

A Multi-Sectoral Analysis of Effects of Foreign Direct Investment on Nigeria's Output Growth

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ABSTRACT: This research work examined the Multi-Sectoral Analysis of effects of Foreign Direct Investment on Nigeria's Output Growth ranging from 1990-2020, covering a period of 30 years. Foreign Direct Investment (FDI) is undoubtedly a key source of external capital to many emerging economies. Nigeria is one of the renowned destinations for FDI in Africa. Inflows of FDI in Nigeria are not significant when compared to some other developing countries. This research explores issues pertaining to sectoral allocation of FDI in the major sectors of the Nigerian economy. Technically, it focused on the effect of FDI on Nigeria's sectoral output growth. Foreign Direct Investment Proxied as FDI is the explanatory variable while Interest Rate proxied as INTR and Exchange Rate as EXR are the control variables while Mining & Quarrying (MQGDP), Manufacturing & Processing (MPGDP), Agricultural Sector (AGGDP), Information & Communication (ICGDP) Output are the dependent variables. The central objective of this research work is to determine the effect of FDI inflows, on Mining & Quarrying (MQGDP), Manufacturing & Processing (MPGDP), Agricultural Sector (AGGDP), Information & Communication (ICGDP) Output and also Interest Rate and Exchange Rate as control Variables. It employed the use of secondary and time series data using statistical tool such as Auto Regressive Distributive Lag (ARDL), Augmented Dickey Fuller unit root to test for the stationarity of the Data, Johanson Co-integration to test for long-run equilibrium relationship that exist among the variables under study. The p.value of FDI on MQGDP, MPGDP, AGGDP, ICGDP are 0.3767, 0.5846, 0.3155, 0.8498 and effect of INTR on MQGDP, MPGDP, AGGDP, ICGDP are 0.8015, 0.7097, 0.9200, 0.8426 and effect of EXR on MQGDP, MPGDP, AGGDP, ICGDP are 0.4172, 0.9330, 0.5513, 0.1755 respectively showing that none is significant. The result shows that FDI, INTR & EXR impacted positively on the output growth of MQGDP, AGGDP & ICGDP while, only FDI impacted positively on MPGDP with INTR & EXR exerting negative effect on it. Based on the findings, the study recommends amongst others that government should encourage the inflow of more FDI into the various sectors by creating an enabling environment and formulating strategic socio-economic policies that will enhance the ease of doing business in Nigeria and boost investor's confidence.

KEYWORDS: Foreign Direct Investment, Gross Domestic Product Mining & Quarrying, Agricultural Sector, Information & Communication.

I. INTRODUCTION

Multinational Corporations (MNCs) reflect the entry of a commercial organization founded in a foreign geographic enclave into a host economy and provide net transfers of real capital from one country to another (Asiedu & Lien, 2011). MNCs are real tools for utilizing direct investment to carry out significant tasks. When parent companies expand their businesses vertically or horizontally, the FDI process takes place. Additionally, FDI happens when parent businesses diversify their holdings. International firms take use of horizontal expansions by expanding their operations to produce the same commodity overseas, introducing some highly wanted goods right into geographically segmented or tariff-controlled markets. Foreign Direct Investment (FDI), has grown over time to become the most significant source of external resource flows to developing countries and a significant component of capital formation in these nations,

even though their share in the global distribution of FDI has remained small or even declined. The importance of foreign direct investment (FDI) as a driver of prosperity in developing nations has long been acknowledged.

The main determinant of a country's business climate is its general economic trend, and a developing economy with a robust Gross Domestic Product (GDP) growth rate over an extended period of time fosters corporate confidence and draws foreign direct investment (FDI). The location has a major role in FDI's competitive advantage. The idea that interest rates are what determine how much money moves from one place to another has been roundly criticized because it ignores the issue of control that investors are also interested in and instead suggests that investors are only interested in making investments abroad where interest rates are higher and where there are few risks to the movement of money (Adelegan, 2008; Kok & Ersoy, 2009). The understanding of

economic behavior at the micro and macro levels has increased as a result of empirical studies on foreign direct investment, opening up new research topics in economic theory. Understanding the driving factors behind foreign direct investment (FDI) and how it affects economic growth requires a full understanding of why companies and investors choose to invest abroad rather than sell goods.

Given its natural resource wealth and sizable market, Nigeria qualifies to be a significant beneficiary of FDI in Africa. In fact, it is among the top three African nations that have continuously attracted FDI over the past ten years. However, in comparison to its resource base and prospective demand, Nigeria only draws a small amount of FDI. Foreign Direct Investment is the movement of capital across international borders; it is not a genuine economic opportunity, but rather a perceived one. Money may enter a nation as a result of a speculative bubble on the way there or an exaggerated assessment of its economic potential. This raises the value of home currency and asset values, luring in more foreign money in a self-sustaining cycle (Adelegan, 2008). Some of the money may be invested wisely, but most of it may be wasted on speculative real estate purchases or credit-based spending, which includes buying foreign items at a discount due to an inflated currency.

When some investors ultimately realize what is happening and withdraw their assets, a flood of money exit the nation (capital flight). Inflation brought on by imports will result from the currency depreciating drastically below its equilibrium level, making it difficult to purchase essentials abroad. Banks may fail as well if they had not covered their exposure to wild currency movements. It could be difficult for domestic companies to get trade finance in popular currencies. In the end, these modifications lead to severe recession, widespread unemployment, declines in aggregate demand, and losses or insolvency for local businesses. Asset values are chronically skewed or highly volatile under the influence of speculative capital flow, which leads to an inefficient distribution of resources in the economy (Asiedu and Lien, 2011). Nevertheless, despite the aforementioned drawbacks that the nations frequently encounter, they nevertheless look for ways to entice international investment, suggesting that the country still has some benefits to offer. Given the foregoing, it is essential to look at how foreign direct investment affects economic development. The main objective of this work is to examine the effect of foreign direct investment on Nigeria’s output growth. The following specific objectives are set out to be achieved: to assess the effect of foreign direct investment on Nigeria’s output growth. To ascertain the effect of interest rate on Nigeria’s output growth. To determine the effect of Exchange rate on Nigeria’s output growth.

II. LITERATURE REVIEW

Conceptual Review

Concept of Foreign Direct Investment

Foreign direct investment is a major component of international capital flows. FDI refers to investment by multinational companies with headquarters in developed countries. This investment involves not only a transfer of funds (including the reinvestment of profits) but also a whole package of physical capital, techniques of production, managerial and marketing expertise, products advertising and business practices for the maximization of global profits. Foreign direct investment is a process where people in one country obtain ownership of assets for the purpose of gaining control over the production, distribution and other activities of a firm in a foreign country (Adelegan, 2008).

The lasting interest reflects the continuation of a long-term relationship between the direct investor and the enterprise and a considerable level of interest on the management of the enterprise. The term “influence” or “control” and “long-term” are used to make a distinction between FDI and portfolio investment because the latter is a short-term investment where the investor does not seek to control the firm. The influence over management decisions and productivity is also the part that differentiates FDI from other types of international investments. This influence implies for instance, that the investor has an ability to elect members on the board of directors of the foreign firm or subsidiary (Kok and Ersoy, 2009).

Gross Domestic Product Per Capita

According to World Bank (2019), Nigeria’s GDP per capita is updated annually. Data of GDP per capita became available from December, 1981 to December 2018. GDP per capita is calculated from the annual nominal GDP divided by total population and converted to USD. Usually, the National Bureau of Statistics (NBS) provides the nominal GDP in local currency at basic prices; the IMF provides the population figure; while the CBN official exchange rate is used for currency conversion to USD.

Theoretical Review

Economic and Foreign Direct Investment Theories

There exists a wide array of literature regarding the importance of international trade and investment to a country’s economy especially welfare, growth and development. The foundation for empirical research about the interaction and relationship of economic variables is drawn from economic theory, neoclassical and endogenous growth models.

Export Theories

The export theory can be classified under the neoclassical growth models. This theory is a culmination of a study by Adam Smith, 1776 who investigated the causes of wealth of countries. The underlying argument of the export theory is that countries need to export goods and services in order to

generate revenue to finance imports which cannot be produced indigenously. Undoubtedly, gross domestic product (GDP) is used as a proxy of a country’s economic growth and it provides an estimate of the value of goods and services produced in a country in a specified period (Gupta and Singh, 2016). Studies that have been undertaken to ascertain whether international trade influences GDP assume that as exports increase, *ceteris paribus*, the GDP of a country rises and spurs economic growth. The export theory can be interpreted in a way that the performance of exports has a stimulating effect to a country’s economy especially in form of technology spillovers (Dutse, 2008; 2010).

International Production Theory

This economic theory states that the tendency of firms to invest overseas is dependent on a cost – benefit analysis of particular factors in both its home country and the host country. This theory explicitly states that the decision to invest in a country is dependent not only on the anticipated returns but could also on country specific factors like barriers to entry, political stability, cost of capital and production, economies of scale and demand for products (Eboh, 2011; Ibrahim & Omoniyi, 2011; Ajayi & Oke, 2012; Muhammed, Azu & Oko, 2018).

firms may invest in countries where labour and raw materials are comparatively cheaper in order to minimize costs. This partly explains the movement of foreign direct investment to Asia; specifically, China and India where the cost of labour is relatively cheaper than the rest of the world.

Endogenous Growth Theories

The emergence of endogenous growth theories emphasized the importance of human capital accumulation and technological externalities in development processes. In this respect, MNCs which rely on the most advanced production and organization methods are seen as powerful vehicles of technology transfer to less developed economies. In this regard, the classical paper of Findlay, 1978 represents a first formal example of the potential link between FDI and technology transfer while the models of the “new growth theory” provides a very useful tool to analyze how the introduction of new inputs and technologies influence the production function of a given economy and how externalities affect the research efforts of the economic agents and the diffusion of knowledge. Hence, endogenous growth theory constitutes the predominant theoretical framework within which recent research studies the impact of FDI on growth (Erhieyovwe & Onovwoakpoma, 2013, Uwakaeme, 2015).

Empirical Review

Erkisi (2018) investigates the causality between FDI, trade and economic openness. The analysis covers 81 observations during the 20 years between 1998Q1 - 2018Q1 for export, import, FDI and GDP of Turkey. ADF (Augmented Dickey Fuller) unit root, Engel Granger co-integration, Granger causality, VAR Decomposition, VAR Impulse-Response

tests and techniques were employed in the analysis. According to the results, economic growth is explained by GDP at a 75% level, by import at a 15% level, by FDI at a 5% level. However, the impacts of FDI and export on economic growth are not statistically significant. GDP and import are statistically significant on economic growth in the first two quarters, but insignificant for subsequent quarters. There is a unidirectional causality from import to economic growth. Invariably, import and GDP are the determinants of economic growth in very short-term. While the effects of FDI and exports on growth are insignificant in Turkey.

The work of Zhang (2017) centres on the relationship between FDI inflows and economic growth, using Engle-Granger bivariate cointegration procedure. The research analyzes the impact from FDI inflows to GDP as well as the causality between them with time series data for 5 countries. The results show that the growth effect of FDI inflows is still ambiguous for the 5 countries, while all 5 countries have a significant effect from GDP on FDI inflows.

According to a study by Muhammed, Azu & Oko (2018) on influence of real exchange rate and volatility on FDI inflow into Nigeria between 1970 and 2014. Generalized auto regressive heteroskedasticity (GARCH) was employed to determine the level of volatility and auto regressive distributed lag (ARDL) model was applied to ascertain the relevant results. The result shows that the effects of exchange rate and its volatility are more of a short-run phenomenon, while devaluation increases inflow of FDI, volatility leads to skepticism on the part of foreign investors.

The study by Ojo & Alege (2010) aimed at examining the period of the current global financial crisis, policy implications and the impact of the sudden rise on FDI flows, as well as the consequent financial and economic development for the selected countries. It was based on International Trade, New Growth and Financial Theories, and an expanded Solow-type model in the determination of the endogenous growth model. The method of panel Vector Auto Regressive (VAR) model was also used, this was done principally to measure the active impact of FDI inflows for policy examination utilizing the role of stimulus reaction. The countries accessed were 27 and the period of estimation was 1987-2007. From the regression result, there was a significant positive value for GDP implying that the inflow of foreign capital would rise as there was growing economic activity in Africa.

Tampakoudis, Subeniotis, Kroustalis & Skouloudakis (2017) examine the effects of some determinants on FDI inflows to middle-income countries with respect to avoiding the middle-income trap. They employ a panel data analysis for fifteen middle-income countries. The results highlight the significance of trade openness, GDP and population growth on inward FDI, while financial development, inflation, infrastructure and fuel exports are found to be insignificant.

Subsequently the study of Asiedu (2006) as cited in Asiedu and Lien (2011), aimed also at determining the impact of natural resources, market size, physical infrastructure, human capital, host countries’ investment policies, legal system reliability and political stability on FDI flows. The research was based on growth theories, and it made use of panel data. The fixed effect panel estimation method of analysis was utilized in the study. Result shows that developed local markets, natural endowment, improved infrastructure, low inflation, efficient legal system, and enhanced investment framework promote FDI. Whereas, corruption, political instability have an opposite effect. It was inferred from the study that, increase in FDI does not invariably mean economic growth, rather, policies that promote FDI have direct impact and long-term effect on economic growth. However, the theory base of the empirical study was not clearly stated. The number of years and countries under observation can also be increased for better outcome of results.

III. METHODOLOGY

Research Design

This research work on the multi-sectoral analysis of the effect of Foreign Direct Investment on Nigeria’s output growth employed Ex-post Facto research design which shows that the data has been in existence and not originally collected by the researcher. It is based on quasi experimental design and not experimental design, that means there were little or no laboratory experiment carried out.

Sources of Data

This study adopted data from secondary sources, which were obtained from the Federal Inland Revenue Service (FIRS), and Central Bank of Nigeria Statistical Bulletin (CBN Bulletin 2020). Federal Direct Investment (FDI), Exchange Rate (EXR) and Interest Rate (INTR) were sourced from FIRS report 2020 and Mining & Quarrying GDP, Manufacturing & Processing GDP, Agricultural GDP and Information and communication GDP were sourced from CBN Bulletin of 2020.

Model Specification

MODEL 1

The mathematical model is stated as follows;

$$GDP = \beta_0 + \beta_1 FDI + \beta_2 INTR + \beta_3 EXR + \mu$$

Where: β_0 = Constant β_1 to β_3 = Parameter estimate for the explanatory variables.

The justification for these models is to estimate the effect of Foreign Direct Investment on Nigeria’s output growth. The model could be modified as follows to suit this work:

Hence, the Functional form of this model is expressed as:

$$MQGDP = f (FDI, INTR, EXR)..... (i)$$

Equation (i) is also expressed in Parametric form as

$$MQGDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 INTR_{,t} + \beta_3 EXR_t + ut..... (ii)$$

Converting equation (ii) to their logarithm form, we have:

$$LnMQGDP_t = \beta_0 + \beta_1 Ln FDI_t + \beta_2 LnINTR_{,t} + \beta_3 Ln EXR_t + \mu t..... (iii)$$

Where: “ $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4$ are Constants; MQGDP = Mining & Quarrying GDP; FDI = Foreign Direct Investment; INTR = Interest Rate; EXR = Exchange Rate and ut = Error Term;

A priori expectation: $\beta_0 >0$, $\beta_1 >0$, $\beta_2 <0$ and $\beta_3 >0$ FDI and EXR are expected to have positive (+) signs while INTR is expected to have negative (-) sign.

MODEL 2

The Functional form of this model is expressed as:

$$MPGDP = f (FDI, INTR, EXR).....(i)$$

Equation (i) is also expressed in Parametric form as

$$MPGDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 INTR_{,t} + \beta_3 EXR_t + ut..... (ii)$$

Converting equation (ii) to their logarithm form, we have:

$$LnMPGDP_t = \beta_0 + \beta_1 Ln FDI_t + \beta_2 LnINTR_{,t} + \beta_3 Ln EXR_t + \mu t..... (iii)$$

Where: “ $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4$ are Constants; MPGDP = Manufacturing & Processing GDP; FDI = Foreign Direct Investment; INTR = Interest Rate; EXR = Exchange Rate and ut = Error Term;

A priori expectation: $\beta_0 >0$, $\beta_1 >0$, $\beta_2 <0$ and $\beta_3 >0$ FDI and EXR are expected to have positive (+) signs while INTR is expected to have negative (-) sign.

MODEL 3

The Functional form of this model is expressed as:

$$AGGDP = f (FDI, INTR, EXR).....(i)$$

Equation (i) is also expressed in Parametric form as

$$AGGDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 INTR_{,t} + \beta_3 EXR_t + ut..... (ii)$$

Converting equation (ii) to their logarithm form, we have:

$$LnAGGDP_t = \beta_0 + \beta_1 Ln FDI_t + \beta_2 LnINTR_{,t} + \beta_3 Ln EXR_t + \mu t..... (iii)$$

Where: “ $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4$ are Constants; AGGDP = Agricultural GDP; FDI = Foreign Direct Investment; INTR = Interest Rate; EXR = Exchange Rate and ut = Error Term;

A priori expectation: $\beta_0 > 0$, $\beta_1 > 0$, $\beta_2 < 0$ and $\beta_3 > 0$ FDI and EXR are expected to have positive (+) signs while INTR is expected to have negative (-) sign.

MODEL 4

The Functional form of this model is expressed as:

$$ICGDP = f(FDI, INTR, EXR) \dots \dots \dots (i)$$

Equation (i) is also expressed in Parametric form as

$$ICGDP_t = \beta_0 + \beta_1 PPT_t + \beta_2 CIT_t + \beta_3 CED_t + \beta_4 VAT_t + ut \dots \dots \dots (ii)$$

Converting equation (ii) to their logarithm form, we have:

$$LnICGDP_t = \beta_0 + \beta_1 Ln FDI_t + \beta_2 Ln INTR_{,t} + \beta_3 Ln EXR_t + \mu t \dots \dots \dots (iii)$$

Where: “ $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4$ are Constants; ICGDP = Information and Communication GDP;

FDI = Foreign Direct Investment; INTR = Interest Rate; EXR = Exchange Rate and ut = Error Term;

A priori expectation: $\beta_0 > 0$, $\beta_1 > 0$, $\beta_2 < 0$ and $\beta_3 > 0$ FDI and EXR are expected to have positive (+) signs while INTR is expected to have negative (-) sign.

Methods of Data Analyses

The models were estimated using Auto-regressive Distributive Lag (ARDL) technique of data analysis, to determine the effect of taxation on the growth of Nigerian Economy. The research hypotheses and questions formed the basis on which the results of the analysis were presented.

Unit Root Test

The results of the ARDL estimation might be spurious if the variables were non-stationary. Unit root test of stationarity for each of the variables adopted, the Augmented Dickey-Fuller (ADF), Philip Peron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) specification were used to ascertain the stationarity of the data. The suitable lag length for ADF estimation starts with maximum lag but that of PP and KPSS starts with few lags.

Co-integration Test

If all the variables are not found stationary at levels (i.e. they exhibit unit roots), we proceed further to carry out a co-integration test. The co-integration relationship between the variables will be ascertained by Johansen co-integration bound as against the Auto-Regressive Distributed Lag (ARDL). The choice of the traditional Johansen co-integration framework as against the recent Auto-Regressive Distributed Lag (ARDL) approach is that ARDL is structured in such a way that it takes into consideration the different order of integration of time series data. however, the variables in this study are all stationary in the same order (1st difference).

ARDL Model

This can be used when the result of a co-integration test for a particular model reveals that more than one co-integrating vectors exist among the variables of interest. An ARDL model is designed for use with non-stationary series that are known to be co-integrated. The ARDL has co-integration relations built into the specification so that it restricts the long-run behaviour of the endogenous variables to converge to their co-integrating relationships, while allowing for short-run adjustment dynamics. The use of the methodology of Co-integration and ARDL add more quality, flexibility and versatility to the econometric modeling of dynamic systems and the integration of short-run dynamics with the long-run equilibrium.

Regression Results Interpretation

The Adjusted R-Squared, F-Statistic and Durbin Watson test were the statistical criteria to interpret the result of the models that will be estimated. Furthermore, the coefficient of the respective variables also explained the nature of relationship between the dependant and the independent variables.

Adjusted R-Square (R²):

The adjusted coefficient of determination indicates how well data points fit a statistical model – sometimes simply a line or curve. It is a statistic used in the context of statistical models whose main purpose is either the prediction of future outcomes or the testing of hypotheses, on the basis of other related information. It provides a measure of how well observed outcomes are replicated by the model, as the proportion of total variation of outcomes explained by the model. An R² of 1 indicates that the regression line perfectly fits the data.

F* Statistic:

F-statistic tests the hypothesis that all coefficients (except the intercept) are equal to zero. This statistic has F(k-1,n-k) distribution under the null hypothesis and normality assumption, and its *p-value* indicates probability that the hypothesis is indeed true. Conventionally, *p-values* smaller than 0.05 is an evidence of rejection of hypothesis of joint significance of explanatory variables.

Durbin Watson Statistic:

The Durbin-Watson test is the conventional tool to check for autocorrelation in the model. In a situation where is the Durbin-Watson detects the presence of autocorrelation in the model, the serial correlation LM test was utilized to correct the autocorrelation issue observed.

IV. RESULTS AND DISCUSSION

Data Presentation

The data used in the analysis of this study are described as shown as Gross Domestic Product of; Mining & Quarrying (MQGDP), Manufacturing & Processing (MPGDP), Agriculture (AGGDP) and Information & Communication (ICGDP) as the Dependent Variables, and Foreign Direct

Investment (FDI), Interest Rate (INTR) and Exchange Rate (EXR) as the Explanatory Variables.

Table 4.1. Augmented Dickey Fuller Unit Root Test Result.

| Variables | Coefficients | Std. Error | Prob. | Level of Diff. |
|--------------|--------------|------------|--------|----------------------|
| MQGDP | -1.004394 | 0.192273 | 0.0000 | I ST DIFF |
| MPGDP | -0.649507 | 0.179034 | 0.0012 | I ST DIFF |
| AGGDP | -0.956053 | 0.192740 | 0.0000 | I ST DIFF |
| ICGDP | -0.646697 | 0.188558 | 0.0020 | I ST DIFF |
| FDI | -2.673091 | 0.297926 | 0.0000 | I ST DIFF |
| INTR | -2.448087 | 0.483533 | 0.0001 | I ST DIFF |
| EXR | -0.973550 | 0.025606 | 0.0000 | I ST DIFF |

Source: E-View Extract Version 10.0

Discussion of Unit Root Test Result.

The general assumption is that time series data have unit roots. This implies that they are usually not stationary over time and this distorts time periods for which regression analysis can be performed for the data. The test of stationary was done to determine the stochastic behaviour of the variables for the study. The Augmented Dicker Fuller (ADF) test for unit root was employed to test for spurious regression. The outcome of the test was used to determine the suitable tool of regression analysis for the study. The results are shown in Table 4.1. The results are based on computed ADF t-statistics and the corresponding probability value (p.value). The decision rule is to reject the null hypothesis that: there is a unit root (not stationary) when the p.value is less than 0.05 level of significance; and to accept on the otherwise. When the null hypothesis is rejected, it can then be concluded that the variable is stationary and therefore reliable for performing time series analyses.

From the results in Table 4.1, both the dependent variables (MQGDP, MPGDP, AGGDP & ICGDP) and the explanatory variables (FDI, INTR & EXR) were not stationary at level but

became stationary at first difference. The models had variables for I(1) stationary status. Thus, Johanson co-integration is the most suitable tool of regression analysis to be used since all the variables were stationary at the same order.

Results of Long-Run Co-integration Test.

After the stationarity test on the variables, the co-integration test was carried out among the variables. When co-integration is present, it means that Foreign Direct Investment, Interest Rate, Exchange Rate and Economic Growth indicators share a common trend and long-run equilibrium. The long run relationship was established by conducting the co-integration test using the Johansen co-integration approach. It involves generating the residuals from the regression and then performing stationarity test on it.

Hypothesis to be tested is: H₀: the variables are not co-integrated

H₁: the variables are co-integrated

Decision Rule: Reject H₀ if the absolute value of the residual exceeds the critical value at 5% level, otherwise do not reject.

Table 4.2. Co-integration Result (FDI, INTR, EXR, MQGDP, MPGDP, AGGDP, ICGDP)

| Hypothesized No. of CE(s) | Eigen Value | Trace Statistic | 0.05 critical value | Prob. | Max-Eigen statistic | 0.05 critical value | Prob. |
|---------------------------|-------------|-----------------|---------------------|--------|---------------------|---------------------|--------|
| None | 0.873588 | 144.8820 | 95.75366 | 0.0000 | 59.93216 | 40.07757 | 0.0001 |
| At most 1 | 0.691433 | 84.94982 | 69.81889 | 0.0019 | 34.09869 | 33.87687 | 0.0471 |
| At most 2 | 0.576868 | 50.85114 | 47.85613 | 0.0255 | 24.94205 | 27.58434 | 0.1050 |
| At most 3 | 0.372583 | 25.90909 | 29.79707 | 0.1314 | 13.51818 | 21.13162 | 0.4058 |
| At most 4 | 0.329750 | 12.39091 | 15.49471 | 0.1391 | 11.60301 | 14.26460 | 0.1265 |
| At most 5 | 0.026803 | 0.787898 | 3.841466 | 0.3747 | 0.787898 | 3,841466 | 0.3747 |

Source: E-view Extract Version 10

* Denotes rejection of the hypothesis at 5% (1%) significance level.

Trace test indicates no cointegrating eqn(s) at the 0.05 level

Max-eigenvalue test indicates no cointegrating eqn(s) at the 0.05 level

Source: Extract from Cointegration Test Result (See Appendix)

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From Table 4.2, the null hypothesis of no co-integration, for $r=0$ (None), $r \geq 1$ (at most 1), $r \geq 2$ (at most 2) are accepted in the trace statistic and rejected in max-eigen statistic. The statistical values of these tests are lower than their critical values implying that there are co-integrating vectors among the series while $r \geq 3$ (at most 3), $r \geq 4$ at most 4, $r \geq 5$ at most 5 are higher than the critical value indicating no co-integrating vector series and as such should be rejected in trace statistics and accepted in max-eigen statistics.

$r=0$ (None), $r \geq 1$ (at most 1), and $r \leq 2$ (at most 2), $r \geq 3$ (at most 3), are accepted in the max-eigen statistic while, $r \geq 3$ (at most 3), $r \geq 4$ at most 4, $r \geq 5$ at most 5 are rejected. The statistical values of this test are lower than the critical values with at most 2 having a greater value, this implies that there is three co-integrating vectors among the series. The implication of these results is that there is possibility of positive long run relationship that exists between the independent variables and the dependent variables.

Auto Regressive Distributive Lag (ARDL) Results.

Table 4.3 ARDL Results of FDI, INTR, EXR & MQGDP.

| Dependent Variable - MQGDP | | | | |
|----------------------------|-------------|-----------|-------------|-------------|
| Variables | Coefficient | Std error | T-statistic | Probability |
| C | -0.168996 | 0.517788 | -0.326381 | 0.7475 |
| FDI | 0.020640 | 0.022827 | -0.904174 | 0.3767 |
| INTR | 0.009117 | 0.035783 | 0.254776 | 0.8015 |
| EXR | 0.042901 | 0.051787 | -0.828409 | 0.4172 |
| R-squared | = 0.841075 | | | |
| Adjusted R-squared | = 0.777505 | | | |
| F-statistic | = 13.23072 | | | |
| Prob(F-statistic) | = 0.000002 | | | |
| Durbin-Watson stat | = 2.377482 | | | |

Source: E-view extract version 10

The result obtained from the ARDL result of Model 1 is presented in table 4.3. From the above result, the relationship of the model is;

$$\text{MQGDP} = -0.168996 - 0.020640 \text{ FDI} + 0.09117 \text{ INTR} - 0.042901 \text{ EXR} + \text{Ut}$$

The result indicates that Foreign Direct Investment (FDI), and Exchange Rate (EXR) have negative effect on the dependent Variable while the Interest Rate has positive effect on the dependent variable (MQGDP). The negative coefficients of the explanatory variables indicate that Gross Domestic Product of Mining & Quarrying (MQGDP) will decrease by 0.0206 & 0.0429 units respectively if revenue generated from FDI and EXR are increased by 1 unit and vice versa. However, positive coefficient of INTR indicates that MQGDP will be increased by 0.0091 units if INTR is ns there is no serial correlation. The outcome of this result is in line the work of Alabi (2019) and Uwakaeme (2016).

increased by 1 unit and vice versa. The coefficients of the two (2) variables (FDI & EXR) are negatively signed which negate the a priori expectation and exerted a negative effect on MQGDP, while the coefficient of INTR is positively signed in contrary to the a priori expectation. The probability values of the explanatory variables are 0.3767, 0.8015, and 0.4172 which indicate that none are significant at 0.05 level. The Adjusted R² of 0.777505 shows that 78% variation in the dependent variable are explained by the independent variables while the remaining 22% are unexplained. The F.statistics probability of 0.0000 is smaller than 0.05 which is evidence of rejection of hypothesis of the joint explanatory variables. The P. value indicates probability that the hypothesis is indeed true. Durbin Watson of 2.02 indicates that there is no autocorrelation which mea

Table 4.4. ARDL Results of FDI, INTR, EXR & MPGDP.

| Dependent Variable - MPGDP | | | | |
|----------------------------|-------------|-----------|-------------|-------------|
| Variables | Coefficient | Std error | T-statistic | Probability |
| C | 0.448676 | 0.217828 | 2.059769 | 0.0514 |
| FDI | 0.011365 | 0.020483 | 0.554861 | 0.5846 |
| INTR | -0.015152 | 0.040177 | -0.377136 | 0.7097 |
| EXR | -0.002148 | 0.025271 | -0.085006 | 0.9330 |
| R-squared | = 0.949576 | | | |
| Adjusted R-squared | = 0.935825 | | | |
| F-statistic | = 69.05074 | | | |
| Prob(F-statistic) | = 0.000000 | | | |

Durbin-Watson stat = 2.016878

Source: E-view extract version 10

The result obtained from the ARDL result of Model 2 is presented in table 4.4. From the above result, the relationship of the model is;

$$\text{MPGDP} = 0.4487 + 0.0114 \text{ FDI} - 0.0152 \text{ INTR} - 0.0021 \text{ EXR} + \text{Ut}$$

The result indicates that Foreign Direct Investment (FDI) has positive effect on the dependent variable while the Interest Rate (INTR) and Exchange Rate (EXR) have negative effect on the dependent variable (MPGDP). The positive coefficient of the explanatory variable indicates that Gross Domestic Product of Manufacturing & Processing (MPGDP) will increase by 0.0114 unit if revenue generated from FDI is increased by 1 unit ceteris paribus. However, negative coefficients of INTR and EXR indicate that MPGDP will be decreased by 0.1515 and 0.0021 units if INTR and EXR are increased by 1 unit ceteris paribus. The coefficient of the variable is positively signed which appear to have met the a

priori expectation and exerted a positive effect on MPGDP, while the coefficients of INTR and EXR are negatively signed while INTR conforms with the a priori expectation, however, EXR is in contrary to the a priori expectation. The probability values of the explanatory variables are 0.5846, 0.7097, and 0.9330 which indicate that FDI, INTR & EXR are not significant at 5% level. The Adjusted R² of 0.9258 shows that 93% variation in the dependent variable are explained by the independent variables while the remaining 7% are unexplained. The F. statistics probability of 0.0000 is smaller than 0.05 is evidence of rejection of hypothesis of the joint explanatory variables. The P. value indicates that the hypothesis is indeed true. Durbin Watson of 2.02 indicates that there is no autocorrelation which means that there no is serial correlation. The outcome of this result is in line with the work of Erkisi (2018) and Asiedu (2006).

Table 4.5. ARDL Results of FDI, INTR, EXR & AGGDP.

| Dependent Variable - AGGDP | | | | |
|----------------------------|-------------|-----------|-------------|-------------|
| Variables | Coefficient | Std error | T-statistic | Probability |
| C | 0.637675 | 0.205334 | 3.105545 | 0.0052 |
| FDI | 0.017877 | 0.017404 | 1.027178 | 0.3155 |
| INTR | 0.003271 | 0.032204 | 0.101569 | 0.9200 |
| EXR | 0.029563 | 0.048853 | 0.605140 | 0.5513 |
| R-squared | = 0.989755 | | | |
| Adjusted R-squared | = 0.986967 | | | |
| F-statistic | = 354.2279 | | | |
| Prob(F-statistic) | = 0.000000 | | | |
| Durbin-Watson stat | = 2.735129 | | | |

Source: E-view extract version 10

The result obtained from the ARDL result of Model 3 is presented in table 4.5. From the above result, the relationship of the model is;

$$\text{AGGDP} = 0.6376 + 0.0179 \text{ FDI} + 0.0327 \text{ INTR} + 0.02957 \text{ EXR} + \text{Ut}$$

The result indicates that Foreign Direct Investment (FDI), Interest Rate (INTR) and Exchange Rate (EXR) have positive effect on the dependent (AGGDP). The positive coefficients of the explanatory variables indicate that Gross Domestic Product of Agricultural sector (AGGDP) will increase by 0.0179, 0.0033 and 0.0295 units respectively if revenue generated from FDI, INTR & EXR are increased by 1 unit and vice versa. The coefficients of the two (2) variables (FDI & EXR) are positively signed which appear to have met the a priori expectation and exerted a positive effect on AGGDP,

while the positive coefficients of INTR are in contrary to the a priori expectation. The probability values of the explanatory variables are 0.3155, 0.9200 and 0.5513 which indicate that only one (1) of the explanatory variables significant at 0.05 level and the other two (2) are insignificant. The F. statistics probability of 0.0000 is smaller than 0.05 is evidence of rejection of hypothesis of the joint explanatory variables. The P. value indicates that the hypothesis is indeed true. The Adjusted R² of 0.986967 shows that 99% variation in the dependent variable are explained by the independent variables while the remaining 1% is unexplained. Durbin Watson of 2.74 indicates that there is no autocorrelation which means there is no serial correlation. The outcome of this result conforms with the work of Ugwuegbe, Okore & John (2013).

Table 4.6. ARDL Results of Fdi, Intr, Exr & ICGDP.

| Variables | Coefficient | Std error | T-statistic | Probability |
|--------------------|-------------|-----------|-------------|-------------|
| C | 0.305642 | 0.097098 | 3.147762 | 0.0051 |
| FDI | 0.006775 | 0.035326 | 0.191789 | 0.8498 |
| INTR | 0.009358 | 0.046524 | -0.0201137 | 0.8426 |
| EXR | 0.111784 | 0.079579 | 1.404696 | 0.1755 |
| R-squared | = 0.996666 | | | |
| Adjusted R-squared | = 0.995333 | | | |
| F-statistic | = 747.3728 | | | |
| Prob(F-statistic) | = 0.000000 | | | |
| Durbin-Watson stat | = 1.822354 | | | |

Source: E-view extract version 10

The result obtained from the ARDL result of Model 4 is presented in table 4.6. From the above result, the relationship of the model is;

$$ICGDP = 0.3056 + 0.0068 FDI - 0.0935 INTR + 0.1118 EXR + Ut.$$

The result indicates that Foreign Direct Investment (FDI) and Exchange Rate (EXR) have positive effect on the dependent Variable while Interest Rate (INTR) has negative effect on the dependent variable (ICGDP). The positive coefficients of the explanatory variables indicate that Gross Domestic Product of Information and Communication (ICGDP) will increase by 0.0068 and 0.1117 units respectively if revenue generated from FDI & EXR are increased by 1 unit and vice versa. However, negative coefficient of INTR indicates that ICGDP will be decreased by 0.0094 units if INTR is increased by 1 unit and vice versa. The coefficients of the two (2) variables (FDI & EXR) are positively signed which appear to have met the a priori expectation and exerted a positive effect on ICGDP, while the coefficient of INTR is negatively signed in conformity with the a priori expectation. The probability values of the explanatory variables (FDI, INTR & EXR) are 0.8498, 0.8426, and 0.1755 respectively which indicate that those variables are not significant at 0.05 level. The Adjusted R² of 0.9947 shows that 99% variable in the dependent variable are explained by the independent variables while the remaining 1% is unexplained. The F. statistics probability of 0.0000 is smaller than 0.05 is evidence of rejection of hypothesis of the joint explanatory variables. The P. value indicates probability that the hypothesis is indeed true. Durbin Watson of 1.82 indicates that there is no autocorrelation which means there no serial correlation. The outcome of this result is in line with the work of Ojo & Alege (2010) and Zhang (2017).

V. CONCLUSION AND RECOMMENDATIONS.

Conclusion

Based on the findings summarized above, the explanatory variables (FDI, INTR & EXR) have impacted positively and negatively on the output of Mining & Quarrying (MQGDP),

Manufacturing & Processing (MPGDP), Agriculture (AGGDP) and Information & Communication (ICGDP). However, the impact was not significant, we then conclude that Foreign Direct Investment has positive but insignificant effect on Nigeria’s output growth. This outcome shows that though Nigeria’s economic growth and development require Foreign Direct Investment to strengthen the Mining & Quarrying sector, Manufacturing & Processing sector, Agricultural sector and Information & Communication sector output of the economy, but government are not properly formulating policies and designing strategies that will help to attract Foreign Direct Investment inflow in the country so as to improve their economic productivity and promote growth.

Recommendations.

From the findings of the study, the following recommendations were made;

Foreign Direct Investment (FDI) and Exchange Rate (EXR) have negative and insignificant effect on Mining & Quarrying output (MQGDP), relevant authorities should ensure that necessary infrastructure and policy framework should be put in place to encourage this sector to attract Foreign Direct Investment and improve balance of payment equilibrium.

Foreign Direct Investment (FDI) has positive but insignificant effect on Manufacturing & Processing output (MPGDP), government should encourage FDI and design strategies that will guarantee sustainable growth.

Foreign Direct Investment (FDI), Interest Rate (INTR) and Exchange Rate (EXR) have positive but insignificant effect on the Agricultural sector output (AGGDP), government at all level should strive to support and promote agricultural sector in order to increase their productivity.

Foreign Direct Investment (FDI) and Exchange Rate (EXR) have positive effect on Information & Communication output (ICGDP), relevant authorities should come up with strategies that will improve the output of this sector which will in turn engender growth.

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