Does Fiscal Deficit Granger Cause Impulsiveness in Inflation Rate in Nigeria?

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Abstract: This study examines the direction of causality between fiscal policy and inflation volatility in Nigeria for the periods 1981 to 2014. Studies have examined the relationship between fiscal policy and inflation volatility without taking cognizant of the direction of relationship that exist between the two variables, hence this study. The study employs quarterly time series data on fiscal deficit and consumer price index (measure of inflation rate) from 1981:1 to 2013:3 and obtains from the central bank of Nigeria statistical bulletin 2014 while the volatility data is generated through GARCH (1,1) method and analyze using the Pairwise Granger Causality Test. The results of the study showed that there is bi-directional causality between fiscal deficit ($F - statistic = 5.86 \,\&\, 3.96; P < 0.05$) and inflation volatility. The implication of this result is that volatility in inflation rate is traceable to the persistent nature of the excess government expenditure over revenue of the Nigerian economy and vice versa; this will inform the government, policy makers and individual the reasons for continuous fluctuation in the prices of goods and services in the country. The paper contributes to knowledge by providing information on the causes of fluctuation in inflation rate in Nigeria.

Keywords: Inflation Volatility; Fiscal Deficit; GARCH; Bivariate Granger Causality Test

JEL Classification: E 31; E62

1. Introduction

Over the years, studies have argued on the reason why either developed or developing countries have found it difficult to maintain single digit inflation rate and this has been a major macroeconomic problem of achieving steady growth in the world economy. Meanwhile, a steady and single digit inflation rate enhances the growth rate of the economy irrespectively of her structure. However, the major cause of disparities in the figure of inflation rate is subject to different opinions. The quantity theory of money by Irving fisher is of the belief that increase in money supply leads to inflation while the classical economists are of the view that increase

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in money supply at full employment level leads to increase in price level while increase in money supply does not increase output, create employment but rather leads to an increase in the price level. Opposing the classical is Keynes that argued that increase in money supply increases aggregate demand and supply, and creates employment opportunities. This was why he recommended government intervention in terms of fiscal deficit during the great depression. Keynes believed that there was need for some form of government intervention in an economy in order to achieve macroeconomic objectives. This government intervention comes inform of fiscal policy which entails the use of the government's expenditure, taxation and its borrowing policies to achieve macroeconomic objectives like full employment of resources, price stability and host of others. Hence, government uses her fiscal deficit to evaluate the direction of any economy's fiscal policy. Huge fiscal deficits which results from an increase in government spending relative to the revenue generated have been recorded over the years in Nigeria. The economic consequences of this deficit could be severe for a nation that lacks the required management abilities. Similarly, fiscal deficits could escalate the supply of money in an economy and when there is excess money supply it can result to higher general price level which may have negative effect on the purchasing power per unit of money spent i.e. the amount of goods and service that a naira can purchase becomes reduced.

Both inflation and fiscal deficits are major macroeconomic problem which are associated with developing countries however despite the much attention that inflation has attracted, one area that has remained vague and has received little or no attention is the volatility in inflation rate in one hand and the direction of the relationship between fiscal deficit and fluctuations in inflation rate on the other hand. Volatility in inflation rate is the fluctuations, instability and flexibility in the inflation rate. The Nigerian inflation rate has showed instability, no two years sequentially have been recorded to have the same inflation rate (CBN, 2014). According to Rother (2004) high volatility of inflation over time raises price level uncertainty, raises costs for hedging against inflation risks and leads to unanticipated redistribution of wealth. Thus, inflation volatility can impede growth even if inflation on average remains restrained.

In the literature, studies in Nigeria have focused on fiscal deficit-inflation relationship and their findings have been contradicting studies like (Oyejide, 1972; Adeyeye & Fakiyesi, 1980; Osakwe, 1983; Asogu, 1991; Onwioduokit, 1999; Oladipo & Akinbobola, 2011; Medee & Nenbee, 2012) believe that there exist a relationship between fiscal deficit and inflation. On the other hand, some studies that have built on the Ricardian equivalence hypothesis (Barro, 1989) have found either no correlation or only a weak correlation between fiscal deficits and inflation like (Niskanen, 1978; McMillin & Beard, 1982; Ahking & Miller; 1985; Landon & Reid, 1990; Fiani, 1991).

Basically, volatility in inflation has been barely considered in Nigeria. Studies that have considered inflation volatility in Nigeria have focused on its relationship with other variables like trade openness, economic development.[1]. Basically since volatility in inflation possess more threat than inflation on the average and this volatility is noticeable in the Nigerian inflation rate (see figure 1 below) there is need to determine whether it is a cause or caused by fiscal deficit. Similarly, large deficits are now the addictive nature of the federal government leading to instability and increase in the amount of deficits incurred on yearly basis. Therefore since the existence of fiscal deficit- inflation relationship has been supported by some studies in Nigeria[2] but the direction of its causality has been missed in the literature, this study intends to fill this gap using Nigerian data from 1981 to 2014.

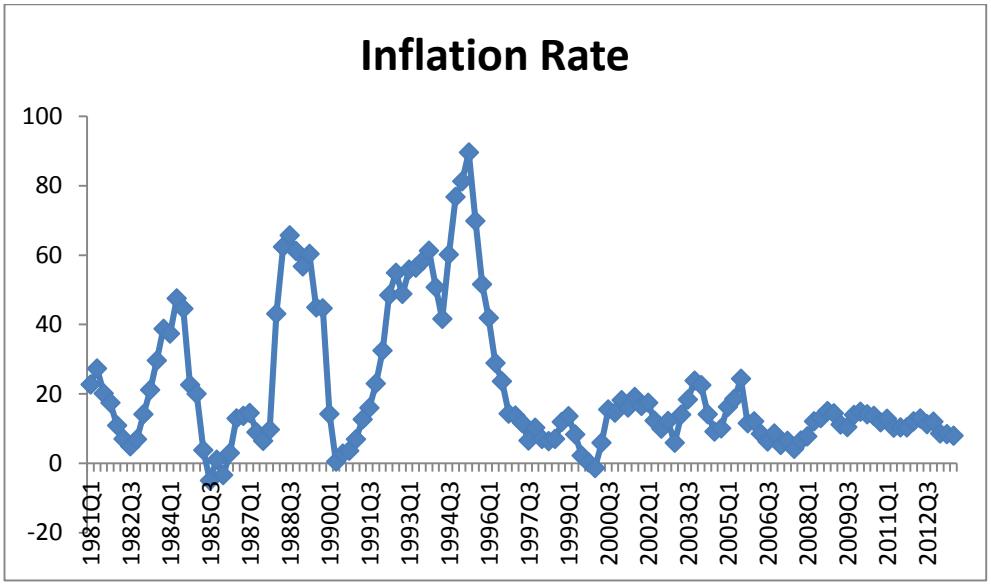

Figure 1. Trend of Inflation Rate in Nigeria, 1981:1-2013:3

Source: Authors, 2015

2. Literature Review

A number of research works has been conducted on fiscal deficit and inflation rates in developing, developed and Nigeria economy in particular. Hermantha (2012) examined the validity of the hypothesis that suggests that there is a link between fiscal deficit and inflation in Sri-Lanka and he discovered that a one percent point increase in ratio of fiscal deficits to narrow money is associated with about an eleven

[1] See (Fielding, 2008).
[2] See (Oladipo & Akinbobola, 2011; Onwiduokit, 1999; Ezeabasili et al 2012).

percent point increase in inflation. However, he concluded that the inflation in Sri Lanka was not only a monetary phenomenon. Catao and Terones (2005) used a dynamic estimation method for 107 countries and he discovered that there is a strong and positive relationship between fiscal deficits and inflation. A study by Fischer et al (2002) classified a sample of 94 countries into high-inflation and low-inflation countries. They showed that fiscal deficits are main drivers of inflation. They also found out that a change in budget balance has no significant effect on inflation in low inflation countries. Alfrin (2013) examined the fiscal-deficit inflation relationship in Bangladesh and she discovered that fiscal deficit has an effect on inflation and she however suggested that demand management policies such as government revenue and expenditure have an important role in controlling inflation. Habibulah et al (2011) examined the long-run relationship between budget deficits and Inflation in thirteen developing Asian countries, namely; Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh. However, annual data for the period 1950 – 1999 was used and co-integration, the error-correction model approach were applied to conduct the long-run and short-run Granger causality tests. The study however showed that budget deficits are inflationary in the thirteen developing Asian countries examined by the study. Fianni (1991) discovered that inflation tends to be subdued despite the presence of large budget deficit in Morocco. However, his findings were contradictory to the theoretical postulation that budget deficit has an effect on inflation.

Rother (2004) examined the effect of discretionary fiscal policies on inflation volatility in range of OECD countries between 1967 and 2001.the empirical results suggested that volatility in discretionary fiscal policy has contributed to volatility in inflation. Ramona (2011) examined the impact of fiscal policy on inflation volatility in Romania during the economic crises context and he discovered that budget deficit has quite a powerful impact on inflation volatility and the study suggested that a limited budget deficit would be a good measure for maintaining price stability.

In Nigeria, Ezeabasili et al (2011) examined empirically the fiscal deficit- inflation relationship during the period of persistent inflationary trends i.e. from 1960 -2006. They adopted a modeling which incorporated the co-integration technique as well as the structural analysis and discovered that there is a positive but insignificant relationship between fiscal deficit and inflation in Nigeria. However, they specified that past levels of deficit do not have any positive or significant role to play with respect to inflation. Oladipo and Akinbobola (2011) examined the relative causal relationship between budget deficit and inflation as well as the economic implications of fiscal deficit financing in Nigeria and their findings however suggested uni-directional causality between inflation and budget deficit in Nigeria. The study recommended that monetary policy should be made to complement fiscal

policy measures. Also there was need for fiscal discipline to be maintained at every level of government.

Onwiduokit (1999) examined the nature of causality between fiscal deficit and inflation i.e. if inflation causes fiscal deficit or fiscal deficit causes inflation and the empirical findings confirmed that fiscal deficit/gross domestic product (which proxy the absorptive capacity of the economy) causes inflation however there empirical results did not confirm a feedback effect between inflation and fiscal deficit in absolute terms. Abel and Olalere (2012) examined whether budget deficit was inflationary or not in Nigeria within the period of 1980 to 2009. The study made use of time series data and employed vector Error correction Mechanism (VECM) to determine the correlation that existed between the two macroeconomic variables. The study also investigated the existence of long run relationship between budget deficit and inflation. The findings of the study suggested uni-directional causality between budget deficit and inflation. The study recommended that government should cut down its expenditure in order to keep the inflation rate low and when fiscal deficits were to be incurred it should be channeled to productive investments in the country. Oseni (2015) examined the empirical relationship between fiscal policy and inflation volatility in Nigeria using error correction mechanism framework and found that discretionary fiscal policy has a temporary effect on inflation volatility in the short-run and a significant negative effect on inflation volatility in the long-run. The study further noted that the fluctuation caused by the level of inflation to its volatility is minimal in the long-run compared to the short-run effect. This study also neglects the direction of causality between fiscal policy and inflation volatility. Thus, the neglect of this crucial issue may mislead the government on the area to tackle the causes of inflation volatility in Nigeria, hence this study.

3. Methodology

This study adopted the Keynesian theory of inflation for analyzing the direction of causality between fiscal deficit and inflation volatility in Nigeria. The Keynesian theory is a short run analysis theory. It is based on the assumption that there exist unemployed resources in the economy. Fiscal deficit can be linked to inflation under the Keynesian theory since it supports the use of fiscal deficit to sustain the economy in periods of economic meltdown (recession), Keynes advocated fiscal deficit i.e. excess spending relative to revenue generated in an economy in periods of recession. Also the fiscal deficit advocated by Keynes if not properly channeled into productive activities in an economy could generate inflation.

To examine the causal relationship between fiscal deficit and inflation volatility using the VAR model, a pairwise granger causality test was utilized. The advantage

of this model is that it allows any variable to have the tendency of being a dependent or independent variable. The model is specified as follows:

$$U(VAR) = (FID, \sigma^{INF}) \quad 1$$

$$\sigma_t^{INF} = \sum_{i=1}^{n} \alpha_{11} \sigma_{t-1}^{INF} + \sum_{j=1}^{m} \alpha_{12} FID_{t-1} + \varepsilon_{1t} \quad 2$$

$$FID_t = \sum_{i=1}^{n} \alpha_{21} \sigma_{t-1}^{INF} + \sum_{j=1}^{m} \alpha_{22} FID_{t-1} + \varepsilon_{2t} \quad 3$$

Where FID represents fiscal deficit, σ^{INF} stands for variance of inflation rate and this is used to measure volatility in inflation rate using GARCH (1, 1) technique.

4. Results and Discussions

Table 1. Unit Root Test using Augmented Dickey Fuller Technique

Variables	LEVEL			FIRST DIFFERENCE			Order of Integration	Autocorrelation
	Constant	Constant, Trend	None	Constant	Constant, Trend	None		
σ^{INF}	-4.02	-4.15	-1.26	-6.95	-6.93	-6.97	I(1)	No
FID	-2.18	-2.41	-0.30	-3.15	-3.18	-3.15	I(1)	No
ecm	-4.23	-5.43	-3.26	-	-	-	I(0)	No
C.V 1%	-3.48	-4.03	-2.58	-3.48	-4.03	-2.58		
5%	-2.88	-3.44	-1.94	-2.88	-3.44	-1.94		
10%	-2.58	-3.15	-1.62	-2.58	-3.15	-1.62		

Source: Author, 2016
Note: C.V indicates Critical Values

Table 1 shows the results of the unit-root test using Augmented Dickey Fuller (ADF) technique. The paper employed this technique to avoid the problem of autocorrelation in the variables. The rule stated that a variable can be stationary if all the three models are satisfied: constant, constant and Trend, and none; otherwise, the variable has unit root problem. In the table 1 above, at 5% significance level, the inflation volatility is stationary at level using constant, constant and trend but not stationary at none indicating that the variables are not stationary at level based on the rule. However, based on the prescribed rule, all the variables are stationary at first difference at 5% significance level. This implies that all the variables are integrated of order one I (1) series. The variables are also tested for autocorrelation problem using correlogram. The results also confirmed that all the variables are I (1) series since the spikes are within the lines and the Q-statistic at ten lag is statistically not significant at 5% level. Based on this, the paper further subjected the variables to long-run test using Engle and Granger Co-integration technique. The result of the cointegration test shows that the two variables have long-run co-movement as

evidence from the unit-root test of the '***ecm'*** in table 1 which is stationary at level at 5% significance level. The short-run relationship using Error Correction Mechanism (ECM) is presented in tables 2 below.

Table 3. Error Correction Mechanism (Short-Run Relationship)

Dependent Variable: $d(\sigma^{INF})$				
Explanatory Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.022909	0.038282	-0.598439	0.5507
ECM(-1)	-0.212038	0.056999	-3.720065	0.0003
D(FID)	0.023932	0.031930	0.749503	0.4550
R-squared	0.707581	Durbin-Watson stat		1.887305
Adjusted R-squared	0.670649	F-statistic		27.546427

Source: Author, 2016

The table 2 shows the results of the short-run relationship between fiscal policy and inflation volatility in Nigeria. The results confirmed the existence of the long-run equilibrium relationship between fiscal policy and inflation volatility since the coefficient of error correction mechanism is negative and statistically significant at 5% level. However, the coefficient of error term is 21.2% indicating that the Nigerian economy corrects its previous dis-equilibrium at a speed of 21.2% quarterly.

Table 3. Empirical Analysis of Bivariate Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
FID does not Granger Cause INFV	128	5.86313	0.0037
INFV does not Granger Cause FID		3.96412	0.0215

Source: Authors, 2016

The granger causality test results showed that there was bi-directional causality between fiscal deficit and inflation volatility. This indicates that volatility of inflation influences the fiscal deficit while fiscal deficit also influences inflation volatility implying that both variables Granger cause each other. However, the implication of the results is that changes in fiscal policy (measured by fiscal deficit) actually influence the fluctuations in inflation rate in the Nigerian economy. That is, an increase or decrease in the fiscal deficit of the economy is capable of generating instability in the inflation rate.

5. Conclusion and Recommendation

Based on the findings of this study, it has been determined that fiscal deficit and inflation volatility have a bi-directional causality. Fiscal deficit influences inflation volatility and inflation volatility also influences fiscal deficit.

Therefore, this study recommends that appropriate policies should be put in place to check the extra budgetary expenditure of the government since they have been found to be inflationary. Appropriate combination of the monetary and fiscal policies should be used in other to regulate all unnecessary money supply, channel expenditures to capital projects that would increase investment opportunities and generate economic growth in the long run.

6. Reference

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