# External Financing and Industrial Sector Productivity in Nigeria

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***Abstract***
*This paper examined the impact of external financing, which comprised net foreign direct investment (NFDI) and net foreign portfolio investment (NFPI), on industrial productivity in Nigeria using time series data for the period 1986-2017, sourced from the Central Bank of Nigeria Statistical Bulletin (2017) and (UNCTAD, 2019) Bulletin. The paper adopted the co-integration-based autoregressive distributed-lag (ARDL) technique as method of data analysis. The findings of the study revealed that net foreign direct investment (NFDI) has significant negative effect and positive effect on industrial development in Nigeria in the short run and in the long run respectively. The net foreign portfolio investment (NFPI) has significant negative effects on industrial development in Nigeria both in the short run and in the long run. In order to mitigate these negative impacts, the study recommended that government of Nigeria should develop policies that will encourage foreign-owned firms through tax incentive to re-invest their earnings in the country and ensure transparency in industrial policies implementation.*

***Keywords:*** *Autoregressive distributed-lag model, Co-integration Net Foreign Direct Investment (NFDI), Net Portfolio Investment (NFPI), United Nations Conference on Trade and Development (UNCTAD).*

## Introduction

Industrialization is about the introduction and expansion of industries in a particular place, region or country (Kitching, 2012). Industrialization helps countries to achieve increase in investment, diversify their economies to achieve a high growth rate, and reduce the risk from external shocks. Findings from newly industrializing and emerging economies have shown that sustainable development is not feasible on a weak industrial base (Kitching, 2012). Alfaro (2003) and Barrios, Gorg, and Strobl (2004) further asserted that there is a strong link between the level of industrialization, economic growth and development. The sustainable development goals (SDGs) which followed and expanded on the Millennium Development Goals (MDGs) are a new universal goals and targets which were initiated in 2015. As the MDGs applied to countries, in reality they were targets for poor countries to achieve, with finance from wealthy states to end poverty; protect the planet and ensure prosperity (Abdu & Anam, 2018).

Different economists have acknowledged the importance of external financing in propelling various economic activities towards sustainable economic growth in economic literature. This is evident in growth models of Classical Growth Theory, Keynesian Theory, and Great Push Theory (Turnovsky, 2000). Therefore, in economies where domestic finance is inadequate, tendency exists for low level of investment in industrial sector and subsequently economic growth will be slow. 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). Over the years, external financing has become the largest source of foreign funds flowing to developing countries, of which Nigeria is one of the highest recipients in sub-Saharan Africa countries (Orozco, 2003; UNCTAD, 2015; World Bank, 2012). Total remittance in 2011 was $10.68 billion rising to $20.8 billion in 2015 and rose to $22 billion in 2017 (Network of Research on Africa, NORMA, 2017). External financing helps to stimulate productivity and national

competitiveness of a country through training, forward and backward linkages with the domestic firms that further stimulate economic activity (UNCTAD, 2015). Therefore, in economies where domestic finance is inadequate, tendency exists for low level of investment in industrial sector and subsequently economic growth will be slow.

Unfortunately, it appears that the tremendous progress recorded in the attraction of foreign capital flows to Nigeria has not yielded the expected vibrant industrial sector (Ezeanyeji & Ifeako (2016). In this regard, empirically studies have provided useful insights into the nature and dynamics of the effect of external financing (cross border investments) on Nigerian industrial growth (Abdul & Barnabas, 2012; Anowor, Ukweni, Ibiam, & Ezekwem, 2013; Effiong, Odey, & Nwafor, 2019); Ezeanyeji & Ifebi, 2016; Ezeanjeyi & Ifeako, 2019; Houssem & Hichem, 2011; Ibrahim & Akinbobola, 2017; Okoli & Agu, 2013; Okonkwo, 2016; Onyinye, Anthony-Orji & Okafor, 2015; Rasaq, Adijat, & Abubakar, 2017; Richardson & Tamarauntari, 2014; Sule, 2019). The only similar works are that of Okonkwo (2016) and Sule (2019). Whereas Okonkwo (2016) focused on industrial growth and failed to incorporate important proxies of external financing options such as foreign direct investment in the model, Sule (2019) failed to perform diagnostic checks on the applied ARDL model. The point of departure from the reviewed empirical literature is that, this study is specifically modeled the impact of foreign direct investment and foreign portfolio investment on industrial productivity with the exchange rate as an intervening variable. The estimated model was evaluated using some relevant diagnostic tests. It is in this light that this study examined the relationship between external financing and industrial productivity in Nigeria.

## Literature Review

### Conceptual Review

Adejugbe (2004) defines industrialization as the process of harnessing human and material resources, with increasing application of science and technology to the production of goods and services. Kitching (2012) describes industrialization as the process of building up a nation's capacity to convert raw materials and other inputs to finished goods and to manufacture goods for other production or for final consumption. Thus industrialization could be described as the process of transforming raw materials, with the aid of human resources and capital goods into (a) consumers goods, (b) new capital goods which allows more consumers goods (including food) to be produced with the same human resources, and (c) social overhead capital, which together with human resources provides new services to both individuals and business (Szirmai, 2012). The extent of industrialization of a country can be assessed by the manufacturing sector capacity utilization, percentage share of the manufacturing sector to the country's gross domestic product, percentage of labour force employed and as well as the output of finished goods from manufacturing sector (Iscan, 2010). Many countries in Sub-Saharan Africa have adopted industrial policies aimed at boosting economic growth. Currently, in SSA, out of twenty-six industrialization strategies identified, nineteen target light manufacturing as an essential sector for development, including agro-industry, the wood, clothing, textiles, leather and footwear sectors; sixteen strategies focus on sustainable development aspects, such as the use of renewable energy and water protection; fifteen strategies focus on agriculture, in particular livestock farming, forestry and fisheries products; thirteen strategies focus on tourism and high-tech services; one of them focuses on mining and resource extraction such as copper, oil and natural gas; eight strategies focus on the energy sector as a priority, and five on construction (Wonyra, 2018).

The concept of productivity, generally defined as *the relation between output and input*, has been available for over two centuries and applied in many different circumstances on various levels of aggregation in the economic system (Kinnander & Gröndahl, 1999). It is argued that productivity is one of the basic variables governing economic production activities, perhaps the most important one (Singh, Motwani, & Kumar, 2000). However, at the same time as productivity is seen as one of the most vital factors affecting a manufacturing company's competitiveness, researchers argue that productivity is often relegated to second rank, and neglected or ignored by those who influence production processes (Singh, Motwani, & Kumar, 2000; Tangen, 2002). In fact, productivity is frequently discussed by

managers but rarely defined, often misunderstood and confused with similar terms, and seldom measured in an appropriate way, leading to productivity being disregarded (Kinnander & Gröndahl, 1999). Nevertheless, if we do not fully understand what productivity is, how can we decide what productivity measures to use? How can we interpret them correctly? How can we know what action to take to improve productivity? Hence, an improper definition of productivity will often result in that action is being misdirected (Forrester, 1993). An important point to keep in mind is that productivity is a relative concept, which cannot be said to increase or decrease unless a comparison is made, either of variations from competitors or other standards at a certain point in time or of changes over time. Basically, improvements in productivity can be caused by five different relationships (Misterek, Dooley & Anderson, 1992). (1) Output and input increase, but the increase in input is proportionally less than the increase in output. (2) Output increases while input stays the same. (3) Output increases while input is reduced. (4) Output stays the same while input decreases. (5) Output decreases while input decreases even more.

Nigeria being a developing economy is still entrenched with deficiency in both the managerial and modern technology to innovate new products, thus the need for external financing through external loans, foreign direct investment and remittances which enhances production capacity hence boosting industrial activities. There are three (3) segments of the industrial sector in Nigeria. They are crude petroleum and natural gas, solid minerals, and manufacturing. According to Todaro and Smith (2009), for a nation to be industrialized, it requires structural transformation and structural transformation is the process of transforming an economy in such a way that the contribution to national income by the manufacturing sector eventually surpasses the contribution by the agricultural sector.

External financing (or cross border investments) are short and long term investments in the domestic economy of another country other than that of investor and reinvestment of earning derived from initial investment into the domestic economy other than that of the investor (IMF, 2016). This nature of investments has been labeled as foreign direct investment (FDI) and foreign portfolio investment (FPI) in international business management literature (World Bank, 2012). Foreign direct investment is defined as the net inflows of investment (inflow minus outflow) to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor (World Bank, 2012). FDI usually involves participation in management, joint venture, transfer of technology and expertise but excludes investment through purchase of shares (World Bank, 2012).

IMF (1993) defines foreign portfolio investment as equity and debt issuances including country funds, depository receipts and direct purchases by foreign investors of less than 10% control. Foreign portfolio investment consists of the acquisition of assets by a foreign national or company in a domestic stock market. Onuorah and Akujuobi (2013) describe foreign portfolio investment (FPI) as an aspect of international capital flows comprising of transfer of financial assets such as cash, stock, or bonds across international borders in want of profit stating that it occurs when investors purchase non-controlling interests in foreign companies or buy foreign corporate or government bonds, short term securities or notes. The United Nations Conference on Trade and Development (UNCTAD, 2015) defines foreign portfolio investment as an investment involving long-term relationship reflecting an investor's lasting interest in a foreign entity. Foreign portfolio investment is often short-term investment through the purchase of foreign securities or notes in order to gain high rates of return on investment and not to get involved in the active management or participation in the company that issued the securities (Onyeisi, Odo, & Anoke, 2016).

**Theoretical Review: The Neoclassical Theory and the Gap Model**

The main theoretical foundations of the effects of external financing on industrialization are hinged on the neoclassical theory and the dual gap theory. The neo-classical economists such as Robert Solow (1956) and Trevor Swan (1956) believe that increase in labour supply in addition to higher level of productivity of labour and capital are required to improve the level of performance and development of any country. The model believes that a sustained increase in capital investments triggers economic

performance. It advocates therefore that capital such as foreign direct investments and foreign portfolio investment should be allowed to flow from rich to poor countries in order to achieve the desirable level of development among poor countries. The theory maintains that if capital were allowed to flow freely, new investments would occur in the poorer economy, and this would continue to be true until the return to investments were equalized in all countries. Against this backdrop, policy makers, especially Nigeria, have deregulated the exchange rate by re-introducing flexible exchange rate that would be purely market-driven using the Thomson-Reuters Order Matching Systems (TOM) as well as the Conversational Dealing Book (CDB) with the hope of stimulating increase in free flows of foreign capital to ameliorating the exchange crisis and its consequences on the lives of many Nigerians. It is expected that the effort to sustain this policy will help resuscitate the dwindling foreign currency availability in Nigeria. This means that stimulating the flow of capital and investment from other countries to Nigeria through appropriate measures will go a long way in buffering foreign resources especially reserves which Nigeria heavily relies upon to stabilize exchange rate and increase the productivity of industrial.

The dual gap theory was developed by Chenery and Strout in 1966. The theory posits that a particular size of savings or investment is required to attain a target economic development. However, there is always a difference between planned savings-investment, foreign exchange, and budgeted expenditure-revenue (fiscal gaps) in most countries. The basic tenet 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. According to the model, gaps occur if the investment–savings, foreign exchange, and estimated revenue fall below the desired level. Hence, the demand for foreign capital will help relieve the countries of the burden of scarce domestic savings, foreign exchange, and meet their deficit budget. The dual gap model supports the hypothesis of investment-limited growth based on the Harrod-Domar neoclassical model, which assumes a specific amount of investment to increase growth (Kolawole, 2013). Although, according to Fazzari, Hubbard, and Petersen (1988), internal and external finance are not perfect substitutes in practice. This model is therefore applicable to many developing countries like Nigeria where domestic savings are usually less than capital required for investment to achieve the targeted growth and development. In this essence, foreign resources could replenish the dearth in domestic savings necessary for investment that aid economic development. This is in addition of inadequate foreign exchange to finance the imports of capital goods needed by their citizens and deficit budget that have hindered developmental plans of the country.

**Empirical Review**

Houssem and Hichem (2011) examined foreign direct investment and portfolio investment on economic growth in developing and developed economies from 1990 to 2009. Using the using Generalized Method of Moments (GMM), the findings showed a statistically significant and positive relationship between FDI and output growth. Also, the coefficient of portfolio investment (PI) was negative and not statistically significant. Abdul and Barnabas (2012) employed the vector error correction technique on annual data from 1989 to 2008 using the vector error correction techniques to test the long-run relationship between foreign direct investment and performance of manufacturing sector in Nigeria. They found a positive long-run relationship between FDI and the performance of manufacturing firms in Nigeria. Anowor, Ukweni, Ibiam, and Ezekwem (2013) employed the ordinary least squares (OLS) technique and annual time series data spanning the period of 1970 to 2011 and found that foreign direct investment (FDI) had a positive relationship with the Nigerian manufacturing sector output growth in the long-run but in the short-run it had a negative significant relationship with Nigerian manufacturing sector output growth.

Okoli and Agu (2013) showed that foreign direct investment flow negatively and significantly impacted on the performance of the manufacturing firms in Nigeria using OLS estimate and VECM to test the long run and the short run annual time series data generated from World Bank and Central Bank of Nigeria Statistical Bulletin spanning for a period of 40

years. Richardson and Tamarauntari (2014) found that foreign direct investment had a negative and significant impact on performance of manufacturing, mining and quarrying, and power subsectors and the aggregate industrial sector in Nigeria using annual time series dataset that covers the period 1970-2012 and ordinary least squares (OLS) technique as method of data analysis. Onyinye, Anthony-Orji, and Okafor (2015) found a negative relationship between FDI and manufacturing output in Nigeria over the period of 1970 to 2010 using the classical linear regression model and concluded that a percentage increase in foreign direct investment decreases local manufacturing output (MO) by 0.26% in Nigeria.

Ezeanyeji and Ifebi (2016) investigated the impact of foreign direct investment on sectoral performance in the Nigerian economy with special reference to the Telecommunications Sector from 1986 to 2014. Using Augmented Dickey-Fuller (ADF) unit-root test, Johansen co-integration test and error correction model (ECM), the results showed that foreign direct investment has contributed significantly to the performance of the telecommunications sector in terms of its contribution to the Gross Domestic Product of Nigeria. Rasaq, Adijat and Abubakar (2017) examined the impact of FDI on manufacturing sector in Nigeria. The study revealed that FDI in the manufacturing sector exerted a positive influence on the manufacturing output and the impact is statistically significant. Effiong, Odey, and Nwafor (2019) investigated the impact of globalization and foreign direct investment on industrial performance in Nigeria from 1981 to 2017 using the error correction mechanism (ECM). The study revealed that FDI has a positive and insignificant effect on industrial sector performance in Nigeria during the study period.

Okonkwo (2016) investigated the impact of foreign portfolio investments (FPI) on industrial performance in Nigeria from 1986 to 2013 using ordinary least squares (OLS) estimation technique and the error correction term (ECM). The study revealed that foreign portfolio investment has a positive and significant impact on industrial performance in Nigeria during the study period. Ibrahim and Akinbobola (2017) investigated the relationship between foreign portfolio investment, democracy, and economic growth in Nigeria from 1986 to 2013. Using the vector auto-regressive (VAR) technique for analysis, the results revealed that in the long run foreign portfolio investment had positive and significant effect on the economic growth in Nigeria. Ezeanjeyi and Ifeako (2019) investigated the impact of foreign portfolio investments (FPI) on economic growth in Nigeria from 1986 to 2015 using the error correction mechanism (ECM). The study revealed that FPI has a positive and significant impact on economic growth in Nigeria during the study period. Sule (2019) investigated the impact of external financing on industrial growth in Nigeria from 1985 to 2018 using the autoregressive distributed-lag (ARDL) model. The study revealed that FDI has a negative and insignificant effect on industrial growth in Nigeria during the study period.

## Methodology

### Data, Sources, and Description

This study adopted the causal-explanatory research design approach. It is causal-explanatory because it tries to explain relationships between variables. This study used annual secondary data on aggregate foreign direct investment), portfolio investment, manufacturing value added, oil and gas valued added, and electricity generations output, valued added of mining and quarrying between 1986 and 2017 sourced from the Central Bank of Nigeria Statistical Bulletin (2017) and (UNCTAD, 2019) Bulletin.

This study proxied industrial productivity with the sum of the value-added in mining, manufacturing, construction, electricity, water, and gas. This is in line with Iddrisu, Adam and Halidu (2015) empirical study. Value-added is the net output of the industrial sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. This study decomposed external financing into foreign direct investment (FDI) and foreign portfolio investment (FPI) in line with the conceptualization of cross border investments as short-term and long investment done by the purchasing of securities in an economy other than that of the investor as the case of foreign portfolio investment, and commitment of financial resources (equity capital, reinvestment

of earnings, other long-term capital, and short-term capital) by foreign investor to acquired lasting management interest (10% or more of voting stock) of existing company operating or to engage in production, marketing and establishment of new enterprise investment (wholly-owned) in an economy other than that of the investor as the case of FDI.

**The ARDL Model Specification**

The starting point of conventional growth theorization is the neoclassical model developed by Robert Solow (1956) and Trevor Swan (1956) which involved a series of equations showing the relationship between labour-time, capital goods, output, and investment. This model was the first attempt to model long-run growth analytically. This model assumes that countries use their resources efficiently and that there are constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress and substitutability between capital and labour. According to this view, the role of technological change is very important. A major issue with growth modeling is the determination of the variables to include in the analysis which has resulted to well over ninety (90) different variables have being proposed as potential growth determinants (Petrakos, Arvanitidis & Pavleas, 2007; Ristanovic, 2010), each of which has some *ex ante* plausibility. This issue results because of the open-endedness of growth theories whereby the validity of one causal theory does not imply the falsity of another. To deal with the issue of open-endedness, some researchers such as Levine and Renelt (1992), have proposed ways to deal with the robustness of variables in growth regressions by identifying a set of potential control variables for inclusion. Inclusion of a variable in the final choice requires that its associated coefficient proves to be robust with respect to the inclusion of other variables. A coefficient is robust if the sign of its OLS stays constant across a set of regressions representing different possible combinations of other variables.

The bulk of modern empirical work on growth has focused on growth regressions of the type pioneered by Barro (1991). A generic form for growth regression is:

$$g_i = X_i\gamma + Z_i\pi + \varepsilon_i \qquad (1)$$

where $g_i$ is real *per capita* growth in economy $i$ over a given period of time. $X_i$ represents variables whose presence is suggested by Solow's growth model: a constant, initial income and a set of country-specific savings and population growth controls. The Solow's model is often treated as a baseline from which to build up more elaborate growth models, hence these variables tend to be common across studies. $Z_i$, in contrast, consists of variables chosen to capture additional growth determinants that a researcher believes are important and so generally differ across analysis. Starting from the key macroeconomic relation, with the aim to considering the impact that foreign direct investment (FDI), foreign portfolio investment (FPI), and exchange rate have on industrial productivity, Equation (1) is modified by the influence of foreign direct investment (FDI), foreign portfolio investment (FPI), and exchange rate and stated as follows:

$$INDRPRD = f(FDI + FPI + EXCRT)$$

where:

INDRPRD = Industrial Productivity
FDI = Foreign Direct Investment
FPI = Foreign Portfolio Investments
EXCRT = Exchange Rate

The autoregressive representation of the model can be stated as:

$$INDRPRD_t = \alpha_0 + \alpha_1 INDRPRD_{t-1} + \alpha_2 FDI_t + \alpha_3 FPI_t + \alpha_4 EXCRT_t + + \varepsilon_t \qquad (3)$$

The method of analysis used in this study was the autoregressive distributed-lag (ARDL) model. The model was introduced by Pesaran, Shin, and Smith (2001). The autoregressive distributed lag (ARDL) approach is a regression technique for determining long-run and short-run relationships among variables under study simultaneously. The ARDL approach has the advantage that it can be applied irrespective of the order of integration of the series (Banerjee, Dolado, & Mestre, 1998; Ghatak & Siddiki, 2001) and can therefore be estimated directly as a multivariable single equation.

Following Pesaran, Shin, and Smith (2001), the autoregressive distributed lag (ARDL) representation of the model (Equation34) is specified as follows:

$$\Delta INDRPRD_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta INDRPRD_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta FPI_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta EXCRT_{t-i} + \beta_1 INDRPRD_{t-1} + \beta_2 FDI_{t-1} + \beta_3 FPI_{t-1} + \beta_4 EXCRT_{t-1} \quad (4)$$

where :

$\text{INDRPRD}_t$ = Current value of industrial productivity,

$\text{INDRPRD}_{t-i}$ = Past values of industrial productivity,

$\text{FDI}_t$ = Current value of foreign direct investment,

$\text{FDI}_{t-i}$ = Past values of foreign direct investment,

$\text{FPI}_t$ = Current value of foreign portfolio investment,

$\text{FPI}_{t-i}$ = Past values of foreign portfolio investment,

$\text{EXCRT}_t$ = Current value of domestic debt,

$\text{EXCRT}_{t-i}$ = Past values value of domestic debt.

$t$ = time period, $\sum$ = summation, $\Delta$ denotes the first difference operator,

$\alpha_0$ is the constant component, and $\varepsilon_t$ is the residual or stochastic term.

The left-hand side of the model (Equation 4) is the industrial productivity. The terms with the summation signs $\alpha_1$ to $\alpha_4$ on the right-hand side of the model (Equation 4) represent the short-run relationship of the model. The first to the fourth term with beta signs $\beta_1$, $\beta_2$, $\beta_3$, and $\beta_4$ on the right-hand side of the model (Equation 4) correspond to the long-run relationship of the model.

**Justification of Variables**

It would be recalled that accelerator investment principle suggests that in increase in the demand for output, is accompanied by increase in the demand for investment (Olofin & Afangidel, 2009). Invariably, investment in form of FDI raises productivity through technology transfers leading to profit thereby raising government revenue through taxation (Brander & Spencer, 1987). Foreign portfolio investment is the acquisition of asset or equity of domestic company, which enables access to credit in foreign countries where they have significant investments and makes the home markets competitive. A decline in the real exchange rate would raise the relative cost of imported goods used by corporations as inputs into production and this increase in cost would tend to lower profitability. Exporters might, on the other hand, benefit, offsetting higher input costs through stronger sales.

Therefore, *apriori* expectations of the coefficients are:

$\alpha_1 > 0$: An increase in the previous value of industrial productivity will lead to an increase in the current value of industrial productivity.

$\alpha_2 > 0$: An increase in foreign direct investment (FDI) will lead to an increase in the current value of industrial productivity.

$\alpha_3 > 0$: An increase in foreign portfolio investment (FPI) will lead to an increase in the current value of industrial productivity.

$\alpha_4 < 0$: An increase in exchange rate will lead to a decrease in the current value of industrial productivity.

**Presentation of Results**

Before performing the main analyses the summary statistics were performed by means of

coefficient of skewness and kurtosis, normal probability plots and Jarque-Bera test of normality. The time series were then tested for stationarity both graphically and with formal testing schemes by means of Augmented Dickey-Fuller test of unit root. The series that were nonstationary were appropriately transformed before proceeding to the main econometric analyses.

**Descriptive Statistics**

The descriptive statistics of the variables were also conducted.

**Table 1: Descriptive Statistics of Variables in Nigeria (1986-2016) at Levels**

| Variable | Mean | Median | Std.Dev. | Skewness | Kurtosis | Jarque-Bera | Observations |
|---|---|---|---|---|---|---|---|
| INDRPRD | 4.43 | 2.27 | 3.31 | 0.59 | 1.64 | 4.28 (0.02) | **32** |
| EXCRT | 95.47 | 114.89 | 79.01 | 0.56 | 2.86 | 1.71 (0.43) | **32** |
| NETFDI | 3.09 | 1.88 | 2.62 | 0.87 | 2.48 | 4.39 (0.11) | **32** |
| NETFPI | -15595.84 | -1385.090 | 46963.91 | -0.575536 | 3.79 | 2.61 (0.27) | **32** |

**Source:** Researchers' calculation by EViews (2019).

Table 1 above provides a descriptive statistics of the variables used for the study. The table shows the mean, standard deviation, skewness, kurtosis, and normality of the variables. The mean of the variables shows their average values from 1986 to 2017. The absence of outliers, especially the industrial productivity (INDRPRD), indicates that we can model industrial productivity in Nigeria without having extreme large or small values that deviate from the historical industrial productivity (INDRPRD) series. Lastly, the descriptive statistics show that the variables have some variations and using them in the models will require identifying their stationarity properties.

**Time Series Analysis**

Before performing formal tests, it is always advisable to plot the time series under study. Such plots give initial clue about the likely nature of the time series. The figure below show the line graphs of the historical performance of the variables used in this study.

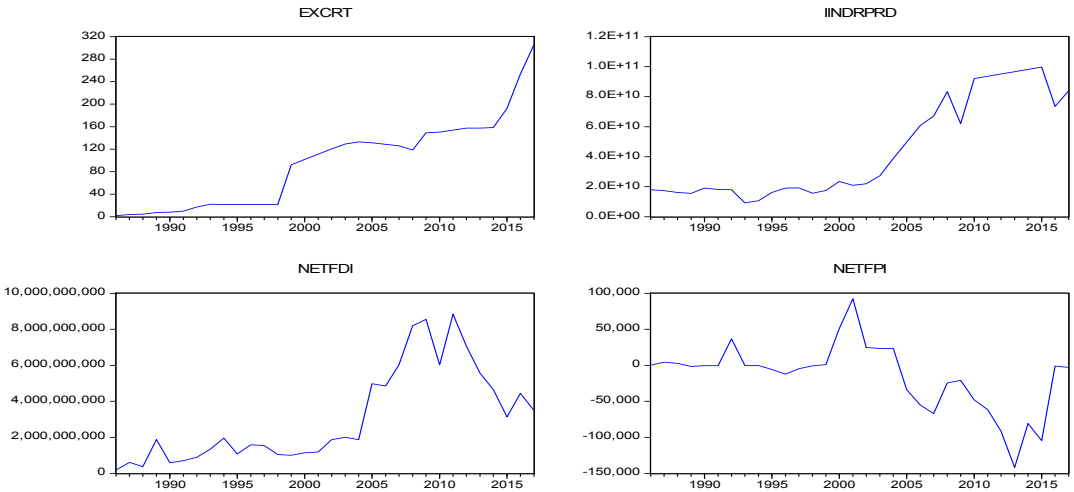


**Figure 1:** Variables at levels
**Source:** Researchers' calculation by EViews (2019).

Figure 1 shows the multiple graphs of the series at their level form. The graphs show that there is little evidence to suspect the presence of structural break or outlier in the four variables

but the graphs of the series display a non-stable variance. Therefore, there is need for stationarity analysis

**Unit Root Tests for the Variables**

The use of ARDL models does not impose pre-testing of variables for unit root problems. However, unit root tests are conducted in this study to find out if there are mixtures in the order of integration of our variables. The order of integration of the time series was investigated by applying the Augmented Dickey-Fuller (1979) test. The Augmented Dickey-Fuller (ADF) unit root test results for the time series variables are presented in Table 2 below.

**Table 2: Unit root test results**

| Variable | ADF Test Statistic at Level | ADF Test Statistic at 1st Difference | 95% Critical ADF Value | Order of Integration | Remark |
|---|---|---|---|---|---|
| **INDRPRD** | -0.563 | -3.135 | -2.964 | ***I* (1)** | **Stationary** |
| **EXCRT** | -1.792 | -7.201 | -2.964 | ***I* (1)** | **Stationary** |
| **NETFDI** | -1.563 | -6.794 | -2.964 | ***I* (I)** | **Stationary** |
| **NETFPI** | -2.133 | -6.209 | -2.964 | ***I* (I)** | **Stationary** |

***Source:*** *Authors' Computation* (2019)

Table 2 shows that the ADF test statistic for each of the variables at level is greater than the respective critical values. This means that there is unit root in each of the time series. The results show that all the variables became stationary after first difference. That is, they are integrated of order *I* (1). Thus co-integration tests can be applied for all variables.

**Co-Integration Test**

The Engel and Granger (1987) co-integration test is used for single equation models. The co-integration test result for the research model is presented in Table 3 below.

**Table 3: Engel and Granger residual based co-integration test**

| *SERIES* | *ADF* | *5% CRITICAL VALUE* | *ORDER OF INTEGRATION* | *REMARK* |
|---|---|---|---|---|
| RESIDUAL | -5.825 | -2.960 | ***I* (0)** | **Co-integrated** |

***Source:*** *Authors' Computation* (2019)

The results in Table 3 show that there is co-integration among industrial productivity (INDRPRD), exchange rate (EXCRT), net foreign direct investment (NETFDI), net foreign portfolio investments (NETFPI). Since the ADF test value for the residual is greater (absolute values) than the critical value, it is said to be stationary. Thus, the time series are co-integrated, implying that a long-run stable relationship exists among the variables used in this study. This means that any short-run deviation in their relationships would return to equilibrium in the long-run.

**Model Estimation, Diagnostics, and Interpretation**

The autoregressive-distributed lag (ARDL) is a technique that allows us to simultaneously estimate the short-run and long-run coefficients of our model. The estimated Autoregressive Distributed Lag (ARDL) model is presented in Table 4.

**Table 4: Parametized ARDL model estimates**
Dependent Variable: D(INDRPRD)
Method: Least Squares

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.27E+09 | 4.05E+09 | 2.288195 | 0.0395 |
| D(INDRPRD(-1)) | -0.971366 | 0.279458 | -3.475905 | 0.0640 |
| D(INDRPRD(-2)) | 0.042609 | 0.226009 | 0.188527 | 0.8534 |
| D(EXCRT) | -94505270 | 91861699 | -1.028778 | 0.3223 |
| D(EXCRT(-1)) | -72154356 | 1.29E+08 | -0.558125 | 0.5862 |
| D(EXCRT(-2)) | -221452.3 | 1.25E+08 | -0.001772 | 0.9986 |
| D(NETFDI) | 1.695012 | 1.467835 | 1.154769 | 0.2690 |
| D(NETFDI(-1)) | -4.651018 | 1.866366 | -2.492018 | 0.0270 |
| D(NETFDI(-2)) | -3.074452 | 1.408155 | -2.183320 | 0.0479 |
| D(NETFPI) | -107787.4 | 59455.18 | -1.812919 | 0.0930 |
| D(NETFPI(-1)) | 86658.16 | 93266.34 | 0.929147 | 0.3697 |
| D(NETFPI(-2)) | -17643.44 | 78329.39 | -0.225247 | 0.8253 |
| INDRPRD(-1) | -1.154025 | 0.321298 | -3.591763 | 0.0033 |
| EXCRT(-1) | 2.28E+08 | 77092108 | 2.955611 | 0.0112 |
| NETFDI(-1) | 6.472128 | 1.687410 | 3.835539 | 0.0021 |
| NETFPI(-1) | -261336.7 | 134627.9 | -1.941178 | 0.0742 |

| | | | |
|---|---|---|---|
| R-squared | 0.819415 | Mean dependent var | 2.33E+09 |
| Adjusted R-squared | 0.611049 | S.D. dependent var | 1.02E+10 |
| S.E. of regression | 6.34E+09 | Akaike info criterion | 48.28071 |
| Sum squared resid | 5.23E+20 | Schwarz criterion | 49.03508 |
| Log likelihood | -684.0702 | Hannan-Quinn criter. | 48.51697 |
| F-statistic | 39.32563 | Durbin-Watson stat | 1.734154 |
| Prob(F-statistic) | 0.008771 | | |

***Source:*** *Authors' Computation* (2019)

After estimating the empirical **ARDL** model, a variety of diagnostic tests were carried out to enhance the credibility of the model. The Breusch-Godfrey serial correlation LM test; the Jarque-Bera test for normality; and the cumulative sum of squares (CUSOM-SQ) test for model stability were conducted. The results of the respective tests are presented in Table 5.

**Table 5: ARDL model diagnostic tests**

| ***TEST*** | ***F-STATISTIC*** | ***P-VALUE*** |
|---|---|---|
| Serial Correlation: Breusch-Godfrey serial correlation LM test | 0.97 | 0.34 |
| Normality: Jarque-Bera test. | 0.41 | 0.82 |
| Ramsey RESET Test | 0.14 | 0.72 |

***Source:*** *Authors' Computation* (2019)

The diagnostics indicate that the residuals were serially uncorrelated and normally distributed based on Breusch-Godfrey serial correlation LM test and Jarque-Bera test respectively. The existence of a stable and predictable relationship is considered a necessary condition for the formulation of fiscal policy strategies. The stability properties of the ARDL model were examined. Because the model is a multivariable model, we compute the recursive statistic to get a further impression of the stability of the model through time. In view of this, we applied the CUSUM-of-squares (CUSUM-SQ) test, which Brown, Durbin, and Evans (1975) developed. According to Bahmani-Oskooee and Wing NG (2002), if the plot of these statistics remains

within the critical bound of the 5% significance level, the null hypothesis (i.e. that all coefficients in the model are stable) cannot be rejected. A graphical presentation of this test for our ARDL model is provided in Figure 3.

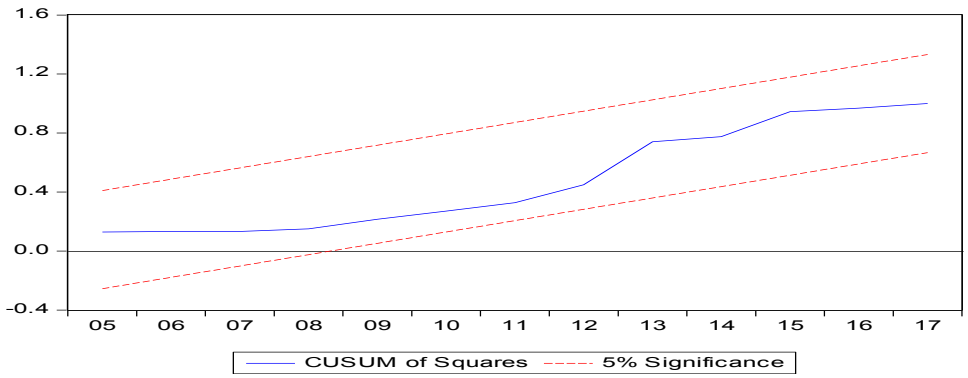


**Figure 3: Cumulative sum of squares (CUSUM-SQ) of recursive residuals plot.**
***Source:*** *Authors' Computation* (2019)

Since the plots of cumulative sum of squares (CUSOM-SQ) statistics for economic growth do not cross the critical value lines as Figures 3 clearly indicate, it is therefore safe to conclude that ARDL economic growth model is stable and economic growth can be used as a target variable. The diagnostic results of the model show that the **ARDL** model performs very well. In other words, this **ARDL** model can be applied in explaining the impact of foreign direct investment and foreign portfolio investment on industrial productivity Nigeria. We can therefore interpret the model.

The model (Equation 5) is extracted from the regression output in Table 4.

$$\Delta(INDRPRD)_t = 9.27 - 0.97\Delta INDRPRD_{t-1} - 4.65\Delta NETFDI_{t-1} - 3.07\Delta NETFDI_{t-2} - 107787.5\Delta NETFPI_t$$
$$(2.39)\quad(-3.48)\qquad(-2.49)\qquad(-2.18)\qquad(-1.81) \qquad (5)$$
$$\{0.04\}\quad\{0.06\}\qquad\{0.03\}\qquad\{0.05\}\qquad\{0.09\}$$
$$-1.15INDRPRD_{t-1} + 2.28EXCRT_{t-1} + 6.47NETFDI_{t-1} - 261336.7NETFPI_{t-1}$$
$$(5.59)\qquad(2.96)\qquad(3.84)\qquad(-1.94)$$
$$\{0.003\}\qquad\{0.011\}\qquad\{0.002\}\qquad\{0.07\}$$

$R$-squared = 0.819415
Adjusted $R$-squared = 0.611049
$F$-statistic = 39.32563
Prob ($F$-statistic) = 0.008771
Durbin-Watson = 1.734154
Note:
*$t$ - values are in brackets.
** probability values are braces below $t$-values.

Equation (5) is the model extracted from the autoregressive distributed-lag model presented in Table 4. It shows the short-run and long-run estimates of the ARDL (1, 2, 0) model. The coefficient of determination $(R^2 = 0.82)$ of the estimated model shows that about 82% of the changes in industrial productivity were explained by the explanatory variables included in the model. The explanatory power remains at 61% after adjusting for the degrees of freedom (Adjusted R-Squared = 0.61. The $F$-test which is used to determine the overall statistical significance of a regression model shows that the overall regression is statistically significant at 1% level. This implies that the ARDL model has a satisfactory goodness-of-fit.

**Short-run Results**

The previous value of industrial productivity has a negative and significant impact on industrial productivity Nigeria in the short run. The previous values (one-period lag and two-period lag) of net foreign direct investment (NFDI) have negative and significant impacts on industrial productivity Nigeria in the short run. These findings are consistent with the findings of Anowor, Ukweni, Ibiam, and Ezekwem (2013); Okoli and Agu (2013); Onyinye, Anthony-Orji and Okafor (2015); and Richardson and Tamarauntari (2014). The findings are not consistent with the findings of Effiong, Odey, and Nwafor (2019); Ezeanyeji and Ifebi (2016); and Rasaq, Adijat and Abubakar (2017). The net portfolio investment (NPI) has a negative and significant impact on industrial productivity Nigeria. This finding is consistent with the finding of Houssem and Hichem (2011) but not consistent with the findings of Ezeanjeyi and Ifeako (2019); Ibrahim and Akinbobola (2017); and Okonkwo (2016). The results show that exchange rate has no significant impact on industrial productivity Nigeria in the short run.

**Long-run Results**

The previous value of industrial productivity also has a negative significant impact on industrial productivity Nigeria in the long run.

The net foreign direct investment (NFDI) has a positive significant impact on industrial productivity Nigeria in the in the long run. This is consistent with the findings of Abdul and Barnabas (2012) and Ezeanyeji and Ifebi (2016). The net portfolio investment (NPI) has a negative significant impact on industrial productivity Nigeria in the long run. This finding is not consistent with the findings of Ezeanjeyi and Ifeako (2019); Ibrahim and Akinbobola (2017); and Okonkwo (2016) but not consistent with the finding of Houssem and Hichem (2011). The results show that exchange rate has a positive and significant impact on industrial productivity Nigeria in the long run.

**Discussion of Findings**

This study investigated the relationships between foreign direct investment (FDI), foreign portfolio investment (FPI), and industrial productivity in Nigeria using annual time series data from 1986 to 2017. Exchange rate was used as a moderating variable. The data were sourced from the publications of the Central Bank of Nigeria Statistical Bulletin (2017) and (UNCTAD, 2019) Bulletin. A model was formulated, estimated (using OLS), and validated (using standard statistical and econometric techniques). The results show that the previous value of industrial productivity has a negative and significant impact on industrial productivity Nigeria in both the short run and the long run

The net foreign direct investment (NFDI) has a negative and significant impact on industrial productivity Nigeria in the short run. The net portfolio investment (NPI) has a negative and significant impact on industrial productivity Nigeria. The net foreign direct investment (NFDI) has a positive significant impact on industrial productivity Nigeria in the in the long run. The net portfolio investment (NPI) has a negative significant impact on industrial productivity Nigeria in the long run.

The negative impact of foreign direct investment (FDI) and foreign portfolio investment (FPI) on industrial performance in the country may be attributed to the fact that most foreign direct investments in industrial sectors have done little to promote backward linkage by sourcing inputs from local firms in Nigeria. They may have also crowded out domestic firms in the industrial sector through the offering of similar or close products with indigenous firms, and investing heavily in advertising to promote the close substitute products offered. In alignment with this, Iddrisu Adam, and Halidu (2015) indicated that the impact of cross border investments on industrial sectors can only positive when they complement domestic firms by buying inputs from domestic firms and will be negative when sourced inputs abroad as well as offering the same products with that of domestic firms.

In addition to the above, the near absence of infrastructural facilities, unwillingness to develop strong institutional governance, and inadequate high skill human capital needed to imitate, absorb, assimilate, replicate, and harness technologies and capital transfers by foreign investors, may have combined with other factors to account for the negative impact of cross border investment on industrial performance in Nigeria. This assertion is consistent with Abdul and Barnabas (2012) and Iddrisu, Adam, and Halidu (2015) that opined that the effect of cross border investment on industrial performance depends on the quality

of human capital, infrastructural development, strong institutional governance and regulation of the recipient countries, which appear to be lacking in Nigeria.

The results show that exchange rate has a positive and significant impact on industrial productivity Nigeria in the long run. The results of exchange rate shows that a one percent increase in exchange rate will lead to an increase by 0.0228 in industrial productivity. This suggests that when the exchange rate of the domestic currency increases (appreciates), on industrial productivity will grow slowly because the various subsectors of industrial sector and their products will be less attractive to importers, decrease export and subsequently reduce industrial output.

**Conclusion and Recommendations**

This study examined the relationship between external financing and industrial productivity in Nigeria. This paper concluded that external financing has added to other challenges affecting the performance of the industrial sector in Nigeria since they are largely negatively associated with industrial performance in the country. The study concluded that Nigeria is yet to fully reap the benefit of external financing since its contribution to GDP is still very low at the moment, whilst the contribution of the industrial sector in the country has not been vibrant enough to spur economic growth. On this basis of these conclusions, it is recommended the government of Nigeria should:

1. develop policies that will encourage foreign-owned firms through tax incentive to re-invest their earnings in the country.
2. strengthen and upgrade the quality of education to boost human capital in order to realize the positive spillover effects of technology and capital transfer by foreign investors.
3. encourage cross border investments that are best suited to local conditions and provide incentive and collaborate with foreign investors to develop a test, research and development centers for small-medium enterprise SMEs in Nigeria.
4. improve on social and economic infrastructure as this will help lessen the burden of industrialist and eventually lower the cost of doing business and in turn attract FDI inflow into Nigeria.
5. frame and implement such policies which create favourable conditions for saving, investment, flow of capital from industrial sector to another and conservation of national resources.
6. the previous value of industrial productivity has a negative and significant impact on the current value of industrial productivity short run and in the long run in Nigeria. This means that expectations that are formed about past levels of industrial productivity affect the current industrial productivity in Nigeria. It is therefore recommended that government should ensure transparency in industrial policies implementation.

**References**

Abdu, M. & Anam, B.E. (2018). Evaluation of the Nigerian industrial Sector and economic growth in the face of sustainable development goals. *International Journal of Advanced Research in Public Policy, Social Development and Enterprise Studies*, *3* (1), 49 - 59.

Abdul, A., & Barnabas, E. B. (2012). Foreign direct investment and the performance of manufacturing firms in Nigeria. *Finance and Development in Africa Research in Accounting in Emerging Economies, 12*, 171 – 183

Adejugbe, M.A. (2004). Industrialization, urbanization and development in Nigeria: Introduction. Lagos: Concept Publications Limited.

Alfaro, L. (2003). Foreign direct investment and growth: Does the sector matter? Boston: Havard Business school.

Anowor, O. F.1., Ukweni, N. O., Ibiam, F. O. I., & Ezekwem, O. (2013). Foreign direct investment and manufacturing sector growth in Nigeria. *International Journal of Advanced Scientific and Technical Research Issue, 3(*5), 231-239

Bahmani-Oskooee, M., & Wing NG, R.C. (2002). Long-run demand for money in Hong Kong: An application of the ARDL model. *International Journal of Business and Economics*, *1* (2), 147-155

Banerjee, A., Dolado, J., & Mestre, R. (1998). Error correction mechanism tests for

cointegration in a single equation framework. *Journal of Time Series Analysis, 19* (3), 267-283.

Barrios, S., Gorg, H., & Strobl, E. (2004). *Foreign direct investment, competition and industrial development in the host country*. Berlin: German Institute for Economic Research.

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics, 106*(2), 407-443.

Baye, M. R. & Jansen, W.D. (2006). Money, banking, and financial markets: An econometric approach. Delhi: A. I.T. B.S. Publishers & Distributors.

Brander J.A., & Spencer, B. (1987). Foreign direct investment with unemployment and endogenous taxes and tariffs. *Journal of International Economics*, *22* (1987), 257-279.

Brown, R. L., Durbin, J. & Evans, J.M. (1975). Techniques for testing constancy of regression relationship over time. *Journal of the Royal Statistical Society* B37, 149-192.

Central Bank of Nigeria. (2017). Statistical Bulletin. Abuja: Central Bank of Nigeria.

Chenery, H. & Strout, A. M. (1966). Foreign assistance and economic development. *The American Economic Review*, *56* (4), 679-733.

Dickey, D. A. & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*, 427-431.

Effiong, C. E., Odey, F. I. & Nwafor, J. U. (2019). Globalization, foreign direct investment and industrial sector performance in Nigeria. *International Journal of Social Sciences and Management Research*, *5* (2), 58 – 70.

Engel, R. F. & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation and testing. *Econometrica, 55*(2), 251-276.

Ezeanjeyi, C. I. & Ifeako, M. (2019). Foreign portfolio investment on economic growth of Nigeria: An impact analysis. *International Journal of Academic Management Science Research*, *3* (3), 24 – 36.

Ezeanyeji, C. I. & Ifebi, O. L. (2016). Impact of foreign direct investment on sectoral performance in the Nigerian economy: A study of telecommunications sector. *International Journal of Humanities Social Sciences and Education* (IJHSSE), *3* (2), 57- 75.

Fazzari, S. M., Hubbard, G. R. & Petersen, B.C. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, 1:1988

Forrester, J. W. (1993). Low productivity: It is a problem or merely a symptom? *Handbook for productivity measurement and improvement*. Cambridge: Productivity Press.

Ghatak, S. & Siddiki, J. (2001). The use of ARDL approach in estimating virtual exchange rates in India. *Journal of Applied Statistics, 28*(5), 273-583.

Houssem, R. & Hichem, S. (2011). The impact of foreign direct investment and portfolio investment on economic growth in developing and developed economies. *Interdisciplinary Journal of Research in Business*, *1* (6), 10-17.

Ibrahim, T. R. & Akinbobola, T. O. (2017). Foreign portfolio investment and economic growth in Nigeria democratic settings. *Journal of Economics and Sustainable Development*, *8* (5), 33-52.

Iddrisu, A., Adam A. & Halidu, B. A. (2015). The influence of foreign direct investment on the productivity of the Industrial Sector in Ghana. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 5* (3), 1-13.

IMF (1993). *Balance of payments manual*, 5 ed. Washington D.C.: International Monetary Fund.

IMF (2016). The growing importance of financial spillovers from emerging market economies. *Global Financial Stability Report* (Chapter 2 Summary). Washington DC, April 2016.

Iscan, T., 2010. How much can Engel's law and Baumol's disease explain the rise of service employment in the United States? *The BE Journal of Macroeconomics*, *10* (1), 1-43.

Kinnander, A. & Gröndahl, P. (1999). Productivity development in manufacturing systems: A project

proposal within PROPER. Internal report, Stockholm: *The Royal Institute of Technology*.

Kitching, G. (2012). *Development and underdevelopment in historical perspective: Populism, nationalism and industrialization*. Routledge.

Kolawole, B. O. (2013). Foreign assistance and economic growth in Nigeria: The two-gap model framework. *American International Journal of Contemporary Research*, *3* (10), 10 - 23.

Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *American Economic Review, 82,* 942-963.

Misterek, S., Dooley, K. & Anderson, J. (1992). Productivity as a performance measure. *International Journal of Operations and Production Management*, 12, 29-45.

Network of Research on Africa (NORMA) (2017). Nigerians in diaspora repatriate N7.519 trillion in 2015 by Prof Aderanti Adepoju, available online at www.pmnewsnigeria.com/2017/07/26

Okoli, T. T. & Agu, O. C. (2015). Foreign direct investment flow and manufacturing sector performance in Nigeria. *International Journal of Economic, Commerce and Management, 3*(7), 413-428.

Okonkwo, O. N. (2016). Foreign portfolio investment and industrial growth in Nigeria (1986 - 2013). *International Journal of Innovative Finance and Economics Research, 4* (3), 31-38.

Olofin, S. O. & Afangideh, U. J. (2009). Financial structure and economic growth in Nigeria: A macroeconometric approach. Centre for Econometric and Allied Research (CEAR).

Onuorah, A. C. & Akujuobi, L. E. (2013). Impact of macroeconomic indicators on the performance of foreign portfolio investment in Nigeria. *European Journal of Business and Management*, *5* (2), 81 -90.

Onyeisi, O. S., Odo, I. S. & Anoke, C. I. (2016). Foreign portfolio investment and stock market growth in Nigeria. *Developing Country Studies*, *6* (11), 64 -76.

Onyinye. A., Anthony-Orji, I. & Okafor, J. (2015). Manufacturing output and foreign direct investment in Nigeria: A new evidence. *International Journal of Academic Research in Economics and Management Sciences, 4* (3), 67-74

Orozco, M. (2003). Worker remittances: An international comparison. Working Paper Commissioned by the Multilateral Investment Fund of the Inter-American Development Bank, Washington D.C; 2003.

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.

Petrakos, G., Arvanitidis, P. & Pavleas, S. (2007). *Determinants of economic growth*: *The view of the experts.* Discussion Paper Series, *15* (1), 1-22.

Rasaq A. D., Adijat, O. O. & Abubakar, W. A. (2017). The impact of foreign direct investment on the Nigeria manufacturing sector: A time series analysis. *European Scientific Journal*, *13* (31), 34-52.

Richardson, K. E. & Tamarauntari, M. K. (2014). Economic liberalization and industrial sector performance in Nigeria: A marginal impact analysis. *International Journal of Development and Emerging Economics, 2* (4), 43-59.

Ristanović, V. (2010). Macroeconomic determinants of economic growth and world economic financial crisis. Facta Universitatis Series: *Economics and Organization*, *7* (1), 17 - 33

Singh, H., Motwani, J., and Kumar, A. (2000). A review and analysis of the state of the art research on productivity measurement. *Industrial Management and Data Systems*, 100, 234-41.

Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics 70,* 65-94.

Sule, A. (2019). External financing and industrial growth in Nigeria. *International Journal of Economics and Management Studies*, *6* (1), 180-193.

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, 32, 334–61. http://dx.doi.org/10.2307/1884513

Szirmai, A. (2012). Industrialization as an engine of growth in developing

countries, 1950–2005. *Structural Change and Economic Dynamics*, *23* (4), 406-420.

Tangen, S. (2002). A theoretical foundation for productivity measurement and improvement of automatic assembly systems. *Licentiate Thesis*. Stockholm: Royal Institute of Technology.

Todaro, M.P. & Smith, S.C. (2009). *Economic development*. Harlow, England: Addison-Wesley.

Turnovsky, S.J. (2000). Growth in an open economy: Some recent developments. Presented at a conference on "how to promote economic growth in the Euro Area? Brussels: Held at National Bank of Belgium, pp. 1-2.

United Nations Conference on Trade and Development (UNCTAD) (2015). World Investment Report 2015. Retrieved on February 4, 2017 from www.unctad.org/en/docs.

United Nations Conference on Trade and Development (UNCTAD) (2016). World Investment Report, Annex Table, UN reports foreign direct Investment. Unctad.org/en/pages/DIAE/world-investment-report

United Nations Conference on Trade and Development (UNCTAD) (2019). FDI inflows in Nigeria: Trend and facts. New York.

Wonyra, K.O. (2018). Industrialization and economic growth in Sub-Saharan Africa: The role of human capital in structural transformation. *Journal of Empirical Studies*, *5* (1), 45-54.

World Bank (2012). World development indicators. The World Bank, Washington D.C

World Bank (2017). World development report. The World Bank, Washington D.C