggests a net crowding –out effect of FDI in the sector. A case in point may be the telecoms sector whereby the continental acquisition of the mobile phone business by India’s biggest mobile network- Bharti Airtel, is presenting growth challenges for local small players.

Literature attributes this relationship to the limited scope for inter-linkages in these sectors. Linkages are the most prominent channel for foreign-to-domestic firm production processes spillovers and this study postulates that sectoral policies aimed at enhancing the creation of linkages will go a long way in turning the face of these statistics.

The industrial sector is now the second largest hub of FDI projects in Africa, after services, according to the latest recorded UNCTAD FDI statistics. The positive productivity spillover effect indicate that there is great opportunity for indigenous host-country firms in SSA to benefit from foreign play in their economies through increased inter-linkages that increases opportunities for imitation of processes as well as for participation in the global value chains.

Evidence of cross-sector spillovers was also established in both regions. However, the negative relationship between FDI in the primary sector and cross spillovers to the industrial sector in the SSA region can be explained by the decreasing flows in resource-based industries (such as coke and petroleum products, and metal and metal products) as investment into the African extraction sector continued to plummet.

# 5.0 CONCLUSION

The study shows differences in spillover effects in the various sectors in Africa. This shows that for Africa to be able to maximize the benefits from foreign play in domestic economies, sector-specific policies and strategies should be adopted. This paper offers a regional action plan for tapping into the great potential of international investments as follows;

1. Industrial Sector,

The positive spillover effect suggest that both upstream and downstream industries have a potential to benefit from the participation of foreign companies in this sector. National policies that encourage industrialization through the production and exportation of beneficiated and value added products will ensure continued benefits from FDI in form of technology and production processes or knowledge spill-overs.

1. Services Sector,

UNCTAD Data on announced greenfield investment projects show that the services sector is driving inflows in Africa. In particular, investments are targeting construction, utilities, business services and telecommunications. Sector-specific measures that encourage research and development (R&D) activities as well as ICT development are necessary for enhancement of the competitiveness of the local players, and to boost their absorption capabilities of foreign technology.

1. Agriculture Sector

Policies that encourage investment in upstream industries to enhance the beneficiation and /or value addition of the African resources, coupled with the removal of barriers to the free movement of machinery will go a long way in enhancing the realized spillover benefits from FDI in the sector.

Conclusively, in order to maximize the contribution of FDI toward sustainable development, host countries in SSA need a comprehensive strategy that encourage free movement of technology/capital and sharing of production know-how between the domestic and foreign firms. Promotion of sector-specific linkages is ‘just that’. Policies that speak to the local content requirements, use of domestic intermediaries, shared ownership of investment projects, use of local management of foreign plants (with a higher degree of autonomy from the headquarters) buttressed with an emphasis on attracting foreign firms that have a real potential of enriching the already existing domestic capacities, as well as a more liberal policy to avoid x-inefficiency, will go a long way in ensuring the creation of linkages and eventually the realization of technological and productivity spillovers from FDI.

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## ANNEXTURE

## Regression Variables

**Y =** GDP or output levels at current prices expressed in millions of dollars

**FDI** = FDI stock, which is the value of the share of their capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprises. FDI stock reflects investment built up over the years and it gives the best picture of long-term investment relations. It is a more preferable measure to inflow as it is more stable and it gives a better reflection of the lasting or long-term interests by the MNC in operating in a given host country.

The statistics were available readily from the UNCTAD database both for regional and individual country analysis, measured in US$ at current prices.

**Capform =** gross fixed capital formation 

**HC=** total labour force in absolute values

**Open= (M + X)/GDP**

**Aid =** Total Official Flows: The sum of Official Development Assistance (ODA) and Other Official Flows (OOF) represents the total net disbursements by the official sector at large to the recipient country. The Other Official Flows (OOF) are transactions by the official sector whose main objective is other than development motivated, or, if development motivated, whose grant element is below the 25% threshold which would make them eligible to be recorded as ODA. The main classes of transactions included here are official export credits, official sector equity and portfolio investment, and debt reorganisation undertaken by the official sector at non-concessional terms (irrespective of the nature or the identity of the original creditor).

**T.o.T=Terms of trade**, refers to the relative price of exports in terms of imports and is defined as the ratio of export prices to import prices.

**Foreign share =** proxied byFDI stock as a percentage of gross fixed capital formation x sector output.

**Demand** = govcons + hsholdconsumtion= total consumption

**Derived demand for sector**= demand \*sector output/GDP

## Regression outputs

## 2. 1 Regression output for SSA; direct FDI impact assessment





## 2. 2 Regression output for SSA; FDI spillover impact assessment





## 2. 3 Regression output for ASEAN; direct FDI impact assessment





## 2. 4 Regression output for ASEAN; FDI spillover impact assessment





## 2. 5 Regression output for SSA; Sector review

**IV. 5. 1 Agriculture**





***Cross-sector spillovers in Agriculture***





**IV. 5. 2 Industry**





***Cross-sector spillovers in Industry***





**IV. 5. 3 Services**





Cross-Sector Spillovers in Services





## 2. 6 Regression output for ASEAN; Sector review

**IV. 6.1 Agriculture**





***Cross-sector spillovers in Agriculture***





**IV. 6.2 Industry**





***Cross-sector analysis in Industry***





**IV. 6.3 Services**





***Cross- sector analysis in services***





1. which has formed the mainstay of first generation as well as recent researchers on this subject [↑](#footnote-ref-1)
2. measured by jobs created, productivity as well as knowledge transfer [↑](#footnote-ref-2)
3. The potential for productivity enhancing spillovers is widely believed to differ across sectors [↑](#footnote-ref-3)
4. through backward and forward linkages [↑](#footnote-ref-4)
5. the host-country firms within the same sector [↑](#footnote-ref-5)
6. By focusing on isolating the extent of the 'within-sector' and 'cross-sector' spillover impact in SSA, the paper is navigating on unfamiliar grounds for many scholars. [↑](#footnote-ref-6)
7. Past researchers have been tempted to generalize their findings from studying the FDI-growth relationship in the East and South-East Asia countries because they say initial conditions in many African economies do not appear to be far removed from those present when these countries began their respective industrial take-offs. [↑](#footnote-ref-7)
8. Thence the traditional belief that FDI contributes more to economic growth than any other input factor. [↑](#footnote-ref-8)
9. a constant return to scale function that links output (GDP) in period t to two factors of production, [the capital stock and the size of the labor force, as well as to total factor productivity (TFP)] [↑](#footnote-ref-9)
10. His methodology became popularly known as ‘Growth accounting’ mathematics [↑](#footnote-ref-10)
11. Because FDI allows for some type of formal control of the technology or knowledge transferred from technological leaders to followers, it is expected to be a major vehicle for technological change in developing countries. [↑](#footnote-ref-11)
12. The concept of x-efficiency was proposed by economist Harvey Leibenstein in his 1966 paper. X-inefficiency occurs when technical-efficiency is not being achieved due to little incentive to control costs or lack of competition. [↑](#footnote-ref-12)
13. This is because the major transmission channels (demonstration and imitation; human-capital externalities; and competition effects) are supposed to operate within the same industry. [↑](#footnote-ref-13)
14. Three sector categories of primary, industry and services sectors (defined according to the ISIC Rev 3 Classifications) were analysed [↑](#footnote-ref-14)
15. According to (Chakraborty, 2008) relatively short period of observation renders it all but impossible to fully capture the long-run effects of FDI. Cointegrations tests also usually suffer from unacceptably low power when applied on a data series of restricted length. [↑](#footnote-ref-15)
16. Normality is not a requirement for obtaining unbiased estimates of the regression coefficients. However, this study runs the normality test just to ensurethat the p-values for the t-tests and F-test (which form the basis for the overall decision to reject or not reject the null hypothesis) will be valid. [↑](#footnote-ref-16)
17. Even though Serial correlation does not affect the unbiasedness or consistency of OLS estimators, it affects their efficiency. The test confirms whether the errors associated with one observation are not correlated with the errors of any other observation [↑](#footnote-ref-17)
18. The test is more general than the [Durbin–Watson statistic](http://en.wikipedia.org/wiki/Durbin%E2%80%93Watson_statistic) (or Durbin's h statistic), which is only valid for nonstochasticregressors and for testing the possibility of a first-order autoregressive model (e.g. AR(1)) for the regression errors.The BG test has none of these restrictions, and is statistically more [powerful](http://en.wikipedia.org/wiki/Statistical_power) than Durbin's h statistic*.* [↑](#footnote-ref-18)
19. Model specification errors affect the estimate of regression coefficients. [↑](#footnote-ref-19)
20. **vif** stands for *variance inflation factor.* Tolerance, defined as 1/VIF, is what many researchers use to check on the degree of collinearity. A tolerance value lower than 0.1 is comparable to a VIF of 10. [↑](#footnote-ref-20)
21. This agrees with the findings of Managi and Bwalya (2010), when they studied productivity spillovers in the manufacturing sector in sub-Saharan Africa. [↑](#footnote-ref-21)