

FDI and economic transformation in Sub-saharan Africa

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Paper prepared for the Midlands State University 1st International Research Conference: Driving Socio-Economic Development through Value Addition and Sustainable use of Resources

Venue: Elephant Hills Resort, Victoria Falls, Zimbabwe

14-16 July 2015

ABSTRACT

Foreign direct investment (FDI) is widely considered one essential element for achieving sustainable development. This paper seeks to establish how much of the FDI activities in Sub-Saharan Africa (SSA) have translated into economic benefit for the host countries. It extends the analysis of aggregate FDI-growth relationships to intra and inter-sector spillover effects, thereby reconciling the often inconclusive evidence on the growth 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 a key phenomenon 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. The findings are important in light of Zimbabwe's current economic woes characterized by low FDI inflows. FDI attraction has been proffered as a panacea to the current recession but the question is its sustainability given the turbulent political and socio-economic environment.

Key Words.

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FDI, growth, SSA, intra and inter-sector, productivity and technological spillovers.

1. Introduction

There has been a world-wide surge in FDI flows in the recent past. According to UNCTAD (2014), developing countries at a new high of \$778billion attracted 54% of global FDI inflows in 2013 and, although the bulky of it went to Asia and Latin America and the Caribbean (attracting about 30% and 20%, respectively), investment into Africa also grew by an additional 4% in 2013 to a total of \$57billion. Africa was the only region to enjoy continuous year-on-year increase in FDI inflows since 2010. Thanks to a most celebrated general growth trajectory in Africa, the International Monetary Fund (October, 2014) considers ‘the world in a mess, but not Africa’. By analysing the amount of FDI that has entered into economic activities of the host countries in SSA, this study helps to explain if FDI is aiding to the growth in the region.

The expected potential development impact of FDI in developing countries includes, in addition to the direct impact of job-creation, technology transfer and direct capital injections, indirect effects on the development process in these countries too. This has resulted in a pervasive rush, by both the developed and developing and transition countries, to attract more FDI envisaged to backstop their development strategies. 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). Much of the rationale according to Wade (2003) lies in the hope that the success story of countries in East and South-East Asia based on outward oriented growth will be replicated in the case of Africa⁴.

⁴ A note of caution on the Asian model has to be added here: it was based not only on FDI attraction, but also on domestic enterprise and technology promotion, and the stimulation of competition in foreign markets.

However, it is still far from obvious that FDI in developing countries 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 effects have been undetectable (e.g. Carkovic and Levine, 2002) or negative (Agosin and Machado, 2005). There have also been social concerns raised, accusing multinational enterprises (MNEs) that carry out the bulk of the FDI, 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 inconclusive at both the micro and macro levels. 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 between the sizes of inward FDI flows relative to growth at macro-level. Svejnar (2015) in turn has argued that firm-level panel data can provide the most significant – and in the majority of cases positive – results, while more aggregate models fail to find results as positive and negative effects mutually cancel each other out, especially if the papers fail to use panel data.

First generation economists such as Solow (1957) and Krugman (1994) confined the impact of FDI on growth to the short-run, arguing that FDI does not contribute to sustainable growth in the long-run due to diminishing returns to physical capital. This paper contents that, in variation with the relative pessimism of 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 spillovers within and across sectors.

A further review of the available literature shows that although the topic on FDI and growth has been widely researched at aggregate (macro) levels and fairly less at disaggregated 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. This is a very important dimension in establishing the long-range impact of FDI on growth in host countries.

A major caveat in the literature attempting to analyse the spill-over effect is that it concentrates only on spillovers taking place within a given sector (intra-sector), whereas, according to Javorcik (2004) and Blalock & Gertler (2008) it is more likely that FDI spillovers would take place within⁵ a sector than across sectors (inter-sector). This is in line with Svejnar's findings (Svejnar, 2005) on the dominance of firm-specific effects and the importance to use panel data to detect them. Kugler(2006) also argued that the degree of the within-sector benefits is generally limited by the fact that a rational MNE will try as much to hide the source of its advantage and limit profit losses due to leakage of technical information to the host-country firms within the same sector.

This takes into consideration the different methodologies used by the researchers in empirical studies in a critical manner, 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-

⁵ through backward and forward linkages

Saharan Africa region. In so doing this paper has an important contribution to make to the existing literature.

The paper also contains a cross-examination of FDI benefits in the East and South-East Asia (ASEAN) region-- being the highest recipient region of FDI inflows into developing countries, 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.

The remainder of the paper proceeds as follows: the second section presents the materials and methodology, third section presents the results and the last section analyses FDI as a vehicle for productivity growth for the SSA region and analyses statistics of the ASEAN region as a control process and then concludes.

2. Model

The study uses panel data for the period 1980- 2012 and employs an econometric estimation with an approach improving the methodology of previous researchers.⁶ This is because we modify the Cobb-Douglas production function to include other variables such as FDI and openness 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, percentages, or differences, which is very important for taking into account the potential non-stationarity in the data series. This approach was used by Hall and Jones (1999) when they focused on institutions as the determinant factors of country differences in

⁶ We do recognize the importance of using more disaggregate data when they are available. In Sub-Saharan Africa, however, those data are usually not available.

Total Factor Productivity (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 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.

Model 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 for estimation purposes:

$$\mathbf{\log GDP}_{it} = \beta_0 + \beta_1 \mathbf{\log FDI}_{it} + \beta_2 \mathbf{\log \Omega}_{it} + \varepsilon_{it} \quad (1)$$

Where:

i- indexes the region and; GDP = total output (current prices); FDI = foreign direct investment, stock (Current US\$); Ω = other measurable ancillary (policy and control) variables; ε = error term and β_1 represents the effect of foreign stock or direct FDI effect on gross output.

Model 2

At the second stage, the study estimates equation 2 below to establish the existing FDI indirect effect through spillovers using aggregate statistics.

$$\log\text{GDP}_{it} = \beta_0 + \beta_1 \log\text{Capform}_{it} * \text{FDI}_{it} + \beta_2 \log\text{HC}_{it} * \text{FDI}_{it} + \beta_3 \log\Omega_{it} + \varepsilon_{it} \quad (2)$$

Where:

Capform = net gross fixed capital formation (Current Price US\$); HC = Human capital or economically active population; Ω = other measurable ancillary (policy and control) variables; ε = error term. The coefficients $\beta_4 + \beta_5$ represent the total indirect effects.

The equation includes the interaction of FDI and fixed 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.

Model 3

Upon establishment of the importance of FDI and the impact of spillovers in the region, the study disaggregates the impact of FDI to sector-specific⁷ levels in the region by estimating equation (3) below, for i sectors and t years.

$$\text{GY}_{ict} = \beta_0 + \beta_{1i} \text{Forenshare} + \beta_{2i} \text{Demand}_{ict} + \beta_{3i} \Omega_{it} + \varepsilon_{it} \quad (3)$$

⁷ Three sector categories of primary, secondary (manufacturing) and services sectors (defined according to the ISIC Rev 3 Classifications) were analysed

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

Ω_i is the sector-specific error component and ϵ_{it} is the basic error component.

Model 4

To quantify the amount of cross-sector spillovers; cross-sector pairs of model 3 above are estimated as follows;

$$(i) \logAgric_{it} = \beta_0 + \beta_1 \log ForenIndustr_t + \beta_2 \log ForenServices_t + \beta_3 Ddagric_t + \beta_4 \log \Omega_{it} + \epsilon_{it} \quad (4)$$

Where \logAgric is the total output in the agriculture sector. This measures spillovers from FDI in the manufacturing and services sectors into the agricultural sector.

$$(ii) \logIndustr_{it} = \beta_0 + \beta_1 \log ForenAgric_t + \beta_2 \log ForenServices_t + \beta_3 Ddagric_t + \beta_4 \log \Omega_{it} + \epsilon_{it} \quad (5)$$

This measures the cross-sector spillovers from the agriculture and services sectors into the manufacturing sector.

$$(iii) \logServices_{it} = \beta_0 + \beta_1 \log ForenAgric_t + \beta_2 \log ForenIndustr_t + \beta_3 Ddagric_t + \beta_4 \log \Omega_{it} + \epsilon_{it} \quad (6)$$

Measuring spillovers from FDI in the other sectors into productivity gain for the services sector.

3. Empirical results and analysis

The discussion above leads to the following testable hypotheses:

- Hypothesis 1: FDI has a positive effect on economic growth of recipient countries,

- Hypothesis 2: The direct effect is stronger in ASEAN countries than in SSA
- Hypothesis 3: FDI has an “indirect effect” on economic growth because of the synergy between FDI and the level of human capital, and domestic investment
- Hypothesis 4: The indirect effect is be stronger in ASEAN countries than in Africa
- Hypothesis 5: FDI spillovers have a direct effect on intra-sector growth in the recipient countries.
- Hypothesis 6: FDI spillovers have an indirect effect on inter-sector growth in the recipient countries.

The study reconciles panel data with Ordinary Least Squares (OLS) regression analysis using models 1 & 2 to test hypotheses 1-4 estimated for the two developing-country regions, model 3 to test hypotheses 5, and model 4 to test hypothesis 6.

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: normality of residuals, serial correlation, model specification, heteroscedasticity and multicollinearity.

Table 1 gives a summary of all the findings both at the aggregate and sector-specific levels. The regression outputs for the aggregate analysis are presented in Table 2, whilst those for the disaggregated/sector-level analysis are given in the Appendix.

Table 1, Summary of the overall FDI impact on growth in the SSA and ASEAN regions

	FDI impact of growth			
Region/ Sector	Direct effect	Technological Spillovers	Productivity spillovers	Evidence of cross-sector spillovers
SSA:	positive and significant at 1% significance level	positive and significant at 1% significance level	weak and negative	
Primary			negative and strong	positive and statistically significant spillovers from the manufacturing sector, at 1%
Secondary			negative and strong	evidence of negative productivity spillovers at 10% significance level
Services			negative effect significant at 5%	strong and positive spillovers from the manufacturing sector at 10% significance level
ASEAN:	positive and significant at 1% significance level	positive but weak	negative and significant at 1% significance level	
Primary			negative but weak	positive cross-spillovers from the services sector significant at 10%
Secondary			negative and strong	positive cross-spillovers from the services sector at 10% significance level
Services			negative	no evidence of positive cross-

strong at 1%
significance
level

spillovers from other sector

Table 2, Direct and indirect effect of FDI on aggregate output in the SSA and ASEAN regions

VARIABLES	Model1		Model 2	
	(SSA) IGDP	(ASEAN) IGDP	(SSA) IGDP	(ASEAN) IGDP
IFDIst	0.539*** (0.0706)	0.708*** (0.0381)		
ILbrforce	0.0136 (0.0453)	-0.000845 (0.0430)		
IODA	-0.118*** (0.0322)	-0.0171 (0.0213)		
ToT	7.04e-06*** (1.48e-06)	-1.46e-06** (6.29e-07)		
Open	-0.00773 (0.00463)	-0.00674*** (0.00133)		
Techspill			0.0344*** (0.00215)	0.0320*** (0.00136)
Prdtspill			-0.00460 (0.00272)	-0.00378* (0.00191)
Constant	8.084*** (0.729)	5.836*** (0.675)	9.224*** (0.137)	9.232*** (0.0896)
Observations	33	33	33	33
R-squared	0.960	0.983	0.972	0.994

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From the regression results shown above, a positive direct FDI-growth relationship was detected in both regions at the aggregate level. The indirect effects through technological spillovers were also shown to be positive in the two regions, and even more favourable (at 1% significance level) in Africa. However, there was no evidence of productivity spillovers at this aggregate level in both regions. According to literature, this non-performance of FDI productivity spillovers 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. Business inter-linkages increase opportunities for imitation of processes by local firms in host countries.

Table 3, in appendix A shows no evidence of intra-sector productivity spillovers in both the SSA and ASEAN regions. 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 the African resources sector and this, coupled with the outside-greenfield divestments/disinvestments recorded for the year 2012, can be used to explain the negative spillover effect in the sector.

The negative effect in the intra-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 \$18,6billion (about 37, 2% of the total investments into the region for the year) and rose to a high of over \$34billion (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- BhartiAirtel, 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, in line with (UNCTAD, 2001), 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 manufacturing sector is now the second largest recipient of FDI projects in Africa, after services, according to the latest recorded UNCTAD FDI statistics. The negative intra-sector spillovers in this sector can be partly explained by Kugler (2006)'s observation that MNEs always try to hide their advantageous processes from competitor firms within their same line of business. Notably, the region still lags behind in terms of production of sophisticated products, despite the evidence of positive technology spillovers shown in table 2 above. The promotion of strategies that increase the backward and forward linkage creation will help to mitigate this problem.

The relative strength of inter/cross-sector spillovers was shown to be mixed in both regions. The negative relationship between FDI in the primary sector and cross spillovers to the manufacturing 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, whilst the presence of positive cross-sector spillovers from manufacturing to agriculture helps to explain the existing potential for this sector to benefit from value addition and beneficiation programmes.

4. Conclusion

Using data from the UNCTAD statistics database for the period 1980-2012, this study fails to reject hypotheses 1-3 and also 6, but does not find sufficient evidence to accept hypotheses 4. Aggregately, this study observes that there is not much difference in the manner in which FDI impacts on growth in both the ASEAN and SSA cases thereby failing to conform to the findings of some previous researchers who have concluded that the growth-inducing hypothesis of FDI only holds for other developing-country regions but not Africa. Notably, the success of the Asian model was based not only on FDI attraction, but also on domestic enterprise and technology promotion, and the stimulation of competition in foreign markets.

The study also fails to accept hypothesis 5. The absence of direct FDI spillovers to same-sector industries indicates that for a sustainable long-term effect from FDI, attention should also be given to how benefits can be maximized through its indirect effect. The variation of productivity spillover-effects at sector-specific levels observed in this study shows that for Africa to be able to maximize the benefits from the presence of foreign affiliates in domestic economies, sector-specific policies and strategies should be adopted. This study postulates that sectoral rather than aggregate policies are necessary for developing countries to maximize the benefits from FDI and offers a regional action plan for tapping into the great potential of international investments as follows;-

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 spillovers.

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.

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 particularly in the agriculture sector.

In conclusion, connections between domestic and foreign firms are an important channel for spillovers absorption by the local firms. In order to maximize the contribution of FDI toward sustainable development, host countries in SSA need a comprehensive strategy that encourage the 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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APPENDICIES

APPENDIX A

1. Regression outputs for Intra-sector review for both regions

VARIABLES	Agriculture		Industry		Services	
	(SSA) IAgric	(ASEAN) IAgric	(SSA) IIndustr	(ASEAN) IIndustr	(SSA) IServices	(ASEAN) IServices
ForenAgric	-0.0356** (0.0165)	-0.0192 (0.0113)				
IDdagric	1.085*** (0.0275)	1.045*** (0.0220)				
ForenIndustr			-0.0369** (0.0148)	-0.0356** (0.0134)		
IDdindustry			1.087*** (0.0240)	1.074*** (0.0256)		
Forenservices					-0.0391** (0.0162)	-0.0406*** (0.0136)
IDdservices					1.083*** (0.0263)	1.082*** (0.0251)
Constant	-0.339** (0.154)	0.131 (0.126)	-0.410*** (0.134)	-0.0697 (0.161)	-0.309* (0.152)	-0.0813 (0.144)
Observations	33	33	33	33	33	33
R-squared	0.996	0.998	0.997	0.999	0.997	0.999

2. Robust standard errors in parentheses

3. *** p<0.01, ** p<0.05, * p<0.1

4.

APPENDIX B

1. Regression output for SSA: *Inter- Sector review*

Cross-sector spillovers in Agriculture

```
. outreg using reg11, se starlevels (10 5 1) summstat (F\|r2_a) summtitle (F statistic\ Adjusted R-squared)
```

	lAgric
ForenAgric	-0.008 (0.033)
Forenservices	-0.381 (0.044)***
ForenIndustr	0.403 (0.043)***
lDdagric	0.977 (0.019)***
_cons	0.075 (0.098)
F statistic	7,625.08
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01

Cross-sector spillovers in Manufacturing

```
. outreg using reg13, se starlevels (10 5 1) summstat (F\|r2_a) summtitle (F statistic\ Adjusted R-squared)
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	lIndustr
lDindustry	0.980 (0.017)***
ForenIndustr	0.423 (0.055)***
ForenAgric	-0.031 (0.026)
Forenservices	-0.381 (0.044)***
_cons	0.072 (0.097)
F statistic	9,831.18
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01

Cross-Sector Spillovers in Services

```
. outreg using reg15, se starlevels (10 5 1) summstat (F\ r2_a) summtitle (F statistic\ Adjusted R-squared)
```

lServices	
Forenservices	-0.360 (0.033)***
lDdservices	0.978 (0.017)***
ForenAgric	-0.031 (0.026)
ForenIndustr	0.404 (0.043)***
_cons	0.077 (0.096)
F statistic	9,632.39
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01

2. Regression output for ASEAN; *Inter- Sector review*

Cross-sector spillovers in Agriculture

```
. outreg using reg17, se starlevels (10 5 1) summstat (F\ r2_a) summtitle (F statistic\ Adjusted R-squared)
```

lAgric	
ForenAgric	-0.185 (0.053)***
Forenservices	0.146 (0.072)*
ForenIndustr	-0.034 (0.081)
lDdagric	1.106 (0.028)***
_cons	-0.039 (0.143)
F statistic	4,585.09
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01

Cross-sector analysis in Manufacturing

. outreg using reg19, se starlevels (10 5 1) summstat (F\|r2_a) summtitle (F statistic\ Adjusted R-squared)

	lIndustr
lDdindustry	1.091 (0.022)***
ForenIndustr	-0.110 (0.074)
ForenAgric	-0.079 (0.034)**
Forenservices	0.130 (0.071)*
_cons	-0.051 (0.136)
F statistic	9,609.61
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01

Cross- sector analysis in services

. outreg using reg21, se starlevels (10 5 1) summstat (F\|r2_a) summtitle (F statistic\ Adjusted R-squared)

	lServices
Forenservices	0.028 (0.078)
lDdservices	1.096 (0.024)***
ForenAgric	-0.077 (0.034)**
ForenIndustr	-0.014 (0.081)
_cons	-0.045 (0.137)
F statistic	9,231.87
Adjusted R-squared	1.00

* p<0.1; ** p<0.05; *** p<0.01