ARE MONETARY AUTHORITIES' ACTIONS (MONEY SUPPLY) FACTORED INTO NIGERIA'S GOVERNMENT REVENUE STREAMS?

UDEGBULE, C. STANLEY, PhD
DEPARTMENT OF ECONOMICS, TOPFAITH UNIVERSITY, AKWA IBOM STATE, s.chima@topfaith.edu.ng

ESTHER ESERA, PhD
DEPARTMENT OF ECONOMICS, TOPFAITH UNIVERSITY, AKWA IBOM STATE, estheresera@gmail.com

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ABSTRACT
Conducting a study on the long-run relationship between money supply and government revenue is crucial for informing monetary-fiscal policy decisions in Nigeria as a developing country. This study analyses the dynamic interaction between money supply (using broad M2) and government revenue, using an autoregressive distributive lag (ARDL) bounds test approach from 1980 to 2020. Results from the analyses show the existence of a long-run correlation between supply and government revenue, when money supply was made the explanatory variable. Using government revenue as the independent variable, there was no evidence of long-run relationship in the analyses. By implication, change in government revenue in the previous years have significantly affected money supply as an economic indicator in the Nigerian economy. In addition, the estimated coefficient of revenue indicates a positive and significant impact on money supply within the period of this study. Specifically, a one percent (1%) increases in revenue caused an approximately 0.96% increase in money supply at the long-run. The result equally revealed that, the signs of the short-run dynamic impact of the variable are significant. The ECM is estimated as 0.17% and -o.28%, which implies that government revenue and money supply have significant short-run effect on the Nigerian economy, as against some of the findings of the literature reviewed. The study recommends that, since the oil sector seems to be generating more revenue to stimulate productivity and encourage other sectors, policy makers should introduce measures to effectively monitor and regulate oil production to ensure transparency and accountability.

1.0 Introduction

One major economic policy priority of third world countries like Nigeria is to ensure general price stability, balance of payments equilibrium and sustainable growth in her gross domestic product (GDP). However, for these goals to be achieved, certain policy instruments are required. These instruments are monetary policy and fiscal policy. Both instruments are macro-economic targets monetary authorities employed in regulating the economy to achieve the above policies in a country. According to Omitogun and Ayinla (2007), a consensus exists in literature that an adequate and effective macro-economic policy is vital to a successful development process that aims at achieving high employment, price stability and balance of payments equilibrium. This suggests that the important roles of monetary growth and fiscal policy in stimulating both economic growth and development in a country cannot be accentuated.

The primary objective of monetary policy (money supply) is to manage inflation or unemployment and maintains exchange rates stability in a country, while fiscal policy (tax & revenue) aims at regulating the realization of revenue through tax and other means, and how such revenues are been spent in a country to achieve the basic macro- economic goals more precisely, both policies seek to achieve relative macro-economic stability in a country.

The central Bank of Nigeria (CBN) adopts monetary targeting policy frame work to maintain price stability. This is based on the believe that inflation is majorly a monetary phenomenon. The CBN utilizes a mix of market determined (also known as indirect) instruments to achieve its monetary objectives, using broad money supply (M_2) as its intermediate target, and monetary base as the operating target. These instruments are open market operation (OMO), liquidity ratio, reserve ratio, discount window and the Nigerian Treasury Bills (NTBs) (IMF country Report, 2020).

At a ten-year interval, except in 1970, government expenditure in Nigeria exceeded its revenues. For instance, 1980, government budget was about N 41.36b. In 1990, it rose to N61.149b, in the year 2000, it was N66.7b, and in 2010, it jumped to N3.93trillion, but skyrocketed to N10.8 trillion and N21.83trillion in the 2020 and 2023, respectively, (NBS, 2023). This deficit could be as a result of the federal government's claim in pursuing rapid economic development programmers as contained in various developments plans in Nigeria. Statistical evidences and economic indices show that government budget deficits over the years have not contributed meaningfully on the Nigerian economy. This is because fiscal deficit reduces aggregate savings, investment, national income and the gross domestic product, which distorts economic growth and development. Thus, the main objective of this study is to ascertain if money supply is part of government revenue, giving the fact that, over the years, the country has not recorded surplus budget except in 1970 as recorded by the National Bureau of Statistics (NBS) (2023).

In addition, over the years, the relationship between monetary policy and fiscal policy has been a debate producing divergence results. While the monetarist led by Milton Friedman believe in fighting inflation by adjusting the amount of money in circulation, the keynesians focus on government spending to regulate the economy. Although, the keynesians acknowledged some value in monetarism's effect on GDP, but feel that monetary adjustment take too long to be felt (www. investopedia.com, 2024). A balanced relationship between money supply and government revenues would help policy makers to ascertain any source of imbalance in the Nigeria economy. In addition, the question is, should government reduce expenditures to stimulate economic growth through increase in tax, or reduce interest rates to stimulate expansionary money supply? Thus, the diverse opinions in literature regarding the efficacy of monetary policy in stimulating economic growth in Nigeria lives is a gap that needs to be filled, and which this study has done justice to.

2.0 Literature Review

Conceptual Clarification

Monetary Policy: This is a policy action taken by the apex bank of a country to control money supply, interest rate and inflation, to promote economic growth and development, and to ensure general stability in the economy. It uses certain tools to like; interest rate, open market operation, reserve requirement, quantitative easing, forward guidance, etc, to achieve its objectives. For instance, the Central Bank of Nigeria can use any of the above tools to achieve

expansionary or contractionary monetary policy in the economy, depending on its goal at the moment. Monetary policy has some targets like; inflation targeting, monetary aggregate targeting and Taylor rule.

Fiscal Policy: It involves the use of government spending and taxation to influence the overall level of economic activities in a country. It promotes economic growth and reduces unemployment, and it uses taxation, government spending and transfer payments to achieve macroeconomic goals in a country.

Theoretical Framework

The Monetarist Theory of Money Supply: This theory was developed by Milton Friedman, and it emphasis on the role of money in determining economic activities in a country. It believes that money supply is the primary driver of economic activities in a country. It questions the effectiveness of fiscal policy in determining economic activities in a country.

Keynesian Theory of Monetary Supply: This theory was developed by John Maynard Keynes, and it emphasis the role of money in an economy, especially during times of economic recession. It believes that money supply is endogenously supplied, and money supply is driven by liquidity preference. Importantly, it argues that money supply is insensitive to interest rate. It promotes government spending as a more efficacy tool in economic growth than the Monetarist side of money supply

Empirical Literature

Adenikinju and Olofin (2000) examined the rate of economic policy in the growth of manufacturing sectors among some African countries, using panel date spanning between 1976 to 1993. The study revealed that, government policies on foreign direct investment contributes significantly on manufacturing industries growth in Africa. Elijah, (2011) Investigated the correlation between public expenditure, private investment and agricultural output growth in Nigeria over a period of 1970 to 2008. The study employed bonds test and Autoregressive distribution lag (ARDL) modeling approach to analyze both the long run and short run impacts of public expenditure an agricultural output in Nigeria. The result of the E.C.M shows that increase in public expenditure has a positive relationship on the growth of agricultural output in Nigeria. The study recommended that policy makers should combine both the private and public investment in increasing agricultural productivity.

Folawewo and Osinubi (2006) investigated role of monetary policy in controlling inflation rate and exchange stability. The study was based on a rational expectation framework that incorporates the fiscal role of exchange rate. Quarterly data spanning over 1980 to 2010 was utilised. Results from the study indicated that the effects of monetary policy in enhancing the finance of government fiscal deficit affect both the rate of inflation and exchange rates resulting to volatility in their rates.

Olubusoya and Oyaromade (2008) investigated the reason for fluctuations in inflation rates in Nigeria between 2000 and 2007, using the ECM. The study showed that lagged consumer price index among other variables cause the dynamics of inflationary rate in Nigeria. The result indicated that output was insignificant but the lagged value of money supply was found to be negative and significant. In a similar study, Mohammad and Amirali (2010) did a study on the relationship between money supply and government revenues. The ARDL approach to co-integration was utilized and the result indicated that money supply and exchange rate risk have a significant effect on government revenue.

Udegbule C. Stanley (2023) examined the impact on monetary policy on the performance of deposit money banks in Nigeria between 1980 to 2020, using the ARDL model to ascertain the long-run relationship between money supply and some selected variables. Results of the study revealed a positive relationship between monetary policy rate and profit after tax, while money supply and non-performing loans indicated negative relationship. The study recommended that monetary policy authorities should review the monetary policy rate to a single digit, which is expected to accelerate savings and aggregate investment/national income.

Bohdalova (2018) Investigated money supply and government revenues between 1980 to 2017, using transition probability matrices and computed Markov chain models. The study found interesting implication for credit rating models when it considered macroeconomic performance as represented by the output gap. Findings from the study that credit situation

does not become stronger throughout years of the positive output gap, and vice versa. It recommends that government should increase money supply, but in doing so, attention should be paid on the trend of non-performing loans.

Syed et al (2010) Analysed the relationship between monetary policy and fiscal policy on the Nigerian economy. The study employed the ARDL approach to co-integration. Results from the analysis indicated a positive correlation between fiscal and monetary policy and significant on the economy. Monetary policy coefficient was greater than fiscal policy coefficient, which implies that monetary policy is more viable and concerned with economic growth than fiscal policy.

3.0 Methodology

This study made use of time series data spanning from 1990 to 2022. Variables for the study and government revenues and broad money supply (M2) secondarily obtained from the Central Bank of Nigeria (CBN) statistical bulletins, 2023.

3.1 Model Specification

MSP= F(REV)----------(1)

REV= F(MSP)----------(2)

The above model implies that, the correlation between total revenue money supply can run in vice versa, the Autoregressive Distribution Lag model shows the long run relationship and interactions between government revenue and money supply using ARDL co-integration test (also known as the bond test).

$$\Delta LMSP = \alpha_0+\beta_1 LMSP_{t-1}+\beta_2 LREV_{t-1}+\sum_{i-1}^{K}\delta i\Delta LMSP_{t-1}+\sum_{l-1}^{K}\delta_2\Delta LREV_{t-1}+\varepsilon_t \ldots\ldots 3$$

$$\Delta LREV = \Theta_0+\lambda_1 LREV_{t-1}+\lambda_2 LMSP_{t-1}+\sum_{i-1}^{K}\phi i\Delta LREV_{t-1}+\sum_{l-1}^{K}\phi_2\Delta LMSP_{t-1}+U_t \ldots 4$$

Where LMSP = Log of Money Supply

LREV = Log of Total Government Revenue

K = Lag length of the unrestricted error correction model

Δ = First difference operator

ε and U = White noise

equations (3) and (4) of the short-run and the long-run relationship were estimated as:

$$LMSP = \alpha_0+\beta_1 LMSP_{t-1}+\beta_2 LREV_{t-1}+\varepsilon_t \ldots\ldots\ldots 5$$

$$LREV = \Theta_0+\lambda_1 LREV_{t-1}+\lambda_2 LMSP_{t-1}+U_t \ldots\ldots\ldots 6$$

From the above, it will be difficult to restore equilibrium immediately because of the speed of adjustment and thus could be caused by the lags and adjustment process used to capture the dynamism in any of the factors influencing government revenue and money supply. This is why the ECM was used to capture the speed of adjustment. Thus, the model is expressed as;

$$\Delta LMSP = \alpha_0+\sum_{i-1}^{K}\delta i\Delta LMSP_{t-1}+\sum_{l-1}^{K}\delta_2\Delta LREV_{t-1}+\delta_3\varepsilon ct_{t-1}+\varepsilon_t \ldots\ldots 7$$

$$\Delta LREV = \Theta_0+\sum_{i-1}^{K}\phi i\Delta REV_{t-1}+\sum_{l-1}^{K}\phi_2\Delta LMSP_{t-1}+\emptyset_3\varepsilon ct_{t-1}\ U_t \ldots 8$$

Where: εct_{t-1} = Error Correction term lagged for a period

δ and ϕ = Coefficient for measuring speed of adjustment in eqns 7 and 8

4.0 Results

Table 1: DF=GLS and Ng-Perron Unit Root Test

Variables	Constant		Constant & Trend	
	DF-GLS	Ng-Perron (MZa)	DF-GLS	Ng-Perron (MZa)
	t-stat	t-stat	t-stat	t-stat
LMSP	0.006852	-1.03238	-1.724226	-5.38181
LREV	0.15576	0.34191	-2.346559	-8.70879
Critical Value test = 5% DF-GLS = -1.949319 NG-Perron = -8.10000			Critical Value test = 5% DF-GLS = -1.949319 NG-Perron = -8.10000	
*MacKinnon (1996) *Ng-Perron (2001, Table 1)			*Elliot-Rothenberg – Stock (1996, Table 1) *Ng-Perron (2001, Table 1)	

- Lag Length for DF-GLS test were based on the modified A/C

- Ng-Perron test were based on the modified A/C & AR spectral GLS detrended spectra.

Table 2: The ARDL Model Test

Equation 3				
F-Stat	95% Lower bound	95% upper bound	90% lower bound	90% upper bound
5.0530	5.2844	6.0484	4.2436	4.9520
Equation 4				
F-Stat	95% bound	95% bound	90% Bound	90% bound
1.7298	5.2844	6.0484	4.2436	4.9520

Source: Computed by the Author using E-view 10 in table 2, the computed F-stat of 5.0530, is greater than the upper bounds critical value of 4.9520 at the 10% significance level. The economic interpretation is that, money supply and government revenues are co-integrated. The F-stat of 1.7298 is lower than the lower bounds critical values and upper bounds critical values. By implication, the null hypothesis of no co-integration cannot be rejected. Therefore, we accept the hypothesis of no long-run relationship between money supply and government revenues.

Table 3: Results of Long-Run Relations (Eqn 5)

Regressor	Coeff.	Std Error	T-ration	Prob.
LREV	0.961 24	0.0375 98	25.56 63	0.000 *
C	1.270 9	0.5055 8	2.513 7	0.017 **

* signifies 1% level

** signifies 5% level

R-Squared: 0.98806 Durbin Watson Stat: 2.02722 Prob (f-stat) 0.000

Table 3 shows that the estimated coefficient of government revenue has a positive and significant impact on money supply. By implication, a 1% increase in government revenue leads to about 0.96% increase in money supply.

Table 4: Result of ARDL Short-Run Relationship (Eqn 7)

Regressor	Coeff.	Std Error	T-ration	Prob.
ΔLMSPI	0.23323	0.13070	1.7845	0.083
ΔLREV	0.16600	0.035581	4.6655	0.000
ECM (-1)	-0.17270	0.036608	-4.7175	0.000
R-Squared: 0.46062		Adjusted R-Squared: 0.41303		
Durbin WT Stat: 1.9519				
Prob (F-stat): 0.000				

From table 4, the coefficient of the short-run of government revenues on money supply is positive and significant. The ECM is -0.17 with a probability value of 0.000, indicating that the ECM is significant. By implication, a 17% discrepancy in the former year is adjusted for the current year.

Table 5: ARDL Estimates (Dependent Variable = LMSP)

Test Stat	LM Version	F Version
I: Serial Correlation	CHSQ(1) = 0.07824(790)	F(1,33) = 0.061620(.805)
II: Functional Form	CHSQ(1) = 1.1054(.293)	F(1,33) = 0.98870(.327)
III: Normality	CHSQ(2) = 0.42332(.809)	Not applicable
IV: Heteroscedasticity	CHSQ(1) = 0.7148E-3(.979)	F(1,36) = 0.6772E3(.979)

I = Lagrange multiplier test of residual serial correlation

II: = Ramsey's RESER test

III = Test of skewness and kurtosis

IV = Regression of squared residuals on squared values

Table 6: ARDL Estimates (Dependent Variable = LREV)

Test Stat	LM Version	F-Version
I: Serial Correlation	CHSQ(1) = 0.027296(.869)	F(1,33) = 0.023002(.880)
II: Functional Form	CHSQ(1) = 0.44647(.504)	F(1,33) = 0.38045(.542)
III: Normality	CHSQ(2) = 1.1961(.550)	Not applicable
IV: Heteroscedasticity	CHSQ(1) = 0.086729(.798)	F(1,36) = 0.082352(.776)

From table 5 and 6, the diagnostic tests are normal because there is no serial autocorrelation and the Ramsey's RESET test values are in order. The normality test indicated that the error term is perfectly distributed, therefore, there is no heteroskedasticity based on the squared residuals.

4.1 Discussion of Results

The results indicated that there is a co-integrating relationship between government revenue and money supply in the first functional form within the period of this study. In addition, government revenue has a positive and significant impact on money supply. This result is in tandem with the work of Adenikinju and Olofin (2000). In the second functional form, government revenue was the dependent variable and it showed no evidence of long run relationship between money supply and government revenues, and the result supports the works of Udegbule C.S (2023) and Bohdalova (2000). However, in the short-run, a relationship existed between the two functional forms. The result also showed that it was government revenue that drives money supply.

5.0 Summary and Recommendation

The study investigated the relationship between money supply and government revenues between 1990 to 2022. The study employed the Autoregressive Distributive Lag (ARDL) bounds test to co-integration to test the correlations between the two functional forms. Results from the study indicated that government revenue has an impact on money supply in Nigeria within the year of the study. From the results, the study recommends that policy makers should come-up with credible and viable policies that will help to regulate all the sources of government revenues in order t ensure transparency, since the sector has a positive impact on the economic development of the country.

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