

EXTERNAL FINANCING AND INDUSTRIAL SECTOR OUTPUT IN A DEREGULATED ECONOMY: ECONOMETRIC EVIDENCE FROM NIGERIA

Imoughele, Lawrence Ehikioya

*Department of Economics,
Faculty of Social Sciences,
Ambrose Ali University, Ekpoma, Nigeria.
GSM: +2348163699536*

E-mail: imolawrence@aauekpoma.edu.ng and imoughelelawrence@gmail.com

ABSTRACT

This study examined the nexus between external financing and the Nigeria industrial sector output from 1986-2018. It employed the Auto Regressive Distributed Lag (ARDL) bounds testing approach to co-integration analysis to establish the long run relationship between the relevant time series data. The result revealed that the industrial sector output and selected external financing variables included in the models have a long run relationship. The result also shows that in the short-run, the external financing has significant impact on Nigeria industrial output while on the long run foreign direct investment, remittance and official development assistance have direct and significant effect on Nigeria industrial output. External debt has direct but insignificant effect on Nigeria industrial output while foreign portfolio investment has inverse and insignificant effect on Nigeria industrial output. Therefore, the study recommended that short run deregulation policies should be tailored towards the attraction of foreign finances to augment domestic capital needs for the expansion of and improve productivity of the Nigerian industrial sector, there is need to spend large amount of remittance on productive investment in the industrial sector instead of consumption, the Nigerian government should concentrate more on foreign direct investment compared to portfolio investment to create enabling environment for the private sector to thrive in the Nigerian industrial sector and finally, there is need for industrialist to analyzed the profitability of all external loan financing projects to ensure that the returns would be in excess of the interest and principal.

KEYWORDS: External Financing, Investment, Capital, Foreign Inflow, Foreign Direct Investments: industrial Output and Industrialization.

JEL Classification: E22, E26, O14

1. INTRODUCTION

Basically, most governments across the world often desire economic growth in order to advance the wellbeing of their citizens and enhance the growth and development of their nations. In their pursuit to achieve this growth through investment, governments formulate and implement policies and programmes which encourage or create an enabling investment environment for local and international investors in the industrial sector. Besides, governments can also directly undertake investment in their economies which is largely dictated by their foreign exchange earnings. Such investments include infrastructures and social services such as roads, rails, air ports and services as health, education and social-securities. However, the demand for development coupled with the shortage or scarcity of capital makes a developing country like Nigeria to acquire capital from abroad in order to supplement the savings-investment (S-I) gap, or the export-import gap (dual gap) resulting from the falling exports earnings like the oil shock of 1970s, 80s and 2014 and the present Covid 19 pandemic in the case of Nigeria.

Literatures are bound on the importance of external finance as an engine for economic growth and development which is also evident in twin gap growth models. Therefore, in economies where domestic finance is inadequate, tendency exist for low level of investment in the industrial sector subsequently economic growth is most likely to be affected. In situations where it is not possible to raise investment levels due to deficient savings, foreign inflow is a valid alternative according to Baye and Jansen (2006) and Sule (2017). Therefore, attracting foreign finances is therefore crucial from a number of standpoints. First, consistent and regulated inflow of foreign finance provides an important source of foreign exchange earnings needed to supplement domestic savings and raise investment levels in the industrial sector. Second, enhance overall level of domestic demand boosting incomes through personal remittance, through taxation enhance state revenues generation and thirdly improve managerial skills and technology through foreign direct and portfolio investment (Chete 1999; Ayanwale, 2007; Imoughele, 2016). Furthermore, Showket and Aligarh (2015) noted that rather than increasing government spending which could lead to high rates of inflation, governments have been turning to external sources of finance for developmental purpose.

Probably persuaded by these overwhelmingly attractive theoretical benefits in support of foreign finances, authorities in Nigeria have, at various times, deregulated there economy and articulated a plethora of incentives aimed at attracting foreign finances into the country. The flow of foreign finance such as Foreign Direct Investment (FDI), portfolio investment and other Official Development Assistance (ODA) in the form of grants and loans at concessional financial terms to the Nigerian economy since the adoption of the Structural Adjustment Programme in 1986 has being on the increased. Ayawale (2007) noted that the policies embarked on by the Nigerian government to attract foreign investors as a result of the introduction of the Structural Adjustment Programme (SAP) are the establishment of the Industrial Development Coordinating Committee (IDCC), investment incentive strategy, non-oil export stimulation and expansion, the privatization and commercialization programme, and

the shift in macro-economic management in favour of industrialization, deregulation and market - based arrangements .

According to UNCTAD World Investment Report (2017) FDI inflows remain unequally distributed across the continent of Africa with only five countries (Angola, Egypt, Nigeria, Ghana and Ethiopia) hosting 57 percent of the continent's total FDI inflows, while FDI Flows to West Africa grew by 12 per cent to \$11.4 billion, propelled by Nigeria's 45 percent increase (to \$4.4 billion). Sule (2017) noted that Nigeria receives the highest amount of remittance in Africa accounting to 65% of officially recorded remittance flow to the region while CBN (2007) reported remittances inflows into the country has outpaced FDI, ODA and other flows into the country. Total remittance in 2011 was \$10.681 billion compared to \$1,392 billion in 2001 representing 5 percent of Nigeria's GDP in the same year. In addition, according to report of Network of Research on Africa (NORMA) (2017) remittance inflow in 2015 alone amount to N7.519 trillion (\$20.8 billion) from official channels adding that figure could be double as there are other indirect ways.

Empirical evidence from developed, newly industrializing and emerging economies has shown that sustainable development cannot be achieved on a weak industrial base (Chete, et.al. 2013). Sule (2017) revealed that industrialization helps countries to achieve increase in investment, diversify their economies and achieve a high growth rate, and reduce the risk from external shocks. Unfortunately, based on the growth outlook in Africa, coupled with weak financial institutions, several developing economies Nigeria inclusive are still operating unsustained industrial growth and development even with several policies initiated aimed at attracting foreign capital to boost the productive sectors.

There are vast studies on the impact of external finance on Nigeria's economic activities. Scholars such as Akinpelu, Ogunbi, Bada and Omojola (2013), Rasaq, Olateju and Aminu (2017), Mbah, Agu and Umunna (2016) and Obalade and Obisesan (2015) among others, have written extensively on the impact of external finance on the Nigerian economy with different findings and conclusions. The conflicting evidences observed in these studies may be due to difference in the methodology employed, difference in time frame consider as well as the context under which these studies were conducted. However, much attention has not been given to the effect of external finance on industrial output in Nigeria. The study of Sule (2017) used error correction model under the VAR framework to examine the effect of external finance on Nigeria industrial output from 1985 to 2016. Hence there is the need to bridge the noticeable gap in knowledge by examining the impact of external finance on the Nigerian industrial sector from 1986 to 2018 using the econometric technique of Auto Regressive Distributed Lag (ARDL) compared to others studies which employed the Ordinary Least Squares (OLS), Error Correction Mechanism (ECM) and vector auto regressive method (VAR). Therefore the main objective of this study is to empirically investigate the effect of foreign finances such as foreign direct investment, foreign portfolio investment, remittance, official development assistance and external debt on Nigeria industrial sector output. Following this introduction section, the remaining structured of this study therefore are: Section two presents the literature reviews, as

section three discusses the methodology. Empirical results are presented in section four while section five is the conclusion and policy recommendations.

2. LITERATURE REVIEW

2.1. Conceptual Issues

This study conceptualizes external financing as a means of providing funds and other capital asset from developed to developing countries to advance their productive capacity. Sule (2019) defined external finance as a flow of technical expertise from foreign countries to developing economies to finance developmental projects for the overall growth of the economy activities. This financing could be in form of foreign direct investment, foreign portfolio investment, external loan, remittance and official development assistance. Sule (2019) noted that this external financing could be in concessionary terms. The rationale for external finance is to augment domestic investment within the developing economies due to saving-investment gap and foreign exchange earnings gap as a result of vicious circle of the developing countries.

However, Black (2003) defined industry as a sector of the economy in which firm uses similar factor inputs to make a group of related product while industrial sector is that part of secondary sector of an economy which is concerned with the production of semi-finished and finished goods without much direct input of natural resources. The industrial sector includes manufacturing, mining and utilities. Furthermore, Adejugbe (2004) defined industrialization as the process of harnessing human and material resources, with increasing application of science and technology to the production of goods and services while Beckerman (2007) looks at industrialization as the progressive ability of a people to harness human and material resources for the production of goods and services as is a key component of economic development. The level of industrialization is both exogenous and endogenously determined because of the various factors of production required for its production processes and Nigeria being an emerging economy is still characterized with dearth in both the managerial and modern technology to innovate new products, therefore the need for external financing.

2.2. Theoretical Issues

External finance in a form of credit and grants which supplement domestic resources in order to relieve savings or foreign exchange earnings constraints. This is the theory of two-gap model of economic development as elucidated by Chenery and Strout (1966). The main theoretical foundation applied in this study to investigate the effect of external financings on industrialization in Nigeria is hinged on the Dual Gap Theory. The basic principle of the two-gap model is that most developing countries face either a dearth of domestic savings to match investment opportunities or a scarcity of foreign exchange earnings to finance needed imports of capital and intermediate goods.

The 'two gap model' supports the hypothesis of investment-limited growth based on the Harrod-Domar growth model, which shows that economic growth is directly related to savings and indirectly related to the capital/output ratio (Conchesta, 2008; Hassaan, Sule &

Abu, 2015; Kolawole 2013; Sule, 2017; Doki and Abu, 2017). Therefore, no state will industrialize without resulting to external financings (foreign borrowing, personal remittance, FDI, portfolio investment and other official development assistance) to augment domestic wealth. Nevertheless, according to Fazzari, Hubbard and Petersen (1988) internal and external finance are not perfect substitutes in practice while Sule (2017) noted that internal finance may be less costly than external finance in terms of transactions, risk, agency problems, cost of financial distress, interest rate charge and exchange rate fluctuations.

Doki and Abu (2017) observed that the basic argument of the two-gap model is that most developing countries face either a shortage of domestic savings to match investment opportunities or a shortage of foreign exchange to finance needed imports of capital and intermediate goods. The two-gap model is therefore a model of foreign aid comparing the savings and foreign-exchange gaps to determine which of them the binding constraint on economic growth is. Todaro and Smith (2011) cited in Doki and Abu (2017) assert that the savings gap (domestic real resources) and the foreign-exchange gap are unequal in magnitude and that they are essentially independent. The implication is that one of the two gaps will be binding for any developing economy at a given point in time. The savings gap results from an excess of domestic investment opportunities over domestic savings, causing investments to be limited by the available foreign exchange. If the savings gap is dominant, this would indicate that economic growth is constrained by domestic investment. Foreign savings may then be used to supplement domestic savings. From the concept of twin-deficit (assuming that there is no central government deficit), the following relation must hold if there is no external debt accumulation.

$$S - I = X - M = 0 \quad (1)$$

This states that if savings equals investment, there will be no trade gap and no need for external financing. In a country without access to external sources of financing, the overall level of investment will be constrained by domestic savings. Low levels of saving mean that the bulk of an economy's production goes to consumption, leaving little for investment. Low levels of investment, including financing for investment in human capital like education and health care and technology result in low levels of income per person in future. Thus a vicious cycle of poverty is reinforced, with poor countries remaining poor because they lack sufficient savings for expanding productive investments over the future.

However, if domestic savings can be supplemented by foreign savings via external financing (foreign borrowing, personal remittance, Foreign Direct Investment, portfolio investment and other Official Development Assistance) then total investment can be pushed above what would be achieved from domestic resources alone. When this occurs via borrowing, equation (1) becomes:

$$S - I = X - M < 0 \quad (2)$$

Foreign finance can help a country to finance this twin deficit by boosting the level of domestic investment and financing the import of investment goods and other inputs to production. This creates a possibility of a virtuous cycle of foreign borrowing, domestic

investment and increases in domestic production – with the expectation that such foreign finance is channelled towards the production of tradable goods. If this condition holds, external finance can contribute to higher economic growth rates and to structural transformation in the production process of the Nigerian industrial sector permitting the country to supplement domestic resources in short supply with foreign resources. Foreign finance can therefore play a critical role in supplementing domestic savings and overcoming the foreign exchange constraint and raising the real rate of economic growth through rapid industrialisation.

2.3. EMPIRICAL ISSUES

Plethora of studies have analysed the role of external finance on economic activity and some of these literature are reviewed herein. Sule (2017) investigated the effect of external financing on industrialization in Nigeria for the period of 1985-2016. The study is hinged on the Dual Gap Model (1966) and adopted the Johansen Cointegration test, Error Correction Model under the VAR framework for data analysis. The study revealed that external financing has inverse effect on Nigeria industrialization given that external loans, foreign portfolio investment, remittance, official development assistance are negative while foreign direct investment exerts a positive impact on industrial output. The study therefore recommended that Nigeria government should properly align foreign funds inflows to suit the industrial sector and the government should also advocate for more of the official development assistance to industrial sector given the small proportion allocated to the sector within the study period.

Ugwu, Asogwa and Ugwuanyi (2017) examined the impact of external capital on Nigeria manufacturing industry. They noted that one of the major sources of investible resources in most developing countries is made of foreign direct investment, foreign aid and external debt. Employing the Ordinary Least Squares (OLS) method on annual time series data for the period between 1982 and 2013. The results obtained shown that in the short-run, FDI has an inverse and insignificant effect on manufacturing output and also foreign aid inflow and external debt have inverse but significant reduction in manufacturing output. The study therefore recommended that government should make the business environment more investor friendly and ensure appropriate utilization of borrowed funds. Using time Series Analysis Rasdaq, Olateju and Aminu (2017) evaluated the impact of foreign direct investment on the Nigeria Manufacturing Sector industry and revealed that FDI in the Manufacturing sector exerts a positive influence on the manufacturing output and the impact is statistically significant and concluded that in order to maintain sustainable economic growth and development, a positive domestic investment is a prerequisite for increasing the flow of foreign investment in the manufacturing sector industry.

Edeh, Ijeoma, Iloka and Ukomah (2017) specifically investigated the direct and indirect effect of remittance inflows on industrialization (measured with industrial output). In general, it examines whether remittance inflows drive industrialization in Nigeria. Annual time series data from World Bank's Development Indicators and Central Bank of Nigeria Statistical

Bulletin 2015 were used. The autoregressive distributed lag model based on unconstrained error correction model (ARDL- UECM) was employed in investigating the direct effect while the indirect effect was determined using the Restricted Vector Autoregressive (VAR) model. Results from ARDL Model demonstrated that remittance inflows have significant positive effect on industrialization in the long run but not in the short run. This implies that the direct effect of remittances on industrialization happens only in the long run. Secondly, results from Restricted VAR Model reveal that private sector credit (i.e., measure of financial development) is an effective transmission channel through which remittances drive industrialization and concluded that the inflows of remittances directly and indirectly drive industrialization in Nigeria in the long run. The study recommend that the development of the financial sector is necessary, in order to enhance the movement of remittances to the Nigeria industrial sector. Also, the proper utilization of remitted funds in productive activities is vital in order to attain industrial growth and development in Nigeria.

Akinpelu, Ogunbi, Bada and Omojola (2013) examined the impacts of remittance inflows on the economic growth of Nigeria. The study employed remittance inflows, and some other traditional sources of economic growth, such as Gross Capital Formation, Foreign Direct Investment, openness and foreign exchange rate to evaluate the influence of remittance inflows on economic growth of Nigeria. Co integration and causality tests were deployed to analysis the data collected, the result of the study revealed that there are long run equilibrium relationship among the variables that were employed. Furthermore, the causality test shows a uni-direction causality from Gross Domestic Product to Remittance Inflows, Gross Capital Formation to Remittances, and Remittance Inflows to Openness. Mbah, Agu and Umunna (2016) noted that in order to achieve the ultimate goal of sustainable economic growth, governments require substantial amount of capital finance through investment expenditures on infrastructural and productive capacity development. Due to the unavailability of adequate capital because of low savings, most developing nations therefore resort to borrowing from external sources to bridge the resource gap. The study embarks on the investigation of the impact of external debt on economic growth in Nigeria. Using the ARDL bound testing approach to cointegration and error correction models and the Granger causality test for the period 1970 – 2013. The result of this study indicates a long-run relationship among the variables. External debt impacts negatively and significantly on output. The finding also established a unidirectional causality between external debt and economic growth. Consequently, the study recommends, government should embark on prudent borrowing and encourage export-oriented growth.

Obalade and Obisesan (2015) determined the relative potency of internal and external sources of financing economic growth in Nigeria using time series data from 1983 to 2012. Ordinary least square regression method, unit root test, Johansen cointegration test and error correction model were used for the purpose of analyses. Gross national saving, internal debt, grants and foreign investment are stationary at level, gross domestic investment at first difference and gross domestic product at second difference. From the over parameterized ECM,

none of the internal and external financing options is significant in explaining economic growth. In the group of internal options, gross national saving, gross domestic investment and internal debt contribute positively to growth in the short and long run, the only exception being gross national saving in the short run.

Kolawole (2013) used the two-gap model framework to analysis the effect of foreign assistance in the form of official development assistance and foreign direct investment on Nigeria economic growth over the period 1980 to 2011. Employing various econometric techniques which include Augmented Dickey Fuller (ADF) test, Granger causality test, Johansen co-integration test and Error Correction Method (ECM). The study revealed that there is no granger causality between each pair of the variables considered. However, the results show that foreign direct investment impacts negatively while official development assistance has no effect on real growth in the country. The study concluded that the intuition behind the results lies on the bulk of foreign assistance meant for infrastructural development in the country are either siphoned or diverted into unproductive use such that its influence is not felt on real growth. Bakare-Aremu and Bashorun (2014) study the two gap model and the Nigerian economy and how foreign direct investment can bridge the gaps. The study shows that domestic savings gap and exchange rate gap equally exist in the Nigerian economy. Using error correction mechanism, the results revealed that, the two gaps retard economic performance, and that FDI is a bridge but not sufficient in the short run and not reliable in the long as it promote importation in both periods, which could widen the existing exchange rate gap. In addition the study found that FDI in Nigeria supports export promotion and not import substitution and that exchange rate gap still persist in the long run but saving gap eroded. They therefore, recommended that Government should attract more FDI by providing enabling environment through political and social stability and development of adequate infrastructures, provision of employment opportunity which would increase output, income, and savings and through multiplier effect generate further employments.

3. METHODOLOGY

In analysing the relationship between foreign financing and industrial output growth in Nigeria, the study made use of a 4-stage econometric procedure. First, the Augmented Dickey-Fuller (ADF) test was conducted to ascertain the order of integration of the variables, the lag length selection criteria was used to determine the number of Lag and then the Auto Regressive and Distributed Lag (ARDL) model was employed to account for long-run and short-run dynamics. The ARDL model was introduced originally by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001).

The justification of this modeling approach is based on the following considerations. First, it circumvents the problem of the order of integration associated with the Johansen likelihood approach (Johansen & Juselius, 1990). Second, unlike most of the conventional multivariate cointegration procedures, which are valid for large sample size, the bounds test approach is suitable for small sample size study (Pesaran, Shin & Smith, 2001). Third, it

provides unbiased estimates of the long run model and valid t-statistics even when some of the regressors are endogenous (Harris & Sollis, 2003). Fourth, the bound test does not impose a restrictive assumption that all variables under study must be integrated of the same order. Also, it is unnecessary that the order of integration of the underlying regressors be ascertained prior to testing the existence of a level relationship between the variables (Pesaran, Shin & Smith, 2001). However, to ensure that the variables are not integrated of higher order 1(2), therefore it is necessary to test the unit root. Fifth, it estimates the short and long run components of the model simultaneously, removing problems of omitted variables and autocorrection. Finally, the study also carried out post estimation test such as serial correlation test, heteroskedasticity test and normality to determine the usefulness, robustness and reliability of the estimated models. The structural stability test is also conducted by employing the Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUM Q) of residual of the ARDL model.

The study employed annual secondary time-series data on External Loan (EXL), Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Remittance (REM), Official Development Assistance (ODA) and Exchange Rate (EXR) into any economy (Onakoya (2012); Adejumo (2013); Uma, Eboh and Uwaka (2015); Orji et al (2015); Ekienabor, Aguwamba and Liman (2016); Akpan and Oweke (2017) ; Sule (2017)) and industrial output from 1986 to 2018. The data are obtained from Central Bank Statistical bulletin for various years and World Bank Development Indicators (WDI).

3.1 Model Specification

From the selected variables above, we draw a function for the impact of External Debt (EXD), Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Remittance (REM), Official Development Assistance (ODA) and Exchange Rate (EXR) in Nigeria with the form;

$$INDD = f(EXD, FDI, FPI, ODA, REM, EXR) \quad (3)$$

Where $INDD_t$ is Industrial sector output and since the study is a time series analysis, the equation of model one can be expressed as:

$$INDD_t = \beta_0 + \beta_1 EXD_t + \beta_2 FDI_t + \beta_3 FPI_t + \beta_4 ODA_t + \beta_5 REM_t + \beta_6 EXR_t + \varepsilon_t \quad (4)$$

Here, ε_t represents the white noise error term at time t , β_0 is a constant which represents the estimated value of industrial output when the explanatory variables are zero. β_{1-6} are the slope coefficients of EXD_t , FDI_t , FPI_t , ODA_t , REM_t , EXR_t respectively while t represents the time index.

The a priori expectation of the explanatory variables in the model is expected to be;

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$$

These expectations are based on economic theory that an increase in $EXD, FDI, FPI, ODA, REM, EXR$ will lead to an increase in $INDD_t$

The primary form of the ARDL model is given as:

$$\begin{aligned} \Delta INDD_t = & \beta_0 + \sum_{i=1}^p \beta_1 \Delta INDD_{t-i} + \sum_{i=0}^p \beta_2 \Delta EXD_{t-i} + \sum_{i=0}^p \beta_3 \Delta FDI_{t-i} + \sum_{i=0}^p \beta_4 \Delta FPI_{t-i} + \sum_{i=0}^p \beta_5 \Delta ODA_{t-i} \\ & + \sum_{i=0}^p \beta_6 \Delta REM_{t-i} + \sum_{i=0}^p \beta_7 \Delta EXR_{t-i} + \alpha_1 INDD_{t-1} + \alpha_2 EXD_{t-1} + \alpha_3 FDI_{t-1} + \alpha_4 FPI_{t-1} \\ & + \alpha_5 ODA_{t-1} + \alpha_6 REM_{t-1} + \alpha_7 EXR_{t-1} + \mu_t \text{-----} (5) \end{aligned}$$

where Δ is the first difference operator, β_0 is the drift component and μ_t is the white noise error term. The equation above connotes the term with the summation sign represents the error correction dynamics i.e. β_{1-7} , while the second part α_{1-7} represents the long-run relationship. Accounting for the short term relationship, the primary form becomes;

$$\begin{aligned} \Delta INDD_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta INDD_{t-i} + \sum_{i=0}^p \alpha_2 \Delta EXD_{t-i} + \sum_{i=0}^p \alpha_3 \Delta FDI_{t-i} + \sum_{i=0}^p \alpha_4 \Delta FPI_{t-i} + \sum_{i=0}^p \alpha_5 \Delta ODA_{t-i} \\ & + \sum_{i=0}^p \alpha_6 \Delta REM_{t-i} + \sum_{i=0}^p \alpha_7 \Delta EXR_{t-i} + \partial ECT_{t-1} + \partial_t \text{-----} (6) \end{aligned}$$

Where ECT is the error correction term which is the residuals retrieved from the estimated long-run relationship while ∂_t is the error terms.

4. RESULTS AND DISCUSSION

4.1. Time Series Properties of the Variables

The ADF test is used to test for stationarity of the data. The ADF test consists of estimating the following regression.

$$\Delta Y_t = \alpha + \beta_t + \delta Y_{t-1} + \sum_{i=1}^m \varphi_i \Delta Y_{t-i} + \varepsilon_t \quad (7)$$

Where α represents the drift, t represents deterministic trend and m is an optimal lag length sufficient enough to ensure that ε_t is a white noise error term. The results of the ADF group unit root test is presented in table 1 below

Table 1: Unit Root Test: Augmented Dickey-Fuller Test (ADF)

Variables	Level T-Stat	Critical Value @ 5%	First Difference T-Stat	Critical Value @ 5%	Order of Integration
LOG(FDI)	-2.900905	-2.963972	-7.388189	-2.967767	1(1)
LOG(FPI)	-2.382099	-2.963972	-7.163124	-2.967767	1(1)
LOG(INDD)	-2.366582	-2.963972	-4.590336	-2.967767	1(1)
LOG(ODA)	-1.528578	-2.963972	-4.272217	-2.967767	1(1)
LOG(REM)	-1.783243	-2.963972	-6.475742	-2.967767	1(1)
LOG(EXD)	-1.944202	-2.963972	-3.995859	-2.967767	1(1)
EXR	- 0.914246	-2.963972	-3.463373	-2.967767	1(1)

Source: Regression Output Using Eview 10.5 (2020)

The time series properties of the variables were conducted using Augmented Dickey-Fuller (ADF) test and the results from this test showed that all the indicators of external debt, foreign direct investment, foreign portfolio investment, remittance, official development assistance and exchange rate are stationary at first difference 1(1).

4.2. Lag Length Selection

The next step in the analysis is to select the optimal lag length for the cointegration equation based on the hypothesis that the residuals are serially orthogonal. The lag length which minimises the Akaike Information Criterion (AIC), Hannan-Quinn information criterion (HQ) and Schwarz Criterion (SC) and at which the model does not have autocorrelation is the optimal lag length. For this analysis, we would employ the AIC as the preference for the selection of our optimal lag length. The test result of the different lag selection methods is reported in table 2.

Table 2: Lag Length Result

Lag length	AIC	SC	HQ
0	25.86713	26.19717	25.97049
1	17.95490	20.59519*	18.78181
2	16.73372*	21.68428	18.28418*

Source: Regression Output Using Eview 10.5 (2020)

Based on the result in table 2, the lag length which minimises AIC is lag two and thus our optimal lag length. Given our optimal lag length, we proceed to test for long-run relationship among the variables.

4.3. Bound Test

To examine the existence of long-run relationships among the variables, the bound testing under Pesaran, et al. (2001) procedure is used. The bound testing procedure is based on the F-test statistic. The F-test statistic is basically a test of the hypothesis of no cointegration among the variables against the assertion of its existence, denoted as:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$$

i.e., there is no cointegration among the variables.

$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$$

i.e., there is cointegration among the variables.

The results of the bounds test for cointegration alongside with critical values are reported in Table .3 below

Table 3: Bound Test Result

Test statistic	Computed F-statistic	lag	Significance level	Bound Critical values	
				Lower Bounds I(0)	Upper Bounds I(1)
F-statistic	9.027843	2		2.88	3.99
			1%	2.27	3.28
			5%	1.99	2.94
			10%		

Source: Regression Output Using Eview 10.5 (2020)

Given the result of the Bound Test, the F-statistic value should be compared with the Pesaran critical value at traditional levels of significance. Since the F-statistic 9.0278, is greater than the upper bound critical value at 5% level of significance (3.28), we thus reject the null hypothesis and conclude that industrial output growth, external debt, foreign direct investment, foreign portfolio investment, remittance, official development assistance and exchange rate have co-movements in the long-run in Nigeria. From the result, we can hence estimate the long-run relationship between industrial output and the explanatory variables.

Table 4: ARDL Long-Run Result.**Dependent Variable: INDD_t**

Variable	Coefficient	Standard Error	t-Statistic	Prob.
LOG(EXD)	0.1241	0.1044	1.1882	0.2508
EXR	0.0063*	0.0030	2.1283	0.0567
LOG(FDI)	0.1768*	0.0498	3.5511	0.0045
LOG(FPI)	-0.0437	0.0500	-0.8735	0.4010
LOG(ODA)	0.3056*	0.1364	2.2394	0.0466
LOG(REM)	0.2902*	0.0504	5.7518	0.0001
C	-10.9241	4.7205	-2.3142	0.0410

Note: * significant at 5%**Source:** Regression Output Using Eview 10.5 (2020)

From Table 4 above, it could be observed that all the variable except foreign portfolio investment have their expected sign. External debt financing LOG (EXD) has direct but insignificant impact on Nigeria industrial output. One per cent increase in LOG (EXD) leads to 0.1241 percent increase in Nigeria's industrial output growth. This is consistent with the apriori expectation. This result supports the fact that in the long run increasing external debt financing enhanced the growth of industrial sector. This finding does not agrees with the findings of Chigbu, Ubah and Chigbu (2015) and Ugwuegbe, Okafor and Akarogbe (2016) position which holds that external debt has direct and significant impact on Nigeria industrial sector.

The result further revealed that the coefficient of foreign direct investment LOG (FDI) has direct and significant effect on the growth of Nigeria's industrial sector such that one percent increase in LOG(FDI) leads to 0.1768 percent increase in Nigeria industrial sector. This implies that increase in number FDI in enhance the sector productivity which is consistent with the apriori expectation. This findings is inline with Eze, Nnaji and Nkalu (2019) findings that FDI has direct and significant impact on Nigeria manufacturing industrial sector. Foreign portfolio investment LOG (FPI) has direct but insignificant impact on the growth of the Nigeria industrial sector suggesting that its contribution to industrial manufacturing output is low. This is not consistent with Okonkwo (2016) who reported that FPI has direct and significant impact on the industrial sector.

The coefficient of official development assistance LOG (ODA) shows a direct and significant relationship with Nigeria industrial sector output. One percent increase in LOG (ODA) leads to about 0.3057 percent increase in Nigeria industrial output. This result showed that development assistance to Nigeria industrial enhanced industrial sector output in the Nigerian economy. Furthermore remittance has a direct and significant relationship with growth of the Nigerian industrial sector such that one percent increase in LOG (REMG) lead to 0.2902

percent increase in Nigeria industrial sector output. This is in line with Odionye and Emerole (2015) who revealed that international remittances inflow has positive and significant impact on the Nigerian economy.

The coefficient of exchange rate shows a direct and significant relationship with Nigeria's industrial sector output. One percent increase in exchange rate leads to 0.0063 percent increase in Nigeria industrial sector output. This is not consistent with the apriori expectation. This result suggests that exchange rate depreciation has not contributed to the growth of the Nigeria industrial sector in long run. Which mean that the use of depreciation as a mechanism for promoting industrialization in Nigeria has not enhances the sector productivity of the sector and this is not inline with Adekoya and Fagbohun (2015) and Lawal (2016) who revealed that exchange rate has a positive relationship with industrial sector output but not significant. Therefore, there is the need for the review of the current exchange rate policy towards appreciation of naira.

Table 5: ARDL short-run relationship

Dependent Variable: INDD_t

Variable	Coefficient	Standard Error	t-Statistic	Prob.
DLOG(INDD)	0.2173*	0.0659	3.2982	0.0071
DLOG(EXD)	0.2706*	0.0454	5.9649	0.0001
D(EXR)	-0.0048*	0.0010	-4.8968	0.0005
DLOG(FDI)	0.0374*	0.0124	3.0086	0.0119
DLOG(FDI(-1))	-0.0398*	0.0132	-3.0223	0.0116
DLOG(FPI)	0.0301*	0.0099	3.0563	0.0109
DLOG(ODA)	0.2161*	0.0338	6.3872	0.0001
DLOG(ODA(-1))	0.0796*	0.0306	2.6002	0.0247
DLOG(REM)	-0.0632*	0.0295	-2.1433	0.553
DLOG(REM(-1))	-0.1918*	0.0309	-6.2044	0.0001
ECM(-1)	-0.5711*	0.0525	-10.8712	0.0000
R² = 0.9073 R⁻² = 0.8559 DW= 2.0235				

Note: * significant at 5%

Source: Regression Output Using Eview 10.5 (2020)

The result in table above shows that in the short-run, industrial output has a cogent relationship with its one period lag value i.e. Industrial output growth depends on its previous value in the short-run. The result also shows that the difference in external debt has direct and significant impact on industrial output growth in Nigeria. This findings implies that external

financing of industry has the ability to induces the growth of the sector if the has the ability yield the principia and cost of the loan. Also official development assistance and its past values have direct and significant impact on industrial growth in Nigeria on the short run. This finding reveals that continuous external development assistance to industrialization sector in the country will inprove the performance of the sector all things being equal.

From the result, it can also be seen that the difference in foreign direct investment (FDI) has direct and significant effect on Nigeria industrial output but one period lag value of FDI has an inverse relationship with Industrial output growth in the short run. This point to the fact that FDI induce industrial out in Nigeria but continuous FDI in industrial sector has inverse effect due to capital flight that characterized FDI in any economy. However, difference in remittance and its previous value have an inverse and significant effect on industrial output growth. Finally, exchange rate has inverse but significant relationship with industrial output growth in the short-run.

The R-squared value of 0.9074 indicates that 91 percent of the variations in Nigeria industrial output growth is explained by the regressors in the model, and after taking cognisance of the degree of freedom, the adjusted R-squared value of 0.0.8559 indicates that 86 percent of the variation in industrial output growth is explained by the. The Error Correction Term which denotes the speed of adjustment towards long-run equilibrium is 57.11 percent. This explains that the whole system can achieve long run equilibrium at the speed of 57.11 percent. The Durbin-Watson value of 2.033 indicates that this model is free from serial correlation. We go further to determine the diagnostic of the ARDL model.

4.4. Diagnostic statistical testing

The results of the ARDL estimation for the model are subjected to statistical diagnostic tests. The standard diagnostic tests can therefore be used to determine which variables should be included in the final specification of the model (Harris, 1995; Du Toit, 1999). The diagnostic test results reported in Table 6 point out that the model surpasses all the statistical diagnostic tests.

Table 6. Diagnostic tests on the real estimated mining and quarrying model

Purpose of test	Test	Test statistic	Probability	Conclusion
Normality	Jarque-Bera	0.7388	0.6912	Normal
Heteroscedasticity	ARCH Heteroskedasticity Test	0.9953	0.5191	No heteroscedasticity
Serial correlation	Breusch–Godfrey serial correlation LM test	0.2002	0.8221	No serial correction
Misspecification	Ramsey Rest	0.3761	0.6969	No specification problem

Source: Regression Output Using Eview 10.5 (2020)

The diagnostic tests is captured by Jarque-Bera, Ramsey reset test Breusch-Godfrey, ARCH Heteroskedasticity among others. The model residual series are normally distributed as suggested by the Jarque–Bera statistics, while the Breusch–Godfrey LM test statistics indicate that the model does not have significant serial correlation problem. Moreover, the ARCH test and the Ramsey RESET test respectively show that the residuals are homoscedastic and the model has correct functional form.

4. 5. Stability Test

Stability test is performed using Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUM Q) of residual of the ARDL model as shown in figures 1 and 2.

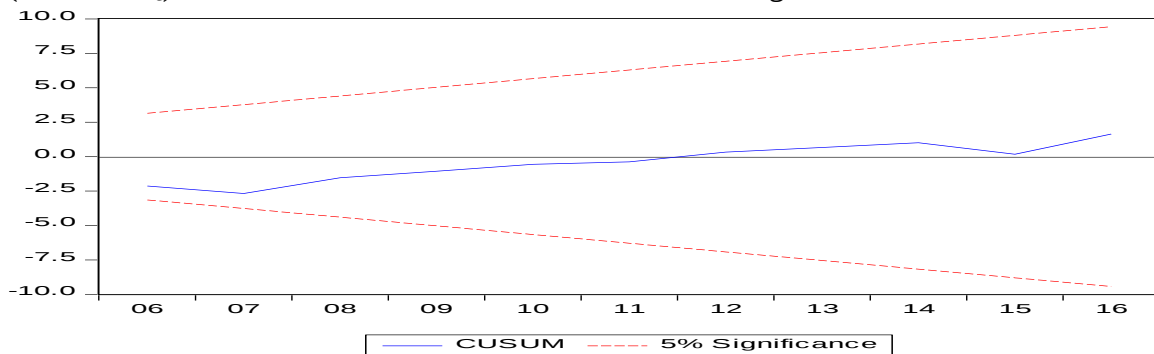


Figure 1: Cumulative Sum (CUSUM)

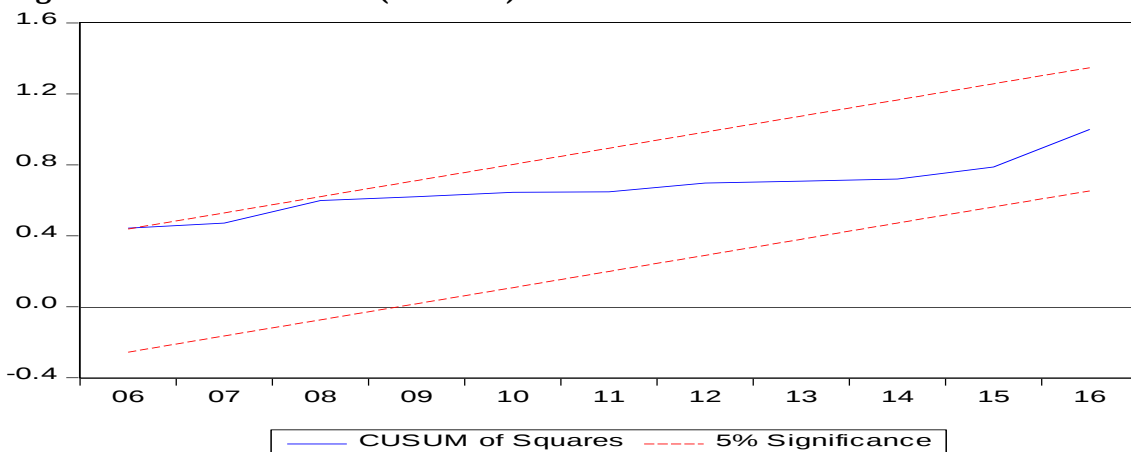


Figure II: Cumulative Sum of Square (CUSUM Q)

The above figure shows that the CUSUM line is within the critical bounds of 5 percent level of significance which indicates that the model has structural stability.

5. CONCLUSION AND POLICY RECOMMENDATIONS

In the study, external financing industrial growth strategy was reviewed vis-à-vis the inflow of foreign finance needed for augmenting Industrial output growth in Nigeria. Also,

Industrial output growth as induced by foreign finances which include external debt, foreign direct investment, foreign portfolio investment, remittance and official development assistance in Nigeria has been estimated using the Autoregressive and Distributed Lag (ARDL) model technique to cointegration. The empirical result reveals that there exists a long-run relationship among industry sector output value added and foreign finances. The result also shows that in the short-run model, the external financing has significant impact on Nigeria industrial output while on the long run foreign direct investment, remittance and official development assistance have direct and significant effect on Nigeria industrial output. External debt has direct but insignificant effect on Nigeria industrial output while foreign portfolio investment has inverse and insignificant effect on Nigeria industrial output. Therefore, the study recommended that short run deregulation policies should be tailored towards the attraction of foreign finances to augment domestic capital needs for the expansion of and improve productivity of the Nigerian industrial sector, Since remittances have fostered industrialization growth in Nigeria, there is need to spend large proportion of them on productive investment in the industrial sector instead of consumption, furthermore, as a result of the negative effect of foreign portfolio investment on industrial output growth for the periods of investigation, though insignificant, it explains that there is need for Nigeria government to concentrate more on foreign direct investment compared to portfolio investment to create enabling environment for the private sector to thrive in the Nigerian industrial sector and finally, there is need for industrialist to analyzed the profitability of all external loan financing projects to ensure that the returns would be in excess of the interest and principal.

REFERENCES

- Adejogbe, M.A. (2004). *Industrialization, urbanization and development in Nigeria: Introduction*. Concept Publications Limited.
- Adejumo, A .V. (2013). Foreign direct investment and manufacturing sector performance in Nigeria, (1970-2009). *Australian Journal of Business and Management Research*, 3(4): 39-56.
- Adekoya, O. M. and Fagbohun, A. (2001). Currency devaluation and manufacturing output growth in Nigeria. *Journal of Economics and Sustainable Development*, 6(7): 207-218.
- Africa Development Bank (2013). Annual Report on Foreign Direct Investment.
- Akinpelu, Y. A., Ogunbi, O. J., Bada, O. T. and Omojola, O. S. (2013). Effects of remittance inflows on economic growth of Nigeria. *Developing Country Studies*, 3(3): 113-122.
- Akpan, E.S. and Eweke, G.O. (2017). Foreign direct investment and industrial sector performance: assessing the long-run implication on economic growth in Nigeria. *Journal of Mathematical Finance*, 7: 391-411. <https://doi.org/10.4236/jmf.2017.72021>
- Ayanwale, A.B. (2007). FDI and economic growth: Evidence from Nigeria. *Final Report Presented to the African Economic Research Consortium*, Nairobi.

- Bakare-Aremu, T.A and Bashorun, O.T. (2014). The two gap model and the Nigerian economy; bridging the gaps with foreign direct investment. *International Journal of Humanities and Social Science Invention*, 3(3): 1-4
- Baye, M.R. and Jansen, W.D. (2006). *Money, Banking, and financial markets; An economics approach*. I.T. B.S. Publishers & Distributors (Regd) Krishan Nagar, 586 - 622.
- Beckerman, W. (2007). The chimera of “sustainable development,” *The Electronic Journal of Sustainable Development*, 1(1).
http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/2428/THE_CHIMERA_OF_SUSTAINABLE_DEVELOPMENT.pdf?sequence=1&isAllowed=y
- Black, F. (2003). *Oxford dictionary of economics*. Oxford University Press,. Oxford.
- Chenery, H. B. and Strout, A.M. (1966). Foreign assistance and economic development. *The American Economic Review*, 56(4): 679-733.
- Chete, L. N., Adeoti, J. O., Adeyinka, F. M. and Ogundele, O. (2013). Industrial development and growth in Nigeria: Lessons and challenges. *Learning to Compete (L2C) Working Paper No. 8 on Industrial Development in Africa*.
- Chete, L.N. (1999). Determinants of foreign direct investment in Nigeria. *Nigeria Institute of social and Economic Research (NISER)*. Monograph series No7
- Chigbu, E.E., Ubah, C.P. and Chigbu, U. S . (2015). Impact of capital inflows on economic growth of developing Countries. *International Journal of Management Science and Business Administration*, 1(7): 7-21.
- Conchesta, N.K. (2008). Foreign Aid and Economic Growth: The Case of Tanzania (Unpublished Material).
- Doki, N. O. and Abu, J. (2017). Interrogating savings and foreign exchange gaps and their roles for rapid industrialisation in Nigeria. Selected paper for the Nigeria Economic Society Annual Conference on Industrialization Growth in Nigeria.
- Edeh, H. C., Ijeoma, F., Iloka, C. and Ukomah, O. (2017). Do remittance inflows drive industrialization? Evidence from Nigeria. Selected paper for the Nigeria Economic Society Annual Conference on Industrialization Growth in Nigeria
- Ekienabor, E. E. Aguwamba, S. and Liman, N. (2016). Foreign direct investment and its effect on the manufacturing sector in Nigeria. *International Journal of Scientific and Research Publications*, 6(5): 671-679
- Eze, A.A, Nnaji, M., and Nkalu, N. C. (2019). [Impact of foreign direct investment on manufacturing sector output growth in Nigeria](#), *International Journal of Applied Economics, Finance and Accounting*, 5(2): 55-64.
- Fazzari, S.M., Hubbard G.R and Petersen B.C. (1988) Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, 24(3):141-195
- Hassan, O.M., Sule, A. and Abu, J. (2016). Implications of external debt on the Nigerian economy: analysis of the dual gap theory. *Journal of Economics and Sustainable Development*, 6(13) :238-248

- Imoughele, L.E. (2016). The manipulation of macroeconomic issues on foreign direct investment inflow in Nigeria: A Co-intergration analysis. *Journal of policy and Development*. 6(12):72-83
- Kolawole, B.O. (2013). Foreign assistance and economic growth in Nigeria: The two-gap model framework. *American International Journal of Contemporary Research* 3(10): 153-160.
- Lawal, E.O (2016) Effect of exchange rate fluctuations on manufacturing sector output in Nigeria, *Journal of Research in Business and Management*, 4(10): 32-39
- Mbah, S. A., Agu O. C. and Umunna G. (2016). Impact of external debt on economic growth in Nigeria: An ARDL bound testing approach. *Journal of Economics and Sustainable Development*. 7(10): 16-26.
- Obalade, A.A. and Obisesan, O.G. (2015). Relative potency of internal and external sources of financing Nigerian economic growth: 1983-2012. *Journal of Economics and Finance*, 6(3): 39-47
- Odionye, J.C. and Emerole, O.B. (2015). The impact of international remittances on the Nigerian Economy. *British Journal of Economics, Management & Trade*, 7(1): 1-9.
- OECD (2005). Organization for economic co-operation and development investment policy reviews. Caribbean Rim Netherlands Antilles, *OECD Publications*.
- Onakoya, A.B. (2012). Foreign direct investments and economic growth in nigeria: A disaggregated sector analysis. *Journal of Economics and Sustainable Development*, 3(10): 66-75
- Orji, A., Akachukwu S.U. and Ilori, E.A. (2014). Foreign capital inflows and growth: an empirical analysis of WAMZ experience. *International Journal of Economics and Financial Issues*., 4(4): 971-983
- Pesaran M.H, Shin Y, Smith R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16: 289-326.
- Pesaran, M.H. and Shin, Y. (1999) *An autoregressive distributed lag modelling approach to cointegration analysis*. In: Strom, S., Ed., Chapter 11 in *Econometrics and Economic Theory in the 20th Century the Ragnar Frisch Centennial Symposium*, Cambridge University Press, Cambridge, 371-413.
- Rasaq, A.D., Olateju, A.O. and Aminu, A.B. W. (2017). The impact of foreign direct investment on the Nigeria manufacturing sector: A Time Series Analysis. *European Scientific Journal*, 13(13): 521-556.
- Showket, A. D. and Aligarh, A.M. (2015). FDI as a source of external finance to developing countries: a special reference to India and China. *Journal of Business and Management*, 17(1): 73-81
- Sule, A. (2017). External financing and industrialization in Nigeria (1985 - 2016). Selected paper for the Nigeria Economic Society Annual Conference on Industrialization Growth in Nigeria.

- Sule, A. (2019). External financing and industrial growth in Nigeria, *International Journal of Economics, Business and Management Studies*, 6(1): 180-193
- Ugwu, J.O., Asogwa, F.O. and Ugwuanyi, R.O. (2017). The relative impact of external capital on manufacturing output in Nigeria. *Journal of Economics and Sustainable Development*, 8(8): 158-167.
- Ugwuegbe, S.U., Okafor, I.G. and Akarogbe, C. A. (2016). Effect of external borrowing and foreign aid on economic growth in Nigeria. *International Journal of Academic Research in Business and Social Sciences*, 6(4): 155-175.
- Uma, K.E., Eboh, F.E. and Nwaka, I.D. (2015). Foreign direct investment and resources utilisation: implications for Nigeria's economic development, *British Journal Of Economics, Management & Trade* 6(2): 112-128.
- UNCTAD (2017). Investment Report 2017: "Capital Accumulation, Growth and Structural Change." Geneva: United Nations.