

THE RELATIONSHIP BETWEEN DOMESTIC INVESTMENT AND FOREIGN DIRECT INVESTMENT IN SUB SAHARAN AFRICAN COUNTRIES. A STATIC MODEL ANALYSIS

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Abstract

This paper investigate the relationship between Domestic Investment, Foreign Direct Investment, Official Development Assistance, Inflation among Eighteen (18) Sub Sahara African Countries span the period 1981 to 2011 using Panel Data estimation, the study posit the magnitude to which Domestic investment can possibly be influenced by macroeconomic indicators in the region. However, the result of Hausman specification test revealed that the Fixed Effect Model is appropriate for adoption. Thus, the result of Fixed Effect estimation indicates that Foreign Direct Investment (FDI) has negative although non-significant effect on Gross Capital Formation. Official Development Assistance and Inflation have a negative and significant effect on Gross Capital Formation in Sub Saharan Africa. However market size proxy as GDP posits a positive and significant effect on Gross Capital Formation. Policy makers will therefore be informed on the contemporary interactions of economic indicators particularly in policy appraisals. Policy recommendation is that although FDI impact negatively but non-significant on gross fixed capital formation, there is need to allow for FDI inflow so that domestic firms can acquire more skills, technology and reduced cost of production thus, this is possible in the context of liberalization process.

Keywords: Domestic Investment, Foreign Direct Investment, Gross capital formation

Introduction

Domestic investment is a drive to economic growth which encompasses an important constituent in development and growth strategy in both developed and developing economies. Developing economies require much external capital inflow to stimulate domestic investment. The inflow of FDI in Sub Saharan Africa has continue to increase with slow growth pace rate in gross capital formation. However, while much of the official assistance is targeted at Sub Saharan Africa for instance in 2009, of the total \$ 165.4 Billion set aside for official development assistance, Sub Saharan Africa receives the total of \$ 42.2 Billion approximately 25.5 percent. Despite the increase in external capital inflow, Sub Sahara Africa continued to remain perpetual poor with large portion of her population having low per capita income, low savings and investment portfolio. The topical issue on domestic investment on Sub Sahara Africa has becomes a subject of concern not only to policy makers rather researchers as well. Although, there are abound literatures on FDI growth Nexus, literatures on domestic investment (gross capital formation) FDI, Official Development Assistance (ODA) Inflation GDP particularly on panel data estimation are relatively scanty. The need to grow the economies of Sub Sahara Africa is essential to preclude poor domestic investment portfolio in the region. To what extent has FDI, ODA, GDP and Inflation influence domestic investment given gross capital formation increase over the years. Therefore, the study seeks to investigate the relationship between domestic investment FDI, ODA, GDP and Inflation in Sub Sahara African Countries. The study is importance because it will contribute to the growing body of literature and argument on the topical issue. This will also identify how significant a macroeconomic variable is to economy. This paper is divided into five sections including introduction, section two of this study reviews several empirical literatures on the subject, section three

explores the methodology, section four of this paper examines the data analysis and section five of the paper discusses recommendation and conclusion.

Literature Review

There are vast empirical literatures on Domestic Investment economic growth nexus while many literatures continue to show the significance of FDI on economic growth, cited in the work of Ghebreyesus and Cadet 1998 (Chenery and Syrquin 1975; Ranis 1976; Kindleberger 1979; and Meier 1989) purportedly indicates a transfer of technology, physical stock of capital, gross capital formation, accessibility to foreign market and managerial skills. It is no disputable fact that FDI generate numerous economic scales to the host economies Dunning and Rugman (1985). Studies indicating a crowd in effect between FDI and Domestic Investment see (Van Loo 1977; Tang *et al*; 2008; Misun and Tomsik 2002; Kim and Seo 2003).

Lautier and Moreaub (2012) establish the relationship between FDI and Domestic Investment to be bidirectional. Amadou (2011) investigate the effect of foreign capital on domestic investment in Togo span the 1980 to 2008 using time series data and result show that foreign capital has a positive effect on domestic investment in Togo.

Contrarily, Kumar and Pradhan (2002) investigated the relationship between domestic investment and foreign direct investment using the panel data sample of 107 countries spanning the period 1980 to 1999, result posit a negative short-run effect and positive long-run effect between FDI and Domestic Investment within the period observed.

Braunstein and Epstein (2002) using provincial panel data span 1986 to 1999 posit that FDI has a negative impact on China economy. Apergis *et al* (2006) showed a negative impact of FDI on Domestic Investment using a panel data of thirty (30) countries for the sample period 1992 to 2002 and applying the univariate model and multivariate model, the former indicate that FDI crowd in Domestic Investment while the latter shows that FDI crowds effect on domestic investment. Titarenko (2006) using quarterly data spanning 1995 to 2004 to investigate the relationship between FDI and Domestic Investment in Latvia, result posits that FDI has a negative impact on Domestic investment. Adams (2009) using Sub Saharan data span 1990 to 2003 and applying the OLS regression analysis shows a positive and significant relationship between domestic investment and economic growth. The result also indicates that FDI has a negative effect in the short-run and a positive effect on the long-run.

Ndikumana and Verick (2007) found a bidirectional relationship between FDI and private investment. Ghazali (2010) applied the pairwise granger causality test to indicate the causal relationship between FDI and domestic investment on Pakistan economy within the sample period 1981 to 2008 and applying the ADF stationarity test and Johansen cointegration. Analysis shows a positive long-run relationship between FDI, domestic investment and economic growth in Pakistan.

Alfa and Garba (2012) investigated the relationship between domestic investment, export and economic growth in Nigeria, he result posits a positive and significant long-run relationship between domestic investment and economic growth and export. The Authors also reported a bidirectional flow between domestic investment and growth in Nigeria.

Javed *et al* (2012) using the generalized Method of Moment GMM posit that domestic investment has a positive long-run effect on economic growth in four South Asian economies Bangladesh, India, Pakistan and Sri-Lanka. Osinubi and Amaghionyeodiwe

(2010) investigated the relationship between domestic investment and economic growth in Nigeria using OLS, and Johansen cointegration test spanning the period of 1970 to 2005, the results of the analysis shows that Domestic Investment positively influence economic growth in the short-run and foreign private investment and export also have positive effect on economic growth in the short-run respectively.

Tan and Lean (2010) applied the ADF Phillip Peron, Multivariate Johansen Cointegration analysis and the Granger Causality test to investigate the linkage between domestic investment export and economic growth for Malaysian economy for sample period of 1970 to 2008, the Authors found a positive long-run and a bidirectional relationship between a domestic investment and economic growth.

Tang *et al* (2008) in their study investigated the impact of FDI and Domestic investment applying the Johansen VAR test, Variance decomposition and impulse response and the granger causality test using data on China economy spanning the period 1988 to 2003, the result of the study shows a long run relationship between FDI and Domestic investment. The authors also found a bi directional relationship between domestic investment and growth with a unidirectional relationship running from FDI to Domestic investment and to economic growth.

In another separate study, Tan and Tang (2016) investigated the causal link among domestic investment, FDI, interest rate and economic growth in ASEAN-5 countries namely Indonesia, Malaysia, Thailand, Singapore, Philippine for the sample period 1970 to 2012 using time series data, the authors employed the stationarity test technique and cointegration test. In their analysis, result of the study reveals a bi directional relationship between FDI and domestic investment.

Vijayakumar *et al* (2010), in their study examines the factors determining FDI inflows of BRICS countries using annual data set from the period 1975 to 2007 using the panel data set, these authors found gross capital formation and market as determinants of FDI. The authors employed the OLS pooled regression, dynamic Panel data framework of (Arellano and Bond 1991) fixed effect, random effect regression and Hausman specification test and the result of the study indicates a negative relationship between gross fixed capital formation and FDI, trade openness is positive although not significant. OLS is biased and inconsistent and even where the unobserved individual specific effect is not serially correlated. Although the fixed effect estimator takes control of that, the lag value of the dependent variable will still be correlated with the disturbance term (Baltagi, 1999).

Farla, Crombrugghe and Verspagen (2013) used balanced 12-year panel data for 46 countries to investigate the relationship between FDI and domestic investment, the authors use the GMM technique in their analysis and also employed the robust techniques in order to avoid serial correlation, in their study also included is time dummies to remove the time-related shocks from errors in GMM analysis. The authors introduced Windmeijer robust estimator for the two-step covariance matrix and model FDI as endogenous and treat FDI as endogenous in the GMM regression and interaction model between FDI along with other variables. In their analysis, the authors found evidence of crowding in rather than crowding out implying that the relationship between FDI and Domestic investment in positive.

Olise1 *et al* (2013) applied the OLS technique to estimate the relationship between domestic investment and FDI in Nigeria over the period 1970-2009. The authors in their work showed a negative effect relationship between domestic investment and FDI. In the same vein, Ali Khan and Adnan Hye (2014) employed all regressors as endogenous variables to estimate the impact of gross fixed capital formation on Pakistan economy for the sample period of 1971–2009 applying the generalized least square (GLS) approach, the authors found that gross fixed capital formation positively affects the inflow of FDI in Pakistan. The authors used gross fixed capital formation as a proxy for domestic investment.

Methodology

This paper seeks to examine the relationship Domestic investment (gross capita formation), Foreign Direct Investment (FDI), Official Development Assistance (ODA), Inflation, Gross Domestic Product (GDP) using the sample size of eighteen (18) Sub Sahara African Countries. The study uses panel data span 1970 to 2011 to investigate the relationship. Sample countries captured include (Benin, Burkina Faso, Burundi, Botswana, Central African Republic, Congo Dem Republic, Congo Republic, Ghana, Kenya, Lesotho, Malawi, Rwanda, Senegal, Swaziland, South Africa, Togo and Zambia). Domestic investment measured as Gross Capital Formation, foreign Direct Investment measured as Net inflow of Investment, Net Official Development Assistance measured as percentage of Gross Capital Formation, inflation measured as GDP Deflator i.e. the annual rate of price change in the economy and market size proxy as GDP is measure as annual percentage growth rate of GDP at constant market prices. However, the choice of selection between Fixed effect and Random effect models determined by the Hausman specification test following the modeling by Torres-Reyna (2011) specified as:

Fixed Effect Model

$$y_{it} = \beta_1 X_{it} + \alpha_i + \varepsilon_{it} \dots\dots\dots(1)$$

$\alpha = (i=1 \dots n)$ is the unknown intercept for each entity (n entity-specific intercepts)

y_{it} = is te dependent variable where i = entity thus, t= time.

X_{it} = denotes one independent variable.

β_1 = is the coefficient for that independent variable.

ε_{it} = is the error term or disturnbance term or white noise Torres-Reyna (2011)

Random Effect Model

$$Y_{it} = \beta_1 X_{it} + \alpha + \mu + \varepsilon_{it} \dots\dots\dots(2)$$

1. Analysis of Result and Interpretation

The result indicates the analysis on static model to show the relationship among series variable across countries.

	gfcf	coef	std Err	t-statistic	p-value (t-sta)
	FDI	-3.25	5.06	-0.64	0.52
	ODA	-0.04	0.004	-9.01	0.000
	INF	-0.0008	0.003	-2.39	0.017
	GDP	0.3560	0.06	5.32	0.000
<i>Cons</i>	21.6985	0.578	37.53	0.000	

R-sq: within = 0.185
F-statistic = 36.08,
P(f-stat) = 0.000
Corr(u-i. xb) = -0.18

The result for fixed effect estimation indicates that Foreign Direct Investment FDI has a negative although non-significant effect on Gross Capital Formation. Official Development Assistance and Inflation also have a negative and significant effect on Gross Capital Formation in Sub Sahara Africa. However, GDP posits a positive and significant effect on Gross Capital Formation. The value $\text{corr}(u-i,xb) = -0.1879$ indicates the correlation of fixed effect with a linear combination of the included regressors.

Gfcf	Coef	std Err.	t-statistic	p-value
FDI	4.82	4.43	1.09	0.277
ODA	-0.026	0.004	-6.44	0.000
INF	-0.0002	0.0025	-1.00	0.318
GDP	0.1833	0.4972	3.69	0.000
Cons	21.009	0.4494	46.74	0.000
Country/		f(17, 657) = 32.046	0.000	(18 category)

The linear regression absorbing indicators is another approach to estimating the fixed effect. The result shows that about 54 percent of the changes in gross capital formation are explained by the independent variables in Sub Sahara Africa.

Random Effect

Gfcf	Coef	std Err.	z	p>[z]
FDI	-2.87	4.66	-0.62	0.53
ODA	-0.04	0.0045	-8.83	0.000
INF	-0.0005	0.003	-1.54	0.124
GDP	0.321	0.638	5.03	0.000
Cons	21.605	0.559	38.58	0.000

R-sq: within = 0.1848
Between = 0.0449
Over all = 0.1797
Corr(u-i.x) = 0 (assumed)

The result of the random effect indicates that FDI, inflation have a negative although no significant effect on gross capital formation while the coefficient sign for official development assistance has a negative and significant effect on gross capital formation. However, the coefficient GD indicates a positive and significant effect on gross capital formation in Sub Sahara Africa Countries. The sign $\text{corr}(u-i. X) = 0$ [assumed] shows that the unobserved heterogeneous term, proxy by the estimated fixed effect is not correlated with a linear combination of the included regressors.

.....Coefficients.....	(b)	(B)	(b-B)
	Fixed	random	Difference

Fdi	-3.25	-2.89	3.64	1.97
Oda	-0.43	-0.04	-0.0028	0.0014
Inf	-0.0008	-0.0005	-0.0003	0.0008
Gdp	0.3560	0.321	0.0350	0.0199

$$Chi2(3) = (b-B)' [(v-b-v-B)^{-1}] (b-B) = 1391$$

$$Prob > chi2 = 0.0030$$

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

The result of Hausman specification test shows significant given the p-value at 0.0030 thus, the fixed effect model is appropriate to be adopted in explaining the relationship between the dependent variable and the independent variables.

Summary

This study investigates the relationship between Domestic investment and some macroeconomic indicators in Sun Sahara Africa. Given the gross increase in FDI inflow, Over sea Development Assistance (ODA), inflation targeting and GDP across Sub Sahara Africa, the sustainability of Domestic Investment i.e. Gross Capital Formation is topical issue, thus, requires address by the policy makers and researchers. From the findings of the study, Foreign Direct Investment (FDI) has negative although non-significant effect on Gross Capital Formation. This finding is in line with the argument by Ndikumana and Verick (2008) which shows that large flow of FDI may crowd out domestic investment. However, this finding is contrary to the findings by Tang et al (2008). Official Development Assistant and Inflation also have a negative and significant effect on Gross Capital Formation in Sub Sahara Africa. However, market size proxy as GDP posits a positive and significant effect on Gross Capital Formation.

Conclusion

This study empirically investigates the relationship between Domestic Investment, Foreign Direct Investment, Official Development Assistance, Inflation among Eighteen (18) Sub Sahara African Countries span the period 1981 to 2011 using the panel data estimation, from the findings, the study indicates the magnitude to which Domestic Investment is influenced by macroeconomic indicators in the region. The result of Hausman specification test reveals that the fixed effect model is appropriate for adoption. Thus, the result of the fixed effect estimation indicates that Foreign Direct Investment (FDI) has a negative although non-significant effect on Gross Capital Formation. Official Development Assistant and Inflation also have a negative and significant effect on Gross Capital Formation in Sub Sahara African. Policy recommendation is that although FDI impact negatively but non-significant on gross fixed capital formation, there is need to allow for FDI inflow so that domestic firms can acquire more skills, technology and reduced cost of production thus, this is possible in the context of liberalization process. The variables inflation and ODA show a significant negative relationship on Gross fixed capital formation thus a caveat for sub Saharan African region to provide for effective institutional framework to target inflation so as to improve the investment climate which has tendency to allowing domestic firms to compete favorably with foreign firms.

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