

Macroeconomic Effects of Monetary and Fiscal Policy Interactions on Economic Growth Dynamics in Nigeria

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Abstract¹

Over the years, the Nigerian economy has been faced with continuous disequilibrium and complexity in policy direction that constitutes a major setback in the growth pattern and macroeconomic instability. In this regard, the paper investigated the effectiveness of fiscal-monetary policy interactions on real output growth in Nigeria between 1999 and 2016. The dynamic analyses of variables have been captured by the multiple least square estimators. The estimated findings reveal that both fiscal and monetary policies variables are effective in stimulating economic growth in the country. However, it was found that fiscal-monetary policy interactions have significant but negative impact on real GDP in Nigeria for the period considered. Thus, it seemed that in past there was no evidence of synergy between fiscal and monetary policies interactions in achieving economic growth in Nigeria. It is therefore recommended that, in order to put Nigerian economy on the path of sustainable growth, the government must co-ordinate fiscal and monetary policies and adopt a policy-mix that will promote growth and greater welfare of the citizenry.

Keywords: Macroeconomics, Fiscal policy, monetary policy, Fiscal-monetary policy interactions, OLS, Economic growth, Cointegration.

JEL Classification: B22, C2, C22, E52, E62, E63, O45.

1. Introduction

The role of monetary and fiscal policies in influencing economic activity has been one of the most extensively discussed issues by both researchers and policy-makers. Sustainable economic growth with relatively stable price level and substantial improvement of the wellbeing of the people have been the drive of policy institutions, policy makers and the government in both developed and developing countries. In this respect, both monetary and fiscal policies are used as major tools for macroeconomic stabilization, economic growth and management as major tools for macroeconomic stabilization, economic growth and management. There have been extensive theoretical discussions about the interaction between fiscal and monetary policies but the

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thresholds on the conflicts of the goals, instruments, targets and coordination between them are still undecided in the literature (Sargent and Wallace 1981).

The much attention on fiscal-monetary interaction emanates from the Tobin-Mundell debate regarding the proper “policy mix” after higher taxes and faster money growth triggered stagnation during the post-war period in the United States of America. During the period fiscal fine-tuning was the core policy while monetary policy was viewed as a tool for stimulating debt-financed purchases by keeping interest rates low. The stagnation phenomenon incited macroeconomists to patch together a Keynesian-neoclassical synthesis (Reynolds, 2001) in which James Tobin’s ‘funnel theory’ attempted to show how the government can employ both fiscal and monetary policies to shape the economy. Given this basis, the combined effect of both fiscal and monetary policies can be estimated on real economic output.

The debate on the effectiveness of fiscal and monetary policies for promoting economic growth and development persists inconclusive, given the conflicting results obtained from current studies (Adeoye 2006). In the same vein, several empirical studies over time have shown that, none of the two policies can be accorded being superior than the other and their relative impact in any economy depends on the economic and political situations obtainable at a given period of time. Hence, the effectiveness of the two policies have been a major concern to economists and policy makers with advocacy ranging from fiscalists/Keynesians, monetarists and both policy coordination.

Traditionally, both the policy instruments were under the control of the national governments. Thus traditional analyses were made with respect to the two policy instruments to obtain the optimum policy mix of the two to achieve macroeconomic goals, lest the two policy tools be aimed at mutually inconsistent targets. But more recently, owing to the transfer of control with respect to monetary policy formulation to central banks (as Central Bank of Nigeria), formation of monetary unions and attempts being made to form fiscal unions, there has been a significant structural change in the way in which fiscal and monetary policies interact. The fiscal and monetary policies decisions of the government have perceptible effects on the short-term and long-term economic output. Directly, the fiscal policy works through its impact on prices by changing taxes and other charges, and indirectly by affecting aggregate demand.

Undoubtedly, fiscal/monetary policy is central to the health of every economy, as government power to tax and spend, as well as money stock; affects the disposable income of individual households, firms, as well as general business climate (Abata, Kehinde & Bolarinwa 2012). By implication, there is a dilemma as to whether these two policies are complementary, or act as substitutes to each other for achieving macroeconomic goals. Policy makers are viewed as interacting on strategic substitutes when one policy maker's expansionary or tightening policies are countered by another policy maker's tightening or expansionary policies. However, for any economy to grow there must be macroeconomic-policy framework that influences economic growth.

The objectives of fiscal and monetary policies in Nigeria are wide-ranging. These include increase in Gross Domestic Product (GDP) growth rate, reduction in the rates of inflation and unemployment, improvement in the balance of payments, accumulation of financial savings and external reserves as well as stability in Naira exchange rate (CBN, 2009). Generally, both fiscal and monetary policies aim at achieving relative macroeconomic growth and stability. However, due to changing government policies and macroeconomic instruments inconsistency, Nigeria has not been able to exploit her economic potentials for rapid economic growth (Ogbole, 2010).

Nigeria as a country has faced different economic challenges over the years, in spite of several and frequent changing fiscal and monetary policies of different government regimes. Various studies on the Nigerian economy have found diverse and at times, contradictory empirical evidence on which direction should policy-makers take and the extent of the effects of some variables on inflation and aggregate output. These findings have sometime led to conflicting discussions on the direction of economic policy, which creates complexities for policy makers in choosing an appropriate policy mix that will facilitate faster output growth in the economy and lower inflation. In order to grow the Nigerian economy, there is need for harmony between the fiscal and monetary policy variables so that they do not contradict one another. Hence, it is significant to study the case in which fiscal policy exerts greater impacts, as well those in which monetary policy performs better.

However, in comparative studies, these two policy instruments have been applied effectively in most developed countries. But despite their demonstrated efficacy in the developed economies, as policies that exert influence for sustainable economic growth, both policies have not been optimally operated in Nigeria (Ajisafe & Folorunsho, 2002).

Based on the foregoing, there have been few or no formal empirical findings that applied the classical least technique on studies of key macroeconomic variables as gross capital formation and trade openness in African countries, including Nigeria, which are critical measures of sustainable economic growth. The paper therefore assess the impacts of fiscal-monetary policy interactions on economic growth in Nigeria and the implications of such interaction effects in promoting sustainable economic growth in Nigeria. The analyses of this study covers the time period spanning from 1999 to 2016 where fiscal policy and most especially monetary policy operates with fair and considerable level of autonomy. This settles the restrictions that likely surface during the military years where monetary policies may not enjoy considerable free flow.

The inception of a new government in Nigeria (led by the All Progressive Congress) after the 2015 general election, has necessitated the need for a formalized empirical study on the most effective and efficient policy framework that will hasten economic growth and improve the general wellbeing of the people in the country. This is in response to the rising hope of the people with exceedingly high expectations of a better and more effective policy consideration from the newly installed administration. Hence, this study establishes how fiscal and monetary policies can be combined or interchanged to give an effective policy direction in an attempt to promoting sustainable economic growth in Nigeria.

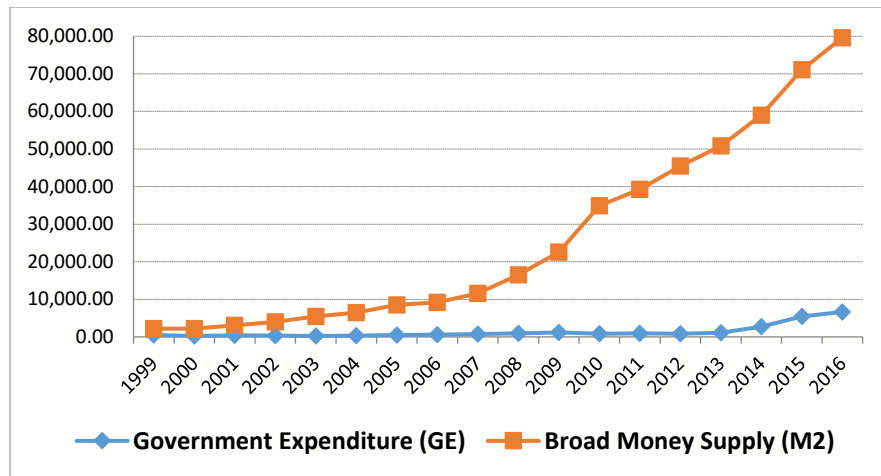
2. Fiscal-Monetary Policy Interactions

Fiscal and monetary policies are the tools through which an economy is regulated by the government or the respective central bank. The monetary-fiscal policy mix and interaction emanate from the fact that both types of policies have impacts on key macroeconomic variables which in turn creates interdependencies in the pursuit of policy objectives. Although monetary and fiscal policies use different policy instruments, they are closely related in terms of achieving specified objectives by affecting the levels of output and economic growth in the economy. Many

researchers (including Adeoye, 2006; Gupta et al, 2005; Omitogun & Ayinla, 2007) believe that fiscal policy combined with monetary policy is the most important means of regulating inflation and controlling depression in an economy. However, the close relationship between monetary and fiscal policies relays the possibility of conflict and sub-optimal policies, should their implementation be at cross purposes (Swanepoel, 2004). The policy mix could consist of various combinations of expansionary and restrictive policies, with a fiscal stance being either supportive or non-supportive of monetary policy. The interactions between fiscal and monetary policies exert shocks or innovations on economic activities.

Monetary and fiscal policy measures should stimulate the economy at least in the short run. The direction and significance of the influence in the long run depend on the structure and level of the economy. Based on this nexus and empirical evidence from some countries, Nigeria, like other developing countries continued to emphasis fiscal and monetary policies as policy tools to stimulate output and stabilize prices. Perhaps, the necessity to ratify the structural imbalances in the real sectors might have further reinforced the centrality of these policies in the overall economic growth process in Nigeria. Given the likely crowding-out effect of fiscal expansion and the possibility of increased interest rate (cost of borrowing) resulting from such expansion, the government has often times relied more on monetary policy as a better policy instrument.

In view of the above, a coordinated monetary-fiscal policy interaction is mutually reinforcing and therefore more effective. Failure to coordinate these policies is potentially dangerous as it may lead to slow growth of the economy and cause surges in inflation. Generally, there are situations where fiscal policy is effective and certain conditions where monetary policy performs better. As a result, it becomes imperative to examine how these two macroeconomic tools can best be coordinated towards promoting a sustainable economic growth in Nigeria. Figure 1 shows a graphical representation of the trend of government expenditure and broad money supply (in billion of naira) in Nigeria for the period of 1999 to 2016.



Source: Author's computation

Figure 1: Government Expenditure and Broad Money Supply in Nigeria (1999-2016)

3. Literature Review

Extensive studies have shown how the interaction between fiscal and monetary policies influence the economic growth of many developed and developing countries of the world. Some research studies found that fiscal policy is the main propellant of economic growth (Chowdhury 1986, Olaloye & Ikhide 1995). Other studies give support for the monetarist view suggesting that monetary policy generally has a greater impact on economic growth and outweighs fiscal policy in terms of its impact on investment and growth (Ajayi 1974, Batten and Hafer 1983). Some comparative findings show that monetary and fiscal policies play only a small role in varying economic performance, while many others proved that monetary combined with fiscal policies exert great influence on economic performance (Chowdhury 1988, Blanchard and Quah 1989, Oyejide, 2003, Yakubu et al 2013).

Friedman and Meiselman (1963) conducted an empirical study to test the validity of the Fiscalist and Monetarist theories using simplified single equation models. The results support the stability of the monetary model as compared to the Fiscalist multiplier model. However, the results have been criticized by many economists on the ground of modeling oversimplification and misinterpretation of econometric results. In another study, Waud (1974) used an econometric model and found that both fiscal and monetary policies are important in influencing the real economic output (real GDP) of an economy.

Similar studies have also been conducted in the developing countries. Ajayi (1974) emphasized that in developing countries, the emphasis is always on fiscal policy rather than monetary policy. In his study, he estimated the variables of monetary and fiscal policies using ordinary least square (OLS) approach and found out that monetary policy influences are much greater and more predictable than fiscal influences. These results were ascertained with the use of beta coefficients that changes in monetary action were greater than that of fiscal action. In effect, the study asserts that greater reliance should be placed on monetary policy actions. However, Chowdhury (1986) and Brimmer and Sinai (1986) adopted Ordinary Least Square method to examine the relative effectiveness of monetary and fiscal policies in Bangladesh. From the analysis, they established that fiscal actions exert greater impact on economic activity than monetary actions. Jordan, Craigwell and Carter (1999, 2000) examined the potency of monetary and fiscal policies in Caribbean countries which include Trinidad, Barbados and Guyana, using annual data. The study uses government expenditure as fiscal policy variable and net domestic assets as the monetary policy variable, and GDP as economic output measure. The results based on a VAR estimation revealed that both policies have significant influence on GDP but the coefficient of monetary policy was negative indicating that an expansion in the monetary policy makes the real output to contract in the long run.

Ajisafe and Folorunso (2002) recorded after using annual series data for the period of 1970 to 1998, in their analytical study using co-integration and Error Correction Modeling (ECM) techniques ascertained that monetary rather than fiscal policy exerts a great impact on economic activities in Nigeria. They concluded that there has been more distortion in the Nigerian economy as a result of the much emphasis on fiscal action of government. Suleiman et al (2009) investigated the long-run relationship between broad money supply (M2), public expenditure and economic growth in Pakistan. The study applied Johnson co-integration test to determine whether there is a long-run relationship between the study variables. The results of the study revealed that there exists a negative relationship between public expenditure and growth in the long-run while broad money supply (M2) impacts positively on economic growth in the long-run. The results in effect suggest that monetary policy has exceedingly high impact on economic growth.

Rina, Tony and Lukytawati (2010), examined the impact of fiscal and monetary policy on industry and growth of economy in Indonesia, using the Computable General Equilibrium (CGE) model. The study found that fiscal and monetary policies have positive impact on Indonesian macroeconomic performance, in respect to change in GDP, investment and capital rate of return. However, this finding has research gap in the view that the Computable General Equilibrium (CGE) model used for the study is not an appropriate model for correlation test.

Adefeso and Mobolaji (2010) examined the relative effectiveness of fiscal and monetary policy on economic growth in Nigeria using annual data covering 1970 to 2007 periods. They employed the error correction mechanism and co-integration technique to draw policy inference. Their findings suggested that the impact of monetary policy on real Output (real GDP) is much stronger and effective than that of fiscal policy in respect to macro-economic stabilization.

Nwosa, Agbeluyi and Saibu (2011) in a related research, established that there have been various regimes of monetary policy in Nigeria, sometimes monetary policy is tight and at other times it is loose mostly used to stabilize prices and enhance the real sector performance such as the manufacturing sector. In a series of other similar studies, . (Saibu, 2012, Nwosa and Saibu, 2012, Saibu and Olayungbo, 2011, Saibu and Nwosa, 2011, Saibu, Nwosa, and Agbeluyi. 2011) it was established that monetary policy when well-coordinated with stable fiscal policy can have stronger effect on real output even in the long run empirically investigated the use of fiscal policy and monetary policy in controlling the economic activities in Nigeria for the period from 1960 to 2010. This was done with the aim of finding out which of the two policies is superior to another. Using Error Correction Mechanism (ECM) method of the analysis, the findings showed monetary policy instruments exert more influence on the economic activity and concluded that proper mix of the policies may enhance a better economic growth.

Yakubu, Barfour and Shehu (2013) examined the effect of monetary-fiscal policies interaction on price and output growth in Nigeria using Co-integrated VAR methodology. The study evaluated the economic growth of Nigeria in a VEC model and the dynamic correlations of variables were captured by the analyses of impulse response and variance decomposition. The findings prove that monetary and fiscal policies have a dominant effect on economic activity. From the review, it is

clear that the relative potency of the two macroeconomic policies remain a puzzle in economic literature. Hence, since coordination among the stabilization policies can be fruitful in the progress of an economy that is facing dual challenges of growth and price stability, it is imperative to examine Nigeria's economy by investigating the policy responses to, and their effects on real output growth.

4. Empirical Methodology

4.1 Model Specification

A theoretical support for this study can be established with the Solow growth model as developed by Solow (1956). The Neoclassical growth model theory is relevant as it assumes that growth is always positive, but slowly declines to zero. It states that identical economies with high population growth rate (like Nigeria) where one simply starts with a smaller level of per capita will never take-over to the other economy. Nevertheless, the Solow model does correctly predict that higher population growth rates and lower savings to investment rates are associated with lower growth levels, and lower standards of living. The open version of the Solow model expresses that when government is introduced into the competitive market economy, the government uses fiscal spending without contributing to production or capital accumulation.

Thus, the theory operates on the assumptions that: "Government fiscal spending is financed with proportional income taxation, at rate $\tau \geq 0$." By implication, the theory concludes that government expenditure thus absorbs a fraction (τ) of aggregate output expressed as: $g_t = \tau y_t$. The further justification and relevance of the adoption of Solow theoretical framework for this study include that; The Solow model provides a simplified approach of the type of dynamic model that this study investigates in relation to contemporary and advanced macroeconomic dynamics. Both basic Solow model and Solow model with technical progress are exogenous growth models. The Solow growth model predicts that the long run improvement of living standard depends on the economy's fundamental characteristics including the population growth rate, the savings rate, the rate of technical progress, and the rate of capital depreciation.

We note that Solow's purpose in developing the model was to deliberately ignore some important aspects of macroeconomics, such as short-run fluctuations in order to develop a model that

attempted to describe the long-run evolution of the economy. This study also seeks to examine the long-run effect of fiscal-monetary policy interactions on economic growth. In respect to this study, the Solow theory serves a more eclectic approach that captures the macroeconomic phenomena (Gross Capital Formation, Trade Openness, Government Expenditure, Broad Money Supply and Gross Domestic Product) that constitute the subject matter of this study.

The Solow framework breaks down the growth of an economy into basics. It starts with the production function $Y = F(K, L)$ which is an expressions of growth rates of the series such that s

$$Y/L = F(K/L, L/L) \text{ becomes } y = f(k) \dots\dots\dots (1)$$

Where; Y is Output, K is Capital and L is Labour (a proportion of the population). k, in equation (1), represents the amount of capital per worker. $y = Y/L$ is the amount of output per worker.

The slope of this function measures the change in output per worker due to a one unit increase in capital per worker is equal to the Marginal Productivity of Capital (MP_K).

Thus the slope of equation (1) is:

$$Y/L = f(MPK) \dots\dots\dots (2)$$

Due to the decreasing marginal productivity of capital, equation (3) is a concave function.

Solow in his growth process assumes a steady state of value for the explanatory variable in $y = f(k)$, implying that Population increase (where L is a component) does not actually affect the amount of capital (K) in the economy. While the major aim and end focus of this study is to measure economic growth in Nigeria with respect to fiscal and monetary policies, we note that the above Solow model specifications are mathematical expressions of growth rates of series, which makes it adequately relevant for this study. The basic model is specified in functional form as follows:

$$Y_t = F(GEt, M2t, GCFt, TOPt) \dots\dots\dots (3)$$

Dividing Y_t by P_t and operating the explanatory variables in ratio of Y_t

$$Y_t/P_t = y_t = f(GEt/Y_t, M2t/Y_t, GCFt/Y_t, TOPt/Y_t) \dots\dots\dots (4)$$

Where; Y = Real Gross Domestic Product $Y/P = y_t$ = Real GDP per population (Per capita GDP), GE = Government expenditure, M2 = Real money supply, GCF = Gross capital formation, TOP = Trade Openness. Based on the foregoing estimation and in response to the objectives of the study,

three models are set up and specified explicitly. In order to investigate the relative impacts of fiscal and monetary policies on Nigeria's economic growth, the study specifies a model explicitly as follows:

$$y_t = \beta_0 + \beta_1 GE_t + \beta_2 M2_t + \beta_3 GCF_t + \beta_4 TOP_t + \mu_t \dots\dots\dots (5)$$

Where: β_0 is the constant, $\beta_1, \beta_2, \beta_3$, and β_4 are parameter estimates of the deterministic terms. μ_t represents the stochastic term. To assess the impacts of fiscal-monetary policy interactions on economic growth in Nigeria, we specify the regression equation estimating the interactions between fiscal and monetary policies thus:

$$\Delta y_t = \beta_0 + \beta_1 \Delta GE_t + \beta_2 \Delta M2_t + \beta_3 \Delta GCF_t + \beta_4 \Delta TOP_t + \beta_5 \Delta GE_t * M2_t + \mu_t \dots\dots\dots (6)$$

Where: Δ denotes change or differenced term. $GE_t * M2_t$ denotes the interaction between fiscal and monetary policies variables. To examine the long-run effect of fiscal-monetary policy interactions on economic growth in Nigeria, we formulate the Ordinary Least Square (OLS) estimator as follows:

$$y_t = \beta_0 + \beta_1 GE_t + \beta_2 M2_t + \beta_3 GCF_t + \beta_4 TOP_t + \beta_5 GE_t * M2_t + \mu_t \dots\dots\dots (7)$$

Equations (6) and (7) express the OLS estimator in a multiple form. The method of data analysis employed in this study is descriptive and analytical. The descriptive tools include the use of graphs, tables and percentage values. The analytical tool used is the Ordinary Least Square (OLS) regression technique and Error Correction Model. The econometric techniques are used to capture the fiscal-monetary policy interactions by building a functional relation of the two policies variables which are regressors in the specified model.

4.2 Data Description

The data were sourced from Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics (NBS) and World Development Index on Nigeria. The variables are measured at constant basic prices. The paper measures economic growth in term of real GDP per capita (dependent variable) and operates four (4) macroeconomic variables explaining the economic growth in Nigeria. In this process, this study addresses the problem of omitted variables evident in various

previous studies (such as the problem associated with the St. Louis equation) by introducing, Gross Capital Formation and Trade Openness into the specified model, which serve as Control variables. Trade Openness is included as a control variable in the model to capture possible external shocks which have a very profound effect on domestic monetary and fiscal policies. Hence, the effectiveness of domestic policy depends on the actions and reactions of other economies. Real government expenditure (both recurrent and capital) is used to proxy fiscal policy, broad money supply (M2) represents monetary policy, while Gross capital formation and Trade openness captures other components determining real economic growth in Nigeria. This study uses secondary time series quarterly data for its analysis. An empirical investigation was carried out based on quarterly observation of selected relevant macroeconomic variables covering the period from 1999 to 2016.

5. Results and Discussion

The results of the real GDP, government expenditure, broad money supply, gross capital formation, trade openness and the interactions of fiscal and monetary variables for the considered period of 1999-2016 in Nigeria are presented in alignment with stated objectives of this study. Hence, the policy implications of the empirical results are drawn from the analysis.

Table 1: ADF Unit Root Test Results

Variables	Intercept	Order of Integration
GCF	-8.276441*(0) {-2.909206}	1
GE	-7.960460*(0) {-2.909206}	1
M2	-6.963930*(0) {-2.909206}	1
TOP	-7.779401*(0) {-2.909206}	1
RGDP	-7.020192*(4) {-3.489228}	1
GE*M ₂	-7.809738*(0) {-2.909206}	1

*Note: * significant at 5%; Mackinnon critical values and are shown in parenthesis. The lagged numbers shown in brackets are selected using the minimum Schwarz Information criteria.*

The unit root test result above shows that the real GDP, gross capital formation, government expenditure, money supply, gross capital formation, trade openness and the interaction variable of fiscal and monetary policy are all stationary at first difference for linear trend test models. This indicates that those incorporated series in the dynamic regression model have no unit-root at first difference with the implication that the series (in their first difference) are mean reverting and convergences towards their long-run equilibrium.

Table 2: Restricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.899466	226.3028	117.7082	0.0000
At most 1	0.448436	86.16993	88.80380	0.0763
At most 2	0.327872	49.87510	63.87610	0.4194
At most 3	0.245634	25.63936	42.91525	0.7568
At most 4	0.077434	8.444809	25.87211	0.9741
At most 5	0.056202	3.528400	12.51798	0.8087

Table 3: Restricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.899466	140.1328	44.49720	0.0000
At most 1	0.448436	36.29483	38.33101	0.0841
At most 2	0.327872	24.23574	32.11832	0.3332
At most 3	0.245634	17.19455	25.82321	0.4415
At most 4	0.077434	4.916409	19.38704	0.9875
At most 5	0.056202	3.528400	12.51798	0.8087

In table 2 and table 3, both trace statistic and Maximum-eigenvalue statistic results indicate that one co-integrating equation exists at 5% level of significance. It thus implies that a long-run relationship exists among the variables employed in the study and that there exists one co-integrating vector. With this being the case, we can now proceed to estimate the long-run model using the OLS.

Table 4: OLS Result of the Relative Impact of Fiscal and Monetary Policies Variables Estimates on Real GDP (without interaction)

Dependent Variable: RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.634115	0.624551	5.818759**	0.0000
LGE	0.216723	0.041404	5.234349**	0.0000
LM2	0.333568	0.086863	3.840137**	0.0003
LGCF	0.083043	0.071943	1.154293	0.2530
LTOP	-0.037466	0.072660	-0.515635	0.6080
R-squared	0.885359			
Adjusted R-squared	0.877587			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.811265			

Source: Author's Computation from E-views (** means significant at 1%)

Based on model one, table 4 above presents the result of the relative impacts of fiscal and monetary policies variables estimates without interaction. The result shows that government expenditure positively and significantly impacts real GDP in Nigeria. The result suggests that a 10% increase in government expenditure while keeping money supply, gross capital formation and trade openness constant will cause real GDP to increase by almost 22%. This conforms to our a priori expectation and economic theory where increase in government expenditure is expected to serve as an expansionary fiscal policy to boost economic activity and bring the country out of recession, according to Keynesians. Also, broad money supply conforms to our a priori expectation as it is growth enhancing. The result affirms that a 10% increase in money supply while keeping other explanatory variables constant will cause real GDP to rise by about 33%. This is in line with the Monetarists view that monetary policy fosters economic growth. Hence, this result attests that both fiscal and monetary policies are important in influencing the real economic output of an economy (Yakub, 2013).

The result shows that Gross capital formation also impacts economic growth positively but insignificantly in Nigeria as suggested by the result in table 4. This is because a 10% increase in gross capital formation while keeping other variables constant will cause real GDP to improve by about 8%. The reason for this insignificant impact is not unconnected with the fact that capital formation in the country as well as other less developed countries is very low and is therefore not significant in propelling economic growth. In the result also, trade openness is observed to negatively and insignificantly impact real GDP in Nigeria as a 10% increase in trade openness while keeping other explanatory variables constant will cause the real GDP to fall by almost 4%. This is unconnected with the fact that Nigeria's balance of trade has always been negative since it imports more than it exports. Moreover, the R-squared value of 0.885 implies that the explanatory variables explain 88.5% of variation in the real GDP while only 11.5% is explained by the residual term. Also, when the effect of insignificant explanatory variables was removed, the adjusted R-squared value is still very high at about 87.8%. The probability value of the F-test indicates that the explanatory variables are linearly related and that the model did not suffer from serial correlation with the Durbin Watson value of 1.81, affirming that the variance of the model was neither over-estimated nor under-estimated.

Table 5: Result of the Impact of the Interactions of Fiscal and Monetary Policies Variables Estimates on Real GDP (with interaction)

Dependent Variable: D(RGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006122	0.005697	1.074663	0.2878
D(LGE)	0.313136	0.049795	6.288503**	0.0000
D(LM2)	0.105139	0.064395	1.632712	0.1089
D(LGCF)	0.067819	0.025835	2.625057*	0.0115
D(LTOP)	-0.088889	0.031314	-2.838642**	0.0066
D(LGE*M2)	-7.708500	2.688477	-2.867236**	0.0061
D(LGE(-1))	-0.121446	0.145050	-0.837268	0.4065
D(LM2(-1))	-0.000691	0.020174	-0.034268	0.9728
D(LGCF(-1))	-0.021926	0.064270	-0.341156	0.7344
D(LTOP(-1))	0.011925	0.027875	0.427791	0.6707
D(LGE*M2(-1))	-0.011126	0.033817	-0.329005	0.7436
D(LGE(-1))	-5.258787	2.824825	-0.186163	0.8531
R-squared	0.554084			
Adjusted R-squared	0.444880			
Prob(F-statistic)	0.000002			
Durbin-Watson stat	2.095525			

Source: Author's Computation from E-views (* means significant at 5% and ** means significant at 1%)

Evaluating the second model, the result of the interactions between the fiscal and monetary policies variables revealed that government expenditure of the current period positively and significantly impacts the real GDP while its lagged value negatively impacts the real GDP. It thus implies that government expenditure has immediate (short run) impact in boosting aggregate demand and consequently the growth of output in the economy. Money supply of the current period positively but insignificantly impact the real GDP while the lagged value negatively impacts the real GDP. It thus follows that at the short run, while an expansionary monetary policy will have positive effect on output expansion in the economy, such effect will be insignificant. This is unconnected with the fact that it takes a little while for monetary expansion to affect the productive sector of the economy as the overall level of investment takes a while before adjusting fully to a monetary expansion and as such, its immediate effect of the real GDP will not be significant. Gross capital formation enhances real GDP in the short while trade openness negatively impacts the real GDP in the short run. This result is also in synch with the earlier long run result obtained without the interaction variables.

The interaction variables of the current period between government expenditure and money supply have negative but significant impact on real GDP in the short run. Its previous value also negatively impacts the real GDP. It thus implies that fiscal and monetary policy mix in the short run has significant but negative effect on Nigeria's economic growth. This is partly in line with our apriori expectation that fiscal and monetary policies interaction have significant impact on economic growth in the short-run (Suleiman et al 2009). This result in effect explains why the bulk of fiscal and monetary policy combination has been significant on economic activities but has not propelled growth in Nigeria. The poor performance of the policy mix has been ostensibly blamed on the problems of policy inconsistencies, high level of corruption, wasteful spending, poor policy implementation and lack of feedback mechanism for implemented policies (Omitogun and Ayinla, 2007).

Table 6: Long-run Estimates of the Impact of the Interactions of Fiscal and Monetary Policies Variables on Real GDP (with interaction)

Dependent Variable: RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.56394	0.222640	105.8389**	0.0000
LGE	0.048304	0.017967	2.688522**	0.0094
LM2	0.256747	0.036234	7.085715**	0.0000
LGCF	-0.001532	0.027257	-0.056202	0.9554
LTOP	0.054847	0.024945	2.198768*	0.0319
LGE*M2	-1.188589	1.706607	-6.964633**	0.0000
R-squared	0.988536			
Adjusted R-squared	0.987547			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.892261			

Source: Author's Computation from E-views (*means significant at 2% and ** means significant at 1%)

With regards to the third model, the result of the long run estimates with the interaction variables measured in table 6 above is similar to the evidence obtained in table 4, when the interaction variables were omitted from the model. A cursory look at table 6 reveals that government expenditure positively and significantly impacts economic growth in the long run, money supply also positively and significantly enhances economic growth in the long run as against what was the case in the short run where it was insignificant. This is because investment will be able to adjust

to monetary expansion in the long run by taking advantage of the fall in interest rate to boost the level of investment and expand output appropriately. Gross capital formation, however, negatively and insignificantly impacts real GDP in the long run when fiscal and monetary policy variables are interacted. Trade openness also changed sign as it now positively and significantly impacts the real GDP in the long run. The interaction variable between government expenditure and money supply retained its negative relationship with real GDP in the long run thereby suggesting that fiscal and monetary policy mix have negative impact on Nigeria's real GDP in both short and long run. This result exposes the fact that there has been poor and ineffective policy coordination in Nigeria over the period examined in this study.

Diagnostics and Robustness sensitivity Test

These tests are conducted to determine the efficiency of the estimated model.

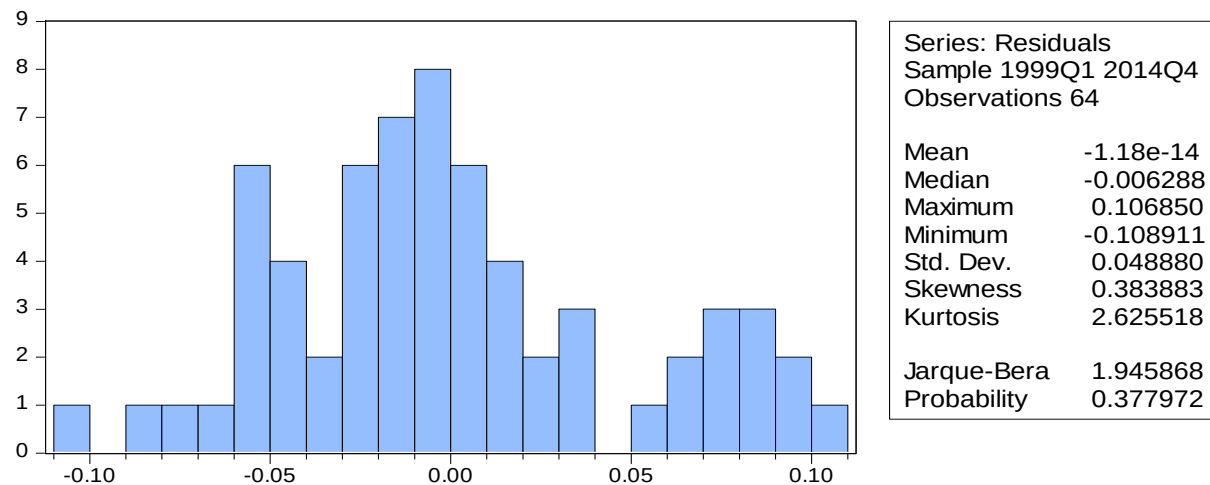


Figure 2: Normality Test

Having considered the Jacque-Bera statistic with value 1.945868 and Probability value of 0.377972 (i.e. 37.8%) which is greater than 0.05 (5%) significance level. We therefore accept the null hypothesis that the residual is multivariate normal and conclude that the residual of the model is normally distributed. According to Gujarati and Porter (2009), Autoregressive Conditional Heteroscedasticity (ARCH) may have an autoregressive structure, in that heteroscedasticity may be observed over different periods, hence it is needful to conduct the test for this study.

Table 7: Result of Heteroscedasticity Test

Observation included: 43	Dependent Variable: RESID ²		H ₀ : No ARCH effect
F-statistic	3.484307	Prob. F(6,35)	0.1127
Obs* R-squared	12.22946	Prob. Chi-Squared (6)	0.0657

Source: Author's Computation

From the table 7, the Probability Chi-Squared value of 0.0657 which is greater than 0.05 levels, hence we accept the null hypothesis that there is no ARCH effect. This is desirable for the study because it signifies that there is no heteroskedasticity problem in the model and that the variance of the residual term is homoscedastic.

5.0 Conclusion and Policy Implications

This research study examines the macroeconomic impact of fiscal-monetary policy interactions on economic growth in Nigeria, with particular reference to the period of stable policy autonomy (1999-2016). Based on the results and findings of this study, it can be concluded that both fiscal and monetary policies are significant in driving economic growth in Nigeria. The selected macroeconomic variables; government expenditure, broad money supply, gross capital formation and trade openness are significant policy variables that affect economic dynamics in Nigeria (using real GDP as proxy for economic growth).

The study established a relative impact such that both fiscal and monetary policies have sizeable impacts on Nigeria's economic growth. However, the result comparatively shows that the coefficient of the parameter estimates of monetary policy variable is greater than that of fiscal policy variable, implying that monetary policy exerts greater impact on economic growth in Nigeria. The impact of fiscal-monetary policy interactions has been significant on economic growth in Nigeria though negative over the period examined. The study ascertains that the use of fiscal and monetary policies has not been successful in stimulating economic growth in Nigeria, especially in the long run. Thus, there does not seem to be a synergy between fiscal and monetary policies interactions in achieving economic growth in Nigeria. In view of the findings of this study, the following implications are noted and for consideration by policy making authorities:

Government should ensure that policy inconsistency is minimized and policy reversals are properly checked for both short and long run effects on the economy. Effective policy

coordination: This study opined that in order to put Nigerian economy on the path of sustainable growth, government of the day must channel and better coordinate her fiscal and monetary policies in conjunction with Central Bank of Nigeria in order to meet the rising needs of people and promote the welfare of the citizenry. Improved capital formation: The level of capital formation determines the level of investment and economic activities in a country, therefore, fiscal and monetary policies programmes that will raise people's income and saving habits should be implemented so as to enhance large capital formation.

In addition, the findings of this research revealed that monetary policy instruments have a sizable impact on economic growth in Nigeria, as such government should allow the monetary authority (as regulated by the Central Bank of Nigeria) to operate with adequate autonomy so as to promote unbiased or effective policy mix framework. Political will to curb corruption: The weakness of the effectiveness of policy mix in Nigeria could be attributed to the prevailing level of corruption in the country. As such government should fight the problem of corruption because without a reduction of the level of corruption in the country, fiscal-monetary policy components will not achieve the required level of economic growth in Nigeria.

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