



THE INTERRELATIONSHIP INTEGRATING CORRUPTION-FDI, GROSS
FIXED CAPITAL FORMATION-EXPORT AND FDI: THE CASE OF SUB
SAHARAN AFRICA

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Abstract

This study seeks to investigate empirically the relationship between corruption, export, tariff and FDI in SSA countries for the period 2013 to 2017 employing sample of 24 SSA countries and applying the differenced generalized method of moment. The result of the study indicates that the lagged value of FDI, export and tariff have a negative effect on current FDI in the short run. The interaction of corruption and FDI posits a positive effect on FDI. However, the interaction of gross fixed capital formation and export has a positive and significant effect on FDI in the short run. In the long run, export and tariff posit a negative relationship and long run causality can be inferred. Interacting corruption and FDI, gross fixed capital formation and FDI have positive effect on FDI and a long run causality impact. The implication of this study is that a designed and deliberate policy must target reducing bureaucracy that promotes corruption; this would necessitate a liberalisation framework to promote a comprehensive competitive business climate to boost FDI inflow into SSA countries. In another development, operating a fairly average tariff policy that could not scare investors cannot be underscored. The consciousness of policy target is needed to improve on quality gross fixed capital formation to increase output thus promoting quality and efficient export cannot be undermined by institutions in SSA countries.

Keywords: FDI, Corruption, Export, Gross Fixed Capital Formation

1. Introduction

There are numerous reasons why Foreign Direct Investment (FDI) inflow into Sub Saharan Africa has been relatively slow while corruption and macroeconomic instability continued to undermine policy action targeted at encouraging FDI inflow into Sub Saharan Africa (Asiedu, 2002). Dearth of empirical studies exists on the factors that determine FDI inflow, with methodological gaps and framework (see Asiedu 2003; Morisset, 2000). Financing Africa current account and balance requires external sources of finance; hence, it is imperative to examine factors that encourage FDI inflow into the region. This is also due to the undeveloped nature of capital markets in most African countries, portfolio investment inflows (equity and bonds) which are not significant and its volatile nature compared to FDI, hence FDI is a major source of external financing in developing countries but its



quality to sustained growth subject to academic and policy discourse (World Bank, 2017). In the case of FDI, in 2016 growth rate benefited from (FDI) and net exports, which were grossly boosted by the depreciation of the real exchange rate after its liberalisation episode (African Economic Outlook, 2018). According to African Development Bank (2020), Africa experienced the fastest growth globally in FDI flows in the period 2018 with 11 percent increase from \$41 billion to \$46 billion, compared with negative global flows -13 percent and flows to developed economies -27 percent and Asia +4 percent. There are empirical literatures on FDI and corruption with methodological limitations. These studies employed the ordinary least square regression technique and may not fulfil adequately the classical linear assumptions (see Voyer & Beamish 2004; Fahad & Ahmad 2016; Ahmad, Draz & Yang 2007). Although Canare (2017) used GMM technique of estimation, studies on the subject and GMM technique are relatively scanty. In addition, most studies have focused on outward FDI (see Ponce; Navarro & Grajeda 2019; Alguacil & Orts 2002; Herzer & Schrooten 2008). This study focuses on inward FDI. It is in view of this that this study seeks to investigate empirically the effect of corruption on inward FDI in Sub Saharan African countries. Thus, this study is structured into six sections including this introduction. Section two looks at empirical literature, section three captures the methodology, section four focuses on results and Discussion and section five of this study presents at summary conclusion and recommendation.

2. Literature Review

In a study, Fahad and Ahmad (2016) employed the panel causality test on eight post conflict countries from 1984 to 2013, applying the dynamic ordinary least square regression. Results indicate a negative long run relationship between corruption and FDI. The causality runs from corruption to FDI. Ponce, Navarro and Grajeda (2019) used causality test to analyse the effect of three governance indicators for LA countries on Chinese outward FDI, employing panel data models of 21 LA countries from 2007 to 2016. The result of the study revealed a bidirectional causality from control of corruption, which implies that China considers priority the degree of corruption control before investing, and Chinese FDI has an impact on control of corruption, regulatory quality causes FDI for some of the sampled countries. This implies that China looks at regulatory quality and government effectiveness in LA countries when deciding to invest. In another study, Dritsaki and Dritsaki (2012) used two staged Engle and granger test (1987), cointegration test by Pedroni 1999 to estimate the causality between export and FDI in 12 new EU countries for the period 1995 to 2010. The result of the study shows a bidirectional relationship between export and FDI. Alguacil and Orts (2002) used Spanish data covering the period 1970.1±1992 and applying the vector autoregressive model, granger causality test and variance decomposition and the impulse response technique to investigate the effect of outward FDI on export. Results depict a causality running from FDI to export.

On the contrary, Canare (2017), in a study, examines the effect of corruption on FDI in Asian-pacific countries employing 46 countries from the Asia and the Pacific region for the sample period 2006 to 2013. The author also used the differenced generalized method of



moment GMM and the result of the study revealed that corruption has a negative and significant effect on FDI inflow. Teixeira and Guimarães (2015) in their study empirically investigate the relationship between corruption and FDI, using sample of 96 countries for the period 2000 to 2010, applying the logistic model. Results of the study show that using distinct proxies for corruption variables and controlling for other types of the countries institutional quality leads to distinct outcomes/conclusions. In isolation, the only significant corruption determinant of FDI is “Bribes” – countries where CEOs consider that irregular payments and bribes seldom occur and those that succeed in attracting high levels (in percentage of their GDP) of FDI inflows. Voyer and Beamish (2004) investigated the effect of corruption on Japanese FDI using 29,546 Investments in 59 countries and applied the ordinary least squares (OLS) linear regression analysis that the levels of perceived corruption in emerging economies are significant predictors of Japanese FDI. In another study, Zangina and Hassan (2020) used autoregressive distributed lag model technique to test for long run relationship during the period 1984-2017. Result revealed that control of corruption has a negative impact on FDI although non-significant. The result also shows that increase in control of corruption by one unit will stimulate FDI inflow by 4.02 per cent of the GDP. Xie and Xue (2019) investigated the impact of FDI and Improvements in the Quality of Export Products in the Chinese Manufacturing Industry applying regression technique. Result of the study reveals that FDI has a positive impact on the quality of Chinese export products

Herzer and Schrooten (2008), in their study, investigated the nexus between outward FDI and domestic investment in two industrial countries applying the Granger (1988) and autoregressive distributed lag model using US data. The result of the study reveals that US, outward FDI has positive and significant long-run effects on domestic investment. However, in Germany, this relationship exists only in the short run. In the long run, outward FDI substitutes for German domestic investment. In another study, Girma, Kneller and Pisu (2005), in their study, estimated the relationship between export and FDI for the period 1990–1996 applying the first-order stochastic dominance between random variables and the result shows that export has a positive relationship with FDI. Ahmad; Draz and Yang (2007), in their study explored the impact of outward foreign direct investment (OFDI) on the home country exports for selected ASEAN countries during 1981-2013 using the ordinary least square regression technique, result of the study indicates a positive and statistical significant relationship between FDI and export

Theoretical framework

There are two notable theories on relationship between corruption and FDI. The ‘grabbing-hand’ theory which argued in support that corruption resembles a ‘grabbing hand’ that hike up transaction costs. This theory is supported by (Shleifer & Vishny 1993; Bliss & Di Tella 1997) corruption is a factor that increasingly pushes up the cost of production by making investment climate difficult in the host country. This theory argued on the negative side effect as it discourages increase cost in innovative investment, lowers investment and increases inefficiency and misallocation of resources encouraging investment in



unproductive investment rather than investment in human skills. It is important to note that property and contract laws are important drivers to growth in investment. Violation of such laws could doubt the assurances and scare away technological transfer specifically FDI inflow.

On the other hand, the helping-hand theory supported by Lui (1985), Beck and Marher (1986) corruption influence investment climate positively. According to the theory, corruption allows for efficient ‘lubrication’ for rigid economic regulation and red-tape. When MNCs bribe the host government, MNCs could bypass stringent economic laws, institutions, regulations or red-tape and potentially obtain maximum benefits in terms of profitable contracts; this also allows the MNCs certain privileges to access the markets and subsidies, which would act as an extra incentive for them to engage in FDI.

3. Methodology

Data Source

This study employed the panel data spanning the period 2013 to 2017. A panel of 24 SSA countries is used as sample using the secondary data source due to availability of data in form of non-probability sampling technique.

Empirical Model and Description of Variables

This employs the GMM approach; hence the approach remains the key instrument in solving the dynamic panel analysis. The GMM approach is introduced by Holtz-Eakin et al. (1990), Arellano and Bond (1991) and Arellano and Bover (1995).

Below is the mathematical exposition of the techniques:

$$Y_{it} - Y_{it-1} = (\alpha - 1)Y_{it} - 1 + \beta_0 X_{it} + \mu_i + \varepsilon_{i,t} \dots \dots \dots 1$$

The above equation 1 indicates the GMM model where Y_{it} is the logarithm FDI, $Y_{it} - Y_{it-1}$ is the rate of per capita income growth, Y_{it-1} is the initial level of FDI, X_{it} represents a vector of explanatory variables, μ_i is an unobserved country-specific effect, $\varepsilon_{i,t}$ is the error term and the subscripts i and t represent country and time period respectively. Rewriting (1), we obtain:

$$Y_{it} = \alpha Y_{it} - 1 + \beta_0 X_{it} + \mu_i + \varepsilon_{i,t} \dots \dots \dots 2$$

Similarly, the country specific effect is one key issue to be addressed in GMM approach thus to take account of this problem we however eliminate country-specific effects by taking first differences of our model in equation (2) thus we have the model below:

$$Y_{it} - Y_{it-1} = a(Y_{it-1} - Y_{it-2}) + \beta_0(X_{it} - X_{it-1}) + \varepsilon_{it} - \varepsilon_{it-1} \dots \dots \dots 3$$

$$Y_{it} - Y_{it-1} = a(Y_{it-1} - Y_{it-2}) + \beta_0(X_{it} - X_{it-1}) + \varepsilon_{it} - \varepsilon_{it-1} \dots \dots \dots 4$$

There is also argument on the limitation of GMM approach for instance; Levine et al. (2000) suggest the use of instruments in the model due to endogeneity problem which is also a common problem associated with GMM approach. Similarly our new error term



$(\varepsilon_{it} - \varepsilon_{it-1})$ in equation (3) is correlated with the lagged dependent variable, $(\mathcal{Y}_{it-1} - \mathcal{Y}_{it-2})$. Moreso, here all the variables in the above equation have been time differenced to remove the fixed effects present to distort the robustness of the data i.e. unobserved heterogeneity.

For this reason, the GMM panel estimator uses the following moment conditions:

$$\mathbb{E}[\mathcal{Y}_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \dots \dots \dots 5$$

$$\mathbb{E}[X_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \dots \dots \dots 6$$

The assumptions that the error term, ε , is not serially correlated and that the explanatory variables, X , are weakly exogenous. The authors refer to this as the difference estimator.

Alonso-Borrego and Arellano (1996) and Blundell and Bond (1998) show that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. The justification for using differenced GMM estimation is that it allows the use of instrumenting level variables with their differenced value. In addition to that, the system GMM produced a Hansen test statistics indicating that there are too many instruments using only one lag period. Hence, difference GMM is employed to check for endogeneity.

Variable Description

FDI: is inflows (% of GDP), it is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. On the other hand, Corruption is measured as Corruption Perceptions Index (CPI), which is a composite index, or poll of polls, that ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians.

Weighted tariff: Weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. However, GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant local currency (see WDI, 2020)

Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments (see WDI, 2020). The parameter Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private



residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation (see World Development Indicators, 2020)

4. Results and Discussion

The result of differenced GMM as depicted in table 1 shows that the past FDI inflow level is a strong predictor of its current level. By implication, the lagged value of FDI across all models are statistically significant at 1 percent level of significance. The model 1 does not include the collapse option 0.0212 not significant at 1%. All column across model 2,3,4,5,6,7 indicate significance at 1% level. Thus, the lagged value of FDI has a negative and statistical significance on current FDI, indicating that the lagged value of FDI can serve as additional instrument in the model.

The coefficient Export shows that column 3,4,5,6,7 are statistically significant at 1% level indicating a negative relationship with FDI. Integrating corruption with FDI, result shows across all model specification that the coefficient corruption (0.508) is positive and statistical significant at 1% level and this confirms with the study by Fahad and Ahmad (2016). However, this result contrasts the study by Canare (2017). The implication of this finding is that a marginal effect of the change in corruption in the control of corruption has a positive influence on FDI. Similarly, integrating gross fixed capital formation with Export across all models of specification depicts a positive and statistical significant relationship with FDI (0.0031). This implies that a marginal effect of change in gross fixed capital formation has a positive role on FDI into SSA. The coefficient tariff depicts a negative and significant relationship with FDI in all column.

Table 1: Differenced GMM

VARS	1	2	3	4	5	6	7
FDI LI	-0.02** (0.02)	-0.06*** (0.01)	-0.06*** (0.01)	-0.02** (0.02)	-0.06*** (.04)	-0.06*** (0.01)	-0.06*** (0.01)
Gdp	-4.67** (3.25)	3.52** (3.61)	2.38** (3.03)	-4.67** (3.25)	3.52** (5.79)	3.52** (3.22)	3.52** (3.61)
Export	-0.05** (0.03)	-0.06** (0.03)	-0.06*** (0.03)	-0.05*** (0.03)	-0.06*** (0.04)	-0.06*** (0.02)	-0.06*** (0.03)
Currfdi	0.56*** (0.01)	0.50*** (0.01)	0.51*** (0.01)	0.56*** (0.01)	0.50*** (0.04)	0.50*** (0.01)	0.50*** (0.01)
Gfcfxpo	0.00*** (0.08)	0.00*** (0.01)	0.00*** (0.01)	0.00*** (0.08)	0.00*** (0.01)	0.00 (0.01)	0.00*** (0.01)
Tariff	-0.21*** (0.09)	-0.91*** (0.15)	-0.84*** (0.10)	-0.21*** (0.09)	-0.91*** (0.50)	-0.91 (0.13)	-0.91*** (0.15)
No. of Obs	42	42	42	42	42	42	42
Time Dummies	yes	yes	yes	yes	yes	yes	Yes
Number of Instruments	11	8	9	11	8	8	8
No of groups	15	15	15	15	15	15	15
F Statistic	3018.64	3478.55	5764.52	3018.64	750.01	30561.58	3478.55
GMM	1	1	1	1	1	1	1
Instrument Lag							
AR(1)	0.165	0.104	0.148	0.165	0.259	0.104	0.104
AR(2)	0.232	0.572	0.715	0.232	0.693	0.572	0.572
Hansen test	0.479	0.758	0.769	0.479	0.871	0.758	0.758

Source: Authors computation using STATA

Notes: *** ** * denotes 1% 5% 10% statistical significance. Z statistics (in parenthesis).



Applying the one lag length, the specification test of AR (2) indicates that the models do not have the problem second order serial correlation due. However, the Hansen test statistics shows that the instruments in the models are not over identified. Thus, inferences can be drawn from the findings. The insignificant coefficient GDP could be attributed to poor performance of formal sector and a large informal sector which is underdeveloped in SSA generally. Similarly, integrating corruption and FDI shows an equalising effect on FDI. For instance, when corruption is controlled, given FDI inflow into SSA, it has much role increasing FDI into the region.

The Differenced GMM is basically a short run estimate. Thus, a long relationship is drawn from the significant coefficients in all columns. A cursory look at table 2 shows the long run estimate. Integrating corruption and FDI indicates a positive long run relationship with FDI in the long run.

Table 2: Long run estimates

Vars	Coef Std. Err
Currfdi	0.4826*** (0.01)
Gdp	2.24** (2.85)
Tariff	-0.7944*** (0.09)
Gfcfexpo	0.0030*** (0.09)
Export	-0.0622*** (0.02)

Source: Authors computation using STATA

Notes: *** ** * denotes 1% 5% 10% statistical significance. Z statistics (in parenthesis).

Export impacts a negative effect on FDI in long run and it is statistically significant at 1% level. This contrast the study by (Girma, Kneller & Pisu 2005; Xie & Xue 2019). Tariff also impacts a negative effect on FDI in long run and it is statistically significant at 1% level. Integrating gross fixed capital formation and export shows a positive relationship with FDI in the long run. In addition, integrating corruption and FDI also depict a positive and statistical significant relationship with FDI in the long run. This also implies that it can be infer there is a long run causality effect between export, tariff, gross fixed capital formation, corruption and FDI.

5. Conclusion and Recommendation

Considering the abundant literature on the subject and the macroeconomic instability featured in African economies, this study investigated empirically the relationship between corruption and FDI in SSA countries for the period 2013 to 2017, covering sample of 24 SSA countries and applying the differenced generalised method of moment. Result of the study indicates that the lagged value of FDI, export and tariff have a negative effect on



current FDI in the short run. The interaction of corruption and FDI posits a positive effect on FDI and so also the interaction of gross fixed capital formation and Export. In the long run, export and tariff posit a negative relationship and long run causality can be inferred. Interacting corruption and FDI, gross fixed capital formation and export have positive effect on FDI and a long run causality impact. The implication of this study is that a design and deliberate policy must target reducing bureaucracy that promotes corruption. This would necessitate a liberalisation framework to promote a competitive business climate to boost FDI inflow into SSA countries. Operating a fairly average tariff policy that could not scare investors cannot be underscored. There is also the need for consciousness of policy target to improve on quality gross fixed capital formation to increase output thus promoting quality and efficient export cannot be undermined by institutions in SSA countries.

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