

**International Capital Flows and Industrial Performance in Nigeria (1990-2015)
Cointegration, DOLS and Granger Causality Approach****Olayemi Henry Omotayo^{1*}, Aderemi Timothy Ayomiyunde¹, Ogunade Ayomide Olayinka¹, Eyeke Anayo Valentine²**¹Department of Economics, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria²Department of Statistics, Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan, Oyo State, Nigeria***Corresponding author***Olayemi Henry Omotayo***Article History***Received: 16.11.2018**Accepted: 25.11.2018**Published: 30.11.2018*

Abstract: It has been observed in the recent time that the bulk of studies on foreign capital flows in Nigeria focused on aggregate economic performance, neglecting the performance of industrial sub-sector. In order to move the frontiers of knowledge in this regard, the paper critically examined the relationship between international capital flows and industrial performance in Nigeria using Cointegration, DOLS and Granger Causality Approach. The study extracted data from CBN Statistical Bulletin and UNCTAD investment report from 1990-2015. Consequently, in order to address the objective of this study necessary diagnostic tests such as unit roots, co-integration and Pairwise Granger Causality Tests were estimated. The findings that emerged from this paper is as follows: long-run effect shows that foreign direct investment and external debt have a significant positive relationship with industrial performance in Nigeria. However, the remittances though have a positive relationship with industrial performance in Nigeria, but are not significant. Also, there is a unidirectional causality which runs from industrial performance to FDI inflows in Nigeria. Hence, this paper recommends that Nigerian government should see inflows of foreign capital as a viable catalyst that has the capacity to propel the expansion of the country's industrial sector, and the policy makers in the country should embark on policy measures that will ensure the sustainability of foreign direct investment inflows and external debt towards the direction of industrial sectors in Nigeria. In the same vein, larger percentage of remittances should be tailored towards industrial sector in the country. If foreign capital flows is sustained there will be industrial revolution in the economy in the nearest future.

Keywords: International Capital Flows, Industrial Performance, FDI, External Debt and Remittances.

INTRODUCTION

The multiplier effects of foreign capital flows on development of industrial sector of any domestic economy cannot be undermined. This has orchestrated the Nigerian government, in the last few decades to embark on different economic liberalization policies towards the accumulation of cross border investment with a view to developing the manufacturing industries which constitute the larger percentage of the real sector of the economy. According to Essien and Onwioduokit [1], there is a dire need for foreign capital flow in developing economies as a result of a wide gap between the desired investment and the actual savings and longtime repayment period for such investments.

However, despite the fact the share of Nigeria in global flows of capital is marginal in comparing to other developing countries, the country has tremendously benefited from capital flows. It is paramount to note that in the 1960s, and 70s, larger quantum of capital flows allocated to the Nigerian government, was in terms of overseas development assistance (ODA) while the rest was allocated to the private sector via the banking system. In the 1980s, international capital flows took another dimension in the form of foreign direct investment (FDI) and foreign portfolio investment (FPI). Consequently, Obadan [2], posits that foreign portfolio investment is attributable to developed countries, in which some newly emerging economies follow suit. Unfortunately, before the advent of Structural Adjustment Program (SAP), there was no record of inflow and outflow of portfolio investment in the Nigeria's balance of payment (BOP) accounts. This was as a result of the underdevelopment of Nigerian financial market in one hand and the conciliation of relevant information regarding the portfolio investments of Nigerian investors in foreign capital and money markets on the other hand CBN [3].

Interestingly, rapid inflows of FDI in Nigeria are primarily traceable to the oil boom of 1970s. From 1980 to 2006, it has been estimated that oil sector alone accounted for 90% of the FDI inflow in Nigeria UNCTAD [4]. The danger that mono-cultural nature of the Nigerian economy has caused on the general welfare of her citizen has necessitated the current advocate puts forward by scholars for the diversification of Nigeria's economy towards non-oil sector, especially industrialization. Industrialization is a catalyst for the promotion of economic growth. No wonder highly industrialized economies like the US, UK, Japan, Germany and Asian Tigers have registered sustainable growth in the past decades. It has been established in the literature that one of the prominent reasons why majority of African countries have not been industrialized is inadequate and the lack of capital for investment. Every economy needs capital for its outstanding performance and the funds to achieve this cannot be sourced internally alone. Foreign direct investment and foreign portfolio investment are the two principal ways by which foreign investors can invest in a domestic economy.

However, there is a link between capital flow, industrialization and economic growth. From the stand point of Harrod-Domar growth model which argues that external capital is a necessary condition for the advancement of industrialization in the overall interest of the economic growth of a country. Meanwhile, an attempt to investigate the relationship between foreign capital inflows and industrial performance in Nigeria has sparked off arguments and controversies in terms of result and policy recommendation in the literature over time See, Johnson *et al.*, [5]. In the same vein, the recent bulk of studies on foreign capital flows focused on aggregate economic performance, neglecting the performance of industrial sub-sector of the country See Oyinlola [6], Oyejide [7], Okodua [8], Steve *et al.*, [9], Aderemi and Aberu [10]. As a result of the aforementioned argument, there is a current need to empirically examine the impact of this critical economic variable on the industrial performance of the country. Therefore, this study will move the frontiers of knowledge in that regards and thereby contributes to the existing literature.

LITERATURE REVIEW

Theoretical Literature Review

This study relies on the following theoretical foundation to substantiate the empirical work

Endogenous Growth Model- the AK model

One of the principal features of endogenous growth model is the absence of diminishing return to capital. The production function without diminishing returns can be specified thus;

$$Y = AK \text{_____} (1)$$

Where ``A`` is used to represent a positive constant (such as the one in the Cob Douglas production function). This implies an index of the level of technology. Here ``K`` could be vied in a broad sense to denote physical and human capital so as to assume away the absence of diminishing returns to capital in the AK production function. However, output per capita is $y = Y/L = A \cdot K/L = AK$ and the APL and MPK are constant at the level $A > 0$.

Moreover, liberalization of national market would attract additional domestic and foreign investment and thus increases the rate at which capital is accumulated. Hence, accumulation of capital can spark off industrial activities which consequently derive the growth of Gross Domestic Product in the country.

Empirical literature

There have been numerous set of empirical investigations about foreign capital flows and industrial performance in both developed, emerging and developing economies in general and Nigeria in particular. This section provides a list of the past empirical studies to see the perspectives of the literature regarding this study.

In his contribution, Ojedide [7] uses a conceptual framework to analysis the volatility effects of capital flows on macroeconomic variables. The author concludes that both pros and cons of capital flows is a function of initial stage of the developing country in question. It could be established from the study that capital flow would propel growth of the real sector if there are robust initial conditions. However, reverse could be the case if the initial condition is contrary. The only way to optimize the contributions of capital flows in developing economies is to embark on capacity building.

UNECA [11] estimates a panel data of thirty one African countries between 1984 and 2009. The paper opines that religious tension risk, share of oil in exports, size of market, past foreign direct investment inflows, level of corruption and domestic credit are the key determinants net FDI inflows in Africa. While analyzing the impact of global financial crisis, policy implications on sudden rise on FDI inflows, and financial and economic development in Africa, Ojo and Alege [12] utilize panel data of twenty seven economies in Sub Saharan Africa. The authors conclude that continuous rise in economic activities stimulate inflows of FDI in Africa.

Similarly, Chakarabarti [13] uses econometric techniques and a range of robustness/sensitivity analysis to estimate the key determinants of FDI inflows in thirty one African countries. He submits that both natural resources and market factors are the principal factors that cause FDI inflow to Africa.

Moreover, Akinlo [14] estimates the impact of FDI inflows in Africa with the adoption of a panel data of twelve African economies. The researcher posits that the impact of FDI inflows is primarily felt by economic growth through accumulation of capital, as opposing to increasing productivity. In addition, Ogun, Egwaikkhide and Ogunleye [15] estimate the relationship that exists between FDI and real exchange rate in some selected Sub-Saharan Africa (SSA) nations with the aid of Granger causality and simultaneous techniques. The finding from the paper submits that FDI flows are sensitive to real exchange rate movements in Sub-Saharan Africa, and a statistically significant nexus exists between the two variables as well.

Consequently, Herzer [16] employs a bivariate VAR modeling technique to examine causal relationship between FDI and economic growth in Nigeria, Srilanka, Tunisia and Egypt. The paper finds evidence to support a positive FDI-led growth in the countries examined in one hand and bidirectional causality runs between FDI and economic growth on the other hand. This implies that FDI catalyzes the productivity of the manufacturing sector which in turn speeds up the growth rate of Gross Domestic Product of the country.

While employing co-integration and error correction mechanism, Steve, Samuel and Bodiseowei [9] critically investigate the nexus between foreign aid, external debt, domestic debt and economic growth in Nigeria between 1981 and 2010. The results from the study submit that a positive relationship between domestic debt and foreign aid, meanwhile reverse is the case between economic growth rate and external debt.

Jonson, Fredrick and Romanus [5], analyze the relative impact of external capital on manufacturing output in Nigeria between 1983 and 2013 with the aid of ordinary least square technique. The authors conclude that FDI has a significant impact on economic growth, but foreign aid and external debt have an insignificant or zero impact on economic growth in the country.

In conclusion, the above review of literature shows that empirical investigation about capital flows and industrial performance is still on going, and there is no consensus about the relationship that exists among these important economic variable. Hence, the relevance of this study.

METHODOLOGY

This study makes use of secondary data from 1990 to 2016. Data on FDI were extracted from UNCTAD database published by World Bank. Meanwhile data on external debt, remittances, industrial output were sourced from CBN Statistical Bulletin. E-Views software was employed for the running of the data.

Model Specification

The model for this study can be specified in the general form as follows:

$$IDP = F(FDI, REMT, ExtDEBT,) \dots\dots\dots(I)$$

Model (I) can be linearized to form model as follows.

$$LnIDPt = \beta_1 + \beta_2 LnFDIt + \beta_3 LnREMTt + \beta_4 LnExtDEBTt + \mu_i \dots\dots\dots (II)$$

However, in order to examine the long run equilibrium relationship among the variables, the study follows Johansen and Juselius [17] whose Trace statistics and Maximum eigenvalue statistics can be estimated from the eigenvalues of the coefficient matrix. The null hypothesis of the Trace statistics is that there are at most *r* cointegrating vectors while the alternative is that there are more than *r* cointegrating vectors, and the maximum eigenvalue statistics test the null that there are *r* coingegrating vectors against the alternative that there are *r* + 1 cointegration relationship.

The Direction of Causality between Capital Flow and Industrial Performance in Nigeria

Furthermore, in analyzing the Granger causality between industrial performance and international capital flows, this paper employed pairwise granger causality analysis in estimating the VAR model in equation (III-VI) which states thus; following Anoruo and Ahmad [18], the model can be specified thus:

$$IDP_t = \alpha_0 + \sum_{i=0}^p \alpha_1 FDI_{t-1} + \sum_{i=0}^p \alpha_2 ExtDEBT_{t-1} + \sum_{i=0}^p \alpha_3 REMT_{t-1} + \sum_{i=0}^p \alpha_4 IDP_{t-1} + \varepsilon_{1t} \dots\dots\dots(III)$$

$$FDI_t = \beta_0 + \sum_{i=0}^p \beta_1 FDI_{t-1} + \sum_{i=0}^p \beta_2 IDP_{t-1} + \sum_{i=0}^p \beta_3 ExtDEBT_{t-1} + \sum_{i=0}^p \beta_4 REMT_{t-1} + \varepsilon_{2t} \text{----- (IV)}$$

$$REMT_t = \gamma_0 + \sum_{i=0}^p \gamma_1 FDI_{t-1} + \sum_{i=0}^p \gamma_2 REMT_{t-1} + \sum_{i=0}^p \gamma_3 ExtDEBT_{t-1} + \sum_{i=0}^p \gamma_4 IDP_{t-1} + \varepsilon_{3t} \text{----- (v)}$$

$$ExtDEBT_t = \gamma_0 + \sum_{i=0}^p \gamma_1 ExtDEBT_{t-1} + \sum_{i=0}^p \gamma_2 FDI_{t-1} + \sum_{i=0}^p \gamma_3 REMT_{t-1} + \sum_{i=0}^p \gamma_4 IDP_{t-1} + \varepsilon_{4t} \text{----- (VI)}$$

Where IDP denotes industrial performance, which measures manufacturing output as a percentage of GDP. FDI means Foreign Direct Investment, ExtDEBT connotes external debt, REMT means remittances from overseas, ε_i is error term and $t=1990-2015$.

RESULTS AND DISCUSSION

Table-1: Descriptive Statistics of Annual Data Series (1990-2015)

Descriptive Statistics	LIDP	LFDI	LExtDEBT	LREMT
Mean	7.50010	3.361398	2.65010	4.708676
Median	7.44010	3.012110	2.91010	3.949211
Maximum	1.11011	10.83256	3.99010	13.04258
Minimum	5.23010	0.642695	9.62009	0.032513
Std. Deviation	2.00010	2.208111	8.32009	3.565368
Skewness	0.309351	1.880175	-0.586321	0.976977
Kurtosis	1.669719	6.977055	2.170577	3.060357
Jargue-Bera	2.331809	32.45363	2.234948	4.140046
Probability	0.311641	0.000000	0.327105	0.126183
Sum	1.95012	87.39634	6.88011	122.4256
Sum. Sq. Deviation	1.00022	121.8938	1.73021	317.7962
Observation	26	26	26	26

Source: Authors` Computation (2018)

Descriptive Statistics of Data Series

In this paper, various descriptive statistics of the data has been examined and shown in the above table. This provides vital information about the sample series such as the mean, median, minimum and maximum values; and the distribution of the sample measured by the skewness, kurtosis and Jaque-Bera statistics.

Consequently, as reported in the table above, the values of mean and median of the variables for the analysis are very close. This result is in line with the submission of Karmel and Polasek [19], who stipulated that when a distribution possesses a perfect symmetry, the mean, mode and median values must be the same. However, in cases of a near symmetry, it is mandatory that the three measures are must be very close. Therefore, it could be established that the distribution of the time series data employed for this study is symmetrical and as well as the thickness of the tails of these distributions respectively. In computing Jargue-Bera statistics, and also testing the normality or asymptotic properties of a particular series, the distribution and thickness of the tails of the distribution of time series date are important factors to consider.

Meanwhile, in carrying out econometric analyses, it is important to factor in the assumptions of normality and asymptotic properties of data series. Hence, from table 1 it could be concluded that all annual data series for this work, are normally distributed going by the null hypothesis that variables are normally distributed.

Table-2: Unit Root Test

Variables	ADF Test			PP Test		
	@Level	@First Difference	Remarks	@Level	@First Difference	Remarks
LIDP	2.9918**	2.9918**	I (1)	2.9861**	2.9918**	I (1)
LFDI	2.98862**	2.9918**	I (1)	2.9762**	2.9919**	I (1)
LExtDEBT	2.1344**	2.9918**	I (1)	2.9863**	2.9918**	I (1)
LREMT	2.9862**	2.9918**	I(1)	2.9862**	2.9918**	I(1)

** %5 level

Source; Authors` computation (2018)

In order to establish the existence or otherwise of stationarity of time series data of the variables adopted for this study, the data were subjected to a unit root test with the aid of the standard Augmented Dickey-Fuller (ADF) and

Phillips-Perron (PP) tests. As results were reported in table 2, it is clear that data on industrial value added, foreign direct investment, external debt, and remittances were stationary after first differencing. This shows that the variables of interest possess a unit root.

Table-3: Johansen Cointegration Test (Trace Statistics)

Null Hypothesis	Eigenvalue	Trace Statistics	P-value
r=0	0.832240	79.66760	0.0434
r≤1	0.610205	36.82226	0.6501
r≤2	0.290491	14.21104	0.7839

Source; Authors` computation (2018)

Table-3: Johansen Cointegration Test (Maximum Eigenvalue)

Null Hypothesis	Eigenvalue	Maximum Eigenvalue	P-value
r=0	0.832240	42.84533	0.0308
r≤1	0.610205	22.61123	0.2425
r≤2	0.290491	8.236359	0.8414

Source; Authors` computation (2018)

The variables of interest industrial value added, FDI, external debt and remittances are I (1) and there is high possibility they possess a long run equilibrium relationship. Therefore, a multivariate cointegration test was carried out with the technique put forward by Johansen and Juselius [17]. The reported results of the multivariate cointegration analysis in table 3 indicate that there is at least two cointegrating vectors in the systems. From the trace statistics, it was observed that there is existence of at least two cointegrating vectors in the model at a lag interval of 1 to 1. Similarly, the maximal eigenvalue statistics above indicates the existence of at least two cointegrating vectors. This implies that these variables of interest possess a long run equilibrium relationship with one another which may likely show some adjustment to short run disequilibrium through one channel. As a result of this, dynamic ordinary least square would be estimated to examine the nature of long run relationship that exists among these variables.

Table-3: The Impact of Foreign Capital on Industrial Performance in Nigeria Dependent Variable: IDP

Variable	Coefficient	t-statistics	P-value
LFDI	1.9325	2.354724	0.0403
LExtDEBT	9.87010	2.274696	0.0462
REMT	1.793262	1.521751	0.1590
C	3.472756	0.214694	0.8343
R-Squared	0.707654		
Adjusted R-Squared	0.356838		
Long-run variance	26.02012		

Source: Authors` computation (2018)

The table-3 above shows that the variable FDI has a positive relationship with industrial performance in Nigeria. This study is line with the submissions of Kabir [20] despite the fact different methodology was adopted. This implies that the coefficient of 1.9325 shows that a unit changes in FDI inflows would bring about more than proportionate increase in industrial performance by 1.9325, though statistically significant at 5 percent level of significance. By and large, FDI inflow had contributed positively to Nigeria economic growth and this had been the sources of portfolio investment in the country. In the same vein, external debt has a significant positive impact on industrial performance. This finding contradicts with the proposition of Jonson, Fredrick and Romanus [5]. This implies that a unit change in external debt brings about a proportionate increase of 9.87010 in industrial performance in Nigeria. However, impact of remittances is also positive on industrial performance, though not statistically significant at 5% level of significant.

Moreover, the explanatory/ independently variables of the model which comprises of foreign direct investment, external debt and remittance jointly explained about 71% of the systematic variations in the dependent variable, industrial value added, leaving 29% unexplained as result of random chance. This implies that the model is good for the analysis. Meanwhile, after adjusting for the loss in the degree of freedom, the explanatory power reduces to 36%.

This section investigates the causal relationship among industrial performance, FDI, external debt and within Pairwise Granger Causality Test. It could be established from the above table that there is a unidirectional causality from industrial performance to foreign direction investment. This implies that industrial performance is facilitating inflows of FDI in Nigeria. Similarly, there is one way field back relationship between the stock of external debt and remittance in the country. However, there is no field back relationship among other variables in the system.

Table-4: Pairwise Granger Causality Test

Pairwise Granger Causality Tests			
Date: 10/31/18 Time: 01:19			
Sample: 1990 2015			
Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Prob.
FDI does not Granger Cause IDP	23	0.61173	0.6172
IDP does not Granger Cause FDI		3.97989	0.0270
REMT does not Granger Cause IDP	23	1.09335	0.3805
IDP does not Granger Cause REMT		1.77457	0.1925
EX_DBT does not Granger Cause IDP	23	2.12638	0.1370
IDP does not Granger Cause EX_DBT		0.87422	0.4750
REMT does not Granger Cause FDI	23	0.51562	0.6774
FDI does not Granger Cause REMT		0.56195	0.6478
EX_DBT does not Granger Cause FDI	23	0.74479	0.5410
FDI does not Granger Cause EX_DBT		0.34345	0.7943
EX_DBT does not Granger Cause REMT	23	0.49704	0.6895
REMT does not Granger Cause EX_DBT		5.74863	0.0073

Source: Authors` computation (2018)

CONCLUSION AND RECOMMENDATIONS

This paper has empirically investigated the impact of foreign capital on industrial in Nigeria over the period of 1990 to 2015. It is important to state it here that on the basis of the findings that emerged in this paper, its results could be summarized below:

The long-run effect shows that foreign direct investment and external debt have a significant positive relationship with industrial performance in Nigeria. However, the long-run effect affirms that remittances though has a positive relationship with industrial performance in Nigeria, but is not significant. There is a unidirectional causality which runs from industrial performance to FDI inflows in Nigeria.

Moreover, from the findings that emerged in this study, this paper recommends that Nigerian government should see inflows of foreign capital as viable catalyst that has capacity to propel the expansion of the country's industrial sector, and the policy makers in the economy should embark on policy measures that will ensure the sustainability of foreign direct investment inflows and external debt towards the direction of industrial sectors in Nigeria. In the same vein, larger percentage of remittances should be tailored towards industrial sector in the country. If there foreign capital flows is sustained there will be industrial revolution in the economy in the nearest future.

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