Impact of Fiscal Policy on Inflation in Nigerian Economy

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ABSTRACT
The study examines the relationship between fiscal policy and inflation rate in Nigeria from 1970 to 2013. Data on Government expenditure, government debt stock (as proxy for government borrowing), government tax revenue and inflation rate were sourced from the National Bureau of for Statistics (NBS) and Central Bank of Nigeria (CBN) Statistical Bulletin (various issues). The data were subjected to Unit root tests, Co-integration and Granger causality tests, and analyzed using Ordinary Least Square (OLS) Regression and Error Correction Mechanism (ECM) techniques. The results found a statistically insignificant positive relationship between government expenditure; government tax revenue and inflation in Nigeria, while government debt stock is positive and statistically significant. The results also reveal that, there exist a long-run equilibrium relationship between inflation and fiscal policy in Nigeria. The study recommends that government should minimize her level of borrowing (domestic and foreign borrowing), improve tax administration in order to reduce tax evasion and avoidance, and implement viable fiscal policy and monetary policy mix as well as diversify the nation’s economic base. This could be achieved through the practice of consistent macroeconomic policies implementation in the non-oil sectors of the economy by providing conducive environment for investors in the agricultural and manufacturing sectors in Nigeria.

Keywords: Fiscal Policy, Inflation, Error Correction Model.

1. INTRODUCTION
One of the macroeconomic problems confronting Nigeria is the problem of inflation. Since the 1970’s, there has been a continuous increase in inflation rate. It is an economic cankerworm which has eaten deep into the fabric of the country’s economy. Its effect on the economy is so calamitous that the real GDP of the country over the years is stunted.

Inflation is a very popular happening in an economy. Opinion survey conducted in India, the U.S.A and other countries reveal that inflation is the most concern of the people as it badly affects their standard of living (Ahuja 2013). The political fortunes of many political leaders and government in Nigeria and abroad have been determined by how far they have succeeded in tackling the problem of inflation, so much so that some researchers called inflation as “enemy number one”. Inflation is the most hotly debated issues among the macroeconomic variables of the economy. Inflation rate has a great effect on the poor and make the life of the poor very miserable. It is therefore described as anti-poor. It redistributes income and wealth in favor of some, and greatly harms others.

Inflation is the continuous and persistent increase in the general price levels of goods and services. One of the goals of modern government is to control inflation and ensures price stability in the economy. The finance minister in collaboration with the central bank of a country must ensure and manage the budget proposal and growth of money supply in the economy in a way that it does not cause inflation. Inflation occur due to the emergence of excess demand for goods and services relative to their supply of output at a prevailing prices.
Fiscal policy is the government’s management of the economy through the manipulation of its income and spending power to actualize some desired macroeconomic objectives amongst which are price stability and economic growth (Ozurumba (2012)). It is also a deliberate alteration of the government spending and taxation to help achieve desired macroeconomic objectives by changing the level and composition of aggregate demand (AD). This simply means that fiscal policy works through the manipulation of subsidies, exchange rate, checks on the external reserve, borrowing which may be used to finance deficits where the projected expenditure exceed revenue.

However, government of Nigeria over the years has not folded its hands; it has adopted several fiscal policy measures to counteract this menace called inflation, but still the problem has been at increase, which means that despite the government’s position to have minimal single digit inflation, it seems nothing has actually been done. It is for this reason that this study is meant to investigate the impacts of fiscal policy on inflation rate in Nigeria from 1970 to 2013. The paper is organized as follows. Section 1 is the introduction, while section 2 contains theoretical and empirical literature. Section 3 consists of methodology and model specification, while section 4 contains discussion of results. Section 5 is for conclusion and recommendation.

2. THEORETICAL AND EMPIRICAL LITERATURE

Different researchers have written in various aspects of fiscal policy especially as it relates and affects the macroeconomics of the economy. Reem (2009) defined fiscal policy as the means by which a government adjusts its level of spending in order to monitor and influence a nation’s economy. According to Reem (2009), fiscal policy is based on the theories of a British economist John Maynard Keynes whose theory basically states that governments can influence macroeconomic productivity levels by increasing or decreasing tax levels and public spending. This influence in turn, curbs inflation, increase employment and maintains a healthy value of money. Various researchers have written on different aspects of fiscal policy especially as it relate to price stability.

Empirical works on the relationship between fiscal policy measures and inflation have yielded conflicting results.

Catao and Terrones (2003) have shown that there is a strong positive relationship between fiscal deficits and inflation among high-inflation and developing country groups, but not among low-inflation advanced economies. They found that 1 percentage point reduction in the ratio of fiscal deficit to Gross Domestic Product (GDP) typically lowers long-run inflation by 1.5 to 6.0 percentage points, depending on the size of the inflation tax base.

Solomon and Wet (2004) found a strong positive relationship between inflation and budget deficit in Tanzania. They stated that budget deficit has a significant effect on inflation. They also concluded that developing countries should give more importance to inflation because inflation tends to be affected from many economic shocks such as high budget deficit. Therefore, inflation should be controlled by efficient fiscal policies.

Ezeabasilli, Mojekwu and Herbert (2012) examined the relationship between fiscal deficits and inflation in Nigeria using data over 1970–2006, a period of persistent inflationary trends. They adopted a modeling approach that incorporates cointegration techniques and structural analysis. The results reveal a positive but insignificant relationship between inflation and fiscal deficits in Nigeria.

Ozurumba (2012) examined the causal relationship between inflation and fiscal deficits in Nigeria, covering the period 1970-2009 confirming a significant negative relationship between growth in fiscal deficit (% of GDP) and inflation.

Jeevan (2008) estimated the relationship between fiscal deficit and inflation in India with the help of OLS estimate conducted over the sample period 1953-2009. He found a positive and significant relationship which suggests that one percentage point increase in the level of the fiscal deficit could cause as much as 0.6 percentage point increase in WPI.

Hamantha (2012) investigates the validity of the hypothesis that suggests there is a link between fiscal deficits and inflation in developing countries using Sri Lanka, a developing country with a persistent
fiscal deficit, a large public sector and increasing inflation, for the empirical study. An auto-regressive
distributed lag (ARDL) model was employed in the analysis, using annual data from 1959 to 2008. The
results suggest that, in the long run, a one percentage point increase in the ratio of the fiscal deficit to
narrow money is associated with about an 11 percentage point increase in inflation.
Olayungbo (2013) examines asymmetry causal relationship between government spending and inflation
in Nigeria from the period of 1970 to 2010. The asymmetry causality test shows that a uni-directional
causality exists from negative government expenditure changes (low or contractionary government
spending) to positive inflation changes (high inflation) in the Vector Autoregression (VAR) model. The
finding implies that inflationary pressure in Nigeria is state dependent, that is high inflation is caused by
low or contractionary government spending.
Han & Mulligan (2002) investigated the relationship between inflation and the size of government. They
found that inflation is significantly and positively related to the size of government mainly when periods
of war and peace are compared. Also they show a weak positive peacetime time series correlation
between inflation and the size of government and a negative cross-country correlation of inflation with
non-defense spending.
Nwaoha (2012) investigated the effect of public spending (recurrent and capital) on inflation in
Nigeria during the period 1980-2006 using the econometric approach rooted in error
correction method. He observed that recurrent expenditure exerts positive and significant
influence on inflation. This implies that, the higher the recurrent expenditure, the higher the inflation.
Ezirim et al (2008) studied the relationship between public expenditure growth and inflation in the U.S
using the cointegration analysis and Granger Causality Model applied to time series annual data from
1970 –2002. The results found that public expenditure and inflation have a long-run equilibrium relation
between them. Inflation significantly influences public expenditure decisions in the U.S. Public
expenditure growth aggravated inflationary pressures in the country, where reduction in public
expenditure tends to reduce inflation.
Mohammad et al (2009) examined the long run relationship among M2, inflation, government
expenditure impact and economic growth in case of Pakistan. For this purpose they used Johansen
cointegration and Granger causality tests to find out long run association and causality. They found a
negative relation between public expenditure and inflation. They explained that most of public
expenditure is non-development and inflation is due to adverse supply shock (cost push inflation) in case
of Pakistan.
Tai -Nguyen (2014), investigates the long-run and short-run impact of government spending on inflation
in three Asian emerging economies including India, Indonesia and Vietnam by applying the cointegration
and Vector Error Correction Model to time series data for the period 1970-2010. The results confirm a
cointegrating causal link between government spending and inflation in the long-run in all three sampling
countries. Evidence also supports the causal relationship between government spending and inflation in
the short-run. For India, government spending has a positive short-run impact on inflation, consistent with
the Keynesian view
Magazzino (2011) examines the nexus between public expenditure and inflation for the Mediterranean
countries during the period 1970-2009, using a time-series approach. He found a long-run relationship
between the growth of public expenditure and inflation for some countries. Furthermore, Granger
causality tests results show a short-run evidence of a unidirectional and bidirectional relationship from
expenditure to inflation for all countries.
Fiani (1991), in his work, The Macroeconomics of the Public Sector Deficit in Morocco. He fined a
negative relationship between fiscal deficit and inflation, and observed that inflation appeared to be
subdued despite the prevalence of large budget deficits. His finding does not support macroeconomic
postulation that large deficits fuel inflation.
Ezeabasili et al (2012) reexamined the effect of fiscal deficit on inflation in the context of a developing
country, Nigeria, using data over 1970–2006, a period of persistent inflationary trends. They adopted a
modeling approach that incorporates cointegration techniques and structural analysis. The results reveal a positive but insignificant relationship between inflation and fiscal deficits in Nigeria. Ammama, Khalid and Muhammad (2011) examined the impact of fiscal deficit on inflation in Pakistan using Cointegration technique in a time series data from 1960 to 2010 which shows a strong positive relationship between fiscal deficit and inflation in Pakistan. Ghulam (2014) in his paper Taxation, Fiscal Deficit and Inflation in Pakistan is aimed to analyze and update the effects of different instruments of fiscal policy on inflation in Pakistan economy. The data time span for the study is 1979-2013. The impact of fiscal policy on inflation is analyzed by utilizing the Bounds testing procedure and ARDL approach of co-integration which is a better estimation technique for small sample size. The outcomes of the study show that both types of taxes (direct and indirect) are causing to increase the inflation level while fiscal deficit is also one of the reasons to increase the inflation in the country. Abdul Qadir (2012) examines the relationship between tax revenue and inflation in Pakistan. He further measured the rate of change in a stochastic variable of the taxes, i.e. direct, indirect, and total taxes, with a unit change in inflation in Pakistan with an assumption of other factors remaining constant, a secondary data for the period of 2000-2010 was used. Findings of the study shows that inflation and taxes are positively correlated and any change in inflation cause taxes to increase in Pakistan. The inflation in the country explains the behavior of taxes positively, but less than 1.

3 METHODOLOGY
This study employs the co-integration and error correction methods (ECM) to analyze the relationship between fiscal policy and inflation rate in Nigeria. An econometric model of multiple regressions was used to test the long run relationship between fiscal policy and inflation rate. We used government expenditure, government debt stock as a proxy of government borrowing and government tax revenue as independent variables while inflation rate as dependent variable. We use annual time series data from 1970 to 2013. The sources of data are from the national bureau for statistics (NBS) and CBN statistical bulletin various issues. The paper adopted a model used by (Medee and Nenbee 2011) who did a similar work. Thus, this paper specifies the following multiple regression equation.

\[
\text{INFL} = f(\text{GEX, GDS, GTR}) \tag{1} 
\]

Mathematically, this functional relationship can be specified in linear form as

\[
\text{INFL} = B_0 + B_1 \text{GEX} + B_2 \text{GDS} + B_3 \text{GTR} + U \tag{2} 
\]

Where

- \( \text{INFL} \) = Inflation rate
- \( \text{GEX} \) = Government expenditure
- \( \text{GDS} \) = Government debt stock
- \( \text{GTR} \) = Government tax revenue
- \( U \) = White noise error term

The model is transformed into log-linear form, which is express as

\[
\log \text{INFL} = \beta_0 + \beta_1 \log \text{GEX} + \beta_2 \log \text{GDS} + \beta_3 \log \text{GTR} + U \tag{3} 
\]

Where

- \( \log \text{INFL} \) = log of inflation rate
- \( \log \text{GEX} \) = log of government expenditure
- \( \log \text{GDS} \) = log of government debt stock
- \( \log \text{GTR} \) = log of government tax revenue
- \( U \) = White noise error term

The a priori expectation is as follows

- \( \beta_0 > 0, \beta_1 > 0, \beta_2 < 0, \beta_3 > 0 \)

Where, \( \beta_0 \) = intercept, \( \beta_1 \) = coefficient of government expenditure, \( \beta_2 \) = coefficient of government debt stock and \( \beta_3 \) = coefficient of government tax revenue.
The contribution of this study to knowledge is in terms of the estimation techniques employed and data used which was extended to 2013. An attempt was made to empirically investigate the relationship between the impacts of fiscal policy on inflation rate on Nigeria economy for the period 1970 – 2013. The equation was estimated using various analytical tools, including unit root tests, cointegration tests and granger causality tests analysis.

4: EMPIRICAL RESULTS

We begin our empirical analysis by showing the degree of association between inflation (INFL) and fiscal policy tools - Government expenditure (GEX), Government debt stock (GDS) and Government tax revenue (GTR) through the multiple regression analysis. Table 1 below depicts the result of the short run relationship between inflation and fiscal policy tools.

**Table 1: Short Run Result**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. error</th>
<th>T- statistic</th>
<th>Pro.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>2.524616</td>
<td>0.46505</td>
<td>5.428650</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOG(GEX)</td>
<td>-0.138685</td>
<td>0.13913</td>
<td>-0.996754</td>
<td>0.3249</td>
</tr>
<tr>
<td>LOG(GTR)</td>
<td>-0.014400</td>
<td>0.09977</td>
<td>-0.144327</td>
<td>0.8860</td>
</tr>
<tr>
<td>LOG(GDS)</td>
<td>0.146407</td>
<td>0.12028</td>
<td>1.423643</td>
<td>0.1623</td>
</tr>
</tbody>
</table>

R² = 0.0485; Adj R² = 0.0227; F-Statistic= 0.6805, D. Watson= 1.14

**Source: Computed Result (E-View 6)**

The short run result reported above shows that all the variables under consideration are insignificant at 5 percent level of significant. The R² value, Durbin Watson statistic and F- statistic are not reasonable. This may be informed by the characteristics of time series data which are usually non-stationary and spurious. Therefore, given this results, it is necessary to test its reliability, that is, whether it is not spurious regression. This we did through the Augmented Dickey-Fuller (ADF) stationarity test.

**Table 2: ADF Test Result.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Difference</th>
<th>Second Difference</th>
<th>Prob.</th>
<th>Integration order</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEX</td>
<td>1.896289</td>
<td>-5.267848</td>
<td>-</td>
<td>0.0001</td>
<td>1(1)</td>
</tr>
<tr>
<td>GTR</td>
<td>5.354139</td>
<td>-7.760143</td>
<td>-</td>
<td>0.0000</td>
<td>1(1)</td>
</tr>
<tr>
<td>GDS</td>
<td>-0.032366</td>
<td>-4.426369</td>
<td>-</td>
<td>0.0000</td>
<td>1(1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.1267841</td>
<td>-6.407728</td>
<td>-</td>
<td>0.0000</td>
<td>1(1)</td>
</tr>
</tbody>
</table>

**Source: Computed Result (E-View 6)**

Note: the 5% critical value for ADF statistic at level is approximately -2.931404 while -2.935001 and -2.936942 are for the first and second difference respectively.

Table 2 above shows that all the time series data that were used in the model in this study are stationary at their first difference, that is they are integrated of order one, i.e. 1(1) variable. Thus, given the fact that all the variables are 1(1) variable, we need to know whether using them together in the model would yield reliable result through cointegration test.

**Table 3: Johansen’s Cointegration Test.**

<table>
<thead>
<tr>
<th>Hypothesized N0.of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistics</th>
<th>0.05 Critical value</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.523796</td>
<td>69.89597</td>
<td>47.85613</td>
<td>0.0001</td>
</tr>
<tr>
<td>At Most 1</td>
<td>0.395920</td>
<td>38.73583</td>
<td>27.79707</td>
<td>0.0036</td>
</tr>
<tr>
<td>At Most 2</td>
<td>0.280827</td>
<td>17.58577</td>
<td>15.49471</td>
<td>0.0240</td>
</tr>
<tr>
<td>At Most 3</td>
<td>0.077069</td>
<td>3.368437</td>
<td>3.841466</td>
<td>0.0665</td>
</tr>
</tbody>
</table>

**Source: Computed Result (E-View 6)**
Table 3 above shows the result of the Johansen cointegration test. It shows that the value of trace statistic is more than the critical value at 5% in three of the four null hypotheses, which indicates three cointegrating vectors. Since the variable are cointegration, then there would be no loss of information (Olayinka 2009), implying that there exist a long run relationship between inflation and fiscal policy tools used in this study which satisfy the condition for fitting in a parsimonious error correction model (ECM).

Table 4: Parsimonious ECM.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>t-statistics</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.029018</td>
<td>-1.819071</td>
<td>0.07770</td>
</tr>
<tr>
<td>D(LOG(GEX(-1)))</td>
<td>0.004076</td>
<td>0.147437</td>
<td>0.8836</td>
</tr>
<tr>
<td>D(LOG(GTR(-1)))</td>
<td>0.002825</td>
<td>0.336631</td>
<td>0.7381</td>
</tr>
<tr>
<td>D(LOG(GDS(-1)))</td>
<td>0.099223</td>
<td>2.231730</td>
<td>0.0253</td>
</tr>
<tr>
<td>D(ECM(-1))</td>
<td>0.802198</td>
<td>65.8275</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

$R^2= 0.992581; R^2\text{Adj.} = 0.991379; F\text{-Statistic} = 1237.497; Dw = 1.931568$

Source: Computed Result (E-View 6)

The parsimonious result shown in table 4 above relates the change in inflation to changes in GEX, GTR, and GDS as well as the equilibrating error in the previous period. The parsimonious result deviated from what we got in the short run multiple regressions. Thus the coefficient of ECM(-1), that is, the degree of adjustment shows that about 80 percent of the difference between the actual and the long run, or disequilibrium value of inflation (INFL) is eliminated or adjusted each period. Thus, the speed of adjustment from the short run disequilibrium to equilibrium in the present period is 80 percent and it is statistically significant, which justifies the use of the error correction model in the inflation model in the inflation model in the study.

From the above the degree of responsiveness of inflation to government expenditure and government tax revenue as well as government debt stock is 0.004076, 0.002825 and 0.099223, respectively. This is such that for every 1 percent increase in government expenditure and government revenue there will be about 0.004 percent and 0.0028 percent insignificant rise in general price level, respectively, where as that of total debt stock, there will be about 0.099 percent significant increase in price level.

The government expenditure complied with our theoretical expectation by bearing a positive sign. This implies that increase in government expenditure spending stimulate inflation while a fall in government expenditure reduced inflation. The government debt stock also complied with our a priori expectation by bearing positive sign. The result is consistent with the works of Tai -Nguyen (2014), Nwaoha (2012), Ezirim et al (2008) that discovered a positive effect of government expenditure on inflation.

However, government revenue that is accruable to the government from both direct and indirect taxes did not complied with our theoretical expectation by bearing a positive sign instead of a negative sign. This may be attributed to high level of tax evasion and avoidance by Nigerian’s may have accounted for this result. It is important to know that the tax system in Nigeria is very weak with serious loopholes in tax administration of Nigeria. This result is in agreement with the works of Ghulam (2014) and Abdul-Qadir (2012) that discovered a positive effect of government revenue/tax on inflation.

The coefficient of determination ($R^2$) of 0.99 indicates that about 99 percent of the changes in the level of inflation rate in the country are explained by the level of fiscal policy. The joint significance of the model, F-statistic, which is 1237.497, shows that the model is statistically significant and can really explain the reason for the changes in the level of inflation rate in Nigeria.

Furthermore, it is appropriate to know the direction of causality between fiscal policy tools and inflation. The Granger causality test result shed light on this, by using the specification as obtained from the EVEIWS.
In table 5 above, the result shows that the Granger causality between GEX and INFL indicates a unidirectional causality among them. This indicates that government expenditure (GEX) Granger cause inflation (INFL) whereas inflation (INFL) does not Granger cause government expenditure. The second hypothesis test shows that there is an independent causality between GTR and INFL. In the third hypothesis we also observed an independent causality between GDS and INFL. While for the causality between GEX and GTR we find a unidirectional causality, meaning that GEX Granger cause GTR and GTR does not Granger causes GEX. In the case of GEX and GDS there is an independent causality among them. This indicates that GEX does not Granger causes GDS so also GDS does not Granger cause GEX. Also in our finding, we observed that GDS Granger cause GTR and GTR does not Granger causes GDS.

5: CONCLUSION AND RECOMMENDATION
This paper examined the impact of fiscal policy on inflation in Nigeria. Econometric techniques have been applied in other to determine this relationship. The literature shows different arguments have been put forward on the impact of fiscal policy on inflation. Some believe that the relationship is positive while others argued that it is negative. This study employs the co-integration and error correction methods to analyze the relationship between fiscal policy and inflation rate in Nigeria using various analytical tools, including unit root tests, cointegration tests and granger causality tests analysis.

Based on the econometric analysis used in this study, we found a statistically positive relationship between fiscal policy tools (government expenditure, government tax revenue and government debt stock) used in the model and inflation rate in Nigeria. This indicates that an increase in government expenditure, government tax revenue as well as government debt stock lead to price rise (inflation). The results also reveal that, there exist a long-run equilibrium relationship between inflation and fiscal policy in Nigeria. We also discovered from our results and findings that fiscal policy measures had serious implication on inflation rate during this period of study. This evidenced in the coefficient of determination of the model (R²) which is obviously high.

The study recommended that government should endeavor to minimize her level of borrowing (domestic and foreign borrowing), devices a method of reducing tax evasion and avoidance and implement viable fiscal policy and monetary policy mix as well as diversifying the nation’s economic base. This could be achieved through the practice of consistent macroeconomic policies implementation in the non-oil sectors of the economy by providing conducive environment for investors in the agricultural and manufacturing sectors in Nigeria.
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