MACROECONOMIC BEHAVIOUR AND FDI INFLOWS IN NIGERIA: AN APPLICATION OF THE ARDL MODEL

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\textbf{Abstract}

\textit{Based on the Macroeconomic theory of FDI movement, this study examined the relationship between FDI and some selected macroeconomic variables both at the long and short run equilibrium in Nigeria. The study used ARDL estimation techniques to inquire if the selected macroeconomic variables have significant influence on FDI, what macroeconomic variable(s) need to be manipulated so as to enhance inflows of FDI to the nation’s economy? What policy implication should be adopted? The results show that policy that attempt to expand trade, increase government expenditure, manipulate the exchange rate system, lower inflation and interest rates are useful in attracting FDI inflows.}

\textbf{Keywords:} FDI, Interest rate, Exchange rate, Real Gross Domestic Product, Nigeria, Africa.

\section{1.0 INTRODUCTION:}

The relationship between Foreign Direction Investment (FDI) and the state of the economy have been extensively discussed both at the empirical and theoretical point of views in economic literature with mixed conclusion (Aitken and Harrison (1999); Lipsey (2002). Macroeconomic theory on FDI shows that a functional relationship exists between FDI and the state of the economy. Evidence abound in literature that inflows of FDI have significant impact on macroeconomic variables (Hong, (2014); Temiz \textit{et al}, (2014); Sanchez-Martin, (2014); Yalta, (2013); Tomohara and Takii (2011); Turkcan \textit{et al}, (2008)).

Previous studies have focused on examining the impact of FDI in driving aggregate economy, with very few studies examining the impact of pull factors in attracting FDI inflows. Besides, most of the studies
that inquire into the impact of FDI inflows on home economies focus on Asian with very few on Africa, Nigeria inclusive. This study tends to advance literature by inquiring into the impact of macroeconomic variables in attracting FDI inflows to the Nigerian economy. Ever since the first republic (1979 - 1983), various policy instruments have been put in place by successive administrations in Nigeria to attract inflows of FDI into the economy. Prime among these policies includes trade liberalization policy of 1985 which aim at enhancing the export base of the economy and to achieve favourable Balance of Payment position; Exchange rate stability policy of 1991 which aimed at correcting the overvaluation of the naira exchange rate and provide sound framework that will boast FDI inflows to the economy; Big-Government policy of 2003 – 2012 (that advocate increase in government expenditure) which was tailored towards providing infrastructures and institutions necessary for the inflows of FDI into the economy; Export Promotion Strategy/policy of the 2000s which focuses on the establishment of the Nigerian Export Processing Zone, Export grants, tax holidays and incentives for exporters and foreign investors, insurance schemes for exporters which all focus on expanding the export base of economy and attracting FDI inflows; The National Economic Empowerment Development Strategies (NEEDS) of the year 2004 which aimed among other things at diversifying the economy from a mono-cultured economy (that mainly depend on oil revenue) to multi-cultured economy where agriculture, service, manufacturing among others play competitive role with crude oil with emphasis on attracting foreign investors. Financial sector reform led by the Banking Sector consolidation exercise of the year 2005 which aimed at repositioning the banking sector as a major player in attracting FDI as well as contributing significantly to the RGDP among others. The questions are does macroeconomic variables have significant influence on the inflows of FDI to the Nigerian economy? In other words, is there any relationship between FDI and macroeconomic variables (Real GDP, Exchange rate, Inflation, Interest rate, Government Expenditure and Trade)? What macroeconomic variable(s) needs to be adjusted or manipulated so as to enhance
inflows of FDI into the Nigerian economy? What policy implication should be adopted to enhance inflows of FDI into the economy? Answering these questions will aid making recommendations to relevant authority on what macroeconomic variables to manipulate so as to enhance adequate inflows of macroeconomic variables in Nigeria.

The rest of the paper is divided into four sections. Section two (2) provides the review of relevant literature, section three (3) deals with methodology, section four (4) centres on results and its interpretations while section five (5) provides the conclusion.

2.0 LITERATURE REVIEW:

2.1 THEORETICAL REVIEW:

The theoretical notes on the roles of FDI in an economy abound in the literature. Basically, we can divide these theories following Azam (2010) into two basic classes viz: Microeconomic theory and Macroeconomic theory of FDI movement.

Microeconomic theory of FDI deals with the role of market imperfections and desire of Multinational Corporations to expand their market power. The impacts of firm specific advantages, product superiority or cost efficiency as a result of economies of scale, multi-plant economies, high level of technology and superior marketing and distribution. Scholars from this school of thought belief that Multinational Companies takes advantages of these developments to expand directly into a foreign country, rather than mere increasing trade (Coskun (2001); Sarbapriya (2012)).

Macroeconomic theory centres on the degree of macroeconomic variable volatility in an economy in determining the inflows of FDI to such economy. The theory observed that both the economic and non-economic factors such as risk, macroeconomic instability and political crisis among other things significantly impacts on FDI. Foreign investors are forward looking and observed fluctuations in each of these factors, knowing that fluctuations in these factors increase uncertainty and may affect investments.
The theory observed that political instability in the home economy could lead to disruption of productive activity as well as destruction of the facility of the foreign investors. (See also Blonigen (1997), Barrell et al(1998), Iyoha (2001), Akinboade, Siebrits and Roussot (2006), Lipsey and Chrystal (2006) Elijah et al, (2008)).

Other insightful depth to the understanding of FDI inflows to a nation’s economy were provided for in Portfolio Allocation Theory of Fedderke (2002) which sees FDI inflows as a function of rates of return and risk on investment; and in Electric/Combine macroeconomic and microeconomic theory of Dunning (1980) among others.

From the preceding discussions, it can be seen that the macroeconomic theory on FDI establishes a functional relationship between FDI and macroeconomic variables. The study therefore tends to examine this relationship within the context of Macroeconomic theory using annual data sourced from 1981 to 2013 for the Nigerian economy.

2.2 EMPIRICAL REVIEW:

This section reviews some of the existing empirical work on FDI inflow determinants in economies across the globe.

Erdal and Mahmut (2008) examined the factors that determine the inflows of FDI in developing economies using a set of data from thirty eight (38) developing countries and a cross-sectional econometric model. Their findings shows that growth rate of per capital GDP, telephone mainlines and degree of openness have positive sign and are statistically significant, labour cost has positive sign while inflation rate and tax rate have negative signs and statistically significant.

Adams (2009) examined the relationship of FDI with Domestic Investment (DI) and economic growth for some selected Sub-Saharan African economies using both the OLS and Fixed Effects estimation techniques for data sourced between 1990 and 2003, and observed that though FDI has an initial negative
effect on DI, the relationship subsequently becomes positive and significant in succeeding years. The study also documented that both the DI and the FDI exhibits positive and significant relationship with economic growth for the economies studied with some elements of crowding out effect from FDI. He recommended that targeted approach to FDI sourcing, increasing the absorption capacity of the local firms by investing in human capital development; and establishment of a cordial relationship between governments of these economies and Multinational enterprises are essential, if achieving a positive impact on economic growth from FDI and DI is in view. Tomohara and Takii (2011) extended literature on the impact of FDI on African economies by calibrating labour market into the FDI model. The study observed that FDI inflows often increase wages of workers above the initial market-based wage prior to FDI inflows in such economies.

Niazi, et al (2011) examined the impact of GDP growth rate and inflation on FDI in an economy using multiple regression model to analyse data sourced between year 2001 and 2010, and observed that a positive but insignificant relationship exist between FDI and GDP growth rate, while a negative but insignificant relationship exist between inflation and changes in FDI. Their findings suggest that overall, the model is significant and that a causal relationship exist between GDP and FDI whereas an inverse relationship exists between inflation and FDI (see also Khalil (2011), Konstantin (2011)).

On a study on FDI inflows into Pakistan, Yulin and Mudassar (2013) used co-integration analysis and dynamic variance decomposition to examine the determinants of FDI into the Pakistani economy. The study observed that a stable relationship exist between FDI and macroeconomic variables used. It thus recommends that policy makers should focus on achieving stability of the macroeconomic variables so as to achieve sustained inflows of FDI.

Similarly, Ivar Kolstad, Arne Wiig (2012) performed an econometric analysis of the determinants of inflows of FDI to host economies from China and observed that large market size, large natural resources
and poor institutions in the host economy are good catalysts that attracts FDI to the host economy from China. Again, a link could be established between this and Nyarko et al (2011) who studied the effects of exchange rate regime on FDI inflows in Ghana and observed that the exchange rate had no significant effect on attracting FDIs into Ghana, rather strategic location and market size are the two main variables that stimulate FDI inflows into the country.

However, a divergent view was observed by Shinji and Zongying (2011), who reported that FDI decreases with a depreciation of the foreign nation currencies (Japanese yen) against host country currencies and increases with exchange rate volatility in the host economy. They added that inflows of FDI to host economy were little affected by the Asian financial crisis that occurred between 1997 and 1998. Furthermore, their findings shows that FDI inflows are sector induced as manufacturing sector attracts more of FDI inflows in these economies from Japan than portfolio flows. Thus, they advised policy makers to make policies that will avoid erratic behaviour with respect to major currencies in the world.

Wattanadumrong et al (2014) examined the determinants of FDI inflows to Thailand using a dynamic panel data approach to analyse annual data from 1970 to 2004 sourced from Thailand and ten other economies which have bi-lateral agreement with Thailand. They distinguished between direct (i.e tax incentives) and indirect (manipulation of macroeconomic variables) approaches by the government as a way of attracting FDI inflows. The study noted that the volume of trade, relative wage rates and geographical distance have significant impact in attracting FDI inflows to Thailand, while macroeconomic variables of RGDP, exchange rate have no significant impact on FDI inflows to Thailand. The authors recommends that effort towards attracting FDI should be tailored towards
improving direct policy approach of tax incentives, provision of sound institutional framework and political stability.

Alguacil et al (2011) investigated the link between FDI and home country macroeconomic and institutional development using annual data sourced from twenty six (26) emerging economies for the period 1976 to 2005. The study used the system Generalized Method of Moments (GMM) for dynamic panel data sourced from these economies and observed that internal and external macroeconomic stability as well as sound institutional framework are required to attract and sustain inflows of FDI to the host economies. They further observed that absorptive capacities in host economies play crucial role in determining the overall impact of FDI on economic growth. Their findings suggests that RGDP impacts significantly on FDI inflows and its sustainability only and only if sound investment framework induced by better macroeconomic and institutional framework is put in place.

Hossain and Hossain (2012) used cointegration and Granger causality estimation techniques to examine the relationship between FDI inflows and RGDP for economies of Bangladesh, Pakistan and India from annual data for a period of thirty six (36) years (1972 - 2008), and observed that there is no cointegration between FDI and GDP both at the long and short run for Bangladesh and India. Their result also shows that no causality relationship exists between GDP and FDI for Bangladesh but a unidirectional causality exist between GDP and FDI for both Pakistan and India. They further stated that cointegration exist between FDI and GDP both at the long and short run for the Pakistani economy.

For Turkey, Temiz and Gokmen (2013) examined the relationship between FDI inflows and GDP growth using the Johansen cointegration test and Granger causality techniques to analyse quarterly data sourced...
from 1992Q1 to 2007Q3 and observed that no significant relationship exist between FDI and RGDP both at the long and short run.

Hong (2014) examined the impact of FDI on economic growth for China using data for the period 1994 to 2010. The study used GMM to analyse data from 254 prefecture level cities in China and observed that a positive and significant relationship exist between FDI and economic growth in China, while no significant relationship exist between trade openness and FDI.

Yalta (2013) investigated the causality between FDI and RGDP in China for the period 1982 to 2008 using Simulation based bootstrap distribution for statistical inference, and observed that no statistical significant relationship exist between FDI and RGDP. The study also calibrated financial development into the model so as to test whether the result of the relationship between FDI and RGDP will change. The result shows that the inclusion of financial development has no impact on the relationship. The study suggests that government attention should shift from efforts that aim at attracting FDI such as incentive tax allowance to increasing domestic investment, private and semi-private enterprises promotion and higher education among other things.

For the Latin America economies, Sanchez-Martín et al (2014) examined the factors that determines FDI inflows for the period 1990 to 2010 using GMM framework, and observed that previous stock of FDI, trade openness, low short term debt levels, balance of payment deficit and government stability are the main determinants of FDI inflows in Latin America economies. Other key factors includes sound legal framework and low expropriation risks. They recommend sound institutional framework, macroeconomic and political stability, low exposure to public debt and trade openness as key to attracting and sustaining FDI inflows to the economies reviewed.
3.0 METHODOLOGY:

This study adopts the use of Autoregressive Distributed Lag (ARDL) bound testing to examine both the long run and short run relationship between FDI inflow and some selected macroeconomic variables in Nigeria. The ARDL was developed by Pesaran and Shin (1999) and later extended by Pesaran et al (2001). This approach is preferable to others existing cointegration estimation techniques of Engle and Granger (1987) and Johahsen (1991) because of the many advantages it offers. Some of these advantages includes its ability to accommodate small data set (Ghatak and Siddiki, (2001); Odhiambo, (2008); (2009); (2010)) it has the ability to analyse data whether the regressors are integrated of the same order or not, in other words, it does not necessary require that we examine the non-stationary property and order of integration of the variables. It works whether the underlying regressor are purely I(0), purely I(1) or a combination of both. The third advantage it has over other existing cointegration techniques is that the ARDL allows the variables to have different optimal lags, which is practically impossible for other techniques. More importantly, the ARDL technique employs a single reduced form equation unlike other traditional cointegration techniques that estimate the long run relationship using a system of equations.

3.1 MODEL SPECIFICATION:

We develop a linear equation model such that:

$$ FDI = f (RGDP, INF, EXC, INT, TRD, GE) $$

(1)

Our choice of variables used was influenced by the works of Sanchez-Martín et al, (2014), Wattandumrong et al, (2014) among others. We expect that a positive relationship exist between FDI and each of the independent variables.

The ARDL estimation is as follow:
\[ \Delta \ln \text{FDI}_t = \beta_{01} + \sum_{i=1}^{n_1} \beta_{11} \Delta \ln \text{FDI}_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12} \Delta \ln \text{RGDP}_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13} \Delta \ln \text{INF}_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14} \Delta \ln \text{EX}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{INT}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{TRD}_{t-\tau} + \phi_{11} \ln \text{FDI}_{t-1} + \phi_{12} \ln \text{RGDP}_{t-1} + \phi_{13} \ln \text{INF}_{t-1} \\
+ \phi_{14} \ln \text{EX}_{t-1} + \phi_{15} \ln \text{INT}_{t-1} + \phi_{15} \ln \text{TRD}_{t-1} + \phi_{15} \ln \text{CE}_{t-1} \epsilon_{t1} \quad (2) \]

\[ \Delta \ln \text{RGDP}_t = \beta_{01} + \sum_{i=1}^{n_1} \beta_{11} \Delta \ln \text{RGDP}_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12} \Delta \ln \text{FDI}_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13} \Delta \ln \text{INF}_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14} \Delta \ln \text{EX}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{INT}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{TRD}_{t-\tau} + \phi_{11} \ln \text{FDI}_{t-1} + \phi_{12} \ln \text{RGDP}_{t-1} + \phi_{13} \ln \text{INF}_{t-1} \\
+ \phi_{14} \ln \text{EX}_{t-1} + \phi_{15} \ln \text{INT}_{t-1} + \phi_{15} \ln \text{TRD}_{t-1} + \phi_{15} \ln \text{CE}_{t-1} \epsilon_{t1} \quad (3) \]

\[ \Delta \ln \text{INF} = \beta_{01} + \sum_{i=1}^{n_1} \beta_{11} \Delta \ln \text{INF}_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12} \Delta \ln \text{FDI}_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13} \Delta \ln \text{RGDP}_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14} \Delta \ln \text{EX}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{INT}_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln \text{TRD}_{t-\tau} + \phi_{11} \ln \text{FDI}_{t-1} + \phi_{12} \ln \text{RGDP}_{t-1} + \phi_{13} \ln \text{INF}_{t-1} \\
+ \phi_{14} \ln \text{EX}_{t-1} + \phi_{15} \ln \text{INT}_{t-1} + \phi_{15} \ln \text{TRD}_{t-1} + \phi_{15} \ln \text{CE}_{t-1} \epsilon_{t1} \quad (4) \]
\[
\Delta EX = \beta_{01} + \sum_{i=1}^{n_1} \beta_{1i} \Delta EX_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12i} \Delta \ln FDI_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13i} \Delta \ln RGDP_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14i} \Delta INF_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta INT_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln TRD_{t-\tau} \\
+ \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln GE_{t-\tau} + \phi_{11i} \ln FDI_{t-1} + \phi_{12i} \ln RGDP_{t-1} + \phi_{13i} \ln INF_{t-1} \\
+ \phi_{14i} \ln EX_{t-1} + \phi_{15i} \ln INT_{t-1} + \phi_{15i} \ln TRD_{t-1} + \phi_{15i} \ln GE_{t-1} \varepsilon_{t1} \quad (5)
\]

\[
\Delta INT = \beta_{01} + \sum_{i=1}^{n_1} \beta_{11i} \Delta INT_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12i} \Delta \ln FDI_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13i} \Delta \ln RGDP_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14i} \Delta INF_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta EX_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln TRD_{t-\tau} \\
+ \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln GE_{t-\tau} + \phi_{11i} \ln FDI_{t-1} + \phi_{12i} \ln RGDP_{t-1} + \phi_{13i} \ln INF_{t-1} \\
+ \phi_{14i} \ln EX_{t-1} + \phi_{15i} \ln INT_{t-1} + \phi_{15i} \ln TRD_{t-1} + \phi_{15i} \ln GE_{t-1} \varepsilon_{t1} \quad (6)
\]

\[
\Delta \ln TRD = \beta_{01} + \sum_{i=1}^{n_1} \beta_{11i} \Delta \ln TRD_{t-\tau} + \sum_{i=0}^{n_2} \beta_{12i} \Delta \ln FDI_{t-\tau} + \sum_{i=0}^{n_3} \beta_{13i} \Delta \ln RGDP_{t-\tau} \\
+ \sum_{i=0}^{n_4} \beta_{14i} \Delta INF_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta EX_{t-\tau} + \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln INT_{t-\tau} \\
+ \sum_{i=0}^{n_5} \beta_{15i} \Delta \ln GE_{t-\tau} + \phi_{11i} \ln FDI_{t-1} + \phi_{12i} \ln RGDP_{t-1} + \phi_{13i} \ln INF_{t-1} \\
+ \phi_{14i} \ln EX_{t-1} + \phi_{15i} \ln INT_{t-1} + \phi_{15i} \ln TRD_{t-1} + \phi_{15i} \ln GE_{t-1} \varepsilon_{t1} \quad (7)
\]
\[ \Delta \ln GE = \beta_{01} + \sum_{i=1}^{n_1} \beta_{1i} \Delta \ln GE_{t-i} + \sum_{i=0}^{n_2} \beta_{12} \Delta \ln FDI_{t-i} + \sum_{i=0}^{n_3} \beta_{13} \Delta \ln RGDP_{t-i} + \sum_{i=0}^{n_4} \beta_{14} \Delta \ln INF_{t-i} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln EXC_{t-i} + \sum_{i=0}^{n_5} \beta_{15} \Delta \ln INT_{t-i} + \phi_{11} \ln FDI_{t-1} + \phi_{12} \ln RGDP_{t-1} + \phi_{13} \ln INF_{t-1} + \phi_{14} \ln EXC_{t-1} + \phi_{15} \ln TRD_{t-1} + \phi_{15} \ln TRD_{t-1} \varepsilon_{t-1} \] (8)

Where \( \ln \) is the log of the variables, FDI represents Foreign Direct Investment; RGDP represent the Real Gross Domestic Product; INT represent interest rate; INF represent inflation rate; EXC represent exchange rate; TRD represent Trade (sum of import and export as a percentage of the GDP) and GE represent Government Expenditure as a percentage of the GDP. \( \Delta \) represents the first difference operator, \( \beta_{0i} \ldots \beta_{07} \) are the constant terms; \( \beta_{11} \ldots \beta_{77} \) represents the short run coefficients, \( \phi_{11} \ldots \phi_{77} \) are the long run coefficients, \( n_1 \ldots n_7 \) are the lag length and \( \varepsilon_{t-1} \ldots \varepsilon_{t-7} \) represents the white noise error terms.

We formulate the \( H_0 \) and \( H_1 \) hypothesis as shown below so as to test for existence of short run \( \beta_1 \) and long run \( \phi_5 \):

**H0: no long-run relationship**

<table>
<thead>
<tr>
<th>( \phi_{11} = \phi_{12} = \phi_{13} = \phi_{14} = \phi_{15} = \phi_{16} = \phi_{17} = 0 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \phi_{21} = \phi_{22} = \phi_{23} = \phi_{24} = \phi_{25} = \phi_{26} = \phi_{27} = 0 )</td>
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<td>( \phi_{31} = \phi_{32} = \phi_{33} = \phi_{34} = \phi_{35} = \phi_{36} = \phi_{37} = 0 )</td>
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<td>( \phi_{41} = \phi_{42} = \phi_{43} = \phi_{44} = \phi_{45} = \phi_{46} = \phi_{47} = 0 )</td>
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**H1: a long-run relationship**

<table>
<thead>
<tr>
<th>( \phi_{11} \neq \phi_{12} \neq \phi_{13} \neq \phi_{14} \neq \phi_{15} \neq \phi_{16} \neq \phi_{17} \neq 0 )</th>
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</tr>
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<tr>
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</tr>
</tbody>
</table>

**H0: no short-run relationship**

<table>
<thead>
<tr>
<th>( \beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = \beta_{15} = \beta_{16} = \beta_{17} = 0 )</th>
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**H1: a short-run relationship**

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</tr>
</tbody>
</table>
Deciding on either to reject or accept $H_0$ (no cointegration among the variables) is based on the following criteria:

If $F_{-\text{Statistics}} (F_s) >$ upper bond, then we reject $H_0$, thus the variables are cointegrated;

If $F_s <$ lower bound, then we accept $H_0$, thus we conclude that the variables are not co-integrated.

But if $F_s \geq$ lower bound and $\leq$ Upper bound, under this condition, the decision is inconclusive.

### 4.0 PRESENTATION OF RESULTS:

#### 4.1 Unit Root Test:

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF t. Statistics</th>
<th>Critical values</th>
<th>Prob.</th>
<th>Lag</th>
<th>Inference</th>
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</thead>
<tbody>
<tr>
<td>FDI</td>
<td>-4.404531</td>
<td>-3.699871</td>
<td>0.0018</td>
<td>0</td>
<td>1(0)</td>
</tr>
<tr>
<td>RGDP</td>
<td>-4.089707</td>
<td>-3.603202</td>
<td>0.0184</td>
<td>0</td>
<td>1(2)</td>
</tr>
<tr>
<td>INF</td>
<td>-2.773300</td>
<td>-2.627420</td>
<td>0.0754</td>
<td>0</td>
<td>1(0)</td>
</tr>
<tr>
<td>EXC</td>
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<td>-3.711457</td>
<td>0.0000</td>
<td>0</td>
<td>1(1)</td>
</tr>
<tr>
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<td>-3.699871</td>
<td>0.0006</td>
<td>0</td>
<td>1(0)</td>
</tr>
<tr>
<td>TRD</td>
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<td>0.0009</td>
<td>0</td>
<td>1(0)</td>
</tr>
<tr>
<td>INT</td>
<td>-5.535971</td>
<td>-4.374307</td>
<td>0.0007</td>
<td>0</td>
<td>1(1)</td>
</tr>
</tbody>
</table>

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The results of the unit root test as displayed in Table 1 above, it is evidence that for all the variables except for RGDP, EXC and INT, the T-values have more negative results than the critical values at 1%, 5% and 10% level, thus we reject the null hypothesis of unit root test in the series. Beyond this, the t-values for EXC and INT are integrated of Order 1 while RGDP is integrated of order 2.

### TABLE 2: F-STATISTICS FOR TESTING EXISTENCE OF A LONG RUN RELATIONSHIP AMONG THE VARIABLES.

<table>
<thead>
<tr>
<th>Equation</th>
<th>The calculated f- statistics</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_{InFDI}(lnFDI/lnRGDP, INT, INF, EXC, lnGE, lnTRD)$</td>
<td>18.6315</td>
<td>Co-integration</td>
</tr>
<tr>
<td>$F_{lnRGDP} (lnRGDP/lnFDI, INT, INF, EXC, lnGE, lnTRD)$</td>
<td>1.73061</td>
<td>No-co-integration</td>
</tr>
<tr>
<td>$F_{INT}(INT/lnFDI, lnRGDP, INF, EXC, lnGE, lnTRD)$</td>
<td>2.7345</td>
<td>Inconclusive</td>
</tr>
<tr>
<td>$F_{INT}(INF/lnFDI, lnRGDP, INT, EXC, lnGE, lnTRD)$</td>
<td>0.73616</td>
<td>No-co-integration</td>
</tr>
<tr>
<td>$F_{EXC}(EXC/lnFDI, lnRGDP, INT, INF, lnGE, lnTRD)$</td>
<td>0.81793</td>
<td>No-co-integration</td>
</tr>
<tr>
<td>$F_{lnGE} (lnGE/lnFDI, lnRGDP, INT, INF, EXC, lnTRD)$</td>
<td>12.6075</td>
<td>Co-integration</td>
</tr>
<tr>
<td>$F_{lnTRD} (lnTRD/lnFDI, lnRGDP INT, INF, EXC, lnGE)$</td>
<td>26.3879</td>
<td>Co-integration</td>
</tr>
</tbody>
</table>
From the table 2 it can be deduced that compelling long term Co-integration exists among the variables when the regression are normalized in the $lnFDI$, $lnGE$ and $lnTRD$ models. For the INT, the outcome is inconclusive as the calculated F- statistics is less than the upper bound critical value but greater than the lower-bound. We thus follow Kremers et al (1992) by adopting the error correction term to establish a cointegration procedure for the study.

Haven established the existence of cointegration, we proceed by estimating the long run and short run ARDL model for the study based on Schwartz Bayesian Criteria (SBC). When the FDI is the dependent variable, the result in Table 3 shows that in the long run, the impact of RGDP on FDI inflows is insignificant though positive, this is in line with the findings of Wattanadumrong et al, (2014) for Thailand, Yalta (2013) for China, Temiz and Gokmen (2013) for Turkey, but contradicts Turkcan et al,(2008), Hossain et al, (2012); Hong, (2014) who documented the existence of significant relationship between the two variables. The result also shows that only Inflation and Government Expenditure have significant impact on inflows of FDI to the Nigerian economy. It further states that a negative relationship exist in the long run between inflation and FDI inflows, this implies that increase in inflation rate will deter inflows of foreign investment as foreign investors will be careful so that their investment will not be eroded by increase in inflation. The positive sign of the Government expenditure indicates that increase in Government expenditure will attract inflows of FDI. The result of a positive relationship between government expenditure and FDI is in line with the findings of Yalta (2013), Sanchez-Martins et al, (2014).

In the short run, the RGDP coefficient is positive but not significant. This implies that RGDP have no impact on FDI inflows to the nation’s economy both at the long and short run (see Alguacil et al, (2011); Temiz and Gokmen, (2013)). The results for other variables show that significant relationship exists between all the variables and FDI inflows. The short run coefficient of Interest rate is negative and
significant; this implies that increase in interest rate in the short run will deter inflows of FDI into the economy. The result from the short run analysis of the impact of Trade on FDI inflows shows that a negative but significant relationship exists between Trade and FDI inflows, this is supported by earlier research as documented by Sanchez-Martins et al, (2014); Alguacil et al, (2002); Caudros et al,(2004) for trade but contradicts Hong, (2014) who find no relationship between trade and FDI for the Chinese economy, and Yalta, (2014) who documented a positive and significant relationship between the two variables. The results from the short run estimates of inflation, exchange rate and Government Expenditure are positive and significant at 99% significant level (see Yalta (2013), Sanchez-Martins et al, (2014)). This implies that increase in these variables will attract more inflows of FDI into the economy.

From our analysis, it can also be deduced that the degree of elasticity of the long run impact of TRD on the inflows of FDI is negative and stood at around 0.21819 and is statistically significant at 5% level, this implies that a 1% fall in TRD will lead to about 22% fall in the inflows of FDI in the short run while the impact at the long run is insignificant. Our result also shows that GE will impact on FDI such that 1% increase in GE will lead to about 32% increase in the inflows of FDI in the short run with a long run effect of about 119%. Furthermore, result shows the elasticity effect of INT on the inflows of FDI is negative and significant at 1% level of significance such that a 1% increase in interest rate will lead to about 99.5% fall in the inflows of FDI to the nation.

The ECM result indicates the speed of adjustment to restore equilibrium in the dynamic model following a disturbance. From the table, it could be seen that the coefficient of the ECM is -0.70877 and significant at 99% level of significant. This implies a high speed of adjustment back to equilibrium, such that about 71% of disequilibrium from previous year can return to long term equilibrium in the current year.

To check the stability of the ARDL model for long term coefficients with the short term dynamics between FDI and its determinants, this study employed the Cumulative Sum of Recursive Residuals
CUSUM and Cumulative Sum of Square CUSUMQ (Bahmani-Oskooee and Bohl, (2000); Pesaran and Pesaran, (1997), (2001); Bahmani-Oskooee and Ng, (2002); Bekhet and Matar, (2013)). The test plots (CUSUM and CUSUMSQ) say that if the statistics plot stays within the 5% range of the significant level (i.e. within the two straight lines), the null hypothesis states that all coefficients in the error correction model are stable and cannot be rejected. If on the other hand, either of the lines is crossed, the null hypothesis of the coefficient constancy can be rejected at 5% level of significance. The CUSUM and CUSUMQ statistics plots for the estimates are shown in Figure 1 below. From the curve, it is evidence that for both CUSUM and CUSUMQ plots, the estimates stays within the two lines, this implies that both the long term coefficients and the short term coefficients for the model are stable.

**TABLE 3: ESTIMATED LONG –RUN AND SHORT RUN COEFFICIENTS USING THE ARDL (2,0,2,2,2,2) SELECTED BASED ON SCHWARZ BAYESIAN CRITERION. DEPENDENT VARIABLE: FDI**

<table>
<thead>
<tr>
<th>Long-run coefficients</th>
<th>Short-run coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regressor</td>
<td>Coefficients</td>
</tr>
<tr>
<td>RGDP</td>
<td>0.16209</td>
</tr>
<tr>
<td>INT</td>
<td>-7295.7</td>
</tr>
<tr>
<td>INF</td>
<td>-17516.0</td>
</tr>
<tr>
<td>EXC</td>
<td>1751.5</td>
</tr>
<tr>
<td>GE</td>
<td>1.1892</td>
</tr>
<tr>
<td>TRD</td>
<td>0.22363</td>
</tr>
<tr>
<td>ECM(-1)</td>
<td>-70877</td>
</tr>
</tbody>
</table>
5.0 CONCLUSION AND POLICY IMPLICATIONS:

This study examined the relationship between FDI and some selected macroeconomic variables in Nigeria within the context of macroeconomic theory of FDI inflows. The ARDL estimation technique was employed to explore the relationship among these variables. Annual data from Central of Nigeria Statistical Bulletin 2015 for the period 1981 to 2014 were used. The result provides strong evidence against the null hypothesis of unit root in most of the series under investigation. The study attempts to answer a number of questions such as does macroeconomic variables have significant influence on the inflows of FDI to the Nigerian economy? What macroeconomic variable(s) need to be adjusted so as to enhance the inflows of FDI to the nation’s economy? What policy implication should be adopted to enhance the inflows of FDI to the Nigerian economy? The empirical results from the ARDL estimates shows interesting results, for instance, from the result it can be deduced that no significant relationship exist both at the long run and short run between FDI and RGDP. The result also shows that in the long run, no significant relationship exist between each of Interest rate, exchange rate, trade and FDI whereas there is a significant relationship between each of these variables and FDI in the short run. Furthermore, it can be seen from the result that there is a significant relationship at both the long and short run between inflation and FDI and between government expenditure and FDI. The result also show that the coefficient of the ECM at -0.70877 has the expected sign (negative) and highly significant at 1% level of significance and indicate the speed of adjustment back from short term disequilibrium to long term equilibrium. Furthermore, the CUSUM and CUSUMQ stability tests show that the error correction model coefficients are stable.

Our results show that significant relationship exist both at the long and short runs between Government expenditure and FDI inflows, we therefore recommends that policy that guarantee increase in government spending tailored towards providing infrastructures (both tangible like constructions of roads, railways,
airways etc and intangible especially Absorptive capacity development schemes) and institutions that provokes inflows of FDI into the economy should be pursued. Similarly, from the result it can be deduced that a significant relationship exist between FDI and trade openness at least in the short run, thus, we recommends that the export promotion strategy that aim at expanding the export base of the economy, thereby improving her Balance of Payment position should be expanded. It is believed that when foreign investors are sure that policies are in place to aid exportation of their products after meeting the local market demands, the inflows of FDI to such economy will be enlarged. Furthermore, from the result, it can be deduced that a functional relationship exist between FDI and monetary policy instruments of interest rates and exchange rates at the short run, and between inflation rate and FDI both at the long run and short run, it is therefore recommended that monetary policy authority should manipulate these variables in such a way that they will serve as good stimuli for attracting FDI into the economy

In summary, based on the results of the estimates, the study recommends that in other to attract more inflows of FDI into the economy, policy makers should focus attention on how to expand trade, increase Government expenditure, manipulate exchange rate system, lower inflation, and adopt lower interest rate policy among others.
Figure 1:

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level
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