# Macroeconomic Effects of Fiscal Policy Changes in Nigeria

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**Abstract**: The study examines the relationship between fiscal policy and macroeconomic performance in Nigeria in the post economic crisis era. The vector autoregressive, granger causality and impulse response function estimators are employed to capture the interactions between fiscal policy and macroeconomic variables. The findings indicate that the previous values of government revenue employed in financing government expenditure have impact on macroeconomic factors except for per capita income growth. However, only money supply to the size of the Nigerian economy reported a direct relationship with total expenditure growth, where others report an indirect relation. Also, the fiscal balance growth only enhances lending rate, total trade to economic size and exchange rate, and the other two variables report otherwise. The paper submitted that fiscal policy is important to achieve better macroeconomic performance in Nigeria.

## 1      Introduction

The 2008 global financial crisis that started from the United States spur renewed interest on how to stabilize global economy. The neoclassical favoured less government involvement in the economy. They believed that the market forces in form of invisible hands and free market enterprise should dictate how to achieve better macroeconomic performance. This is premised on the idea that government intervention crowd out private investment. However, the Keynesian believed that government intervention in the economy through fiscal policy stance could help to stabilize the economy in the short and medium term. The Keynesian believed in the visible hand of government to intervene to correct market failures and externalities of the free market enterprises (Akanbi, 2013).

The relationship between fiscal policy and macroeconomic performance has been subject of long debate in the macroeconomic literature. The empirical evidences have been mixed and inconclusive. While substantial number of studies documents that fiscal policy has significant impact on macroeconomic performance (Gibson and Van Jeventer, 1997; Calitz, 2000; Abbas, Belhocine, ElGanainy & Horton, 2010; Romer and Romer, 2010; Olsan, 2011; Afonso and Sousa, 2012; Endegnanew, AmoYartey & Turn-Jones, 2012).Several other studies documents that fiscal policy does not have significant impact on macroeconomic performance (Dornbush, Fischer & Starz, 1998; Blanchard and Perotti, 1999; Blinder and Solow, 2005; Ramsey, 2008). But there are limited studies in the literature that provide strong empirical evidences from the Nigerian context that capture the

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role of fiscal policy (tax revenues, expenditures and fiscal balance growth) on macroeconomic performance. This study provides comprehensive assessment of the role of fiscal policy components (tax revenue growth, expenditure growth and fiscal balance growth) on macroeconomic performance in Nigerian.

Nigeria is largely a public sector led economy with huge government consumption expenditure usually finance through oil revenue. The government revenue through taxes is minimal because of the underdeveloped tax environment and weak institutions that cannot guarantee effective tax revenue collection thereby result to revenue loss due to tax evasion. As fiscal policy is expected to play substantial and important role in the stabilization process in Nigeria particularly in the short-to medium term the role of tax revenue supporting the expenditure programmes of government to ensure stable and favourable macroeconomic performance cannot be ignored.

The paper is one of the few evidence based studies in recent times that examine the impact of fiscal policy (tax revenue, expenditures and fiscal balance growth) on macroeconomic performance in a lower income developing country context. In the light of this, the paper was able to establish how resource dependent country like Nigeria where oil account for greater percentage of the GDP and government revenue as well as expenditures have been able to use fiscal policy particularly through tax revenue to engender macroeconomic performance. This paper represent one of the few nascent studies that examines jointly the role of three main fiscal policy variables (tax revenue, government expenditure and fiscal balance growth) in a dynamic framework using the vector autogressive estimator. Apart from the introduction, the paper is organized as follows: Section 2 review the related literature. Section 3 presents the methodology. Section 4 provides the results and section 5 concludes the paper.

## 2       Literature review

Over the past years, a great deal of theoretical studies has been developed to explain the relationship among various macroeconomic performances and fiscal policy instruments. Aside the intervention made by the Keynesian on the importance of the visible hand of government to correct market failures and externalities of the free market enterprises, different fundamental questions about economic behaviour were also raised under different hypotheses to show various macroeconomic implications. Among these hypotheses are: the conventional view of debt; Ricardian equivalence theorem and tax-smoothing models. Under the conventional view of debt, it was proposed that the most important effects of government budget deficits is that it increases aggregate demand in the short-run, and reduces capital stock in long-run. In the same vein, government debt reduces national savings, which in turn crowds out capital accumulation (Mankiw, 2000). The Ricardian equivalence theorem proposition is that policy will not alter consumption, capital accumulation, or growth. The situation with the tax cut and budget deficit is equivalent to the situation without it. However, the overall conclusion of the theorem states that policy does not influence savings or capital accumulation but only the quantity of government purchases regardless of how it is being financed i.e. taxation or borrowing. And, the tax-smoothing models states that what determines the deficit is the desire of government to minimize distortions associated with raising taxes (Barro, 1979), implying that deficits and surpluses arise when the ratio of government purchases to output is expected to change.

Several studies ranging from country-specific to panel analysis with different methodologies and scope coverage have been empirically carried out testing the

relationship between fiscal policy instruments and macroeconomic policy indicators. Divergent conclusions have been made with regards to various fiscal policy instruments and macroeconomic performance (per-capita income, trade, money supply, interest rate etc.) (Barro, 1991; Burney & Akhtar, 1992; Easterly & Schmidt-Hebbel, 1993; Hakkio, 1996; Rahman, Mustafa & Bailey, 1996; Cebula, 2000; Modeste, 2000; Vamvoukas, 2000; Bruck & Stephen, 2005; Eugenia-Ramona, 2012; Sangosanya & Atanda, 2012; Appah & Chigbu, 2013; Murwirapachena, Maredza & Choga, 2013; Umeora, 2013; and Wosowei, 2013). Their results also differ due to positive-negative relationship and bi- to uni- to no causality reported on different variables used as only few drew attention on macroeconomic performance due to fiscal policy shocks. For instance, Easterly & Schmidt-Hebbel (1993) employed a panel OLS estimation technique to study relationship between fiscal deficits and macroeconomic performance in 10 developing countries for 1970-1988. Empirical evidence soundly refutes the Barro-Ricardian proposition that consumers react the same to conventional taxes, unconventional taxes (inflation or financial repression), and debt financing.

Macroeconomic shocks captured by the GDP forecast error variable was reported by Bruck & Stephen (2005) that they are positively correlated with the deficit forecast errors. In their survey involving 17 Eurozone and Non-Eurozone countries (15-EU, Japan and US), they further asserted that Greece and US have high positive while Luxembourg and Belgium high negative coefficients, indicating that these countries systematically under- and over-estimate their budget deficits, respectively. Eugenia-Ramona (2012) went further to study the relationship among fiscal balances, GDP and other macroeconomic variables among 27 (15-old & 12-new) European member states within 1996-2011. Result revealed that economic growth seems to be the most significant determinant of budget balance volatility in both old and new EU. Barro (1991) opined that a negative relationship existed between output growth and the share of government consumption expenditures for 98 cross-sectional countries within 1960-1985. Murwirapachena, Maredza & Choga (2013) used Vector Error Correction Model (VECM) to examine economic determinants of budget deficits in South Africa within 1980-2010. The study revealed that all the determinants have a positive impact on budget deficits except for foreign debt.

Additionally, several studies examine the impact of fiscal policy instruments on interest rates. Studies such as Cebula (1988), Al-Saji (1993) and Cebuka & Rhodd (1993) argued that government budget deficits do exert a positive effect on nominal and long-term interest rates; whereas, Feldstein & Eckstein (1970) discovered that the relatively slow growth of the public debt has exerted downward pressure on interest rates. However, Evans (1985) reported that no level of relationship between the variables. Using cointegration and ECM techniques, Vamvoukas (2000) affirmed that a positive relationship existed between budget deficits and interest rates in Greece, thus, supporting the Keynesian elasticity hypothesis.

Empirical studies were also carried out on causal relationship between exchange rate and fiscal deficits. Hakkio (1996) revealed that in all OECD countries, except Japan, UK, and Australia, deficit reduction through cutting government spending causes the currency to appreciate for a period of 1979-1994. Burney & Akhtar (1992) and Rahman, Mustafa & Bailey (1996) argued that budget deficits have a significant positive impact on the real exchange rate directly for Pakistan and United States respectively.

In the Nigeria context, Wosowei (2013) reported a bilateral causality relationship between government deficit and gross domestic product, government tax, and unemployment, while there is an independent relationship between government deficit and government

expenditure and inflation. Umeora (2013) showed that GDP, exchange rate, inflation, and money supply have positive significant relationship with government deficit spending; whereas, lending interest rate has negative significant effect with government deficit spending and most likely crowd-out the private sector by raising the cost of funds; and deficit spending has been known to have adverse effects on the economy and government is advised to curtail excessive deficit spending between 1970-2011. A more recent study also carried out by Sangosanya & Atanda (2012) on exchange rate variation and fiscal balance in Nigeria revealed that exchange rate has impacted negatively on fiscal deficit i.e. over-valuation of naira widens fiscal deficit while continuous depreciation contracts fiscal deficit. They resorted that it may be due to the composition of fiscal deficit in Nigeria in which the huge proportion constitute of local currency rather foreign currencies.

The review of literature suggests that the issue of macroeconomic effects of fiscal policy (tax revenue, government expenditure and fiscal balance) changes still remain largely unexplored particularly in the context of an oil dependent lower income country like Nigeria. Fiscal policy in Nigeria for several decades even till date is contingent on crude oil revenues rather than tax revenues. The shocks in the international oil sector may have great consequential effects on fiscal policy of government which in turn may affect the macroeconomic performance in Nigeria has been experienced currently in the country thereby calling for the use of other revenue sources particularly taxes to finance government expenditures. But there are limited empirical studies in the literature that have focus specifically on the macroeconomic effects of fiscal policy changes particularly tax revenues in the financing of government expenditures in the context of Nigeria. It is very important to investigate this matter in the Nigerian context because Nigeria provides different institutional setting where fiscal policy especially budget deficit has been rising consistently for several decades, the private sector is often crowded out because the economy is public sector led and the fiscal policy impact in achieving better socioeconomic development outcomes is minimal due to extractive rent seekers that divert state resources for private use and over dependent on oil revenues. It is against the foregoing that this current study provides evidence based empirical study on how fiscal policy changes (tax revenues, government expenditures and fiscal balance) affect macroeconomic performance in the Nigeria context.

## 3    Data and methodology

### 3.1    Econometric Framework and Modelling

The VAR approach that this study utilizes to examine the relationship between macroeconomic performance and fiscal policy allows an interaction between all the specified variables. The variables included in the VAR are government revenues, government expenditures and fiscal balance growth (FBG), money supply to economic size (M2GDP), lending rate (LR), total trade to GDP (*TRADEGDP*), exchange rate (*EXR*) and per capita income growth (*PCIG*).

The VAR model takes each of the variables in the system and relates its variation to its own past history and the past values of all the other variables in the system. A typical VAR model in standard form can be written as;

$$Y_t = C + \sum_{i=1}^{p} A_i\, Y_{t-1} + \varepsilon_t \qquad (1)$$

Where $Y_t$ denotes the (8x1) vector of the six endogenous variables given by:

$Y_t = [gov\ rev, gov\ exp, fbg_t, m2gdp_t, lr_t, tradegdp_t, exr_t, pcig_t]'$, c, is a (8x1) vector of intercept terms, $A_i$ isthe matrix of autoregressive coefficients of order $i$. The basic identification scheme uses a recursive VAR model (proposed by Sims (1980) in which the ordering of the variables is $[GOV\_REV, GOV\_EXP, FGB, M2GDP, TRADEGDP, PCIG, EXR]$, where the contemporaneously exogenous variables are ordered first. The variable in the VAR is thus ordered from the most exogenous to the least exogenous one. The government revenue, government expenditures and fiscal government balance was ordered first so that a shock in fiscal policy variables may have an instantaneous effect on all the other variables not vice versa. However, fiscal policy variables do not respond contemporaneously to any structural disturbances to the remaining variables.

**Table I:** Descriptive Statistics

| Variables | Mean | Maximum | Minimum | Std. Dev. | Skewness | Kurtosis | Jarque-Bera | Prob. |
|---|---|---|---|---|---|---|---|---|
| **GOV_REV_GR(%)** | 28.49 | 115.04 | -10.39 | 29.68 | 1.29 | 4.40 | 15.40 | 0.00 |
| **TEXP_GR (%)** | 24.85 | 407.76 | -29.82 | 67.93 | 4.65 | 25.52 | 1063.92 | 0.00 |
| **FBG (%)** | 176.71 | 3104.94 | -382.48 | 673.54 | 3.28 | 13.16 | 261.91 | 0.00 |
| **M2_GDP (%)** | 23.15 | 37.96 | 9.32 | 7.28 | 0.26 | 2.04 | 2.16 | 0.34 |
| **PCIG (%)** | 1.74 | 30.34 | -15.46 | 8.01 | 0.95 | 6.25 | 25.37 | 0.00 |
| **EXR ($1=₦)** | 46.55 | 157.50 | 0.55 | 59.39 | 0.80 | 1.83 | 7.06 | 0.03 |
| **INF (%)** | 19.27 | 72.81 | 1.65 | 17.35 | 1.54 | 4.39 | 20.45 | 0.00 |
| **TOP** | 50.93 | 88.24 | 21.55 | 14.64 | 0.12 | 2.53 | 0.51 | 0.78 |

*Source:* Authors' computation (2015).

All the data were sourced from both Central Bank of Nigeria statistical bulletin, (2015) and World development Index (2015). Table I above summaries the statistical features of our time series data. The VAR were estimated using the levels of all the series. Our analysis is based on Impulse Response Functions (IRFs) to generalised shocks and forecasted error variance decompositions (FEVDs).

Also, the unit root test using the conventional methods revealed that all the variables are stationary at first difference i.e. I(1). We went further to conduct the cointegration test and the result shows that these variables are not cointegrated[5]. Sims (1980) and Doan (1992) showed that differencing a variable may suppress important information while providing no valuable merit. Hence, the VAR analysis is conducted using variables at their levels rather than at first difference, although they all have unit roots.

## 4       Empirical result and discussion

### 4.1     Impulse Responses Analysis

Figure I below presents the contemporaneous response of fiscal policy indicators (government revenue, total expenditure and fiscal balance) to Cholesky one squares variances shocks on macroeconomic performance. As shocks in government revenue growth arise, the response of money supply to GDP (MS) was negative for the first two periods and later reacts positively in the latter periods. This is similar to the response of total trade to GDP (TOP) and per capita income (PCIG). Contrary, lending rate (LR) and exchange rate (EXR) react positively in the first two periods and thereafter decline

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[5] These are available on request.

smoothly when shocks in government revenue occur. It is worthwhile to note that shocks in total expenditure of government make all the macroeconomic indicators react in opposite direction when shocks in government revenue take place. However, the shocks in government expenditure dictate the direction of shocks in fiscal balance. It implies that government expenditure played a major role on the performance of macroeconomic indicators in Nigeria. More so, this is evidenced in the country's fiscal performance as a run-down of her annual government expenditure from 1970 (at the end of the Nigeria – Biafra War) to 2013 shows that the government ran annual deficits for 38 years.

## 4.2      Variance Decomposition Analysis

This sub-section presents the variance decomposition, which separates the variation in an endogenous variable into the component shocks of the VAR model. Table II below presents the variance decomposition of macroeconomic performance proxy by per capita income growth to innovation shocks from fiscal policy, monetary policy and external policy instruments. In the second column, the labelled "S.E." contains the forecast error of the variable at a given forecast horizon. The source of this forecast error is the variation in the current and future values of the innovations to each endogenous variable in the VAR. The other columns for each of the macroeconomic variables give the percentage of the forecast variance due to each innovation, with each row adding up to 100.
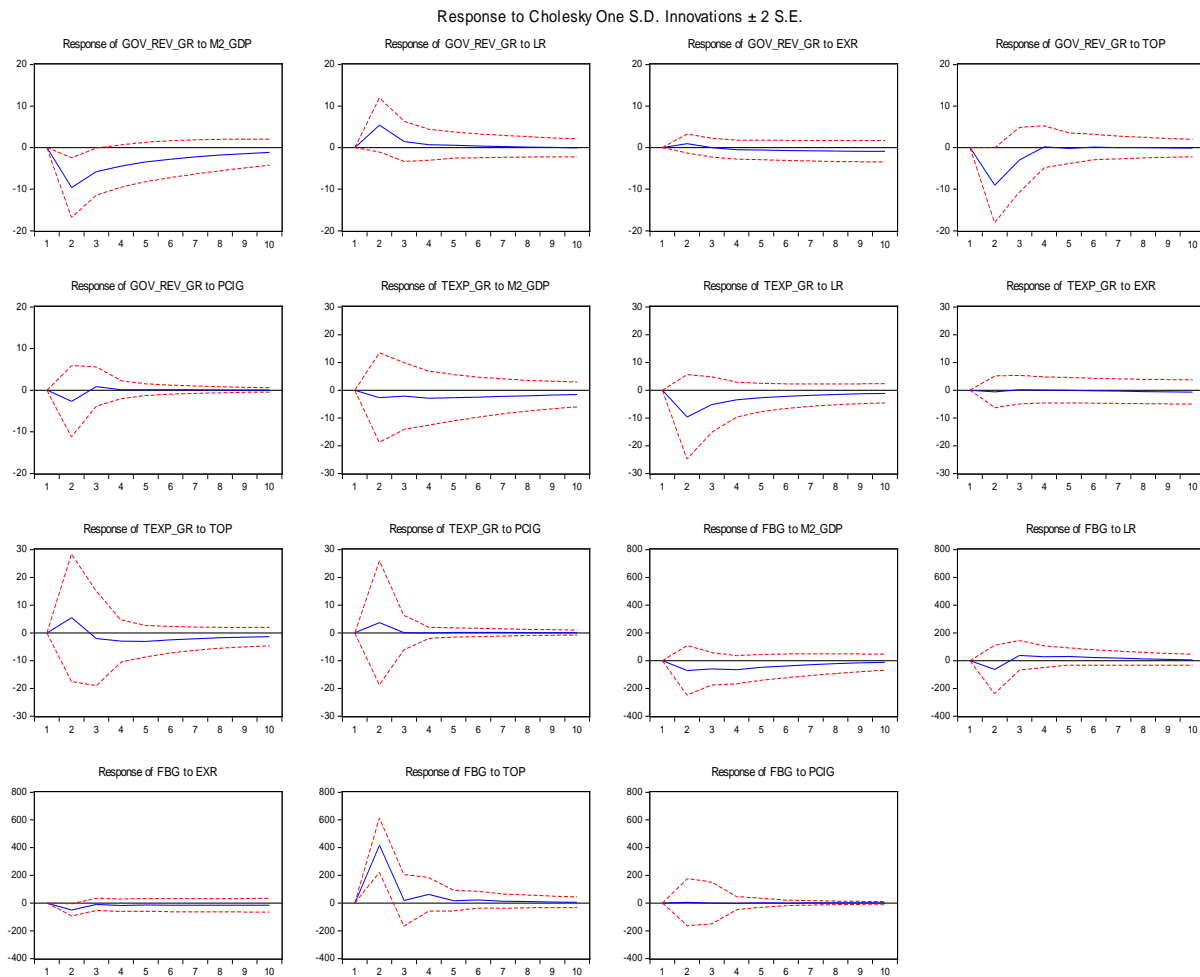


Response to Cholesky One S.D. Innovations ± 2 S.E.

*Figure I: Impulse Response Plot of Fiscal Policy and Macroeconomic Policies Shocks*

**Table II:** Variance Decomposition Analysis

| Period | S.E. | PCIG | GOV_REV_GR | TEXP_GR | FBG | M2_GDP | LR | TOP | EXR |
|--------|------|------|------------|---------|------|--------|------|------|------|
| 1 | 27.82 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 31.47 | 89.14 | 0.24 | 0.68 | 0.52 | 4.23 | 1.31 | 2.81 | 1.08 |
| 3 | 32.35 | 85.30 | 0.41 | 0.81 | 1.66 | 4.88 | 1.70 | 3.56 | 1.69 |
| 4 | 32.71 | 83.97 | 0.41 | 0.89 | 1.68 | 5.54 | 1.84 | 3.58 | 2.08 |
| 5 | 32.93 | 82.74 | 0.50 | 0.95 | 1.91 | 5.86 | 2.03 | 3.55 | 2.44 |
| 6 | 33.08 | 81.74 | 0.56 | 1.00 | 2.02 | 6.09 | 2.21 | 3.63 | 2.74 |
| 7 | 33.17 | 80.83 | 0.64 | 1.04 | 2.14 | 6.22 | 2.41 | 3.71 | 3.02 |
| 8 | 33.24 | 80.01 | 0.72 | 1.07 | 2.23 | 6.30 | 2.60 | 3.81 | 3.27 |
| 9 | 33.29 | 79.25 | 0.80 | 1.09 | 2.32 | 6.33 | 2.80 | 3.92 | 3.50 |
| 10 | 33.32 | 78.54 | 0.87 | 1.11 | 2.40 | 6.33 | 3.00 | 4.04 | 3.71 |

*Source:* Authors' computation (2015).

Table II above also presents the variation in per capita income growth due to shocks is decomposed into related policy instruments. The results of the percentage of share of per capita income growth changes accounted by the considered policy instruments shocks are presented in Table III. The table revealed that shocks within itself (i.e. economic shocks), fiscal policy shocks, monetary policy shocks and external policy shock accounted for 84.2%, 3.07%, 7.17% and 5.61% of the total variation in macroeconomic performance measured by per capita income in Nigeria respectively. It indicates that fiscal policy is the least among various policy instruments driving the level of macroeconomic performance in Nigeria between 1970 and 2013.

**Table III:** Percentage of Per Capita Income Variation due to Policy Instrument Shocks

| Overall % Share of Policy Instrument Shocks | | | |
|---|---|---|---|
| Economic Shocks | Fiscal Policy Shocks | Monetary Policy Shock | External Policy Shock |
| 84.2% | 3.07% | 7.17% | 5.61% |

*Source:* Authors' computation (2015).

## 4.3 Granger Causality Test

Granger-Causality test helps determine the pattern of relation between the explanatory variables in the model. This relation can occur in one way or two ways. The relation between macroeconomic performance and fiscal policy indicators has a two-way relation, which is depicted in Table IV. The table shows that only money supply to the size of Nigerian economy and government revenue growth reported a two way causal relations at varying significant values. Nonetheless, a one way causal relation from exchange rate to government revenue growth at 5% significant level. Similarly, openness of trade Granger cause fiscal balance growth at 0.01 critical values. None of the macroeconomic factors was found to granger cause total government expenditure as an indicator of fiscal policy.

**Table IV:** Results of Long-run Granger Causality Test (Pairwise Granger; Lag: 2)

| Independent Variables | Dependent Variables (F-statistics value) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *gov_rev_gr* | *texp_gr* | *Fbg* | *m2_gdp* | *lr* | *top* | *exr* | *pcig* |
| *gov_rev_gr* | - | 0.0748 | 0.0186 | 2.8626*** | 0.5502 | 0.5015 | 0.5078 | 0.2764 |
| *texp_gr* | 0.5141 | - | 0.0887 | 0.5691 | 0.2935 | 1.1570 | 0.0983 | 0.3164 |
| *Fbg* | 1.5515 | 0.7244 | - | 0.0496 | 0.9700 | 0.0319 | 5.0964** | 0.2076 |

| m2_gdp | 3.7299** | 0.2837 | 0.7500 | - | 0.8280 | 1.8791 | 0.9234 | 0.1878 |
|--------|----------|--------|--------|---|--------|--------|--------|--------|
| Lr | 0.4568 | 1.5073 | 0.0382 | 2.1522 | - | 7.8952* | 0.7944 | 1.7558 |
| Top | 0.0626 | 0.2319 | 8.8995* | 0.5060 | 1.0368 | - | 2.3921 | 1.2996 |
| Exr | 5.0070** | 0.5214 | 2.3652 | 1.2900 | 0.1499 | 0.3491 | - | 3.7357** |
| pcig | 0.0290 | 0.1148 | 0.0526 | 0.0554 | 0.7333 | 0.9075 | 0.1240 | - |

**Note:** *, ** and ***signifies significance level at 1%, 5% and 10% respectively.
*Source:* Authors' computation (2015).

Moreover, fiscal balance growth Granger cause exchange rate at 5% significant level. Relationship among the macroeconomic factors reveals a one way causal relationship from lending rate to trade openness as well as from exchange rate to per capita income growth at varying degrees. Thus, other relations reported non-directional relations at different significant levels. Conclusively, the results showed that shocks from monetary policy instruments and trading activities with other countries affect fiscal policy instruments in the Nigerian economy.

## 5    Conclusion

The paper examines the interaction between fiscal policy and macroeconomic variables in the Nigerian context with specific focus on the role of tax revenue in an oil rich and oil dependent country like Nigeria. Vector autoregressive framework, granger causality and impulse response econometric estimators are employed to capture the impact of fiscal policy (tax revenue, government expenditure and fiscal balance) on macroeconomic performance. The findings indicate that the previous values of government revenue from taxes used to finance expenditure accelerate all the macroeconomic variables except for per capita income growth. However, only money supply to the size of the Nigerian economy reported a direct relationship with total expenditure growth, where others report an indirect relation. Also, the fiscal balance growth only enhances lending rate, total trade to economic size and exchange rate, and the other two variables report otherwise. The paper therefore contend that fiscal policy particularly tax revenues is crucial to achieve better macroeconomic performance in Nigeria.

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