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Afolabi, Joseph Olarewaju and Atolagbe, Oluwafemi

Department of Economics, University of Ibadan, Nigeria, Ibadan
School of Government and Public Policy, Nigeria

2 September 2018

Online at <https://mpra.ub.uni-muenchen.de/88786/>

MPRA Paper No. 88786, posted 06 Sep 2018 11:48 UTC

Empirical Analysis of Fiscal Dominance and the Conduct of Monetary Policy in Nigeria

Joseph Olarewaju Afolabi^{1,*} and Oluwafemi Ariyoosu Atolagbe^{1,2}

[*joecee001@gmail.com](mailto:joecee001@gmail.com)

+2348132741271

¹Department of Economics, University of Ibadan, Nigeria

²Ibadan School of Government and Public Policy, Nigeria

Abstract

The study empirically investigates fiscal dominance and the conduct of monetary policy in Nigeria, using quarterly data from 1986Q1 to 2016Q4. It adopts the vector error correction mechanism (VECM) and cointegration technique to analyze the data and make inference. The findings reveal that there is no evidence of fiscal dominance in Nigeria. The empirical results show that budget deficit, domestic debt and money supply have no significant influence on the average price level. However, budget deficit and domestic debt are shown to have significant influence on money supply, but only in the short-run. The policy implication is that the government should enforce fiscal discipline through the appropriate institution and the Central Bank should be given autonomy to perform the primary function of long-term price stability, among other functions.

Key words: Fiscal dominance, fiscal policy, monetary policy, VECM, Nigeria.

1.0. Background to the Study.

The achievement of macroeconomic policy objectives should be the desire of every nation. These macroeconomic objectives include price stability, external equilibrium, full employment level, sustainable growth and development. For a developing economy like Nigeria, other important economic objectives includes; debt management, equitable distribution of income, elimination of economic dualism, provision of subsistence, environmental protection, etc. (CBN, 2003). In the natural settings, all these objectives are not easy to come by, but any economy that aims towards development must strive hard to leave no stone unturned. Macroeconomic policy suggests that an economy, especially a free market economy is being managed to ensure stability and growth, however, if left unmanaged, a free market economy would be subject to business fluctuations that may even threaten the survival of the economy. This calls for government intervention in the management of the economy to limit the treat of such fluctuations. This

management includes the use of some policy measures, notably among them are fiscal and monetary policy.

Fiscal policy is the deliberate action of the government to manipulate items of expenditures, revenue and borrowings in order to achieve macroeconomic objectives (Idowu, 2009). It is a growing belief that sustained economic growth is possible only within a sound macroeconomic framework and in that framework; fiscal policy plays a crucial role (Fischer and Easterly, 2002). Monetary policy on the other hand includes the control of money supply and credit availability to influence the level of economic transactions. The monetarist argued that only money matters and as such monetary policy is more potent instrument than fiscal policy in economic stabilizer. Ojo (1992) asserts that an effective and efficient monetary policy is essential for growth and development.

The potency of these two economic policies has been argued extensively by their proponents (see Keynes, 1936 and Friedman, 1968). One way in which fiscal and monetary policy can be linked together is fiscal dominance. It describes the condition in which the monetary authority accommodates completely, all government debt (Sanusi and Akinlo, 2016). That is, it is the situation where monetary policy operates to facilitate fund for the government as against the objectives of price stability. Turner, (2011) is of the opinion that the potential impact of debt on inflation depends on the response of monetary policy. That is, high government debt could well constrain the ability of the Central bank to set the policy rate to control inflation. As pointed out by Ekpo, et al. (2015) that in some developing economy, budget deficits are mostly financed by printing more money and the monetization policy often results in inflation and leads to the dominance of fiscal policy over monetary policy. Theoretical literatures linking fiscal and monetary policy together can be found in the works of (Metzer 1951; Patinkin 1965; Friedman 1968; Sargent and Wallace 1981; Aiyagari and Gertler 1985; Bohn 1998)

The Nigerian debt profile has been on the rise from time immemorial, particularly from 1986, when government expenditure is expected to be limited with the proposed Structural Adjustment Programmed (SAP). In 1986, the total debt of the country stood at N69.89 billion, by 1996, it was recorded for a figure of N1.03 trillion. Also, N3.18trillion and N17.36 trillion was recorded for the periods of 2006 and 2016 respectively. This was accompanied by a perpetual increase in Money Supply (M2) even within the same periods. As at 1986, Money Supply was estimated

around N27.31 Billions, in 1996, the figure increased tremendously to about N370.33 Billions, N4.03 trillion and 23.73 trillion for 2006 and 2016 respectively. The Nigerian budget deficit has also been perpetually deficit within these periods with the exception of 1995 and 1996 where surplus of N1 billion and 32.05 billion Naira were recorded respectively (computed from CBN, 2016). A long period of large fiscal deficit and a very high public debt to GDP ratios raises the concern for fiscal dominance.

Studies related to fiscal deficit and the independence of central bank have been conducted in developed countries by scholars like, Hein (1981), King and Plosser (1985) and Ahking & Miller (1985) and in developing nations by, Dornbush & Fisher (1981), Buiters & Patel (1992), Dogas (1992). These studies have produced mixed results. Surprisingly, not much of this investigation has been empirically carried out in Nigeria, particularly investigating fiscal dominance and the conduct of monetary policy. It is against this backdrop that the study seeks to investigate fiscal dominance and monetary policy in Nigeria.

2.0 Theoretical Literature

2.1 The Keynesian Theory of Inflation and Money

J.M. Keynes in his book published in 1936 titled “the general theory of employment, interest and money” advocates government participation in economic activities to stimulate aggregate demand so as to improve the level of employment, output and income. According to Him, low aggregate demand is responsible for low income, high unemployment that characterizes economic downturn. He suggested that there are so many slacks in the economy and that government can help stimulate the economy without necessarily affecting price. As against the monetarist, the Keynesian argued that money does not play any active role in changing prices in an economy; He posits changes in prices are mainly caused by structural factors. Keynesian theory does not provide much insight into changes of the price level. They propose that money is transparent to real forces in the economy, and that visible inflation is the result of pressures in the economy expressing themselves in prices (Mishkin, 2000). As monetarists assert that the empirical study of monetary history shows that inflation has always been a monetary phenomenon, by contrast, Keynesians typically emphasize that the role of aggregate demand in the economy rather than the money supply in determining inflation.

2.2 The Monetarist Theory.

The Monetarists theory is mainly associated with Economist Nobel Prize winner Milton Friedman for his seminar work titled “A monetary history of the United states between 1867 to 1960” which he wrote with his friend Anna Schwartz in 1963. The monetarist holds that “only money matters” and as such monetary policy is more potent instrument than fiscal policy in economic stabilizer. According to the theory, money supply is the dominant although not exclusive determinant of both the level of output and price in the short run (short run monetary non-neutrality) and of the level of price in the long run (long run money neutrality). i.e. the level of output is not influenced by money supply (Mishkin, 2010). The modern quantity of money led by Milton Friedman holds that “inflation is always and everywhere a monetary phenomenon that arises from a more rapid expansion in quantity of money than in total output” (Mishkin, 2010). The major implication of the quantity theory of money as presented by Bernanke (2002) is that a given change in the rate of money growth induces an equal change in the inflation rate. He explained further that Friedman relies on the crucial assumption that the velocity of money or its growth rate is constant and money growth has no effect on real GDP growth at least at a sufficiently long horizon. This theory is supported by the report of David Ricardo that attributed inflation in Britain as solely the result of Bank of England irresponsible issue of money between 1772 and 1823. Totonchi (2011) reported that in general, the cause of inflation in developed countries is broadly identified as growth of money supply, whereas, in developing countries, inflation is not purely monetary phenomenon.

2.3 Budget Deficits and Inflation Theory.

Governments have responsibilities and thus need finance to fulfill their obligations. As extracted from Mishkin (2000), the government pays their bills exploring three major options – raise revenue by levying taxes or go into debt by issuing government bonds or create money and use it to pay its bills. The methods of financing government spending are described by an expression called government budget constraint, which states that government budget deficit which equals the excess of government spending over tax revenue must be equal to the sum of the change in the monetary base and the change in government bonds held by the public (Mishkin, 2000). It is algebraically expressed as;

Government Deficit = Government spending – Taxes = change in Monetary base + change in Government Bonds.

The government budget deficit reveals two important facts: If government deficit is financed by an increase in bond holdings by the public, there is no effect on monetary base and hence, on money supply. But if the deficit is not financed by increased bond holdings by public, the monetary base and the money supply increase (Mishkin, 2000). In summary, a deficit can be the source of a sustained inflation only if it is persistent rather than temporary and if the government finances it by creating money rather than by issuing bonds to the public (Mishkin, 2000).

2.4 Empirical Reviews

Sargent and Wallace (1981) made a significant contribution to modern macroeconomic theory by investigating the role of coordination between fiscal and monetary policies for price level determination. To achieve that, they explored the idea that the fiscal authority must stick to an inter-temporal budget constraint. That is, they establish that the value of government debt is equal to the present discounted value of future surpluses. One of the ways to produce surplus is by increasing seigniorage revenues, and for that reason fiscal deficits are related to monetary growth rate and to inflation rate. If the fiscal authority, by means of tax revenue, does not keep the inter-temporal budget at a balance, the monetary authority will likely be coerced to generate enough seigniorage to meet the inter-temporal budget constraint. In this situation, fiscal policy actions dominate monetary policy, leading to what Sargent and Wallace (1981) called fiscal dominance. Nachegea (2005) conducted a study on fiscal dominance and inflation in the Democratic Republic of Congo between 1981 and 2003, using multivariate cointegration analysis and vector error correction model. He reported a strong and statistically significant relationship between budget deficits and seigniorage, as well as between money supply and inflation. Similarly, Chaudhary and Ahmad (1995) report similar results while investigating money supply, deficit and inflation in Pakistan between 1973 and 1992. They assert that the execution of monetary policy may be determined by the Central Bank, but the overall formulation of policy is heavily dependent on the fiscal decisions made by the government. This is further corroborated by Metin (1998) and Koyuncu (2014) who conducted similar study in Turkey. Metin (1998) reported a strong and positive relationships between budget deficit and inflation between 1950 and 1987, while Koyuncu (2014) discovered a bi-directional causality between budget deficit and inflation.

Contrary to the above findings, Van (2014) investigated the effect of budget deficit, money growth and inflation in Vietnam between 1995 and 2012, using month data, and found that budget deficit growth has no impact on money growth and inflation. In the same vein, Oladipo and Akinbobola (2011) examined the linkage between budget deficit and inflation in Nigeria between 1959 and 2005, and discovered from empirical result that there was no causal relationship between inflation and budget deficit. Likewise, Sanusi and Akinlo (2015), adopted structural vector auto-regressive model to investigate fiscal dominance in Nigeria between 1986-2013, and reported that shocks to fiscal deficits of government does not stimulate response from growth of monetary base. Still on Nigeria, Bakare, et al (2014) found a contradicting result. They empirically investigated linkages between budget deficit, inflation and money supply in Nigeria and found inflation to be highly dependent on fiscal deficit in the country.

3.0 Data and Methodology

The study adopted secondary data from CBN statistical bulletine, 2017. The variables used in the model include broad Money Supply (M2) which measures the total volume of money in circulation plus demand deposite, savings and fixed deposite. Domestic Debt(DOMD) which measures the total borrowings of the government from within the national boundary, Budget Deficit (BDEF) is the excess of government total expenditure over total revenue within a fiscal year, while inflation(INF) measures the average price level in the country. The study covers the period of 1986Q1 to 2016Q4.

3.1 Vector Error Correction Model (VECM)

This study adopted vector error correction (VECM) estimation method to examine fiscal dominance and the conduct of monetary policy in Nigeria. This method is adopted because it is considered the best to capture the linear interdependencies among multiple time series. Consequent to the estimation of VECM, the study uses Augumented Dickey-Fuller (ADF) to test for the stationery property of the series.

3.2 The Model

Vector error correction mechanism (VECM), a variant of Vector autoregressive models (VARs) were popularised in econometrics by Sims (1980) as a natural generalisation of univariate autoregressive models. A VAR is a system regression model i.e. there is more than one dependent variable that can be considered a kind of hybrid between the univariate time series

models and the simultaneous equations models (Brooks, 2008). The VECM model is allowed for variables that are integrated at order one I(1) and are cointegrated. The simplest case is a bivariate VECM, where only two variables are involved, x_t and y_t , as demonstrated below;

$$\Delta y_t = \alpha_0 + \sum_{i=1}^k \alpha_{1i} \Delta y_{t-i} + \sum_{i=1}^k \alpha_{2i} \Delta x_{t-i} + \gamma_1 ECM_{t-1} + \varepsilon_{1t} \dots \dots \dots (1)$$

$$\Delta x_t = \beta_0 + \sum_{i=1}^k \beta_{1i} \Delta y_{t-i} + \sum_{i=1}^k \beta_{2i} \Delta x_{t-i} + \gamma_2 ECM_{t-1} + \varepsilon_{2t} \dots \dots \dots (2)$$

The baseline model is specified as shown below;

$$INF = F(M2, BDEF, DOMD) \dots \dots \dots (3)$$

4.0 Estimation and Interpretation of Result

4.1 Unit root test: This was conducted using Augmented Dickey Fuller (ADF) to test for the stationery property of the series. This is shown in the table below;

Table 1: Unit root test

Variables	Levels	first diff	order of intergration
BDEF	2.6675	-4.1461	I(1)
M2	1.8834	-3.9196	I(1)
DOMD	1.9215	-2.945	I(1)
INF	-1.8525	-4.3223	I(1)

Critical values; 1% = -4.309824*; 5% = -3.574244**; 10% = -3.221728***

This shows that the variables are all stationery at first difference but at different significant level.

* signifies significance at 1%, ** at 5% and *** at 10%.

4.2 Cointegration test: this is used to test for long-run relationships between the variables using Trace and Max-Eigen test statistics as shown below:

Table 2: Cointegration Test

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.2092	60.166	47.856	0.0023
At most 1 *	0.1464	31.750	29.797	0.0294
At most 2	0.0679	12.584	15.494	0.1309
At most 3 *	0.0331	4.0751	3.8414	0.0435
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.2092	28.415	27.584	0.0391
At most 1	0.1464	19.166	21.131	0.0921

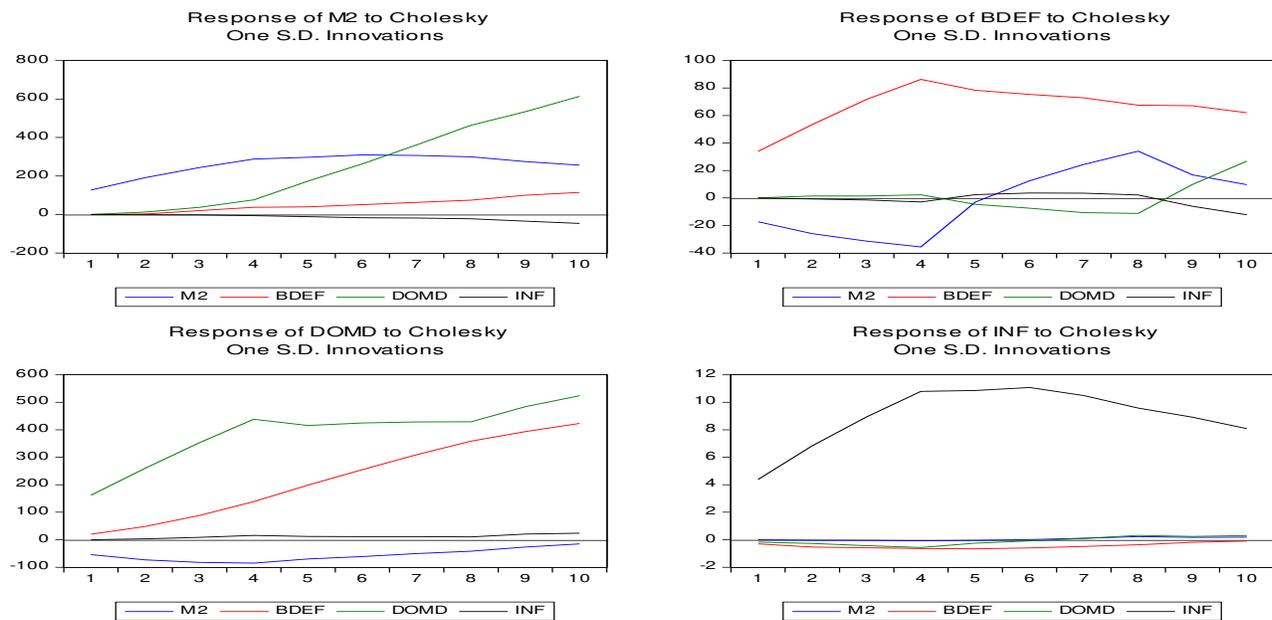
At most 2	0.0679	8.5096	14.264	0.3292
At most 3 *	0.0331	4.0751	3.8414	0.0435

*Denotes cointegrating vector. Both Trace and Max-Eigen statistic show that the variables are cointegrated and have long-run relationships.

4.3 Impulse Response

The VECM impulse response measures the responses of each variable to a one standard deviation in other variables within the model, including own shock. This is shown in figure below;

Figure 1: Impulse Response Graph



From figure 1 above, money supply responds positively to shocks in budget deficit and domestic debt, but only up to the fifth quarter. It reaches its peak at the fifth quarter, and thereafter becomes non-responsive. This shows that budget deficit and domestic debt influence money supply, but only in the short-run. Also, inflation responds positively to shocks in money supply, budget deficit, and domestic debt, up to the fourth quarter, and thereafter becomes non-responsive between the fourth and the seventh quarter, after which it began to decline. This shows money supply, budget deficit and domestic debt influence price level, but only for a short period.

4.4 Forecast Error Decomposition Variance

This shows how the variables in the model account for changes in each other. This is represented in table 3 below;

Table 3: Variance Decomposition

variables	quarters	M2	BDEF	DOMD	INF
M2	1	100	0	0	0
	4	95.51608	0.871195	3.593495	0.019227
	7	65.63838	1.378811	32.86969	0.113126
	10	37.82796	2.079335	59.84145	0.251258
BDEF	1	20.5843	79.4157	0	0
	4	16.26094	83.63547	0.047945	0.055639
	7	10.50971	88.8505	0.52817	0.111626
	10	10.32385	87.10957	2.131029	0.435554
DOMD	1	9.882878	1.327659	88.78946	0
	4	4.816673	6.412926	88.69877	0.071631
	7	2.766918	18.97938	78.19346	0.060237
	10	1.527828	29.20883	69.18662	0.076729
INF	1	0.000162	0.477623	0.159903	99.36231
	4	0.003541	0.428873	0.232535	99.33505
	7	0.003667	0.352163	0.112504	99.53167
	10	0.016135	0.275167	0.110739	99.59796

From Table 3 above, the variance decomposition shows that money supply (M2) responds completely to own shocks in the first quarter, but afterwards, this effect diminishes through time. In the 4th quarter, it accounts for 95%, 65% in the 7th quarter and 37% in the 10th quarter. The decline in own shocks over time, shows that other variables in the model are endogenous to money supply. Domestic debt tends to account more for variation in money supply than other variables in the model. It accounted for 3.6% variation in the 4th quarter, 32.9% variation in the 7th quarter and 59.8% variation in the 10th quarter. Budget deficit exerts a rather marginal influence on money supply. It influences changes in money supply by 0.9% in the first quarter, 1.4% in the seventh quarter, and 2.1% in the 10th quarter. Inflation accounts for a rather insignificant variation in money supply throughout the period. Their show that changes in money supply is influenced by less than 1% of inflation.

Also, Table 3 above shows that money supply exerts a significant influence on budget deficit throughout the period. Although, it has more influence in the short-run than in the long-run. Money supply exerts 20.6% influence on changes in budget deficit in the first quarter, 16.2% in the 4th quarter, 10.5% in the 7th quarter and 10.3% in the 10th quarter. The effect of own shocks increase over the period, except for the 10th quarter. This show the variables in the model are exogenous to budget deficit (BDEF) and cannot fully account for changes BDEF. The effect of domestic debt and inflation is rather marginal, accounting for less than 1% variations in all quarters, except for domestic debt that accounts for 2.1% in the 10th quarter.

Furthermore, the result in Table 3 shows that effect of own shock on domestic debt decline over the periods (88.8% in the first quarter, 88.6%, 78.2% and 69.2% in the 4th, 7th and 10th quarters respectively. This indicates that the variables in the model are endogenous to domestic debt. Money supply explains more variation in domestic debt in the short-run, than in the long-run. It contributes 9.9% to variation in domestic debt in the 1th quarter, 4.8% in the 4th quarter, 2.8% and 1.5% variation in the 7th and 10th quarters respectively. On the other hand, Budget deficit explains more significant variation in domestic debt in the long-run than in the short-run. It shows that 1.3% variation in domestic debt is accounted for by budget deficit in the first quarter, 6.4% in the 4th quarter, 19% in the 7th quarter and 29% in the 10th quarter.

In addition, the variance decomposition table shows that money supply, inflation explains an insignificant variation in inflation. They account for less than 1% variation in inflation throughout the period of investigation. Also, the influence of own shocks shows that the variables in the model are exogenous to inflation.

5.0 Conclusion and Recommendation

The study empirically examined whether there is fiscal dominance in Nigeria in the presence of persistent fiscal deficit and growing price level in the country. Adopting, VECM, a variant of VAR to investigate the responses of inflation to shocks in money supply, budget deficit and domestic debt; it was found that although, money supply responds positively to shocks in budget deficit and domestic debt, it has an insignificant effect on the average price level. The forecast error decomposition variance shows that money supply, budget deficit and domestic debt explains an insignificant variation in inflation, even though budget deficit and domestic debt accounts for a significant variation in money supply. This scenario is perfectly explain as presented by Mishkin (2004) who posits that if government deficit is financed by an increase in

bond holdings by the public, there is no effect on monetary base and hence, on money supply. But if the deficit is not financed by increased bond holdings by public, the monetary base and the money supply increase. In the light of these results, it is safe to conclude that there is no evidence of fiscal dominance in Nigeria, even in the midst of persistent budget deficit and increase in money supply. This result corroborates the findings of Sanusi and Akinlo (2016) who investigated fiscal dominance in Nigeria between 1986 and 2003. It is recommended that the government should ensure fiscal discipline amidst increasing budget deficit and the Central Bank should be given autonomy to pursue the objectives of price stability, rather than financing government fiscal operation.

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