DYNAMICS OF FISCAL AND MONETARY POLICIES IN NIGERIA: AN ECONOMETRIC APPROACH

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Abstract

The paper examined the dynamics of monetary and fiscal policy using econometric approach. Money supply and federal government capital expenditure were used to mirror monetary and fiscal policy respectively. The Augmented Dickey Fuller (ADF) unit root test showed that both money supply and capital expenditure were I(1) while gross domestic product was I(0). With this, Autoregressive Distributed Lag (ARDL) Model was considered. The findings revealed that monetary and fiscal policy produce a co integrating regression with money supply and federal government capital expenditure explaining about 99 percent variation in economic growth. However, the transmission of fiscal and monetary policy mechanism from short run to long run economic growth was weak, it stood around 2 percent. The paper recommended emphasizes on monetary measures to enhance economic growth in Nigeria. It equally suggests application of more fiscal discipline on the part of the authority.

Keywords: Dynamics, Capital Expenditure, Autoregressive, Model, Cointegration.

Introduction

The term dynamics refers to the type of analysis in which the object is either to trace and study the specific time path of the variables or to determine whether, given specific time the variables will tends to converge to certain (equilibrium) values (Chiang, 2005).The two main instruments used in achieving macroeconomic objective are the monetary and fiscal policy. Monetary policy is a major economic stabilization weapon which involves measures design to regulate and control the volume, cost and availability and direction of money and credit in an economy to achieve some specified macroeconomic policy objective (Anyanwu, 1990). On the other hand, fiscal policy is the use of taxation and expenditure to control the economy of a country. It is the government plan of action concerning the raising of revenue through taxation and other means and deciding the pattern of expenditure to be applied. The current discuss on this subject emphasizes expectation as determinant of fiscal and monetary dynamics (Tilman and Magdalena, 2017). Others insist that large public spending is the main cause of fiscal dynamics (Niccolo et al, 2019). Deficit financing and the mounting public debt is seen as a negative monetary- fiscal policy dynamics (Kuncoro et al, 2013). This can be seen in the current unbridled inflationary rise in prices. Two pertinent issue must be noted here. Firstly, government unchecked borrowing can be a serious financial burden to future generation if not properly annexed to productive

investment. Secondly, expansionary monetary policy without prudency on the part of monetary authority produces hyper-inflation, a concept that is inimical to growth and development. A research conducted by Okeowo (2019) on modelling inequality adjustment in west Africa sub region for sustainable development also finds out that dynamics of monetary and fiscal policy gains, including the continuous mounting public debt does not reflect in favourable adjustment of inequality gap in Nigeria, as the modelled result shows low inequality adjustment in Nigeria. Hence that work shows that poverty is perpetuated with the current dynamics. Abata et al (2012) assessed how fiscal and monetary policies influence economic growth and development in Nigeria. They suggested that for any meaningful progress towards fiscal prudence on the part of government to occur, some powerful pro-stability stakeholder, strong enough to challenge government fiscal recklessness will need to emerge. Bodunrin (2016) explore fiscal, monetary and economic growth with a view to determine which of fiscal or monetary policy has been effective in economic growth without looking at their long run relationship, a cardinal determinant and variable often considered in econometric ventures. However, worthy of note is the fact that Bodunrin finding reveal that the degree to which fiscal policy distract real Gross Domestic Product (GDP) is faced out after one year in the short run. Similarly, the article submitted that monetary policy has no significant impact on real GDP. Again, introduction of capital and recurrent expenditure into the model have tendency of spreading the effect of the dependent variable in line with parsimonious principle. If the theory of parsimonious principle is relaxed the finding revealed that capital expenditure has significant impact on GDP while recurrent expenditure is insignificant. This result is not unexpected as capital expenditure increase government investment with its attendance positive effect on economic growth. Channeling resources to where they are mostly needed as suggested by Bodunrin is only possible if economic agents know the impact of their long run economic actions. In a verge to determine Nigeria growth process Gideon (2015) only analyse the monetary policy variables. The author sees monetary policy as an important element of macroeconomics management and opined that it effectiveness is key to overall economic growth. Non-monetised rural sector, large quaintly of money outside the banking sector, under developed money and capital market, proliferation of illegal financial houses and poor banking habits in the economy where recognise as the main impediments to the effectiveness of monetary policy in propelling growth. All the above listed variables by Gideon exclude fiscal tools. Emphasizing monetary and fiscal tools which is completely absent in the above article is stating the obvious. As a matter of principle, analysing the effectiveness of macroeconomic tools without the fiscal counterpart cannot produce the desired results. Although, Yakubu et al (2013) analysed the effectiveness of monetary-fiscal policies interactions, the article did not analyse these effectiveness in relation to the dynamics of fiscal and monetary policies. Rather, it was analysed in relation to price and output growth. The research opined that monetary and fiscal variables have dominating effect on economic activities and consequently, economic activities is dominated by its own dynamics in most of the period.

Statement of the Problem, Research Questions and Objectives

Most of the Nigeria macro-economic time series data are not stationary. Since economic policies and prediction are based on this data set, there is need for more empirical work on this data set for proper and effective economic policies. The analysis is based on the following research questions.

1. Do monetary policy and fiscal policy have long run relationship?

2. Does monetary policy have greater influences on Nigerian economy than fiscal policy?

The objectives of the paper were to:

1. Analyse monetary policy and fiscal policy long run relationship.
2. Show the impact of monetary policy and fiscal policy on Nigeria economy

Conceptual and Theoretical Literature

Monetary policy is the use of money and credit in other to achieve certain objective. It refers to the credit control measures adopted by the central bank of the country (Jhingan, 2010). Anyanwu (1990) lists five major objectives of monetary policy. It include: maintenance of relative stability on domestic prices, attainment of a high rate of, or full, employment, achievement of a high, rapid and sustainable economic growth, maintenance of balance of payment equilibrium and exchange rate stability.

What it means is that, monetary policy major task is to achieve the above stated objectives. However, there are conflicts in the attainment of these objectives. Economists have identified two major conflicts. They are necessary conflict and policy conflict. Necessary conflict occurs when the objectives are naturally incompatible. A good example is the 'Philip trade off' of inflation and unemployment. Policy conflict occurs when two goals/objectives cannot be achieved at the same time. For example, the major way of achieving economic growth is through expansionary monetary policy. In a chain reaction, an expansionary monetary policy has within its ambit, a reduction in interest rate; and what is the general effect of this? Higher inflation rate is the result of such action.

Two main instruments are recognized in economic literature; they are quantitative and qualitative instrument. The qualitative could be traditional or nontraditional. The qualitative traditional weapons rely heavily on market forces (demand and supply) in other to influence the volume of credit in the economy. It includes the bank rates, also known as discount rate, cash reserve or cash ratio or what is called reserve requirement and Open Market Operation (OMO).

Classical Monetary Theory: Say's Law, Waras' law and the quantity theory of money provide a common thread running through the thoughts of classical writers as proposed by Anyanwu. Say's law states that supply creates its own demand. According to Say, general over production is impossible. No one will want to make a product useless he wants to exchange it for some other product which he wants. Therefore, the very act of supply goods means there is a demand for them. In this circumstance, over production is impossible since supply of goods will not exceed demand. However, a particular product can be produced in excess as a result of incorrect estimation of the product that others want. But this is a temporary phenomenon, for the excess production of a particular product can be corrected in time by reducing its production as opined by Jhingan. Waras' law stipulates that excess demand for money balances and aggregate money value of excess demands are zero. It implies that excess demand equal zero.
Within the ambit of the above two theorists is the quantity theory of money. The study of the value of money in connection with the quantity of money and the price level generate the quantity theory of money. It talks about the relationship between the quantity of money in circulation in an economy and the general price level. Quantity theory of money states clearly that an increase in the quantity of money in circulation would bring about a proportionate rise in the prices of goods and services. The transactions formulation or the equation of exchange and

the cash balances formulation and the Cambridge equation were used by the quantity theorist to explain the general price level.

The equation of exchange is credited to an American Economist, Professor Irving Fisher. The number of times money changes hand over a period of time is what fisher called the velocity of circulation of money or what could be referred to as the dynamics of circulation of money in classical sense.

Keynes Theory of Money: Keynes debunks the constant income velocity. Keynes discarded the old view that the relationship between the quantity of money and prices is direct and proportional. Instead, he establishes an indirect and non-proportional relationship between quantity of money and prices. Other monetary theories include: Baumol'sinventory model of cash management, Tobin's theory of liquidity preference, Tsiang'sinventory theoretical model.

Empirical Literature

David and Fernando (2018) concluded that optimal monetary policy follows a generalized Friedman rule that eliminates the liquidity premium on scarce treasury debt. Operational performance of fiscal and monetary policies in Nigeria financial institution, a research carried out by Enahoro et al (2013) concluded that until the fiscal and recklessness of government is checked, the use of fiscal and monetary policy to achieve macroeconomics stability and financial discipline will remain an illusion. Enahoro study shows that the best way to address the issue of extreme macroeconomics importance in the economy is to take a two-tiered policy approach that combines elements of both fiscal and monetary policy. In terms of monetary policy, Enahoro opined that the federal government through the apex bank should cut interest rate.

Cynthia and Itode (2018) examined fiscal policy and macroeconomic performance in Nigeria using ARDL, Engle-Granger co-integration and error correction modeling techniques were used in order to determine fiscal policy dynamics. Based on the bound test, it was established that a long run relationship exist between fiscal policy and macroeconomic performance in Nigeria. Cynthia and Itoda further suggested fiscal discipline, accountability and transparency as tools that foster macroeconomic stability. In addition, policy mix, prudent public spending, diversification of the nation economic base and setting of achievable fiscal and monetary policy target must be the goal of governance according to Cynthia and Itode.

Attahir (2016) analysed a linkage between unemployment and output using fiscal policy dynamics theory in the context of Keynesian principles framework. Accepting the above predictions implies that the existence of involuntary unemployment in capitalist economies proves that underemployment equilibrium is a normal situation and full employment equilibrium is abnormal and accidental. The empirical work conducted by Attahir used Structural Vector Autoregression (SVAR) methodology. The finding revealed that public expenditure has positive and long run effect on output. It implies that as expenditure increases, output increases which are in line with economic theory. Similarly, revenue shock and unemployment was found to be inversely related; implying that government revenue volatility increases unemployment. Government at various levels will be unwilling to inject fund into the economy because of revenue uncertainty. This indirectly will lead to credit squeeze in the economy with its attendance effect of reduction in investment. It was suggested that the revenue base of the government should be expanded through diversification and effective tax system in order to increase output and reduce unemployment. Anthony et al (2015) investigated fiscal policy

variables and economic growth. The fiscal policy variables used include: capital expenditure, recurrent expenditure and direct income tax. Using growth accounting framework, the study specified fiscal policy variables as a determinant of economic growth. Applying the Augmented Dickey Fuller test, it was discovered that all the variables are I(1). Long run stable relationship was also established between economic growth and the independent variables. Direct income tax, a fiscal policy tool, was inversely related and statistically significant in determining economic growth in the long run. As capital expenditure increased by 1%, income increased by 3.94%. Similarly, as recurrent expenditure increased by 1%, income increased by 3.22%. On the contrary, the study revealed that as direct income tax increased by 1%, national output fell by 6.83%. The paper concluded by recommending a fiscal policy framework with appropriate tax regime that will instigate economic growth instead of retarding growth process. The study equally recommended increasing the capital expenditure since it instigates growth more than the increase in recurrent expenditure.

Anowor and Okorie (2016) reassessed the implications of monetary policy dynamics, in relation to monetary policy instrument in Nigeria. In practical terms, instrument or tools of monetary policy could be quantitative or qualitative. The quantitative traditional tools include: Open Market Operations, discount rate policy and reserve requirement. Within the ambit of reserve requirement or required reserve ratio is the statutory cash reserve ratio. Anowor and Okorie assessed the statutory cash reserve ratio in order to look at its unilateral impact on economic growth. The study revealed that 1% increase in statutory cash reserve ratio increase economic growth by 7%. However, there is a point of caution in that study. The study used error correction model without conducting the appropriate second order econometrics test. Economic literatures constantly warn that estimating time series data without conducting appropriate second order econometrics test could produce spurious result. Similarly, if two variables co-integrate, there exists an error correction model that tied the short run to its long run equilibrium value. ARDL could be a good econometrics tool in dealing with co-integration variables before estimating the short run error correction adjustment model.

Oriavwote et al (2015) considered three variables that fall within the jurisdiction of fiscal policy dynamics. The variables include: petroleum profit tax, government expenditure and external debts. The study indicated that these three variables had positive and significant impact on the level of economic growth. It was recommended that a well-managed fiscal policy has a tendency of increasing growth. Miftahu and Rosni (2017) quarry the contradiction of continuous increase in government expenditure without the multiplier effect on revenue as postulated by economic theory. The study submitted that lack of synergy between theory and empiricism has led to inflationary pressure within the market economy. The research introduced monetary dynamics from the angle of inflationary pressure, insisting that such pressure has been the obstacle to the desired growth process. The study recommended a reduction in deficit budget and broadening the revenue base of the country through increase in non-oil revenue. Marry (2016) investigated the extent to which fiscal policy can be an instrument of controlling inflation in Nigeria. The Johansson co-integration test result showed that inflation rate in Nigeria is not exogenous and therefore the variable only responds to policy shocks.

Methodology

The analysis is based on time series data for Nigerian economy for the period 1981 – 2018. The data has been collected from Central Bank of Nigeria (CBN) 'Data Base'. To analyze the

dynamics of monetary and fiscal policy using an econometric approach, Autoregressive Distributed Lag (ARDL) Model is considered. GDP is the dependent variable while money supply and federal government capital expenditure act as an indicator for monetary policy and fiscal policy respectively. The first step that is done is to determine the order of integration of the variables, that is, stationary test is conducted. Augmented Dickey – Fuller (ADF) test is used to carry out unit root test.

The calculated values of these statistics test are compared with their critical values. Consideration is given to the properties of the series used in the equations. If a time series is stationery, its means, variance, and auto covariance (at various lags) remain the same no matter at what point we measure them; that is, they are time invariant (Damdar, 2005). Such time series is integration of order zero denoted as I(0). If two time series data are I(1) and their linear combination produce I(0), then the concerned variables, are said to be co-integrated. If the variables are I(1), but not co-integrated, Ordinary Least Square (OLS) will give spurious result. Researchers are constantly advised especially in advanced study, involving macro time series data to test for unit roots and co-integration before a structural relationship is estimated and reported for police analysis.

Augmented ARDL model can be presented in the functional form:

$$Dy_t = c_0 + c_1 t + \lambda_{yx} z_{t-1} + \sum_{i=1}^{p-1} \gamma_i Dy_{t-i} + \sum_{i=0}^{p-1} \gamma_i Dx_{t-i} + \delta_t w_t + u_t \qquad t = 1,\ldots,n$$

where, $y_t$is the dependent variable, c_0 is the constant term, x_{it} are the independent variables, L is lag operator, and w_t is the vector of deterministic variables including intercept terms, time trends and other exogenous variables with fixed lags (Do Thi & Zhang, 2016). The operational form is given in the model below.

$DLn(GDP) = \alpha + \beta_1 D(InCEXP)_{t-i} + \beta_1 D(InM2)_{t-i} + DLn(GDP)_{t-i}$

Where

GDP= Gross domestic product

M2 = Money Supply

CEXP = Government Capital Expenditure

Co-integration will be established between the variables if they have long run relationship. Except we check that the time series does not contain unit root, the traditional regression methodology could produce an inconsistence policy result. The valuables contribution of the concepts of unit roots which test for the order of integration is to force economic analysts to find out if the regression residuals are stationary for consistency policy formulation. Econometrician has a general statement on this; they unanimously agreed that, a test for co-integration can be thought of as a pre-test to avoid 'spurious regression' situation.

In co-integration theory, if two variables co-integrate, it means there is a long run or equilibrium relationship between the two. In the short run, there may be disequilibrium. One can treat the error term as the short term equilibrium error. Error correction mechanism (ECM) can be used to tie the short term behavior with the long run value. Granger representation theorem according to Gujarati state that if two variable X and Y are co-integrated, then the relationship between the two can be expressed as ECM. The ECM model is specified below.

$\Omega\ GDP = \mu_0 + \mu_1 \Omega M2t + \mu_2 U_{t-1} + CEXP_t$

$GDP = \lambda_0 + \lambda_1 CEXPt + \lambda_2 \Omega V_{t-1} + E_i$

Where Ω denotes the first difference operator, E_t and E_i are random error term and U_{t-1} and V_{t-1} = (GDP_{t-1}-□□□□$_z M2_{t-1}$) and ($GDP_{t-1} - a_1 - a_z CEXP_{t-1}$) respectively. That is the one-period lagged value of the error from the co-integrating regression. The ECM depicts the extent of disequilibrium. It enables us to induce flexibility by combining the short-run and long-run dynamics in a unified system and the estimates of the parameters are consistent and efficient.

Analysis of Result

The results of the Augmented Dickey Fuller (ADF) of unit root test are presented below:

Table 1: Unit Root Test Result

Levels				**Fist Difference**		
Variables	ADF Test Statistic	**5 percent Critical Value**	**Remarks**	**ADF Test Statistic**	**5 percent Critical Value**	**Remarks**
GDP	3.574918	-2.967767	I (0)	3.060315	-2.971853	I (0)
CEXP	0.737695	-2.971853	I (1)	3.078437	-2.976263	I (0)
M2	2.900101	-2.971853	I (1)	2.707782	-2.97626	I (1)

This result in **Table 1** indicates that Gross domestic product is stationary at levels. Federal government capital expenditure and money supply contain unit roots. However, Federal government capital expenditure is first difference stationary.

Table 2: ARDL Bounds Test

F-Statistic	42.99647
Upper bounds	4.85
Lower bounds	3.79

Result extracted from E-views 9 output

Table 3: ARDL Cointegrating And Long Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)	-0.020792	0.539142	-0.038565	0.9696

The F statistics is greater than the lower and upper bound as shown in **Table 2**, indicating that the variables captured in this study have a long run relationship. A unique feature demonstrated by the ARDL model is that the dynamic error correction model can be known following a simple linear transformation process where the error correction model integrates short run dynamics with long run equilibrium without losing long run information. Short run deviation is corrected for by 2 percent **Table 3**.

Table 4: Short-Run Error Correction Adjustment Model

Variables	Coefficients	Std. Error	T-ratio	Prob.
CEXP(-1)	0.181252	0.041057	4.414656	0.0002
D(CEXP(-1))	-0.288911	0.031524	-9.164872	0.0000
M2(-1))	3.457079	1.135250	3.045215	0.0062
D(M2(-1))	4.719263	1.272030	3.710026	0.0013

Result extracted from E-views 9 output

Table 4 is the short run version of the ARDL model which shows the dynamic relationship among capital expenditure, money supply and Gross domestic product in the short run. The variation in the dependent variable is explained by the dynamics in fiscal and monetary policy as captured by capital expenditure and money supply respectively with 0.99 R-Squared. 'One lagged' that is previous year capital expenditure is positive and significant, implying that previous capital expenditure has positive effect on economic growth. One lagged money supply has positive and significant effect on economic growth. The difference of previous year capital expenditure is negative and significant while the difference of previous year money supply is positive and significant. This is in line with expansionary monetary theory that suggests that increase in money supply may instigate economic growth.

Conclusion

The transmission of fiscal and monetary policy mechanism from short run to long run economic growth is weak, it stood around 2 percent. Empirically, this equally shows weak macroeconomic fundamentals. However, the model produces a co-integrating regression with money supply and federal government capital expenditure explaining about 99 percent variation in economic growth. This paper recommends effective policy measure that enhance better fiscal policy implementation with fiscal discipline on the part of the authorities in Nigeria that will in the short and long run contribute to growth with more robust and viable monetary policy measures. Similarly, a historic analysis of fiscal and monetary policy in Nigeria within (1981-2018) suggest that monetary conditions might have been more accommodative and growth in Nigeria might have been higher and less volatile than what was observed in the past, had Nigeria followed prescriptions based on a rule consistence with monetary stability. The paper recommended emphasizes on policy mix to enhance economic growth in Nigeria.

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