

Abdul, Shobande Olatunji

## Article

# Interrogating the rationale for monetary and fiscal policies : synchronization in Nigeria

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## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/econis-archiv/>

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## **Interrogating the Rationale for Monetary and Fiscal Policies Synchronization in Nigeria**

**Shobande Olatunji Abdul<sup>1</sup>**

**Abstract:** This study examines two empirical issues that triggered the recent negative economic growth recorded in Nigeria. First, the country's output level in the past 16 quarters, which has been far below expectation questions the extent to which those in charge of the Nigerian economy understand the dynamics of macroeconomic policy. Second, while the fiscal authorities had focused on the use of government spending to stimulate economic growth, the monetary authorities focused their attention on inflationary targeting with a view to enhancing economic stability. Thus, conflicting objectives were observed with varying efforts at resolving the conflict. This study identified the main fiscal and monetary transmission channel that can enhance economic growth recovery of the country using the SVAR approaches. Overall result of the study shows the need for greater policy coordination and objective reconciliation among fiscal authorities.

**Keywords:** Monetary policy; fiscal policy; Output; Nigeria

**JEL Classification:** E52; E5; E63

### **1. Introduction**

The primary objective of macroeconomic policy is to ensure the attainment of sustainable growth in the context of price stability and non-inflationary growth. The efficient pursuit of this objective depends largely on the fiscal and monetary authorities' coordinated framework. It therefore implies that without effective policy coordination, realizing sustainable economic growth may be unrealistic (Shobande, 2019). Besides, evidence has shown that fiscal actions have vitiated effect on monetary policy formation. It suggests therefore that the Central Bank's ability to regulate the economy rest on fiscal discipline and the extent to which the economy rely on fiscal deficit as its source of finance. (Shobande, 2018) This underscores the need to understand the puzzle behind policy coordination and its relative impact on economic growth. (Adeoye & Shobande, 2016; Oke & Shobande, 2016; Shobande & Adeoye, 2017; Shobande & Ibrahim, 2018)

Cross countries evidence has shown that urgent attention has been given to integrating monetary and fiscal policies to ensure achievement of macroeconomic objectives. For instance, experience in Pakistan clearly shows that the coordination of monetary and fiscal policies was institutionalized after implementation of financial reform and independence of Pakistan Central Banks was given a second thought. Prior to the move for policy coordination, Pakistan experienced gross fiscal indiscipline and poor macroeconomic management, which resulted in rootless growth. (Sayed, Faisal & Nasir, 2011; Hussain & Siddiqi, 2012; Abdul, Rabbia & Nazia, 2014) In Indonesia, the establishment of ministerial

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<sup>1</sup> Business School, University of Aberdeen, UK, Nigeria, Corresponding author: o.shobande.19@abdn.ac.uk.



level inflation targeting, monitoring and control team in 2005 enhanced the coordinated effort between the government and Bank of Indonesia in seeking fiscal policy harmony (Kuncoro & Sabayang, 2013; Sasongko & Huruta, 2018; Sryana, 2018). In Nigeria, the quest for policy coordination lead to the establishment of Monetary and Fiscal Policy Coordinating Committee (MFPCC) in 2014 as a platform for harmonization of monetary, fiscal, exchange rate, and debt policies with a view to settling dispute in policy goals and enhancing macroeconomic stability (Adeoye & Shobande, 2017; Aladejare, 2018; Joseph & Olufemi, 2018; Shobande, 2019).

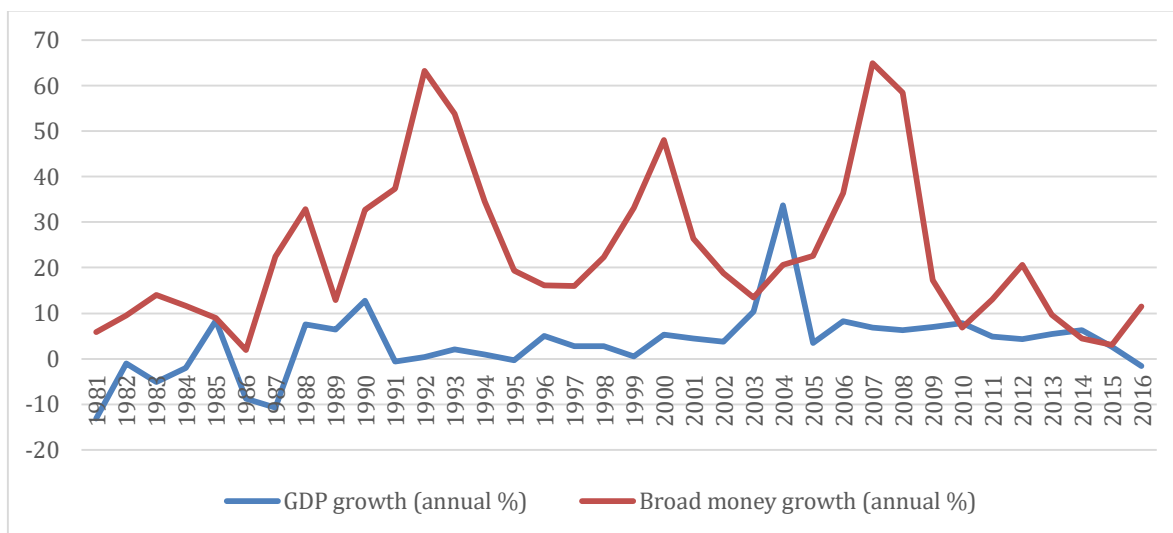
Despite the efforts to harmonize policy objectives in Nigeria through the creation of a forum for resolving dispute among the various fiscal and monetary authorities, it appears that expansionary practice of the government through increase in spending without sustainable revenue has cast doubt on whether the aim of policy harmonization has been achieved. Also, the continued injection of liquidity into the economy with poor regulation and lack of financial inclusion clearly show that the Central Bank cannot account for the volume of money in circulation. On a second thought, the uncoordinated budgetary operation of the three tiers of government and poor coordination among the economy managers sometimes have negative effects on macroeconomic stability and growth objectives of the government.

Interestingly, appreciating the rationale for policy coordination with a view to achieving greater policy credibility and effectiveness remains a subject of debate in Nigeria. Thus, this study queries the existing policy mix and examines the extents to which they could possibly guarantee effective long-term output growth in Nigeria. The study is relevance at this time when the country is undergoing macroeconomic turbulence as well as high degree of output volatility. The outcome of this study will serve as resource to stakeholders in the policy formulation/management as well as academic scholars.

The rest of the paper is organized as follows: Section 2 discusses the review of related literature for the study; sections 3 and 4 present the theoretical framework and methodology and section 4 while section 5 shows empirical results. Section 6 concludes the paper with some policy implications of our findings.

## **2. Stylized Fact**

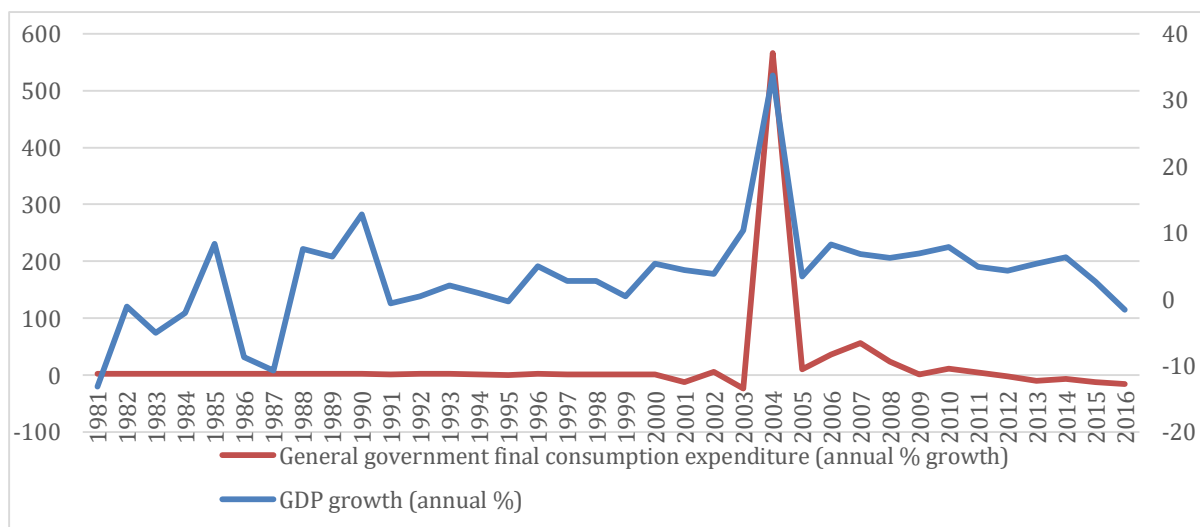
Nigeria is a middle income, mixed economy and an emerging market with a growing population and abundant resources as her comfort. While the economy has maintained remarkable growth over the past ten years the country's average GDP growth stands between six and seven percent. The rebasing of the GDP by the Nigerian Bureau of Statistics paved way for increase in the economy size that made her ranked as the 30<sup>th</sup> largest economy in the world. Beyond this, the inability to sustain the growth as a result of mono-economy practice and lack of economic diversification led to unimpressive performance resulting from low demand for Nigerian crude oil. Between 2015 and 2016, the country recorded successive decline in its GDP growth in five quarter. This posed a puzzle to managers of the economy as they were under pressure to provide urgent economic recovery strategy and restore the economy to better performance. By 2017, the policy initiatives implemented provided prospect of economic recovery indicating a positive growth rate of 0.5 percent y/y.



**Figure 1. Analysis of Money Supply and GDP Growth in Nigeria**

*Source: World Development Indicator, online version 2018*

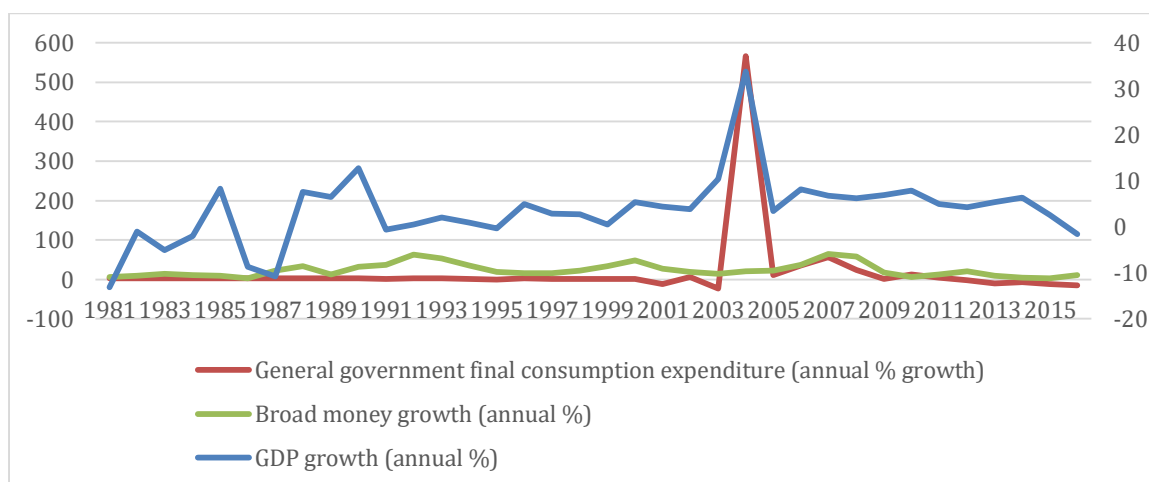
Figure 1 depicts the movement of money supply and GDP growth in Nigeria from 1981 to 2016. It appears from the figure that there is a pro-cyclical relationship between monetary policy indicator and economic growth. This implies that an increase in money supply led to increase in GDP growth as experienced between 1981 up to 2013. Between 2004 and 2016, an inverse relationship was observed.



**Figure 2. Trend Analysis of Government Expenditure and GDP Growth in Nigeria**

*Source: World Development Indicator, online version 2018*

Figure 2 depicts the relationship between fiscal policy indicator and economic growth in Nigeria from 1981 to 2016. The figure shows that there was a direct relationship between government spending and GDP growth. Specifically, between 1981 and 2012 the fiscal expansion impacted positively on GDP growth and recorded highest growth impact between 2003 and 2005.



**Figure 3. Trend Analysis of Money Supply, Government Expenditure and GDP Growth in Nigeria**

*Source: World Development Indicator, online version 2018*

Figure 3 depicts the combine effects of monetary policy and fiscal policy on GDP growth in Nigeria from 1981 to 2016. The figure shows there was inverse relationship between money supply and GDP growth and direct relationship between fiscal policy (government spending) and GDP growth.

### 3. Survey of Related Literature

Early Research suggested aggregate demand through the increase in government spending as an antidote for stimulating the economy. (Keynes, 1936) In particular, the literature supports government intervention through its fiscal policy to provide platform for stimulating investment through effective demand. This notion was however challenged by Friedman (1960) who argued that policy makers should be blamed for irregular fluctuation and poor macroeconomic performance in the economy. Friedman (1960) noted that only money matters and the need to curtail the growth of money through proper management by monetary authority is vital to avoid collapse of the economy. Friedman's point of view on monetary economics has also been supported by literature providing two distinct explanations. First, the willingness of monetary authority to respond to monetary growth without been constrained by fiscal objective remained an unsettled issue. The second is the new attention created by economists that inflationary pressure not a monetary phenomenon should be given attention; hence, economists should focus on output growth, since no amount of inflationary targeting can guarantee economic growth.

Sargent and Wallace (1981) and Shobande (2018) provided theoretical basis for monetary and fiscal policy coordination. Sargent and Wallace (1981) hinged on the concept of fiscal dominance and showed the implication of government budget deficit on monetary policy. Shobande (2018) used the government demand function to show the possibility of government spending on monetary policy toolkits.

From empirical perspective, resources have been devoted to the study of monetary and fiscal policy harmonization with inconclusive results regarding the basis for integrating the two policies to influence the real economy. While most of these studies queried the rationale for inflationary targeting, some insisted that 10 percent increase in money supply might likely trigger price stability, which might lead

to irregular fluctuation in the medium run. Buti, Roegaer and Velt (2001) examined the potential conflict between fiscal and monetary policy and showed that conflict in goals is a major factor that requires objectives harmonization. The authors further stressed that while government tried to achieve output maximization, monetary authorities seek to achieve price stability.

Gali and Monacelli (2008) developed a tractable multi-country framework suitable for monetary and fiscal policy analysis in a currency union and found that the emergence of potential conflict between monetary and fiscal policies constraint the achievement of stability role among the partnering union. Also, Ogege and Shiro (2012) examined the dynamics of monetary and fiscal policies on economic growth using co-integration techniques, which is anchored on the Vector Error Correction Model. Their results showed that there exists a long run linear relationship between policy mix and economic growth in the Nigeria. Likewise, Algozhina (2012) examined the effect of monetary and fiscal policy on inflation, exchange rate and output using Dynamic Stochastic General Equilibrium (DSGE) model to design for an emerging open economy. The author's results show that public consumption has potential of activating inflationary pressure which impact negatively on fiscal multiplier as opposed to public investment, which boosts output and does not bring inflation pressure.

Some studies advocated that monetary and fiscal policies should focus on price stability rather than growth initiative. For instance, Kappel and Janku (2014) evaluated mutual interaction of monetary and fiscal policies in the countries of Visegrad group (Czech Republic, Slovakia, Poland and Hungary) using a game theoretical model. Their analysis confirmed the dominant role of monetary policy in Czech Republic and Hungary but noticed conflicting results between the other two countries studied. Similarly, Coric, Simovic and Deskar-Skrbic (2015) analysed the possibilities of monetary and fiscal policies in achieving economic growth using the Structural Vector Autoregressive (SVAR) model. The study shows that expansionary monetary and fiscal policies both have positive effect on economic activity during the periods reviewed. Sayeed and Abassi (2015) examined the role of Central Banks in economic growth with specific focus on Pakistan's economy. According to the study, the macroeconomic performance of Pakistan economy over the last decade has been characterized by stag inflation and moderate growth reflecting that unemployment has been a major concern. It further emphasized that the role of Central Banks must be redefined towards growth initiative rather than inflationary targeting that is rarely achieved.

In the same vein, Adeleke, Uboh and Shobande identified the most effective monetary policy instruments that can bring about inclusive growth in Nigeria using the Structural Vector Autoregressive (SVAR) model. Their study recommends that monetary policy must combine both conventional and unconventional policies in order to achieve inclusive growth in Nigeria. Kubendran (2016) investigated the effectiveness of monetary and fiscal policies on economic activity in terms of economic integration under different exchange rate regimes. Results from the study showed that fiscal policy is more effective under managed float exchange rate and monetary policy is more effective under perfectly flexible exchange rate system. Besides, Worrell, Moore and Beckles (2017) proposed an integrated fiscal and monetary approach to economic stabilization policy in small open financially integrated economies using the conventional Mundel-Fleming model. They revealed that the quest for inflationary targeting constraint the achievement of output growth during the period reviewed. Uboh (2017) attempted to quantify the extent of monetary and fiscal policy coordination in Nigeria using the set theoretic approach

with time series data covering between 1982 and 2015. The results show that lack of commitment to macroeconomic objectives is a major factor affecting the quest for economic integration in Nigeria.

Furthermore, a substantial amount of studies has recently investigated the causes, trends, consequences and circumstance under which fiscal and monetary policies' coordination can be used to stimulate the economy. Despite the extensive volume of literature, it appears that the results remain controversial as policy options vary. While considerable numbers of authors have attempted to explain the basis for integrating monetary and fiscal policies using VAR, DSGE and Game theoretical approach, only a relative few considered the potential of SVAR methodology, which is considered for this present study. The applicability of the New Keynesian theoretical proposition in the Nigerian context as it explains the subjects under contemplation was also examined.

## 4. Theoretical Framework and Methodology

### 4.1. Theoretical Framework

This study is premised on the New Keynesian theory, which posited that output is the normal state of the economy and significant government intervention (in the form of fiscal and monetary policies) is required if output targets are to be reached. The theory assumed that there are two groups of agents which are private agents (comprising households and firms) and the monetary authority, where the two agents have no perfect information, that is, there is information asymmetry. Also, the theory further stressed that agents have imperfect and heterogeneous knowledge, which leads to heterogeneous expectations formation. This implies that agent believes that each agent forms his own expectations and do not learn from the experiences of others.

### 4.2. Model

This study employs the SVAR framework to analyse the possibility of integrating monetary-fiscal policies and economic growth in the Nigerian economy. The SVAR approach emanated from the celebrated work of Bernanke (1986), Sim (1986) and Blanchard and Watson (1986), where economic theory was utilised to estimate the structural parameter and to recover the underlying independent structural disturbances. (Adeleke, Uboh & Shobande, 2015; Adeoye & Shobande, 2016)

In a general form, an identified SVAR model under rational expectations from equations following the work of Shawn, (2006) and Kim, Soyoung and Roubini, Nouriel, (2000) can be written as

$$i_t = \gamma_0 + \pi_t + \gamma_1(E_t\pi_{t+1} - \pi^*) + \gamma_2x_t + \varepsilon_t^i \quad (1)$$

$$x_t = \alpha_0 + \alpha_1E_tx_{t+1} - \alpha_2(i - E_t\pi_{t+1}) + \varepsilon_t^x \quad (2)$$

$$\pi_t = \beta_0 + \beta_1E_t\pi_{t+1} + \beta_2x_t + \varepsilon_t^\pi \quad (3)$$

Adding short-run dynamics into the contemporaneous structural model described in equations (1 to 3) and rewriting the structural model in matrix form will give

$$\Gamma_0y_t = \Gamma_0y_{t-1} + \dots \dots \dots \Gamma_qy_{t-q} + \varepsilon, \varepsilon \approx (O, D) \quad (4)$$

Where  $y_t = (i_t, x_t, \pi_t)$  contains the endogenous variables,  $\tau_i$  are the coefficient matrices and  $q$  denotes the lag order.  $\varepsilon_t = (\varepsilon_t^i, \varepsilon_t^x, \varepsilon_t^\pi)$  is the vector of structural disturbances,  $0$  denotes  $3 \times 1$  vector of zeros and  $D$  is the  $3 \times 3$  diagonal variance-covariance matrix. Pre-multiplying equation (3.4) by  $\Gamma_0^{-1}$  makes the reduced form VAR to become:

$$y_t = A_1 y_{t-1} + \dots \dots A_q y_{t-q} + \varepsilon, \varepsilon \approx (0, \Omega) \quad (5)$$

Where,  $A_1 = \Gamma_0^{-1} \Gamma_1$ ,  $i = 1, 2, \dots, q$

$$\varepsilon_t = \Gamma_0^{-1} \varepsilon_t \text{ and } \Omega = \Gamma_0^{-1} D \Gamma_0^{-1}$$

To convert into an innovation that consist of structural disturbances and VAR innovations that captures heterogeneous expectations driven by adaptive technology, we need to subtract from each variable the expectation of that variable at time  $t-1$  conditioned on all available past information and this will give

$$\varepsilon_t^i = (i_t - E_{t-1} i_t) - (\pi_t - E_{t-1} \pi_t) - \gamma_1 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1}) - \gamma_2 (x_t - E_{t-1} x_t) \quad (5)$$

$$= e_t^i - e_t^\pi - \gamma_1 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1}) - \gamma_2 \varepsilon_t^x \quad (5a)$$

$$\varepsilon_t^x = (x_t - E_{t-1} x_t) - (E_t x_{t+1} - E_{t-1} x_{t+1}) + \alpha_1 (i_t - E_{t-1} i_t) - \alpha_2 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1})$$

$$= e_t^x - (E_t x_{t+1} - E_{t-1} x_{t+1}) + \alpha_1 e_t^i - \alpha_2 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1}) \quad (5b)$$

$$\varepsilon_t^\pi = (\pi_t - E_{t-1} \pi_t) - \beta_1 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1}) - \beta_2 (x_t - E_{t-1} x_t)$$

$$= e_t^\pi - \beta_1 (E_t \pi_{t+1} - E_{t-1} \pi_{t+1}) - \beta_2 \varepsilon_t^x \quad (5c)$$

Where,  $(i_t - E_{t-1} i_t), (x_t - E_{t-1} x_t), (\pi_t - E_{t-1} \pi_t)$  are the current values of the output gap, fiscal and monetary policy VAR innovations respectively.

There are three main approaches to identifying restrictions in SVAR. One approach is to identify a SVAR that is based strictly on an established theoretical macroeconomic model. Another is to select identification restriction that are largely in line with the desired theory and stylized facts obtained from the empirical results from previous studies. (Adeoye & Shobande, 2016) To identify orthogonal monetary and fiscal policy shocks, it is normal to impose short run restriction on the SVAR model. The relevance can be established through review of the dynamics.

Therefore, the relationship between monetary – fiscal policy nexus on economic growth variable can be modeled using the reduced form representation of the system ignoring constants and deterministic variables since they do not affect expectations revisions as:

$$Y_t = AY_{t-1} + Qe_t \quad (6)$$

Equation (6) can be equivalently written as:

$$BY_t = \begin{bmatrix} A_1 & A_2 & \cdot & \cdot & A_q \\ 1_n & 0_n & \cdot & \cdot & 0_n \\ 0_n & 1_n & \cdot & \cdot & 0_n \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ 0_n & 0_n & 0_n & 0_n & 1_n \end{bmatrix} \begin{bmatrix} y_{t-1} \\ y_{t-2} \\ y_{t-3} \\ \cdot \\ \cdot \\ y_{t-q} \end{bmatrix} + \begin{bmatrix} 1_n \\ 0_n \\ 0_n \\ \cdot \\ \cdot \\ 0_n \end{bmatrix} e_t \quad (7)$$



Where  $q$  denotes the lag order of endogenous variables  $1_n$  and  $0_n$  are  $(n \times n)$  identity and zero matrices respectfully and  $n=3$  is the number of endogenous variables. Therefore, the dynamic SVAR in an open economy can be written in a matrix form as:

$$\Gamma_0 y_t = \Gamma_1 y_{t-1} + \dots + \Gamma_q y_{t-q} + \varphi_0 z_t + \varphi_1 z_{t-1} + \dots + \varphi_k z_{t-k} + \varepsilon_t, \varepsilon_t \varepsilon, \varepsilon \approx (0, D) \quad (8)$$

Following the work of (Shawn, 2006), the reduced form can be written as:

$$\varepsilon_t^x = e_t^x - r_x A Q e_t + \alpha_1 (e_t^{-i} - r_x A Q e_t) - \alpha_2 (e_t^s - e_t^x / 400) \quad (8a)$$

$$\varepsilon_t^\pi = e_t^\pi - \beta_1 r_x A Q e_t - \beta_2 e_t^\pi \quad (8b)$$

$$\varepsilon_t^s = e_t^s - r_x A Q e_t + e_t^i \quad (8c)$$

### 4.3. Estimation Procedure

The estimation of the SVAR model is in two categories; First, we estimated the reduced form VAR specified in equation (5), the parameter estimates contained in  $A$  and the rational expectations restrictions specified in equations (5a to 3c) was imposed on  $\tau_0$ . Further exclusion restrictions placed on the contemporaneous exogenous variables are in  $\varphi_0$  and the lag dynamics were unrestricted. Secondly, we estimated the structural equations specified in (3.8) using full Information Likelihood Estimation by assuming normality of the structural disturbances. The structural parameters were obtained by maximizing the following log-likelihood function.

$$L = \sum_{t=1}^T \left[ -\frac{n}{2} \ln(2\pi) - \frac{1}{2} \ln(\tau_0^{-1} D \tau_0^{-1}) - \frac{1}{2} \varepsilon_t D^{-1} \varepsilon_t \right] \quad (9)$$

### 4.4. Data Sources and Variable Measurement

The data used for estimation in this study are annual time series of selected variables covering a thirty-six-year period from 1981 to 2016. Data were sourced from World Development Indicator (WDI) and Central Bank of Nigeria Statistical Bulletin. The data set, and measurement of variables used in the model are as follows: (1) annual data of real GDP (GDP) which serves as the measure of real economic activity, (2) annual data of the Government expenditure (GOVEXP) was used to capture fiscal policy while (3) the money supply (M2) serves as market-based monetary policy variable.

## 5. Results

### 5.1. Preliminary Analysis: Descriptive Statistical of the Variables<sup>1</sup>

The summary statistics of the variables used in the analysis provides information about the mean, maximum, minimum, standard deviation of each variable. The Mean for example measures average value of the series summing it up and divides it by the number of observations. The corresponding maximum and minimum statistics measure the maximum and minimum values of the series for the period under consideration. The standard deviation statistic accounts for the degree of dispersion or spread in the series. The variables are not haphazardly distributed as indicated by the summary statistics. As shown in Table

<sup>1</sup> This analysis was done before all the variables were computed into their natural logarithm. This is done in order to reduce the heteroscedasticity of the series.

4.1, the number of observations in the analysis covered the period of 1981 to 2016 (36 years). The mean of Money supply (M2) as a proxy for monetary policy and Government expenditure (GOVEXP) as a proxy for fiscal policy showed that on average, Nigeria recorded a value of over 8481.21 and 3231.69, while the output value is up to the tune of 15,842.10 between the periods of analysis.

**Table 1. Summary Statistics of Variable**

Variable	Obs	Mean	Std. Dev.	Min	Max
M2	36	8481.26	22547.6	14.47	101490
GDP	36	15842.1	24425.6	94.33	89043.6
GOVEXP	36	3231.69	4035.71	9.64	11403

*Source: Computed by the Author*

## 5.2. Diagnostic Tests

The transmission channel between monetary policy rates (M2), fiscal policy (GOVEXP) and output (GDP) are traced using the Structural Vector auto regression (SVAR). The choice of the SVAR is largely influenced by its derivation from economic theory - the necessary restrictions on the estimated reduced form model, required for identification of the underlying structural model, can be provided by economic theory. The ideal thing in the literature before estimating a SVAR models is to first determine the number of lags selection and testing of the underlying VAR model. According to Spanos (1990), it is important to check the statistical adequacy of the reduced form VAR before the structural estimators can be treated with good faith. For this analysis, the diagnostic tests (presented in Appendix 1) show that the underlying VAR structure satisfies the tests for normality and serial correlation<sup>1</sup>.

## 5.2. Unit Roots Test

The unit root stationarity test and the stationarity tests are presented in this section. For the purpose of this study, the Augmented Dickey –Fuller (ADF) and the Phillips – Perron (PP) were employed. The unit root test results confirmed that all series are largely stationary at first difference (i.e. I (1) at 1% significance level). Table 2 presents the results.

**Table 2. Pre-tests: Unit Root Test Results**

	Level	First Difference	Level	First Difference
Variable	ADF (Z(t))	ADF (Z(t))	PP (Z(t))	PP (Z(t))
M2	1.199 (0.996)	-6.066 (0.000)	1.548 (0.998)	-6.091 (0.000) *
GDP	-1.472 (0.547)	-5.333 (0.000)	-1.455 (0.556)	-5.337 (0.000) *
GOVEXP	-1.402 (0.582)	-5.305 (0.000)	-1.315 (0.622)	-5.391 (0.000) *

*Source: Author Computation*

Note: \* denote 1% level of significant, while figure in parenthesis are the probability value

## 5.3. Pre-test: Optimal Lag Selection Criteria

In policy analysis, the influence of past policy (lags) on current level of macroeconomic determinants are importance in predicting the future situations of an economy, therefore, we proceed to investigate the possible number of lags to include in the final model estimating the transmission mechanism between MPR, LR, PSC and GDP in Nigeria. Thus, we test for the numbers of lags values that is needed to enter

<sup>1</sup> In the standard literature, the diagnostic tests are expected not to be statistically significant for a good model in econometric.

the system of equation. In statistics, there are several guiding principles for the choice of the lags, however, this analysis employed the use of Akaike Information Criteria to determine the optimum number of lags. Table 3 presented the obtained results; it is evidenced that one lagged value is the optimum number of lags selected. This is confirmed by other selection criteria as reported in Table 3.

**Table 3. VAR Lag Order Selection Criteria**

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-117.235				0.368	7.515	7.560	7.652
1	9.955	254.380	9	0.000	0.000229*	0.127828*	0.310022*	0.677479*
2	14.711	9.513	9	0.391	0.000	0.393	0.712	1.355
3	21.504	13.586	9	0.138	0.000	0.531	0.986	1.905
4	32.500	21.992*	9	0.009	0.000	0.406	0.998	2.193

\* indicates lag order selected by the criterion

Source: Author Computation

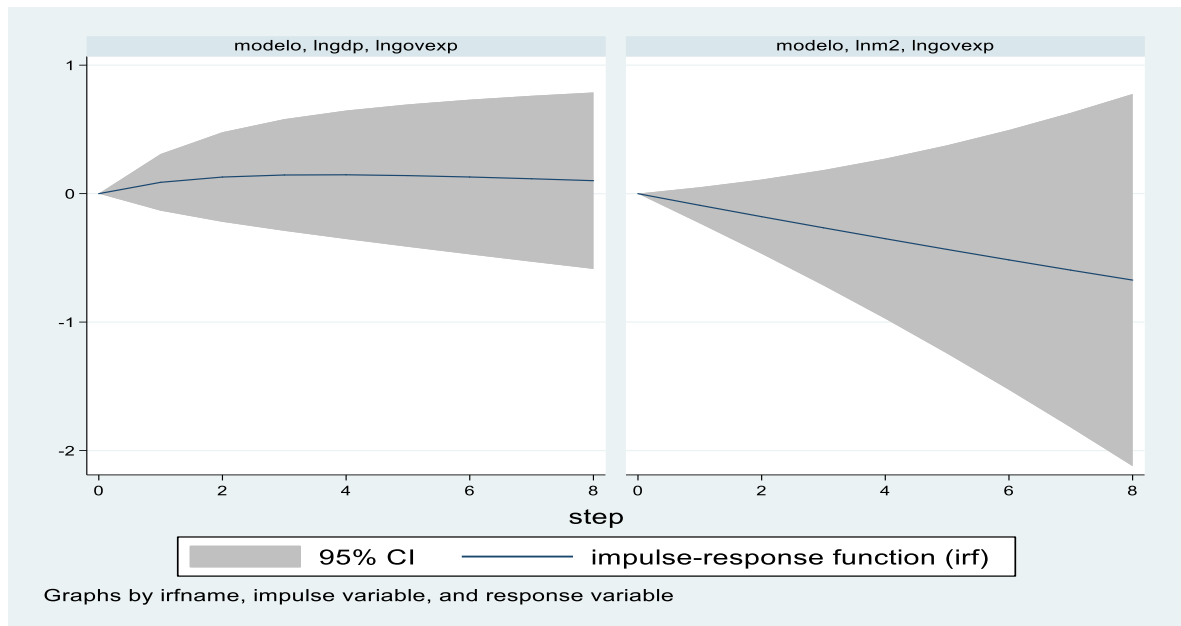
#### 5.4. Impulse Responses Analysis

In this analysis, it is assumed that the output is contemporaneously affected by both monetary policy rate and fiscal policy in the system of equation and not in the reverse order. Furthermore, through this equation, we allow monetary policy and fiscal policy to influence domestic output implicitly. The last equation represents the goods market equilibrium of the domestic economy. Similar to several past empirical works (e.g. Cheng, 2006; Kim, 2003; Bagliano & Favero, 1998; among many others), the motivation for this identification is based on the assumption that “firms and investors do not change their price and output suddenly in response to unexpected changes in monetary and fiscal policy within a short period due to the inaction, adjustment cost and planning delays. (Kim & Roubini, 2000)

Following from the above assumptions, the SVAR model impulse response for each of the transmission is discussed as follows. The impulse response functions to the three (3) structural shocks: monetary policy rate (M2), fiscal policy (GOVEXP) and output (GDP) shocks are presented in Figures 4 to 5. The size of each structural shock is one standard deviation of the estimated value.

##### 5.4a. Monetary Policy Rate Shocks

Figure 4 depicts the impulse response of gross domestic product (GDP) and fiscal policy (GOVEXP) to a shock to monetary policy rate (M2). A shock to monetary policy appears to have a positive influence on domestic output both in the short and long term. However, a shock response to monetary policy rate has a negative effect in the short run with fiscal discipline in Nigeria. This implies that it is not often the case for government to increase both fiscal and monetary policy simultaneously. Moreover, it is observed that a similar response in the long run influence fiscal policy positively.

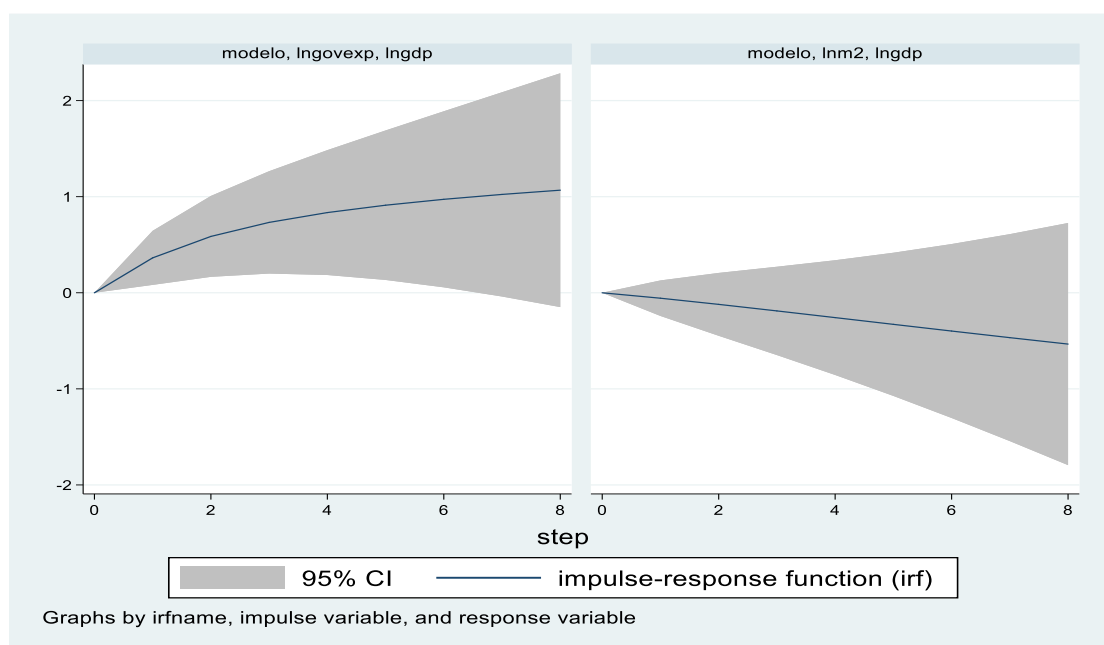


**Figure 4. Impulse Response Functions to a One Standard Deviation Monetary policy rate Shock**

*Source: Computed by the Author Computation*

#### 5.4b. Fiscal Policy Shocks

Figure 5 depicts the impulse response of monetary policy rate and output (GDP) to a unit change in fiscal policy. The response of GDP to an unexpected change in fiscal policy is significantly positive for all the period, although this response became stable around 2% in the long term following an initial increase from 1%. However, no significant response is observed for the case of monetary policy rate, as changes in the variable remain negative and tending toward 2% in the long run. This may further show the reasons why government may not increase both fiscal and monetary policies simultaneously in correcting for output dynamics.

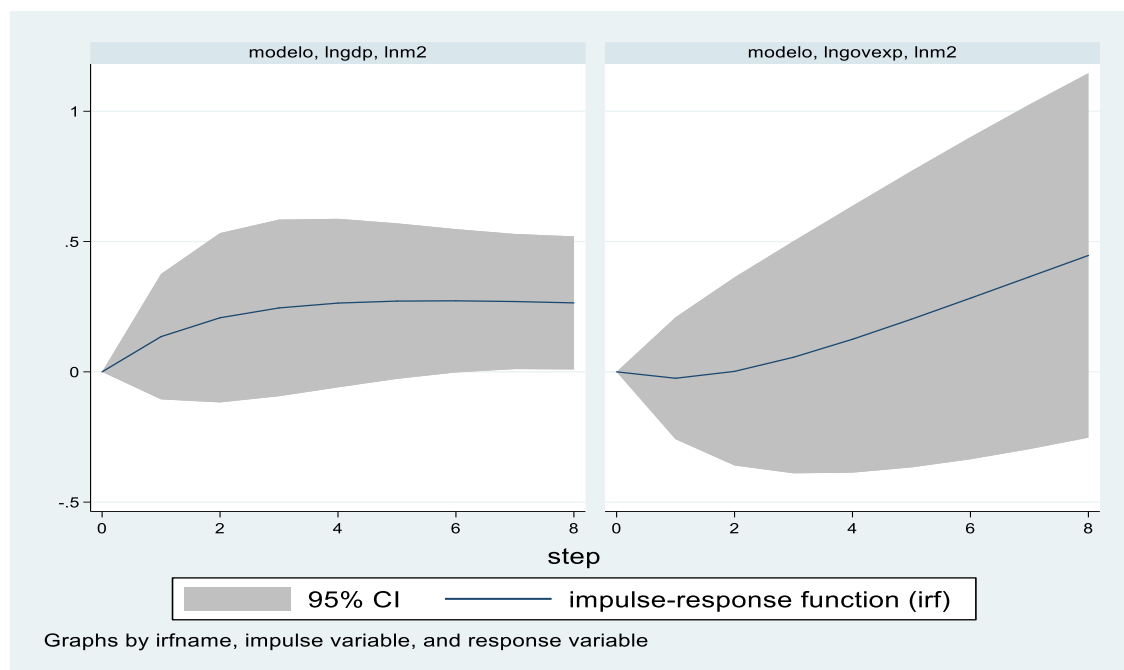


**Figure 5. Impulse Response Functions to a One Standard Deviation Fiscal Policy Shock**

*Source: Author Computation*

### 5.4c. Aggregate Demand Shocks (GDP)

Figure 6 depict the impulse response of monetary and fiscal policies to a shock in aggregate demand (GDP) in Nigeria between 1981 and 2016. The top left panel shows that monetary policy has a positive but very low response (close to one) to an unexpected unit change in domestic output. This implies that when aggregate demand rise, incentives are created for businesses to seek funds for investment purposes which is principally influenced by monetary policy (M2). However, since increase in aggregate demand increases sales and profit, firms may prefer to plough back more profits rather than continual dependence on credit. In contrast, the top left and bottom panels on the influence of fiscal policy on aggregate demand reveal both positive (in the long run) and negative (short run) response of fiscal policy respectively to an unexpected unit change in aggregate demand. This appears to be in line with theoretical expectation that increase in government expenditure will lead to an increase in aggregate demand. However, in the short run, the result may reflect the influence of lags in policy before effectively influencing aggregate demand or output in an economy.



**Figure 6. Impulse Response Functions to a One Percent Standard Deviation Aggregate Demand Shock**

*Source: Author computation*

## Concluding Remarks

Studies on how monetary and fiscal policies affect economic growth have received considerable attention in literature in recent past but a particular strand that crafts on the rationale for integrating monetary and fiscal policy to stimulate the economic growth is still at infancy. This study interrogated the rationale for monetary and fiscal policy harmonization in Nigeria. Specifically, it identifies the most effective monetary and fiscal transmission channel that can enhance growth recovery in Nigeria. This is a remarkable lacuna that has created a puzzle among the economic managers over the years, hence, the need to reconcile this conflicting objective among these policies. This is a major gap this study intends to bridge.

The overall results indicate that a shock on monetary policy appears to have positive impact on domestic output in both short and long run. While a shock response to monetary policy has negative effect on the short run with fiscal discipline in Nigeria. Suggesting that expansionary policy to stimulate aggregate demand through monetary and fiscal policy do not occur simultaneously. Thus, this study recommends effective harmonization of monetary and fiscal policies anchored on common objective and complementary actions.



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