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An Empirical Analysis of The Effects of Fiscal Deficits on Economic Growth in Nigeria

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Abstract-- The main objective of this paper is to investigate the effects of fiscal deficit on economic growth in Nigeria through the application of OLS techniques, Augmented Dickey-Fuller technique, Granger causality test and Johansen cointegration test. The results of unit root suggested that all the variables of the model are stationary at first difference. The results of Causality suggested that there is one-way causation between exchange rate and real GDP, between government fiscal deficit and real GDP, between domestic investment share of real GDP and real GDP. Causation runs from exchange rate to real GDP, real GDP to government fiscal deficit, real GDP to domestic investment share of real GDP. The result also shows no causation between some variables of the model especially, exchange rate and interest rate, government fiscal deficit and interest rate, domestic investment share of real GDP and interest rate, government fiscal deficit and exchange rate, and domestic investment share of real GDP and exchange rate. The Johansen cointegration result shows the absence of long run relationship between real GDP and the included variables of the model, especially government fiscal deficit. The results of OLS revealed that interest rate, exchange rate, government fiscal deficit possessed a positive impact on economic growth proxied by real GDP. The result also shows that government fiscal deficit does not significantly affect economic growth (Real GDP), but a good performance of an economy in terms of real GDP per capita growth may therefore be attributed to the interest rate, exchange rate, and domestic investment share of real GDP in the country. The overall finding of this paper shows that government fiscal deficit has no significant effect on real GDP, hence, the need for fiscal deficit in Nigeria is minimal. A major policy implication of this result is that concerted effort should be made by policy makers to instill financial discipline among political office holders. Government fiscal deficit should be control in order to achieve meaningful growth and development in the economy. Fiscal deficit should also be directed toward boosting productivity in the country, since it has positive impact on real GDP.

Keywords-- Fiscal deficit, domestic investment, interest rate, exchange rate, and Granger causality.

I. INTRODUCTION

Effective macroeconomic management is a panacea for growth –induced employment and poverty reduction of any nation.

There are quite a number of fiscal reforms as a part of reform programmes undertaken by various governments in Nigeria and be young to unlogged the path to economic development.

Fiscal deficit is a situation where current expenditure exceeds expected income. The Keynesian Demand side economics postulates expansion in government expenditures event beyond current income, particularly during depressions when the economy suffers from an insufficiency of active demand such as the great depression of 1929 to 1932 and most recently, the 2008 Global Financial and Economic crisis. This will thereby increase the demand for productive output, resulting in unemployment being overcome (Anyanwu and Oaikhenan, 1995, Ogboru, 2006).

Fiscal deficit may be as a result of inadequate collection of taxes and heavy expenditure on the part of the government on infrastructure. The situation may also be aggravated by corruption and uncontrolled spending leading to the widening of the gap between government revenues and its expenditure.

Governments in the past and present employ two major methods of financing fiscal deficit. These approaches are through monetary financing which has to do with printing of currency by which is “Seigniorage” and borrowing of money in order to meet budgetary obligations (Albu and Pelinescu, 2000). Borrowing to finance fiscal deficit may result in heavy debt service burden coupled with low government revenues and high expenditures may subsequently lead to the emergence of recurrent budget deficits (Asfaha, 2007 and Neame, 2008).

The effective macroeconomic management is critical to economic growth and poverty reduction. Over the years most economies have experienced huge budget deficit, that is the reason its fiscal policy has a very important role in its economic performance. More so positive reforms regarding the fiscal matters may enhance the economic growth and could arrest it. However, Nigeria experienced over the years persistence of macroeconomic imbalances that posed serious threat to growth and development of the economy.
Hence, fiscal profligacy has grossly undermined the growth drive thereby adversely impacting adversely on physical and social infrastructure in the country. This paper, therefore seeks to examine the effects of government fiscal deficit on economic growth in Nigeria.

II. Theoretical Issues and Literature Review

The study on effects of fiscal deficit and economic growth has basis in the perspective of both the Keynesians and monetarist schools of thought reveals mixed results. The Keynesians economists argue that an increase in government spending enhances domestic output and recognizes the possibilities of government spending crowding out private (investment) spending through interest cost credit (interest rate). Also, they believe that fiscal deficit could have a negative impact on external sector, reflected through trade deficit, but only if the domestic economy is unable to absorb the additional liquidity through an expansion in output.

The Monetarists on the other hand were of the view that government deficits, financed by domestic debt constitute merely as a transfer of resources from the private sector to the public sector with little or no effect on output. Moreover, the Richardian Equivalence theory holds that fiscal deficits, notwithstanding how financed would have no effect on private consumption and interest rate would depend on individual internalize both government’s budget constraints and utility of their offsprings, the capital market efficient, in which the interest rate is the same for borrowers and lenders and there are no distortion taxes (Frish, 2003: 22, 34).

Development models of public expenditure which primarily is the work of Rustow (1971) anchors on the fact the countries of the world must pass through different stages before they could develop, and that these different stages requires varied proportion of Government spending to total investment in the economy will be large since most of her activities centre on capital formation bordering on roads, housing telephone, education, health care, among others in preparation for takeoff into the middle stage.

Many studies have been conducted on the effects of fiscal deficits on economic growth in quite a number of economies including Nigeria. Cooray, (2009), Abdullahi, (2000), Gregornu at al (2007), and Erkin, (1998) in their works the impact of government expenditure on growth discovered that countries with large government expenditure tend to experience higher growth. Deficit spending by the government stimulates the economy in the short run by making households feel wealthier, thus, raising total private and public consumption expenditure.

Through the resulting increase in the aggregate demand, budget deficit has a positive effect on macroeconomic activities, thereby stimulating savings and capital formation Seater in (Okpanchi and Abimiku, 2007), Chakraborty and Chakrabarty, (2006) Liu, et al (2008) examined the casual relationship between GDP and public expenditure for US data during the period 1947-2002. The causality results revealed that the total government expenditure causes growth of GDP. They concluded that judging from the causality test Keynesian hypothesis exerts more influence than the Wagner’s law.

Owole et al (2007) investigated the relationship between government expenditure and economic growth for a group of 30 OECD countries during the period 1970-2005. The regression results showed the existence of a long-run relationship between government expenditure and economic growth. Also, they observed a unidirectional causality from government expenditure to growth for 16 out of the countries, thus supporting the Keynesian hypothesis. However, causality runs from economic growth to government expenditure in 10 out of the countries, confirming the Wagner’s law. Finally he found that the existence of feedback relationship between government expenditure and economic growth of four countries.

Goher et al (2011) verified the impact of government fiscal deficit on investment and economic growth using time series of thirty years stretching between 1980 and 2009. They believed that fiscal profligacy has seriously undermined the growth objectives thereby adversely impacting physical and social infrastructure in the country. Huynh (2007) conducted his study while collecting data from the developing Asian countries from the period of 1990 to 2006. He concluded that there is negative impact of budget deficit on the GDP growth of the country while analyzing the trends in Vietnam.

Vamvoukas (2000) explored with the help of Keynesian preposition and Richardian Equivalence, the effect of budget deficit on interest rate and inflation rate, while using data of Greek economy from 1948-2001 by applying co-integration analysis, granger causality and impulse function.

Shojai (1999) concluded that deficit spending, financed by the central bank, can also lead to inefficiencies in financial markets and cause high inflation in developing countries. At the same time it also distorts real exchange rates, which in turn undermines the international competitiveness of the economy.
III. METHODOLOGY

Sources of data: The data for the paper were obtained from secondary sources; such as: the Central bank of Nigeria statistical bulletins, Economic and Financial Review and Annual reports and statement of accounts and Federal Office of Statistics (FOS). Other sources of data were from Debt Management Office (DMO) publications and website. The data gathered were subjected to various econometric analysis and software package systems.

The estimated techniques include the Ordinary Least Square (OLS) method, Augmented Dickey-Fuller (ADF) unit root test, Granger causality test, Johansen Co-integration test.

Model specification

The Mathematical and econometric forms of the model is specified as:

\[ \text{RGDP} = F(\text{INTR}, \text{EXR}, \text{GFD}, \text{DPI}) \] 

\[ \text{RGDP} = \alpha + \beta_1 \text{INTR} + \beta_2 \text{EXR} + \beta_3 \text{GFD} + \beta_4 \text{DPI} + u_t \ldots \]

Where: RGDP = real gross domestic Product (Independent variable) and INTR = interest rate, EXR =Exchange rate, GFD = Government fiscal deficit, DPI = domestic investment share of real GDP, \(u_t\) = Error term 

\(\alpha\) = Intercept of relationship in the model, and \(\beta_1 - \beta_4\) = Coefficients of independent variables.

IV. EMPIRICAL RESULTS AND DISCUSSION

Table 4.0.1 contains linear regression results for the growth effects of interest rates, exchange rates, government fiscal deficit and domestic investment share of real GDP share in Nigeria. The results indicated that the coefficient of exchange rates, domestic investment share of real GDP, domestic investment share of real GDP and the constant were found statistically significant while the coefficient of government fiscal deficit was found statistically insignificant.

Precisely, the coefficient of exchange rates, domestic investment share of real GDP, and the constant were found statistically significant at 1 percent as indicated by their probability values of 0.0000, 0.0000 and 0.0000 respectively; but the coefficient of domestic investment share of real GDP was significant at 10 percent level as indicated by it probability value of 0.0726.

Table 4.1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>177237.3</td>
<td>20308.60</td>
<td>8.727205</td>
<td>0.0000</td>
</tr>
<tr>
<td>INTR</td>
<td>2093.278</td>
<td>1114.774</td>
<td>1.877760</td>
<td>0.0726</td>
</tr>
<tr>
<td>EXR</td>
<td>894.7333</td>
<td>175.4631</td>
<td>5.099268</td>
<td>0.0000</td>
</tr>
<tr>
<td>GFD</td>
<td>0.045283</td>
<td>0.048918</td>
<td>0.925690</td>
<td>0.3638</td>
</tr>
<tr>
<td>DPI</td>
<td>0.175654</td>
<td>0.014600</td>
<td>12.03069</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared | 0.967051     | Mean dependent var | 344929.5
Adjusted R-squared | 0.961559     | S.D. dependent var | 159867.1
S.E. of regression | 31343.99     | Akaike info criterion | 23.69902
Sum squared resid | 2.36E+10     | Schwarz criterion | 23.93476
Log likelihood | -338.6358    | Hannan-Quinn criter. | 23.77285
F-statistic | 176.0989     | Durbin-Watson stat | 1.140605
Prob(F-statistic) | 0.000000     |                     | 0.000000

SOURCE: E-Views 7 Computer output
The result of the study therefore, implies that a 1 percent change in interest rate and exchange rate will increase real GDP by 2093.278 units and 894.7333 units respectively; the result further revealed that one unit change in government fiscal deficit and domestic investment share of real GDP, real GDP will increase by 0.0453 units and 0.1757 units respectively. Though individually some variables of the study were found statistically insignificant, especially, government fiscal deficit, but jointly was found significant. The F-statistic value of 176.0989, which measure the joint significance of the explanatory variables, was found statistically significant at 1 percent level as indicated by the corresponding probability value of 0.000000 in table 4.0.1. This implies that all the variables of the model were jointly positively significantly affecting real GDP in Nigeria during the period under review. The constant was found to be positive and statistically significant, implying that there were other variables that affect real GDP in Nigeria apart from those captured in the course of this study but were not included.

The $R^2$ value of 0.9671 (96.71%) implies that 96.71 percent total variation in the real GDP was explained by interest rates, exchange rates, government fiscal deficit and domestic investment share of real GDP in Nigeria. Coincidentally, the goodness of fit of the regression remained high after adjusting for the degree of freedom as indicated by the adjusted $R^2$ ($R^2=0.9616$ or 96.16%). The Durbin-Watson statistic 1.1406 in table 4.1 is observed to be higher than $R^2$ (0.9671) indicating that the model is non-spurious (meaningful), therefore it can be used for policy purpose. The Durbin-Watson statistics 1.1406 is less than 2 indicating the presence of autocorrelation. This provides the basis for conducting unit root test to stationarise the data.

Table 4.0.2 above shows simple correlation coefficients of the variables of the model. This revealed the extent to which real GDP relates to interest rates, exchange rates, government fiscal deficit and domestic investment share of real GDP. The results revealed that interest rates, exchange rates and domestic investment share of real GDP were positively correlated to real GDP in Nigeria for the period under review, but government fiscal deficit was found to be negatively correlated with real GDP as indicated by its correlation value of -0.625.

4.0.3 Unit Root Test For RGDP

Null Hypothesis: D(RGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>-7.801133</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

4.0.4 Unit Root Test For INTR

Null Hypothesis: D(INTR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-6.555363</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -3.689194
- 5% level: -2.971853
- 10% level: -2.625121


4.0.5 Unit Root Test For EXR

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-5.386771</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -3.679322
- 5% level: -2.967767
- 10% level: -2.622989


4.0.6 Unit Root Test For GDF

Null Hypothesis: D(GDF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-4.135040</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -3.679322
- 5% level: -2.967767
- 10% level: -2.622989

4.0.7 Unit Root Test For DPI

Null Hypothesis: D(DPI) has a unit root  
Exogenous: Constant  
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

<table>
<thead>
<tr>
<th>Augmented Dickey-Fuller test statistic</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test critical values:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1% level</td>
<td>-3.699871</td>
<td></td>
</tr>
<tr>
<td>5% level</td>
<td>-2.976263</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.627420</td>
<td></td>
</tr>
</tbody>
</table>


V. DISCUSSION OF UNIT ROOT TEST RESULTS

The results of unit root test are contained in table 4.0.3, 4.0.4, 4.0.5, 4.0.6 and 4.0.7. The results in all the tables revealed that all the variables of the model were found to be stationary at first difference (d(1)). Real GDP, interest rate (INTR), exchange rates (EXR) and government fiscal deficit (GFD) were both stationary at first difference (d(1)) and at 1 percent level of significant as indicated by their probability values of 0.0000, 0.0000, 0.0001 and 0.0033 respectively, while domestic investment share of real GDP was found stationary at first difference (d(1)) but at 5 percent level of significant as indicated by its probability value of 0.0156. The stationarity of the variables was further confirmed by the ADF values in all the tables greater than the critical values in negative direction, which implied the rejection of the null hypothesis that the variables have unit root.

<table>
<thead>
<tr>
<th>TABLE 4.0.3 GRANGER CAUSALITY RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pairwise Granger Causality Tests</td>
</tr>
<tr>
<td>Date: 03/09/14  Time: 15:31</td>
</tr>
<tr>
<td>Sample: 1980 2010</td>
</tr>
<tr>
<td>Lags: 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Null Hypothesis:</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTR does not Granger Cause RGDP</td>
<td>30</td>
<td>0.73527</td>
<td>0.3987</td>
</tr>
<tr>
<td>RGDP does not Granger Cause INTR</td>
<td>9.8E-05</td>
<td>0.9922</td>
<td></td>
</tr>
<tr>
<td>EXR does not Granger Cause RGDP</td>
<td>30</td>
<td>4.14523</td>
<td>0.0517</td>
</tr>
<tr>
<td>RGDP does not Granger Cause EXR</td>
<td>0.17296</td>
<td>0.6808</td>
<td></td>
</tr>
<tr>
<td>GDF does not Granger Cause RGDP</td>
<td>30</td>
<td>1.03327</td>
<td>0.3184</td>
</tr>
<tr>
<td>RGDP does not Granger Cause GDF</td>
<td>5.67022</td>
<td>0.0246</td>
<td></td>
</tr>
<tr>
<td>DPI does not Granger Cause RGDP</td>
<td>28</td>
<td>0.63548</td>
<td>0.4329</td>
</tr>
<tr>
<td>RGDP does not Granger Cause DPI</td>
<td>8.66337</td>
<td>0.0069</td>
<td></td>
</tr>
<tr>
<td>EXR does not Granger Cause INTR</td>
<td>30</td>
<td>0.02079</td>
<td>0.8864</td>
</tr>
<tr>
<td>INTR does not Granger Cause EXR</td>
<td>0.70470</td>
<td>0.4808</td>
<td></td>
</tr>
<tr>
<td>GDF does not Granger Cause INTR</td>
<td>30</td>
<td>0.27626</td>
<td>0.6035</td>
</tr>
<tr>
<td>INTR does not Granger Cause GDF</td>
<td>0.30180</td>
<td>0.5873</td>
<td></td>
</tr>
<tr>
<td>DPI does not Granger Cause INTR</td>
<td>28</td>
<td>0.10515</td>
<td>0.7484</td>
</tr>
</tbody>
</table>
The null hypothesis of there is cointegrating equations was rejected at 5percent level.

VIII. Concluding Remark

This paper investigates the effects of fiscal deficit on economic growth in Nigeria through the application of OLS techniques, Augmented Dickey-Fuller technique in testing the unit root property of the series and Granger causality test of causation between real GDP, interest rates, exchange rate, government fiscal deficit and domestic investment share of real GDP. The results of unit root suggested that all the variables in the model are stationary at first difference. The results of Causality suggested that there is one-way causation between exchange rate and real GDP, between government fiscal deficit and real GDP, between domestic investment share of real GDP and real GDP. Causation runs from exchange rate to real GDP, causation runs from real GDP to government fiscal deficit, causation runs from real GDP to domestic investment share of real GDP. The result also shows no causation between some variables of the model especially, exchange rate and interest rate, government fiscal deficit and interest rate, domestic investment share of real GDP and interest rate, government fiscal deficit and exchange rate, and domestic investment share of real GDP and exchange rate. The Johansen cointegration result shows the absence of long run relationship between real GDP and the included variables of the model. The results of OLS revealed that interest rate, exchange rate, government fiscal deficit possessed a positive impact on economic growth proxied by real GDP. The result also shows that government fiscal deficit does not significantly affect economic growth (Real GDP), but a good performance of an economy in terms of real GDP per capita growth may therefore be attributed to the interest rate, exchange rate, and domestic investment share of real GDP in the country. The overall finding of this paper shows that government fiscal deficit has no
significant effect on real GDP; hence, the need for fiscal
deficit in Nigeria is minimal.

The simple correlation coefficient indicated that
government fiscal deficit was negatively correlated to real
GDP in Nigeria. A major policy implication of this result is
that concerted effort should be made by policy makers to
instill financial discipline among political office holders.
Government fiscal deficit should be control in order to
achieve meaningful growth and development in the
economy. The fiscal deficit should also be directed toward
boasting productivity in the country, since it has positive
impact on real GDP.

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http://www.mpfra.unr.uni-muenchen.de/7601/MPRA-paper-
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some evidence from New Zealand Time Series data: Keio economic

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directions for growth in the 25 years (pp.3-34). Makurdi Aboki
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### Table 1

COINTEGRATION RESULTS

Date: 03/09/14   Time: 15:57  
Sample (adjusted): 1983 2009  
Included observations: 27 after adjustments  
Trend assumption: Linear deterministic trend  
Series: RGDP INTR EXR GDF DPI  
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.603664</td>
<td>67.92670</td>
<td>69.81889</td>
<td>0.0701</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.560802</td>
<td>42.93839</td>
<td>47.85613</td>
<td>0.1341</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.357926</td>
<td>20.72265</td>
<td>29.79707</td>
<td>0.3752</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.210277</td>
<td>8.760248</td>
<td>15.49471</td>
<td>0.3880</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.084588</td>
<td>2.386288</td>
<td>3.841466</td>
<td>0.1224</td>
</tr>
</tbody>
</table>

Trace test indicates no cointegration at the 0.05 level  
* denotes rejection of the hypothesis at the 0.05 level  
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.603664</td>
<td>24.98831</td>
<td>33.87687</td>
<td>0.3858</td>
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<tr>
<td>At most 1</td>
<td>0.560802</td>
<td>22.21574</td>
<td>27.58434</td>
<td>0.2095</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.357926</td>
<td>11.96241</td>
<td>21.13162</td>
<td>0.5514</td>
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<tr>
<td>At most 3</td>
<td>0.210277</td>
<td>6.373960</td>
<td>14.26460</td>
<td>0.5657</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.084588</td>
<td>2.386288</td>
<td>3.841466</td>
<td>0.1224</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates no cointegration at the 0.05 level  
* denotes rejection of the hypothesis at the 0.05 level  
**MacKinnon-Haug-Michelis (1999) p-values