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The Effectiveness of Monetary and Fiscal Policies in Stimulating Real Sector Output in Nigeria: The Need for Monetary-Fiscal Coordination

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Abstract: This paper sought to examine the influence of monetary and fiscal policies on real sector output in Nigeria for the period 1981 to 2019. Data for the study were obtained from the Central Bank of Nigeria statistical bulletin and the World Development Indictors. The study employed the Augmented Dicky-Fuller and Philip-Peron test for unit root, Johansen cointegration test, Bounds test for levels relationship, error correction model, and Granger causality test. Both the Johansen cointegration test and the Bounds test for levels relationship revealed evidence of long run equilibrium relationship, necessitating the estimation of the error correction model. Based on the error correction model, monetary policy variables (broad money supply and prime lending rate) and fiscal policy variables (government expenditure, oil revenue, and non-oil revenue) exerted the desired significant effect on real sector output (gross domestic product) in the short run. The error correction term (0.393) indicates that 39.3% of the short run disequilibrium in real sector output is corrected annually. However, both government expenditure and broad money supply exerted a negative effect on real sector output in the long run; while prime lending rate and both oil and non-oil revenue generated a positive effect. The Granger causality test revealed no causality between government expenditure and real sector output, but a two-way causality flows between broad money supply and real sector output. The paper recommended a sound monetary-fiscal coordination so as to generate the desired effect on the real sector of the economy.

Keywords: fiscal policy, government expenditure, monetary-fiscal coordination, monetary policy, macroeconomic management, real sector output.

JEL Classification: C22, E52, E62, O4

Introduction

Macroeconomic objectives over the years have been centred on economic growth, full employment, price stability, and maintaining a balance of payments that is favourable. In achieving these objectives, macroeconomic management ensues through the utilization of various policy stands. These have been centred on both monetary policy and fiscal policy perspectives. In the fiscal policy angle, the government utilizes its revenue and expenditure programmes to achieve the desired macroeconomic objective. The monetary policy is anchored within the purview of the monetary authority of a country, usually the central bank. Folawewo and Osinubi (2006) noted that the long term objectives of monetary policy for most economies have been in the areas of maintaining stability in prices, maintaining a balance of payment that is favourable to the economy, massive unemployment reduction, output growth, and sustainable economic development. In achieving them, the monetary authority utilizes several policy tools such as the open market operation, bank rate policy, special deposits, and credit rationing to control the supply, availability, and cost of credit.

In the quest to stimulate the real sector of the economy so as to achieve economic growth, the monetary and fiscal policy position tends to be expansionary. At the fiscal policy realm, the achievement of economic growth is believed to be catalysed by an increase in government expenditure and a reduction in taxation (Reem, 2009). This action is believed to stimulate aggregate demand, boost domestic production and therefore lead to economic growth. On the contrary, monetary policy can influence economic growth by increasing the supply and availability of credit, while reducing the cost of such credits to the investors. In a normal parlance, an increase in money supply will not act directly on real sector output rather, through series of transmission mechanisms.

For instance, the interest rate channel serves as a link between money supply and real sector of the economy. In that way, an increase in money supply will create a pool of loanable funds which far exceed the demand. Thus, the excess supply of money will exert a downward pressure on the rate of interest. A low interest gives a greenlight to investors to borrow and finance productive investments. In this way, productivity is being boosted and the real sector of the economy is positively stimulated.

For monetary and fiscal policy to be effective in macroeconomic management, scholars have trumpeted that these two policies need not to be executed in isolation. Thus, monetary-fiscal coordination has been

advocated so as to avoid policy misses. Take for instance, if the government is aiming at stimulating production in the real sector of the economy, it is expected that the monetary authority should also formulate policy positions that favours output growth. The implication here is that to promote economic growth, expansionary fiscal policy must be followed by an expansionary monetary policy. As noted by Laurens and de la Piedra (1998), "without efficient policy coordination, financial instability will ensue, leading to high interest rate, exchange rate pressures, rapid inflation, and an adverse impact on economic growth".

The magnitude of government expenditure and broad money supply have been on the rising over the years. Based on the Central Bank of Nigeria (2019), broad money supply stood at ₦14.47 billion in 1981 but rose to ₦47.42 billion in 1990. Further, it increased to ₦878.46 billion and ₦11,101.46 billion in 2000 and 2010 respectively. The value was put at ₦20,885.52 billion as at 2015 while a record high of ₦34,251.70 billion was obtained in 2019. In the same vein, aggregate government expenditure was ₦11.41 billion in 1981 but increased steadily to ₦60.27 billion in 1990. Between 1991 and 1999, government expenditure averaged ₦328.95 billion but rose very high to an average of ₦2,044.44 billion between the period 2000 and 2009. The figure stood at ₦4,988.86 billion in 2015 but increased significantly to ₦9,714.84 billion in 2019.

These magnitude of increase in government expenditures and rising money supply is expected to yield positive effect on the real sector of the Nigerian economy. However, the growth rate of gross domestic product (GDP) has been characterised by both positive and negative values over the years. Statistics from World Development Indicators (2018) reveal that the growth rate of GDP between 1981 to 1984 remained negative, averaging -7.99%. This was followed by a period of positive economic growth which lasted between 1985 to 1992; with GDP growth averaging 4.40%. Thereafter, the Nigerian economy returned to a three-year period of negative growth which lasted between 1993 to 1995; and the economy recorded an average growth rate of -1.31%. Not until 2016, the economy maintained a positive growth rate which lasted for twenty years (1996 – 2015) with the growth rate averaging 6.01%. The 2016/2017 recession led to the -1.62% growth rate in GDP with the economy recovering gradually to 0.81% and 1.94% in 2017 and 2018 respectively.

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With the dwindling economic activities in Nigeria due to the global Covid-19 pandemic, it is glaring that the growth rate of GDP will be negative. Meanwhile, the economy recorded -6.10% growth (year-on-year) in the second quarter of 2020 and -2.18% (year-on-year) in the second half as against 2.11% in the first half of 2019. In order to lift the economy out of the present economic downturn, lessons from the Great Depression of the 1930s should be put to practice. Macroeconomic management is therefore crucial for such feat to be attained. This study therefore seeks to investigate the effectiveness of monetary and fiscal policy in stimulating the real sector of the Nigerian economy. The study examines both the short run and long run effect of the policy variables in influencing the real sector of the Nigerian economy for the period 1981 to 2019. Also, the study examines the nature of causality between monetary and fiscal policy variables and real sector output in Nigeria within the study period. This period (39 years) is long enough is evaluate both the long run and short run effect of monetary and fiscal policy variables in stimulating the real sector of the Nigerian economy. The monetary policy variables of interest are the broad money supply and the prime lending rate; while the fiscal policy variables included were government expenditure and government revenue (both oil and non-oil). Meanwhile, the real sector output is represented by the real gross domestic product. Based on the objectives stated so far, the following null hypotheses will be tested:

i. Broad money supply does not significantly affect real sector output.
ii. There is no significant effect of prime lending rate on real sector output.
iii. Government expenditure does not significantly affect real sector output.
iv. There is no long run relationship between monetary/fiscal policy variables and the real sector output in Nigeria.

The paper is structured in five major sections. Following this section 1 is section 2 which presents the literature review – both theoretical and empirical. Section 3 presents the methodology of the research; while section four focuses on the analysis and result/discussions. Finally, the conclusion aspect of the paper is adumbrated in section 5.

1.0 Literature Review

2.1 Theoretical Literature

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In this section, we discuss the monetary and fiscal policy theories as they affect the real sector of the economy.

Monetary Policy Theory

Indicators of monetary policy such as money supply, bank credit, and interest rate serves as the targets of monetary policy. Money supply becomes a good indicator of monetary policy if the central bank is solely responsible for its changes otherwise, it is hardly an indicator. To the monetarist, open market operations and changes in the reserve requirements are the main cause of the movement in money supply. To them, money supply is the most dominant determinant of both the level of output and the price level in the short run but only potent in determining the price level and the nominal aggregate demand in the long run (Jhingan, 2011). Changes in money supply affects aggregate demand through effects on a wide range of assets. A narrow transmission mechanism between money supply and changes in aggregate demand is the view of the Keynesians. To them, an increase in money supply will lead to greater expenditure on bonds which translates to a reduction in interest rate and thereby leading to a rise in investment (Keynes, 1936). However, the monetarist in their view trace an increase in money supply to be related to expenditure on a broader range of assets rather than on only bonds. Excess money supply will be utilized in the accumulation of both financial and real assets (Jhingan, 2011). Although the demand for financial assets may rise, interest rate will fall but only temporarily. If the gross national product increases, the rate of interest will also rise because there is a greater need for day-to-day cash transactions to carry out the expanding business activity. Firms will borrow to raise more cash and interest rate will rise. With an expansionary monetary policy, interest rate will either rise or decline depending on the speed and strength of the change in gross national product and on price expectations. With a contractionary monetary policy, interest rate may also rise or decline depending on similar factors.

On the perspective of bank credit and interest rate, Keynesian economist and the monetarist are of differing views. The monetarist downgrade interest rate as an indicator of monetary policy because it is not under the full control by the central bank (Jhingan, 2011). This view is also held by the Keynesians but they differ in regards to the transmission mechanism. To the Keynesians, an increase in money supply leads to a decline in interest rate inasmuch as there is no liquidity trap (that is, the

demand for money becoming perfectly inelastic). The decline in interest rate will stimulate investment provided it is not inelastic to the rate of interest. A downward trend in the rate of interest will prevail so long as the increase in money supply persists (Keynes, 1936). According to the monetarist view, interest rate will decline if money supply increases through open market purchase of securities by the central bank, thereby increasing the services of the commercial banks through loans expansion. The monetarist regarded this as the 'liquidity effect' which translates to a short run decline in the rate of interest (Jhingan, 2011). This low rate of interest will stimulate investment, leading to an increase in the prices of investment goods with a resultant increase in the demand for and prices of financial and real assets – a rise in production and demand for money will bid up the rate of interest (the output effect). Since lenders expect prices to rise and they buy interest-bearing securities and other goods, price expectation effect is likely to ensue (Jhingan, 2011). It follows that after the initial decline in the rate of interest, interest rate will rise again and settle at a new rate depending on the rate of inflation generated by the increase in money supply. Thus interest rate as an indicator of monetary policy shows that when an increase in money supply produces a rise in interest rate, it will be likened to an expansionary monetary policy. Therefore, 'monetary authority should focus on controlling the money supply rather than manipulating the rate of interest' (Friedman, 2001).

Fiscal Policy Theory

The theoretical linkages between fiscal policy (through government expenditure) and real sector output can be traced to Wagner's law. Wagner (1890) argues that "for any country, public expenditure rises constantly as income growth expands". Thus, the theory sees the development of an industrialized economy as being the catalyst for increased public expenditure hence, an increased share of public expenditure in the gross domestic product of such a nation. It follows that government expenditure will affect the economy positively, thereby promoting increased spending and economic progress in an industrialized nation. The theory believes that the public sector share in the national economy grows continually as nations industrialize. Other scholars have reiterated that the increasing social, administrative, protective and welfare functions in the state has led to the rising government expenditure pattern (Singh, 2008). Thus, stimulating the real sector of the economy can be achieved through expansionary fiscal policy action that entails amplified government expenditure and tax reduction.

2.2 Empirical Literature

The efficacy of broad macroeconomic policies in influencing the real sector of the economy have received series of empirical attentions. Empirical study for the period 1970 to 2002 was carried out by Adeoye (2006) to examine how fiscal policy impact Nigeria's economic growth. The study presents a negative effect of public expenditure on economic growth. The study therefore identified that public expenditure crowds out private investment.

A study on the how fiscal policy contributes to Nigeria's sustainable economic growth was empirically carried out by Omitogun and Ayinla (2007) by utilizing the OLS approach to estimate the Solow growth model. The findings revealed fiscal policy was ineffective in achieving a growth pattern that is sustainable in Nigeria; and pointed out that incessant unproductive foreign borrowing, wasteful spending and uncontrolled money supply, should be duly minimized.

Agu, Okwo, Ugwunta and Idike (2015) examined the impact of various components of fiscal policy on economic growth in Nigeria for the period 1961 – 2010. The various components include general administration expenditure, social and community Services, and economic Services. The study utilized descriptive statistics and the ordinary least squares (OLS) approach to multiple regression. Findings from the study indicates that government expenditure on economic services exhibits a positive correlation with economic growth. The study noted that in public spending, it is important to note that the effectiveness of the private sector depends on the stability and predictability of the public incentive framework, which promotes or crowds in private investment (Agu *et al.*, 2015).

Within the West African sub-region, a positive impact of government expenditures on the economic growth was observed (Yasin, 2011). Similarly, Effiong and Inyang (2020) analysed the effect of government expenditure on economic growth. The study was carried out for fifteen West African countries for the period 1990 – 2018 under Ram (1986) framework. Using the fixed effect LSDV approach to panel regression and the Stacked causality test, the study revealed that government expenditure has a positive and significant effect on economic growth of West Africa countries. Also, a unidirectional causality flows between economic growth and government expenditure. The study recommended the need for increased spending by the governments of West African countries so as to generate the desired growth.

Utilizing quarterly data for the period 1970 to 2010, Chuku (2010) examined the monetary-fiscal interaction in Nigeria by employing the vector auto-regression (VAR). The result pointed out a counteractive manner of interaction of monetary and fiscal policies in between 1980-1994, with no observed symmetric pattern of interface afterwards.

Making reference to the current Covid-19 pandemic, Effiong (2020) investigates the effect of government expenditures on education and health on the growth potential of Nigeria. The study utilized the Bounds test for cointegration and the error correction model. Findings from the Bounds test revealed that there exists a long run relationship between the two government expenditure components on economic growth in Nigeria. Also, the vector error correction model revealed the existence of both a short run and long run positive and significant effect of government expenditures on education and health on economic growth in Nigeria. The study advocated for a massive investment in the education and health sectors to ensure its smooth operation in this period of global pandemic.

At the monetary policy sphere, there have been records of both positive and negative effect of monetary policy variables on economic growth. An empirical study by Fasanya, Onakoya and Agboluaje (2014) by using time series data that covers 1975 to 2010; investigated how monetary policy impact Nigeria's economic growth using the Keynesian IS-LM function, cointegration test, and error correction model. The result indicated that monetary policy has a strong and positive impact on the Nigeria economic growth.

Using annual time series data for the period 1986 to 2008, Onyeiwu (2012) examined the how monetary policy impact Nigeria's economic growth by utilizing the ordinary least squares technique of data growth rate of gross domestic product and balance of payment but negative impact on the rate of inflation.

A recent study analysis. The result revealed that monetary policy, through money supply, exercises a positive impact on the by Ayodeji and Oluwole (2018) investigated the influence of monetary policy on economic growth of Nigeria by utilizing time series data covering the period 1981 to 2016. The study adopted the cointegration test, error correction model and the Granger causality techniques in achieving its objectives. The results show that monetary policy exerts a positive short run and long run effect on economic growth. Further, the Granger causality test reveal the existence of a one-way causality flowing from money supply to economic growth.

Adigwe, Echekoba and Justus (2015) examined the influence of monetary policy on the Nigeria's economic growth by utilizing data that covers 1980 to 2010. The study utilized the OLS estimation approach and the result revealed the monetary policy impact Nigeria's economic growth in a positive and significant manner.

Using the cointegration approach and Granger causality test techniques on time series data for the period covering 1981 to 2012, Sulaiman and Migiro (2014) examined the relationship between monetary policy and the economic growth in Nigeria. Their result show that a positive and long run relationship exist between monetary policy variables and economic growth. Also, the Granger causality test identifies a unidirectional causality that flows from monetary policy to economic growth. The authors view monetary policy as being directed towards creating stability and encouraging growth in the economy.

At the foreign scene, studies such as Ahmad, Afzal and Ghani (2016) and Najal (2017) in Pakistan; Lennard (2018) and Chang, Chen and Chang (2013) in the British economy; Afrin (2017) in Bangladesh; Aastveit, Natvik and Sola (2017) in the United States; Zhao, Chen and Hao (2018) in the China; Visokavičienė (2014) in Lithuania; Dimitrijević and Lovre (2013); Obeid and Awad (2017) in Jordan; Agbonlahor (2014) in the United Kingdom; Younsi and Nafla (2017) for developing countries; Lut and Moolio (2015) in Cambodia; Precious and Palesa (2014) in South Africa; Kamaan (2014) in Kenya; and Alavinasab (2016) in Iran; all discovered a positive effect of monetary policy on economic growth.

On the negative impact of monetary policy on economic growth, Adediran, Mathew, Olopade and Adegboye (2017) adopted the VAR framework on time series data for the period 1980 to 2014 to study the relationship between monetary policy shocks and inclusive growth in Nigeria. They realized the inability of the monetary authority to control the instability of the exchange rate thus leading to non-inclusive growth. Also, Ezeaku, Ibe, Ugwuanyi, Modebe and Agbaeze (2018) examined the effect of monetary policy transmission mechanisms on the industrial sector of the Nigerian economy for the period 1981 to 2014. The Johansen cointegration test indicate that monetary policy transmission channels jointly have a long-run relationship with industrial sector real output growth. However, the error correction model shows that credit, interest rate, and exchange rate channels have negative effects on real output growth both in the long-run and short-run. Studies like Mallick (2011) in India;

Twinoburyo and Odhiambo (2016) in Kenya; Njimanted, Akume and Mukete (2016) in CEMAC zone; Mumtaz and Theophilopoulou (2017) in the UK; Srithilat and Sun (2017) in Lao PDR; reported the ineffectiveness of monetary policy in influencing real sector output.

An exploration of the literature indicates that there are varying views on the effectiveness of monetary and fiscal policies in influencing economic growth. Meanwhile, most of the studies lend weight on the positive effect of these two policies in influencing real sector output. Most of these studies too, have examined the effect of these two policies separately in influencing output. However, very few studies, such as Chuku (2010), have tried to bring this two policy stance together to see how they interact to influence real sector output. This paper therefore fills this gap by examining the effect of the two policies in a single model to see how they jointly affect real sector output. Thus, this study hinges on the need to coordinate monetary and fiscal policies so as to achieve the desired economic objective of increased real sector output.

2.0 Methodology

3.1 Methods of Data Analysis

This study employed the descriptive statistics to unveil the unique characteristics of the variables; correlation analysis to detect the existence/non-existence of any linear relationship so as to avoid multicollinearity; and root test to detect the order of integration of the variables. The study utilized the Augmented Dickey-Fuller (ADF) unit root test approach as well as the Philip-Peron (PP) approach so as to confirm the result of the ADF approach. The variables can be stationary at level, I(0), first difference, I(1), or second difference, I(2). The study further utilized the Johansen cointegration test along with the ARDL Bounds test to detect the existence of any long run relationship in the model. The study adopted the error correction model in detecting the speed of adjustment of the short run disequilibrium to a long run equilibrium relationship. In examining the nature of the relationship between monetary/fiscal variables and economic growth, the Granger causality test was utilized. The data were analysed using Eviews 10 software package.

3.2 Model Specification

The model for this study stems from the general production function, that output (Y) is a function of capital (K) and labour (L), expressed simply as:

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$Y = f(K, L)$ - - - - - - - - - - - (1)

Using the Keynesian aggregate demand framework, the effect of monetary and fiscal policy can be traced as follows:

$Y = C + I + G$ - - - - - - - - - - (1.1)

$C = \alpha + \beta Y_d$ - - - - - - - - - - (1.2)

$I = I_0 - Vr$ - - - - - - - - - - (1.3)

$G = G_0$ - - - - - - - - - - (1.4)

$T = T_0 + t_1 Y$ - - - - - - - - - - (1.5)

$Y_d = Y - T$ - - - - - - - - - - (1.6)

Where Y is output; C is consumption; I is investment; G is government expenditure; Yd is disposable income; I_0 is investment that is not affected by interest rate; V is the marginal efficiency of investment; r is the rate of interest; and T is taxes. Solving for the equilibrium level,

Since $C = \alpha + \beta Yd$; $Y_d = Y - T$; $I = I_0 - Vr$; $T = T_0 + t_1 Y$; and $G = G_0$,

$Y = \alpha + \beta Y_d + I_0 - Vr + G_0$ - - - - - - - - - (1.7)

$Y = \alpha + \beta(Y - T) + I_0 - Vr + G_0$ - - - - - - - - (1.8)

$Y = \alpha + \beta Y - \beta T + I_0 - Vr + G_0$ - - - - - - - - (1.9)

$Y = \alpha + \beta Y - \beta(T_0 + t_1 Y) + I_0 - Vr + G_0$ - - - - - - - (1.10)

$Y = \alpha + \beta Y - \beta T_0 - \beta t_1 Y + I_0 - Vr + G_0$ - - - - - - - (1.11)

By rearrangement,

$Y - \beta Y + \beta t_1 Y = \alpha + I_0 + G_0 - Vr$ - - - - - - - (1.12)

$(1 - \beta + \beta t_1)Y = \alpha + I_0 + G_0 - Vr$ - - - - - - - (1.13)

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$$Y = \frac{\alpha + I_0 + G_0 - \beta T_0 - Vr}{(1 - \beta + \beta t_1)} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1.14)$$

Equation (1.14) presents the equilibrium level of income in a closed economy. The effect of monetary and fiscal policy can be analysed by evaluating the multipliers. This is given as follows:

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1 - \beta + \beta t_1} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1.15)$$

$$\frac{\Delta Y}{\Delta r} = \frac{-v}{1 - \beta + \beta t_1} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1.16)$$

$$\frac{\Delta Y}{\Delta T} = \frac{-\beta}{1 - \beta + \beta t_1} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (1.17)$$

Equations (1.15) to (1.17) captures the government expenditure multiplier, investment multiplier, and the tax multiplier. It follows that an expansionary fiscal policy will increase output by the number of times represented by Eq. (1.15) and (1.17) for expenditure and tax respectively. Similarly, an expansionary monetary policy that increases money supply, leading to a decline in interest rate will affect investment. This will increase output through the multiplier effect represented by Equation (1.16). Therefore, monetary policy and fiscal policy do have a link in influencing the real sector output of the economy. This yields the Eq. (2).

$$Y = f(K, L, M, F) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (2)$$

Where M and F are the monetary and fiscal policy variables of interest. Expanding Eq. (2) into an estimable form, and representing each of the variables in the desired form;

$$GDP = \beta_0 + \beta_1 GCF + \beta_2 POP + \beta_3 BMS + \beta_4 PLR + \beta_5 NOR + \beta_6 ORV + \beta_7 GEX + \mu \quad - \quad (3)$$

Where:

GDP = real gross domestic product (a proxy for real sector output),

GCF = gross fixed capital formation (a proxy for capital),

POP = population aged 15 – 64 years (a proxy for labour),

BMS = broad money supply,

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PLR = prime lending rate,

NOR = non-oil revenue,

ORV = oil revenue,

GEX = total government expenditure,

β_0 to β_7 = parameters to be estimated,

μ = the random error term which is assumed to be normally distributed.

Transforming Eq. (3) into an ARDL error correction form, we have:

$$\Delta GDP_t = \delta + \sum_{i=0}^{p} \alpha_1 \Delta GDP_{t-i} + \sum_{i=1}^{q} \beta_1 \Delta GCF_{t-i} + \sum_{i=1}^{q} \beta_2 \Delta POP_{t-i} + \sum_{i=1}^{q} \beta_3 \Delta BMS_{t-i} + \sum_{i=1}^{q} \beta_4 \Delta PLR_{t-i} + \sum_{i=1}^{q} \beta_5 \Delta NOR_{t-i} + \sum_{i=1}^{q} \beta_6 \Delta ORV_{t-i} + \sum_{i=1}^{q} \beta_7 \Delta GEX_{t-i} + \theta ECT_{t-1} + \varepsilon_t \quad ----------(4)$$

Where p and q are the optimal lag length for the dependent and explanatory variables respectively; θ measures the speed of adjustment of the system to its long run equilibrium; and ECT is the error correction term.

In determining the nature of the relationship between economic growth and monetary/fiscal variables, the model for the Pairwise Granger causality test is specified as follows:

Gross Domestic Product and Broad Money Supply

$$GDP_t = \sum_{i=1}^{n} \beta_i BMS_{t-i} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad ----------(5)$$

$$BMS_t = \sum_{i=1}^{n} \gamma_i GDP_{t-i} + \sum_{j=1}^{n} \delta_j BMS_{t-j} + \mu_t \quad ----------(6)$$

Gross Domestic Product and Prime Lending Rate

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$$GDP_t = \sum_{i=1}^{n} \beta_i PLR_{t-i} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad ----------(7)$$

$$PLR_t = \sum_{i=1}^{n} \gamma_i GDP_{t-i} + \sum_{j=1}^{n} \delta_j PLR_{t-j} + \mu_t \quad ----------(8)$$

Gross Domestic Product and Non-oil Revenue

$$GDP_t = \sum_{i=1}^{n} \beta_i NOR_{t-i} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad ----------(9)$$

$$NOR_t = \sum_{i=1}^{n} \gamma_i GDP_{t-i} + \sum_{j=1}^{n} \delta_j NOR_{t-j} + \mu_t \quad ----------(10)$$

Gross Domestic Product and Oil Revenue

$$GDP_t = \sum_{i=1}^{n} \beta_i ORV_{t-i} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad ----------(11)$$

$$ORV_t = \sum_{i=1}^{n} \gamma_i GDP_{t-i} + \sum_{j=1}^{n} \delta_j ORV_{t-j} + \mu_t \quad ----------(12)$$

Gross Domestic Product and Government Expenditure

$$GDP_t = \sum_{i=1}^{n} \beta_i GEX_{t-i} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad ----------(13)$$

$$GEX_t = \sum_{i=1}^{n} \gamma_i GDP_{t-i} + \sum_{j=1}^{n} \delta_j GEX_{t-j} + \mu_t \quad ----------(14)$$

An index of monetary/fiscal policy has causation on GDP if the lagged value of the index is significant in the equation for economic growth. The statistic of interest is the F-statistic which its significance implies that there is causation otherwise, no causation. The significance of the F-statistic

reveals whether there is a unidirectional causality or bidirectional causality as the case may be. The null hypothesis is that there is no causality flowing between variables of interest.

3.3 Data Sources

Data for the study covers the period 1981 to 2019 and were obtained from World Development Indicators and the Central Bank of Nigeria statistical bulletin. Data obtained from the World Development indicators include gross fixed capital formation and labour force; while data obtained from the Central Bank of Nigeria statistical bulletin were broad money supply, prime lending rate, non-oil revenue, oil revenue, and total government expenditure. This study is strictly carried out with reference to the Nigerian economy.

4.0 Results and Discussion

4.1 Descriptive Statistics

The descriptive statistics presented in Table 1 showcases the characteristics of the variables utilized in this study.

Table 1: Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
GDP	39	34,690.67	20,237.78	13,779.26	71,387.83
GCF	39	34,690.67	20,091.17	14,028.36	73,640.56
POP	39	67,861,822	20,237,098	39,852,682	1.08E+08
BMS	39	6,585.141	9,911.373	14.47117	34,251.70
PLR	39	17.51106	4.583386	7.750000	29.80000
NOR	39	1,039.706	1,351.775	2.984100	4,725.600
ORV	39	2,430.350	2,723.421	7.253000	8,878.970
GEX	39	2,040.908	2,544.412	9.636500	9,714.843

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The result presented in Table 1 indicates that the gross domestic product of Nigeria within the study period averaged 34,690.67 billion with a standard deviation of 20,237.78 billion while gross fixed capital formation averaged 34,690.67 billion with a standard deviation of 20,091.17 billion. The labour force in Nigeria averaged 67,861,822 with a standard deviation of 20,237,098 while broad money supply averaged 6,585.141 billion with a standard deviation of 9,911.373 billion. Similarly, prime lending rate averaged 17.51% with a standard deviation of 4.58% while non-oil revenue averaged 1,039.706 billion with a standard deviation of 1,351.775 billion within the study period. Oil revenue averaged 2,430.350 billion with a standard deviation of 2,723.421 billion while total government expenditure averaged 2,040.908 billion with a standard deviation of 2,544.412 billion.

The high standard deviation exhibited by gross domestic product, gross fixed capital formation, labour force, broad money supply, non-oil revenue, oil revenue, and government expenditure is an indication that there is a high degree of variation in the data over the years. The table further states the minimum and maximum values of the variables over the study period. For instance, the maximum GDP is 71,387.83 billion while its minimum is 13,779.26 billion.

4.2 Correlation Results

The correlation matrix is presented in Table 2.

Table 2: Correlation Test Result

	GDP	GCF	POP	BMS	PLR	NOR	ORV	GEX
GDP	1							
GCF	0.9978	1						
POP	0.9721	0.9795	1					
BMS	0.9351	0.9409	0.8939	1				
PLR	-0.0181	-0.0231	0.0832	-0.1013	1			
NOR	0.9645	0.9681	0.9297	0.9832	-0.0886	1		

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ORV	0.8592	0.8542	0.8347	0.6989	-0.0722	0.7846	1	
GEX	0.9580	0.9668	0.9367	0.9777	-0.0822	0.9859	0.7892	1

From Table 2, all the variables correlate perfectly with themselves hence, the perfect correlation coefficient of 1. All the variables except prime lending correlates positively with GDP. This implies that the variables move in the same direction with GDP. However, prime lending rate moves in an opposite direction with gross domestic product; implying that as prime lending rate goes up, GDP is likely to exhibit a downward trend. The correlations among the explanatory variables are quite high for some of the variables. Meanwhile, since such correlations are not perfect, the problem of multicollinearity may not occur.

4.3 Unit Root Tests Results

The unit root test result is carried out based on the Augmented Dickey-Fuller and Philip-Peron approaches. The estimation follows the assumption of a constant and deterministic trend. An extract of the result is presented in Table 3.

Table 3: Augmented Dicky-Fuller (ADF) and Philip-Peron (PP) Unit Root Test Result

Augmented Dicky-Fuller Test					**Philip-Peron Test**			**Decision**
Variables	ADF Statistic @ Level	ADF Statistic @ First Difference	ADF Statistic @ Second Difference	Order of Integration	PP Statistic @ Level	PP Statistic @ First Difference	PP Statistic @ Second Difference	Order of Integration
GDP	-1.9389 (0.6142)	-2.6861 (0.2478)	-6.5671 (0.000)**	I(2)	-1.8259 (0.6723)	-2.6423 (0.2651)	-12.698 (0.0000)**	I(2)

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GCF	-7.4505 (0.000)**	---	---	I(0)	-6.2598 (0.000)**	---	---	I(0)
POP	3.9704 (1.0000)	-0.0651 (0.9933)	1.7093 (1.0000)	non stationary	2.1616 (1.0000)	0.2859 (0.9978)	-5.4893 (0.0004)**	I(2)
BMS	2.6567 (1.0000)	-5.1062 (0.0010)**	---	I(1)	3.5484 (1.0000)	-5.0657 (0.0011)**	---	I(1)
PLR	-5.1071 (0.0012)**	---	---	I(0)	-3.2976 (0.0820)	-10.140 (0.0000)**	---	I(1)
NOR	0.4048 (0.9985)	-5.4865 (0.0004)**	---	I(1)	2.7634 (1.0000)	-5.8211 (0.0001)**	---	I(1)
ORV	-4.0749 (0.0171)*	---	---	I(0)	-2.6905 (0.2459)	-6.3629 (0.0000)**	---	I(1)
GEX	2.1690 (1.0000)	-5.0202 (0.0015)**	---	I(1)	1.5512 (1.0000)	-3.9287 (0.0206)*	---	I(1)

Source: Output extracted from Eviews 10.

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Note: ***, and * denotes significance at the 1% and 5% level respectively. Probabilities are in parenthesis ().*

The result of the unit root shows that the variables were integrated of mixed order. Under the ADF approach, gross fixed capital formation, prime lending rate, and oil revenue were all stationary at levels, I(0), while broad money supply, non-oil revenue, and government expenditure were stationary at first difference, I(1). Meanwhile, gross domestic product was reported to be stationary at second difference, I(2), while labour force was non stationary. In confirming the result of the ADF approach with Philip-Peron approach which is considered to be more powerful, GDP and labour force are stationary at second difference; gross fixed capital formation is stationary at level; while broad money supply, prime lending rate, non-oil revenue, oil revenue, and government expenditure are all stationary at first difference. Since our variables are in mixed order of integration, the analysis takes this into consideration by employing the ARDL approach to error correction mechanism.

4.4 Influence of Monetary and Fiscal Policy Variables on Economic Growth in Nigeria

The study utilized the ARDL approach by first examining the existence of a long run relationship. The result of the Johansen cointegration test and the ARDL Bounds test for levels (long run) relationship are presented in Table 4 and Table 5 respectively.

Table 4: Johansen Cointegration Test Result

Hypothesized number of cointegrating equations	Eigenvalue	Trace Statistic	0.05 Critical Value	Probability
Unrestricted Cointegration Rank Test (Trace)				
r = 0	0.950084	425.8507	197.3709	0.0000***
r > 1	0.920886	314.9461	159.5297	0.0000***

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r > 2	0.863193	221.0821	125.6154	0.0000***
r > 3	0.804517	147.4824	95.75366	0.0000***
r > 4	0.625990	87.08800	69.81889	0.0012**
r > 5	0.479612	50.69950	47.85613	0.0264**
r > 6	0.267586	11.68794	15.49471	0.1725
r > 7	0.004471	0.165806	3.841466	0.6839
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized number of cointegrating equations	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Probability
r = 0	0.950084	110.9046	58.43354	0.0000***
r > 1	0.920886	93.86392	52.36261	0.0000***
r > 2	0.863193	73.59973	46.23142	0.0000***
r > 3	0.804517	60.39440	40.07757	0.0001***
r > 4	0.625990	36.38850	33.87687	0.0245**
r > 5	0.479612	24.16768	27.58434	0.1290
r > 6	0.267586	11.52213	14.26460	0.1299
r > 7	0.004471	0.165806	3.841466	0.6839

Note: **** and ** denotes significance at the 1% and 5% levels respectively.*

Evidence from the Trace statistic shows that there are six cointegrating equations while the Max-Eigen statistic reported five cointegrating equations at the 5% critical values. The existence of cointegrating

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equations is an indication that there is a long run equilibrium relationship in the model. However, since we are dealing with an ARDL framework, such needs to be confirmed through the Bounds test for level relationship.

Table 5: ARDL Bounds Test for Levels Relationship

F-Bounds Test	Null Hypothesis: No levels relationship			
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	26.746***	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Note: **** denotes significance at the 1% level of significance.*

The Bounds test for levels relationship, as presented in Table 5, indicates that the F-statistic is statistically significant at the 1% level of significance. This is because the F-statistic is greater than both the upper and lower bounds critical values at all the identified levels of significance. Thus, the significance of the F-statistic is an indication that there is a levels relationship. Hence the null hypothesis of no levels relationship is rejected at the 1% level of significance. The existence of the long run equilibrium relationship necessitates the estimation of the error correction model as follows.

Table 6: Short Run ARDL Vector Error Correction Result

Variable	**Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
Δ(BMS)	1.620	0.120	14.789	0.0000***
Δ(BMS(-1))	-0.222	0.110	-2.021	0.0628*

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Δ(BMS(-2))	-0.829	0.122	-6.821	0.0000**
Δ(PLR)	-41.020	14.188	-2.891	0.0118**
Δ(NOR)	1.343	0.438	3.066	0.0084**
Δ(NOR(-1))	-5.283	0.576	-9.178	0.0000***
Δ(NOR(-2))	-3.565	0.515	-6.923	0.0000***
Δ(ORV)	0.520	0.068	7.610	0.0000***
Δ(ORV(-1))	-1.593	0.115	-13.874	0.0000***
Δ(ORV(-2))	-0.239	0.079	-3.046	0.0087**
Δ(GEX)	1.523	0.229	6.652	0.0000***
Δ(GEX(-1))	8.422	0.501	16.799	0.0000***
Δ(GEX(-2))	5.569	0.433	12.848	0.0000***
ECT(-1)	**-0.393**	**0.020**	**-19.449**	**0.0000*** **
R-squared = 0.9662		Durbin-Watson statistic = 2.27		Log likelihood = -251.0325

Note: ****, **and * denotes significance at the 1%, 5% and 10% levels respectively.*

Table 6 presents the ARDL error correction model result and shows the speed of adjustment of the short run disequilibrium to a long run equilibrium relationship. The result follows ARDL(1, 0, 0, 3, 1, 3, 3, 3) with restricted constant and no trend. The error correction term is rightly signed (negative) and statistically significant at the 1% level of significance. Based on the one-period lag of the error correction term, ECT(-1), coefficient of 0.393, it can be said that 39.3% of the short run disequilibrium in real sector output is adjusted annually so as to attain a long run equilibrium level. The R-squared shows that 96.62% of the variations in the real sector output is explained by the variations in the

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explanatory variables in the model. The Durbin-Watson statistic of 2.27 indicates that there is no serial correlation in the model.

The short run estimates all yields a significant effect on real sector output. For instance, changes in broad money supply and non-oil revenue exerts positive and significant effect on real sector output at the 1% and 5% levels respectively. Thus, a unit percentage increase in broad money supply will lead to 1.620% increase in real sector output; while a 1% increase in non-oil revenue will yield a 1.343% increase in real sector output. This significant effect of broad money supply on real sector output supports the monetarist view that 'money supply is the most dominant determinant of both the level of output and the price level in the short run'. Therefore, the null hypothesis that broad money supply does not significantly affect real sector output is rejected. Similarly, changes in oil revenue and government expenditure exerts positive and significant effect on economic growth in Nigeria within the study period both at the 1% level of significance. The positive effect of government expenditure on the real sector output is in consonance with the findings of Ram (1986); Barro (1991); Easterly and Rebelo (1993); Otani and Villanueva (1990) Komain and Brahmasrene (2007); Ranjan and Sharma (2008); Cooray (2009); Wu, Tang, and Lin (2010); Yasin (2011); Nworji, Okwu, Obiwuru, and Nworji (2012); and Effiong and Inyang (2020). The implication is that a unit percentage increase in oil revenue will lead to a 0.523% increase in real sector output; while a unit percentage increase in government expenditure will result to a 1.523% increase in real sector output. Thus, the null hypothesis that government expenditure does not significantly affect real sector output is rejected at the 1% level of significance. However, prime lending rate exerts a negative and significant effect on real sector output at the 5% level of significance. Thus, as interest rate increases by a unit percentage, real sector output reduces by 41.020%. The null hypothesis that prime lending rate does not significantly affect real sector output is rejected at the 5% level of significance.

Table 7: Long Run Estimates

Variable	Coefficient	Standard Error	t-Statistic	Prob.
GCF	1.40E-07	6.56E-08	2.136	0.0508*

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POP	0.0001	0.0001	1.189	0.2541
BMS	-0.3971	0.8949	-0.444	0.6639
PLR	-322.592	81.6733	3.950	0.0015**
NOR	28.708	13.9031	-2.065	0.0580*
ORV	5.554	0.9608	5.781	0.0000***
GEX	-10.519	5.7113	-1.842	0.0868*
C	11305.25	4188.551	2.699	0.0173**

Note: ****, **and * denotes significance at the 1%, 5% and 10% levels respectively.*

In the long run, only interest rate as a monetary policy variable significantly affect real sector output. Therefore, a unit percentage decrease in prime lending rate will result in a 322.592% increase in real sector output. This negative effect of prime lending rate affects real sector output in various ways. This include the fact that higher interest rate will increase the cost of borrowing, leading to a decline in investment; increase the incentive to save rather than consume; increase the value of currency due to hot money flows, leading to reduction in exports and increase in import, creating a negative net export and thus reducing aggregate demand in the economy; and reducing the confidence to borrow. Thus, higher interest rate reduces consumption expenditures and investment, leading to a fall in aggregate demand. The findings of the negative effect of prime lending rate on real sector output is in line with the findings of Effiong (2020), Etale and Ayunkun (2016), Mutinda (2014), Ifeanyi and Chukwu (2014), Erega (2010), as well as Utile, Okwori and Ikpambese (2018).

Non-oil revenue and oil revenue in the long run all exerts a positive and significant effect on real sector output in Nigeria. Thus, a 1% increase in non-oil revenue will lead to 28.708% increase in real sector output; while a unit percentage increase in oil revenue will yield a 5.554% increase in real sector output. This points to the fact that the non-oil sector is likely to contribute more to the real sector output than the oil sector. It therefore indicates that the diversification of the Nigerian economy is crucial for

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the sustainable economic growth of Nigeria especially in this period of declining demand for crude oil with its attendant oil price cut.

Government expenditure is observed to have a negative and significant effect on economic growth in the long run. Thus, a 1% increase in government expenditure will reduce real sector output by 10.519%. This negative effect of government expenditure on the real sector output can be linked to mismanagement of funds, corruption in the public sector, as well as misallocation of funds to productive sectors of the economy. Also, this negative effect can be linked to the fact that government expenditure has a crowding out effect on private investment; leading to a declining real sector output. The findings of the negative effect of government expenditure on economic growth is in consonance with the work of Adeoye (2006), Olawunmi and Ayinla (2007), Chuku (2010), Omitogun and Ayinla (2007), Abu-Bader and Abu-Qarn (2003), and Laudau (1986)

Similarly, broad money supply also exerts a negative, though an insignificant effect, on real sector output in Nigeria in the long run. Though in a normal situation, an increase in money supply supposed to lower interest rate thereby encouraging investment and borrowing which stimulates real sector output; the negative effect of money supply can also be traced from the angle of its effects on inflation. Increase in money supply without a corresponding increase in output will likely result to an increase in inflation. If inflation is cost push, then firms will not be able to procure raw materials to produce; exerting a negative effect on real sector output and growth. The negative and insignificant effect of monetary policy through the broad money supply agrees with earlier findings such as Ezeaku *et al.* (2018) Inam and Ime (2017), Lut and Moolio (2015), Younsi and Nafla (2017), Precious and Palesa (2014), Obadeyi, Okhiria and Afolabi (2016), Srithilat and Sun (2017), Adediran, Mathew, Olopade and Adegboye (2017), Njoku and Susan (2016), Twinoburyo and Odhiambo (2016), Njimanted, Akume and Mukete (2016), and Mallick (2011).

From the foregoing, both monetary and fiscal policy variables exert a significant effect on real sector output in the short run but such magnitude can only be achieved through few means in the long run. For instance, increasing government expenditure and increasing broad money supply will stimulate real sector output in the short run but will be detrimental in the long run.

4.5 Coefficients Diagnostic Test Result

The diagnostic test carried out include the serial correlation test based on Breusch-Godfrey and the Breusch-Pagan-Godfrey heteroscedasticity test.

Table 8: Serial Correlation and Heteroscedasticity Test Result

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.5559	Prob. F(2,12)	0.5876
Observations × R-squared	3.0529	Prob. Chi-Square(2)	0.2173
Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.3407	Prob. F(21,14)	0.9873
Observation × R-squared	12.176	Prob. Chi-Square(21)	0.9347
Scaled explained Sum of Squares	2.7418	Prob. Chi-Square(21)	1.0000

The Breusch-Godfrey heteroscedasticity test result indicates that both the F-statistic and the Chi-Square statistic are not statistically significant. Therefore, the model is not heteroscedastic rather, it is homoscedastic; implying that there is a constant variance. Also, none of the statistics in the test for serial correlation is statistically significant. Hence, the null hypothesis of serial correlation is rejected; implying that there is no serial correlation.

4.7 The Nature of Causality between Real Sector Output and Monetary/Fiscal Variables

In examining the nature of the relationship between monetary/fiscal variables and real sector output, the result of the Pairwise Granger causality test is presented in Table 9.

Table 9: Pairwise Granger causality test result

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Null Hypothesis	Number of Observations	F-statistic	Probability
BMS does not Granger Cause GDP		6.18712	0.0053**
GDP does not Granger Cause BMS	37	8.79816	0.0009***
PLR does not Granger Cause GDP		0.23994	0.7881
GDP does not Granger Cause PLR	37	0.58720	0.5618
NOR does not Granger Cause GDP		4.63304	0.0171**
GDP does not Granger Cause NOR	37	2.40010	0.1069
ORV does not Granger Cause GDP		2.12048	0.1365
GDP does not Granger Cause ORV	37	4.46520	0.0195**
GEX does not Granger Cause GDP		1.55536	0.2267
GDP does not Granger Cause GEX	37	0.63453	0.5367

Note: ****, ** and * denotes significance at the 1%, 5% and 10% levels respectively.*

From Table 9, no causality flows between prime lending rate and real sector output as well as between government expenditure and real sector output. This is because the F-statistic is not statistically significant. Also, there exist a bidirectional causality flowing between broad money supply and real sector output. Thus, broad money supply granger causes real sector output; and real sector output also granger cause broad money supply. In the same vein, a unidirectional causality flows between non-oil revenue and real sector output as well as between oil revenue and real sector output. This means that real sector output granger cause oil revenue and not the other way round. Also, non-oil revenue granger causes real sector output and not the other way round too,

3.0 Conclusion and Recommendations

Macroeconomic management through monetary and fiscal policy actions are conducted on the basis of promoting price stability, economic growth, favourable balance of payments, and full employment. These goals are achieved through the use of government expenditure and taxation in the fiscal realm while in the monetary realm, the monetary authority utilizes monetary policy tools such as bank rate policy, open market operations, changes in reserve ratios, and selective credit controls. Meanwhile,

money supply has been regarded as the most important determinant of the level of output and price level in the short run, but a propeller of the price level and nominal aggregate demand in the long run.

This paper examined the effectiveness of monetary and fiscal policy in stimulating real sector output in Nigeria for the period 1981 to 2019. It is observed that monetary and fiscal policy variables are effective in stimulating real sector output in the short run. For instance, a unit percentage increase in broad money supply is observed to exert a 1.62% increase in real sector output; while a unit percentage increase in government expenditure is also observed to exert a 1.523% increase in real sector output. Government revenue (both oil and non-oil) also affects real sector output positively. A unit percentage increase in oil revenue is followed with a corresponding 0.52% increase in real sector output; while a unit percentage increase in non-oil revenue tantamount to a 1.343% increase in real sector output. Prime lending rate also exerts a negative and significant effect on real sector output in the short run implying that a unit percentage decrease in prime lending rate will yield a 41.02% increase in real sector output.

However, the effectiveness of monetary and fiscal policy variables yields a disturbing result in the long run. Broad money supply yields a negative, though insignificant, effect on real sector output; implying that a unit percentage increase in broad money supply results to a 0.3971% decrease in real sector output. Similarly, government expenditure yields a negative and significant effect on real sector output. Thus, a unit percentage increase in government expenditure is likely to lead to a 10.519% decrease in real sector output. This therefore points to the fact that both monetary and fiscal policy needs to be coordinated if the desired long run objective of stimulating real sector output is to be achieved. It therefore points to the fact that to achieve a sustainable increase in real sector output, there is need for coordination between monetary policy within the purview of the monetary authority; and fiscal policy within the ambit of the government.

Meanwhile, prime lending rate and government revenue (both oil and non-oil) generated the desired long run effect on real sector output. This paper recommends the need for a sound monetary-fiscal coordination for the achievement of sustainable stimulation of real sector output. This is because without coordination, both fiscal and monetary policies may not generate the desired effect since they are conducted in isolation. Without coordination, policy misses are bound to occur. Also, the rate of interest must be kept on check as this study reveals a negative and significant effect of the prime lending

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rate on real sector output. This is because a higher rate of interest will discourage borrowing which contracts investment.

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