



IMPACT OF SELECTED MACROECONOMIC VARIABLES ON FOREIGN DIRECT INVESTMENT IN NIGERIA: AUTO-REGRESSIVE DISTRIBUTED LAG (ARDL) MODEL

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Abstract

This study examined the impact of selected macroeconomic variables on foreign direct investment in Nigeria over the period of 1981 to 2017. It employed the Auto-Regressive Distributed Lag (ARDL) bound cointegration model to examine both the short run and long impacts of the selected variables on FDI. The bound cointegration test result showed evidence of long run relationship between FDI and selected macroeconomic variables in the country. The result of the ARDL model showed that foreign exchange rate and crude oil prices positively and significantly influenced FDI in the country both in the short run and in the long run. The result further showed inflation to have negative and significant impact on FDI both in the short and long run. It equally showed that, while real gross domestic product has positive and significant influence on FDI in the short run, in the long the effect is insignificant. In view of the empirical result, government policies to bring about price stability and stability in the macroeconomic environment is required in order to attract FDI in the country.

Keywords: Macroeconomic variables, ARDL, foreign direct investment, bound cointegration

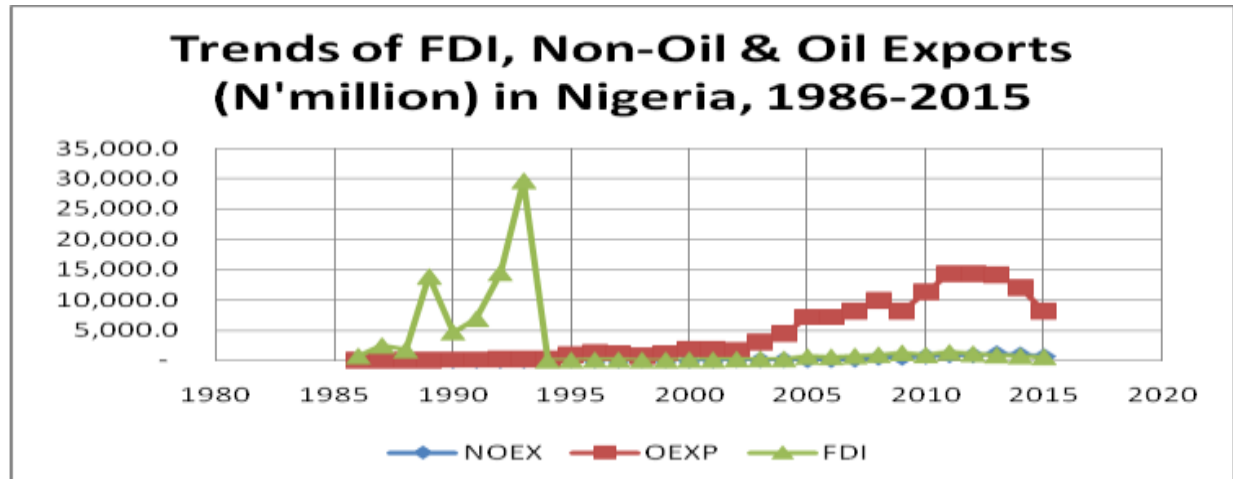
INTRODUCTION

The growing debate in foreign direct investment is driven by the perceived opportunities that can be derived from the utilization of foreign capital injection into the economy to add to domestic savings and promote economic growth and development (Aremu, 1997). Owing to the above premise, strands of literature opine that foreign direct investment inflow have accounted for more than forty percent of external development finance to developing and transition economies (UNCTAD, 2015). Thus, high level of FDI inflow is arguably desirable in Nigeria. Similarly, Akinlo (2004) is of the opinion that before any country takes full advantage of what foreign direct investment has to offer, it must first improve on their economic environment by making it an enabling environment for investors. On that note, the environment in which these businesses function is influenced by several forces, one of such forces are the macroeconomic performance of the country. Therefore, the stability and instability of the indicators of macroeconomic performance reflects the economic situation of a country, and the level of business activities and growth determines the attractiveness of the inflow of foreign direct investments into the country (Agbonifo, 2005).

Furthermore, Agbonifo (2005) expressed the enormous benefits of foreign direct investment to the economic prospect of Nigeria in numerous ways: first, foreign direct investment can greatly enhance the industrialization and development goals of Nigeria, by helping to finance investment. It is assumed by many economists that one of the objectives of industrialization is to provide employment for the inhabitants, and make goods available for consumers. Hence, if foreign direct investment is wooed into the country it will help provide employment, training and development of talents, technical or managerial skills to the citizens. It will also bring about development of technology. Moreover, it can also impact on the country's balance of payment by promoting export, also helping in integrating the country's economy into a global market. Foreign Direct Investment serves as an important engine for economic development which will result in the increase of the standard of living of the people, and much more.

An analysis on recent studies reveals that foreign investors are attracted to a country where there is macroeconomic stability and low investment risk in terms of steady price, high economic growth, less volatile exchange rate, increase in GDP and much more. But when we take a closer look at the situation in Nigeria, we find out that there is a high level of macroeconomic disequilibrium emanating from various disturbances on these macroeconomic variables. For instance the issue of dwindling oil price which occurred as a result of the collapse in the global oil price per barrel, this situation has reduced our foreign reserve as well as the GDP growth rate in the country.

Figure 1: Trends of FDI, Non-Oil Export and Oil Export



Source: Authors' Plot from CBN (2015)

Figure 1 indicates the patterns of movements in FDI, non oil export and oil export earnings from 1986 to 2015. Between 1986 and 1994, FDI outnumber both oil and non-oil export as it maintained a continuous increase from 1989 to 1994 when it reached a decade all time high of N29660.3m, the highest value ever recorded since 1986 and thereafter nosedived sharply in 1994 and maintained a steady but slow improvement. During this period, oil export maintained a steady increase while non-export trailed oil export in the trend. Nevertheless, the recent increase in the inflationary rate as a result of scarcity in petroleum products is not helping matters as this has caused an increase in the prices of goods and services leading to investment risk. Our currency (naira) is depreciating day after day owing to the fact that only just a few countries are demanding for our products. Economic growth is not left out as lower investment leads to lower GDP. This situation has weakened the economy against its global competitors driving away potential investors. Which shows that even though Nigeria is one of the top recipients for FDI destination as attested by UNCTAD, (2015) it is much less compared to the number of foreign direct investment we are supposed to get in a country blessed with so much natural resources. This further raises the question of what factor determines FDI in the country. Furthermore, the inability to retain the foreign direct investment inflow into the country and understanding the macroeconomic factors that attract or scare FDI into a country become imperative. This study therefore sought to determine the impact of selected macroeconomic variables on foreign direct investment in Nigeria.

Although, there are many research studies on the nexus between foreign direct investment and economic growth in Nigeria, only few of the studies examine the impact selected macroeconomic variable on FDI (see Uwabanwen and Ogremudia, 2016; Pulstrova, 2016;

Muntah, Khan, Haider and Ahmad, 2015; Agrawal, 2015; Otto and Ukpere, 2014). This study differs from the existing studies by investigating the impact of selected macroeconomic variables on foreign direct investment in Nigeria employing Auto Regressive Distributed Lag (ARDL) model. The remaining part of this work is divided into four. Section two reviews related literature, section three discusses the methodological issues and section four presents and discusses the empirical results while section five highlights policy implications and conclusion.

EMPIRICAL LITERATURE

Ogbulu and Paul (2009) evaluated empirically the impact of black market exchange premium on the inflows of foreign direct investment (FDI) in Nigeria, during the period of economic liberalization (1986 - 2006). Annual data on FDI inflows, Black market exchange premium, inflation rate and Real GDP were collected through secondary sources. The data collected were analyzed using a semi-log-linear regression method. The results obtained indicated that black market exchange premium was not a significant determinant of FDI inflows during the period. The results further showed that factors such as real official exchange rate, political risk factors, inflation rate and market size are significant determinants of FDI inflows in Nigeria.

In another paper, Isu, Ogbulu and Paul (2009) investigated empirically the impact of trade openness on the inflows of foreign direct investment (FDI) in Nigeria during the period (1986-2006). Annual data on FDI inflows, inflation rate, total trade volume, oil exports and government overall fiscal deficit/surplus were collected through secondary sources. The data collected were analyzed using a semi log-linear regression method. The results indicated that openness to trade impacted on the FDI inflows positively and significantly during the period under review. The authors concluded that government resolve to open the economy to foreign investors contributed greatly to inflows of FDI. Also the results from the control variables indicated that besides openness to trade, the availability of natural resources has promoted inflows of FDI, while price instability had retarded it. The study recommended that government should continue to embrace the policy of trade openness and fiscal discipline among others to attract greater FDI inflows.

Uwubanmwun and Ogiemudia (2016) examined the effect of foreign direct investment on economic growth in Nigeria using annual time series data covering the period 1979 to 2013. The data were analyzed using Error Correction Model. The results reveal that FDI has both immediate and time lag effect on Nigeria economy in the short run but has a non-significant negative effect on the Nigeria economy in the long run. Pulstova (2016) studied the effects of foreign direct investment and firm export on economic growth in Uzbekistan. The study covered the period 1990 – 2014 and descriptive method was adopted. He found that an increase in FDI

may cause firms to increase their export of products. Muntah, Khan, Haider and Ahmad (2015) studied the impact of foreign direct investment on economic growth of Pakistan covering the period 1995 to 2011. The data were sourced from World Bank, Economy of Pakistan Books, Index Monde and Economic Survey of Pakistan. Regression analysis was used in the study. They found that FDI impacts positively on economic growth of Pakistan.

Agrawal (2015) assessed the relationship between foreign direct investment and economic growth in the five BRICS economies, namely, Brazil, Russia, India, China and South Africa over the period 1989 – 2012. Cointegration and Causality analysis were applied. The results indicate that foreign direct investment and economic growth are cointegrated at the panel level, indicating the presence of long run equilibrium relationship between them. Results from causality tests indicate that there is long run causality running from foreign direct investment to economic growth in these economies.

Melnyk, Kubatko and Pysarenko (2014) examined the impact of foreign direct investment on economic growth in post-communism transition economies. The study used neoclassical growth theory to analyze the effect of FDI on economic growth. They found a significant FDI influence on economic growth of host countries. They concluded that in addition to the direct capital financing it supplies, FDI can be a source of valuable technology and know-how while fostering linkages with local firms, which can help to jumpstart an economy. Based on these arguments, industrialized and developing countries have offered incentives to encourage foreign direct investments in their economies. The study recommended that transition and developing economies should pay more attention to the business climate and positive institutional changes. Otto and Ukpere (2014) assessed foreign direct investments and economic development and growth in Nigeria over a 41 year period. They observed that there is a positive relationship between foreign direct investments and economic growth in Nigeria. They suggested that policies are required which will facilitate foreign direct investments into Nigerian economy.

Koojaroenprasit (2012) explored the impact of foreign direct investment on economic growth of South Korea using secondary data for the period 1980–2009. Multiple regression analysis was employed in the study. This study found that there is a strong and positive impact of FDI on South Korean economic growth. Furthermore, the study indicated that human capital, employment and export also have positive and significant impact, while domestic investment has no significant impact on South Korean economic growth. He argued that the interaction effects of FDI- human capital and FDI-export indicated that the transfer of high technology and knowledge has an adverse impact on South Korean economic growth. Roman and Padureanu (2012) found that FDI and capital endowments are positively correlated with GDP in Romania, but what was not expected was the fact that the human capital was negatively correlated with

GDP evolution. As the authors stated, the last fact is explained by the reduction of Romanian population in 1995-2004. Pelinescu and Dulescu (2009) found that direct FDI influence is still at a low level, but the indirect influence, through the increase in productivity and competitiveness is more evidenced in Romania.

Ayanwale (2007) examined FDI and economic growth in Nigeria using secondary data sourced from the Central Bank of Nigeria, International Monetary Fund and Federal Office of Statistics. The period of analysis was 1970- 2002. An augmented growth model was estimated via the ordinary least squares and the 2SLS method to ascertain the relationship between the FDI, its components and economic growth. Results suggest that the determinants of FDI in Nigeria are market size, infrastructure development and stable macroeconomic policy. Openness to trade and available human capital, however, are not FDI inducing. He observed that FDI in Nigeria contributes positively to economic growth. He stressed that although the overall effect of FDI on economic growth may not be significant, the components of FDI do have a positive impact. He added that FDI in the communication sector has the highest potential to grow the economy and is in multiples of that of the oil sector. The manufacturing sector FDI negatively affects the economy, reflecting the poor business environment in the country. According to him, the level of available human capital is low and there is need for more emphasis on training to enhance its potential to contribute to economic growth.

Alfaro (2003) examined the effect of foreign direct investment on growth in the primary, manufacturing and service sectors. An empirical analysis using cross-country data for the period 1981-1999 suggests that total FDI has an ambiguous effect on growth. He found that foreign direct investments in the primary sector, however, tend to have a negative effect on growth, while investment in manufacturing has a positive effect. According to the researcher, evidence from the service sector is ambiguous. Njeru (2013) assesses the impact of Foreign Direct Investment on Economic Growth in Kenya from 1982 to 2012. The statistical package for social sciences was used to analyze the data where descriptive analyses, frequencies and trend analysis, as well as inferential analyses involving Analysis of Variance (ANOVA) and correlation analysis to establish positive relationships between variables. Similarly, Nkechi (2013) also examines the impact of FDI on economic growth in Nigeria. Using OLS technique and secondary data, it was discovered that Foreign Direct Investment has a negative impact on Economic Growth. Akinlo (2004) using data for the period 1970 to 2001 in his Error Correlation Model (ECM) results found that FDI has a small and statistical insignificant effect on economic growth in Nigeria. Therefore, it becomes imperative that the impact of FDI in the Nigerian economy must be isolated in order to test whether the relationship is positive or negative.

Asiedu (2006) found natural resources, large market size, lower inflation, good infrastructure, an educated population, and openness to FDI, less corruption, political stability and a reliable legal system as major determinants of FDI flows. Akinlo (2004) found that foreign capital has a small and not statistically significant effect on economic growth in Nigeria.

Onu (2012) investigates the impact of foreign direct investment (FDI) on Economic Growth in Nigeria within the period 1986-2007. The study found that FDI has the potential to positively impact upon the economy though its contribution to GDP was very low within the period under review. The multiple regression results also revealed that FDI, government tax revenue (GTR) and savings exerted positive but not significant impact, except savings, on GDP during the study period. However, foreign exchange and public expenditure on education (PEE) had inverse relationship with GDP. The study concluded that FDI induces the inflow of capital, technical know-how and managerial capacity which can stimulate domestic investment and accelerate the pace of economic growth.

Jerome and Ogunkola (2004) assessed the magnitude, direction and prospects of FDI in Nigeria. They noted that while the FDI regime in Nigeria was generally improving, some serious deficiencies remain. These deficiencies are mainly in the area of the corporate environment (such as corporate law, bankruptcy, labour law, etc.) and institutional uncertainty, as well as the rule of law. The establishment and the activities of the Economic and Financial Crimes Commission, the Independent Corrupt Practices Commission, and the Nigerian Investment Promotion Commission are efforts to improve the corporate environment and uphold the rule of law. Ayanwale (2007) investigated the empirical relationship between non-extractive FDI and economic growth in Nigeria. Using OLS estimates, he found that FDI has a positive link with economic growth but cautioned that the overall effect of FDI on economic growth may not be significant.

Adigwe, Ezeagba and Francis (2015) examine the relationship between foreign direct investment, exchange rate and gross domestic product. Using time series data, data for the study were collected from CBN Statistical Bulletin from 2008 to 2013. Pearson Correlation was used to test the hypothesis with aids of SPSS version 20.0. Their findings revealed that there is a significant relationship between FDI, EXR and GDP, indicates that economic growth in Nigeria is directly related to foreign direct investment and exchange rate.

METHODOLOGY

Given the nature of the time series properties of the model variables in this study, ARDL model was employed was examined the impact of selected macroeconomic variables on foreign direct investment in Nigeria.

The functional form of the model is given as:

$$FDI = f(RGDP, INF, COP, FXR) \dots \dots \dots (1)$$

Where, FDI = foreign direct investment, RGDP = real gross domestic product, INF = inflation rate, COP = crude oil prices and FXR = foreign exchange rate.

All the variables except inflation are in logarithm form. The choice of ARDL model was based on its advantages over other models. The Auto Regressive Distributed Lag (ARDL) Model which uses a bounds test approach based on unrestricted error correction model (UECM) was employed here to estimate the impact of macroeconomic variables on foreign direct investment and to test for a long run relationship among the relevant variables. This model was developed by Pesaran and Pesaran (1997) and used by Pesaran, et al (2001) and the main advantage of this approach lies in the fact that it can be applied irrespective of whether the variables are I (0) or I (1). This approach also allows for the model to take a sufficient number lags to capture the data generating process in a general-to-specific modelling framework. Although, a dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation, Banerjee et al., 1998 and Pesaran et al., 2001, have introduced bound testing as an alternative to test for the existence of cointegration among the variables. The bounds test procedure is merely based on an estimate of unrestricted error correction model (UECM) using ordinary least squares estimator. Tang (2003) argues that the UECM is a simple re-parameterization of a general ARDL model. Also following Shrestha and Chowdhury (2007), to illustrate the ARDL modeling approach, the unrestricted error correction model of equation (1 and 2) respectively is:

$$\Delta FDI_t = \beta_0 + \beta_1 FDI_{t-1} + \beta_2 RGDP_{t-1} + \beta_3 INF_{t-1} + \beta_4 COP_{t-1} + \beta_5 FXR_{t-1} + \sum_{i=0}^p \delta_i \Delta FDI_{t-i} + \sum_{i=0}^q \gamma_i \Delta RGDP_{t-i} + \sum_{i=0}^q \phi_i \Delta INF_{t-i} + \sum_{i=0}^q \alpha_i \Delta COP_{t-i} + \sum_{i=0}^q \eta_i \Delta FXR_{t-i} + \mu \dots \dots \dots (2)$$

The terms with the summation signs in equation 2 represent the Error Correction Model (ECM) dynamics and the coefficients β_i are the long run multipliers corresponding to long run relationship (Poon, 2010). β_i and μ represent the constant and the white noise respectively. Δ is the first difference operator. In order to obtain the cointegrating equation, equation 2 is transformed into 3 as follows:

$$\Delta FDI_t = \beta_0 + \beta_1 FDI_{t-i} + \beta_2 RGDP_{t-i} + \beta_3 INF_{t-i} + \beta_4 COP_{t-i} + \beta_5 FXR_{t-i} + \sum_{i=0}^p \delta_i \Delta FDI_{t-i} + \sum_{i=0}^q \gamma_i \Delta RGDP_{t-i} + \sum_{i=0}^q \phi_i \Delta INF_{t-i} + \sum_{i=0}^q \alpha_i \Delta COP_{t-i} + \sum_{i=0}^q \eta_i \Delta FXR_{t-i} - \lambda ECT + \mu \dots \dots \dots (3)$$

Where,

$$ECT_t = Y_t - \alpha_0 - \sum_{i=1}^p \gamma_i \Delta Y_{t-i} - \sum_{i=0}^p \beta_i \Delta X_{t-i} \text{ and } \lambda = 1 - \sum_{i=1}^p \gamma_i \Delta Y_{t-i} \dots (4)$$

The Bound test procedure used equations 2 and 3 into 4 as:

$$\Delta Y_t = - \sum_{i=1}^{p-1} \gamma_i Y_t * \Delta Y_{t-i} + \sum_{i=0}^p \beta_i \Delta X_{t-i} - \rho Y_{t-1} - \alpha - \sum_{i=0}^p \delta X_{t-i} + \mu_{it} \dots (5)$$

Then we tested the existence of level relationship as $\rho = 0$ and $\delta_1 = \delta_2 = \dots = \delta_k = 0$

Where, Δ = difference operator, μ = white noise error term. The data used for this study are secondary data and were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin (2017), covering 1981 – 2017.

Unit Root Tests

It is important to check each time series variable for stationarity or unit root before conducting the co-integration test on specified models. The unit root test has to be conducted first because without it, if the regression analysis is conducted in the traditional way and time series variables are found to be non-stationary, the result will be spurious. Here we use the Augmented Dickey Fuller (ADF) for the unit root tests.

The ADF is unit root test for time series. It is shown in the equation below:

$$\Delta Y_t = \beta_0 + \beta_1 t + \delta Y_{t-1} + \sum_{i=1}^n \alpha_i \Delta Y_{t-i} + \varepsilon_t \dots \dots \dots (3)$$

Where, Y_t is the variable in question, ε_t is white noise error term.

These tests are used to determine whether the estimated δ is equal to zero or not. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in (3) is serially uncorrelated. Fuller (1976) has compiled cumulative distribution of the ADF statistics by showing that if the value of the calculated ratio of the coefficient is less than critical value from ADF statistics, then Y is said to be stationary.

ANALYSIS AND FINDINGS

The estimates from the analysis (ADF, regression, test of cointegration) carried out using E-views 10 software are presented thus:

Unit Root Test

A unit root test (ADF) was conducted to ascertain whether the variables in the model are stationary and to determine the order of integration of the model variables (Table 1). This is necessary as it helps to avoid spurious regression results.

Table 1: Summary of ADF test results at 1%, 5% and 10% critical value

Variable	Order of Integration	ADF Test Statistics	ADF Critical Value			Lag Length	Remark
			1%	5%	10%		
FDI	I ~ (1)	-7.924662	-3.6329	-2.9484	-2.6129	0	Stationary
COP	I ~ (1)	-7.112199	-3.6329	-2.9484	-2.6129	0	Stationary
RGDP	I ~ (1)	-3.339741	-3.6397	-2.9482	-2.6129	0	Stationary
INF	I ~ (0)	-3.302123	-3.6329	-2.9484	-2.6129	1	Stationary
FXR	I ~ (1)	-5.108291	-3.6329	-2.9484	-2.6129	0	Stationary

From table 1 above, observe that all the variables except inflation (INF) are stationary after first difference which implies that the variables (FDI, COP, RGDP and FXR) are integrated of the order one (I ~ (1)) whereas only INF is integrated of order zero (I ~ (0)). Since the variables are integrated of order one and zero and none of the variables is integrated of order two. We therefore, applied the ARDL bound cointegration test. But before we apply the ARDL bound cointegration test, we first determined the optimum lag length using Akaike information criteria. After twenty (20) models automatically generated, ARDL (1,0,3,0,3) was chosen based on Akaike information criteria.

ARDL Bound Cointegration Test

A necessary condition for testing for ARDL bound co-integrating test is that each of the variables be integrated of either of order one or zero or both (Pesaran, Shin and Smith, 2001). Since all the variables are integrated of order one and zero, we proceeded to estimate the ARDL bound test. The null hypothesis of ARDL bound cointegration is that the variables are not cointegrated as against the alternative that they are cointegrated. The decision rule is to reject the null hypothesis if the F-statistics is greater than the upper bound critical values at chosen level of significance. The result of the ARDL cointegration test is shown in table 2 below.

Table 2: ARDL Bound Cointegration Test Result

Model	F-Statistics	K	Significance level	Critical Bound Value	
				10 (Lower Bound)	11 (Upper Bound)
1	8.143034	4	5%	2.56	3.49
			2.5%	2.88	3.87
			1%	3.29	4.37

From table 2 the F-statistics is 8.143 which is greater than the upper (I1) bound of 4.37 at 1% level of significance. Thus, we reject the null hypothesis and conclude that there is cointegration in the model. This implies that there is a long run relationship between foreign direct investment and selected macroeconomic variables in Nigeria.

Since there is long run relationship between FDI and selected macroeconomic variables, we therefore estimate the short run and long run ARDL regression model and the result is presented in tables 4 and 5 below respectively:

Table 3: Summary of Parsimonious Short Run Relationship between FDI and Selected Macroeconomic Variables

ARDL Model (1, 0, 3, 0, 3)

Variables	Dependent Variable FDI			
	Coefficient	Std. Error	t-statistics	Probability
Constant	7.384440	4.280905	1.724972	0.0986
lnFDI(-1)	0.799215***	0.148898	5.367531	0.0000
lnFXR	0.991326***	0.197753	5.012949	0.0001
lnCOP	0.688772***	0.218429	3.153305	0.0046
lnRGDP(-1)	6.708568**	2.483554	2.701197	0.0130
INF(-1)	-0.020317**	0.008553	-2.375523	0.0267
INF(-2)	-0.030127***	0.006865	-4.388570	0.0002
ECM(-1)	-0.799215***	0.103211	-7.743536	0.0000
R-squared = 0.741811 Adj R-Squared = 0.684436				

***[**] denotes significant of variable at 1% [5%] significance level respectively.

Variables were based on their order of integration

Interpretation of Short Run ARDL Result

From table 3 above, the coefficient of the previous value of FDI is positive and statistically significant implying that the present value of FDI depends positively on its immediate past state. In other words, what drives the present value of FDI into the country is its value.

The coefficients of foreign exchange rate (FXR) and real gross domestic product (RGDP) are positive and statistically significant implying that depreciation in exchange rate as well as economic growth attract foreign direct investment into the country. This is in line with the a priori expectation suggesting that exchange rate depreciation makes investment in the host country cheaper and attractive which will increase FDI into the country. In the case of economic growth which means a persistence increase in income, this will increase total demand and in turn attract FDI into the country. This result corroborates the findings of Ogbulu and Paul (2009) and Adigwe, Ezeagba and Francis (2015).

Similarly, the result shows crude oil price as having positive and significant impact on FDI. This is consistent with the theoretical postulation and suggests that an increase in crude oil prices, crude oil being the major source of foreign revenue and the key driver of economic growth in Nigeria will increase total demand and this in turn will attract FDI into the country.

Expectedly, inflation at lag one and two inversely and significantly affects FDI in Nigeria. This implies that a rise in investment will reduce FDI as investment decision becomes difficult and uncertain and hence reduces FDI in the country. This result supports the finding of Ogbulu and Paul (2009) who studied the determinants of FDI in Nigeria and their result showed, among other things, inflation and official exchange rate as the major determinants of FDI in Nigeria.

The coefficient of error correction model (ECM (-1)) is (-0.799) and is appropriately signed. This speed of adjustment suggests that about 80% of the previous period's disequilibrium in FDI value is corrected every year by macroeconomic variables such as foreign exchange rate, real gross domestic prices, crude oil prices and inflation. The implication is that it will take about one year and two months for any disequilibrium in the FDI value to be corrected by selected macroeconomic variables.

The coefficient of multiple determination is 0.742, suggesting that about 74.2% of the variations in FDI is explained by the selected macroeconomic variables in the model. This further shows a good explanatory power of the model.

Table 4: Summary of Long Run Relationship between FDI and Selected Macroeconomic Variables

Variables	Dependent Variable FDI			
	Coefficient	Std. Error	t-statistics	Probability
Constant	-9.239611	4.607959	-2.005142	0.0574
lnFXR	1.240374***	0.115186	10.76845	0.0000
lnRGDP	0.483004	0.537377	0.898817	0.3785
lnCOP	0.861811***	0.269584	3.196822	0.0042
INF	-0.054550***	0.009249	-5.898133	0.0000

***[**] denotes significant of variable at 1% [5%] significance level

Interpretation of Long Run ARDL Result

The long run coefficient from table 4 above shows that, in the long run, foreign exchange rate and crude oil prices have both positive and significant impact on foreign direct investment in Nigeria. While real GDP does not have significant impact on FDI, inflation negatively and significantly impacted on FDI in the long run in Nigeria.

Table 5: Results of Diagnostic Tests

	F- Statistics	Probability
Breusch-Godfrey LM test for autocorrelation	1.017788	0.3572
Harvey Heteroskedasticity	1.672093	0.3064
Ramsey RESET Test	0.0454	0.0.9611
Normality Test	2.318349	0.215420

The results of the diagnostic tests were also presented in table 5. The emphasis was on testing the presence or absence of serial correlation in the residuals generated from the models, Ramsey model specification test, heteroskedasticity test and stability test as well as the normality test. The serial correlation tests of the residuals were based on the Breusch-Godfrey LM test for autocorrelation. The estimated model Result from the second order tests indicates no evidence of serial correlation in the model. Also, the Ramsey reset test result indicates no evidence of omitted variable problem in the results and the Harvey Heteroskedasticity test shows no evidence of heteroskedasticity in model. In the same vein the normality test shows that the residual is normality distributed.

CONCLUSION AND POLICY RECOMMENDATIONS

This study investigated the impact of selected macroeconomic variables on foreign direct investment in Nigeria using Auto-Regressive Distributed Lag (ARDL) model. The empirical findings suggest that foreign exchange rate and crude oil prices have positive and significant impact on foreign direct investment both in the short run and in the long run in Nigeria. It further shows that inflation, as expected, negatively and significantly affect FDI both in the short and the long run. On the contrary, real GDP has positive and significant on FDI in the short run but the impact insignificant in the long run. Following this empirical result, policies of the government to ensure price stability and macroeconomic stability is required to attract foreign direct investment into the country. Also, government should formulate sound foreign exchange rate policy that will attract foreign direct investment through exchange rate stability. This study focuses on the impact of selected macroeconomic variables on FDI in Nigeria. Further research

study can be carried on the direction of causality between FDI and economic growth as well as FDI and selected macroeconomic variables to determine which variable(s) influences the other.

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