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Asymmetric Effects of Money Supply Growth on Economic Growth in Nigeria

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Abstract: The study employs the Shin-Greenwood-Yin nonlinear autoregressive distributed lag (NARDL) approach to cointegrating and error correction modeling to examine the asymmetric effects of broad money growth on economic growth in Nigeria. Annual time series data spanning the period from 1981-2016 are used for the analysis. The study finds asymmetric relationship between the variables in the short run as positive change in broad money growth is found affect economic growth positively and significantly, while negative change is found to have negative, but more sizable and more significant effect on growth. The study also finds no significant effect of positive change in broad money growth on economic growth in the long run. Negative change in broad money growth positively and significantly affects economic growth in the long run. Further evidence from the study are that growth in government financial consumption expenditure positively affects economic growth in the short- and long-run, while inflation adversely affect growth in both time horizons. Based on the evidence, it is recommended that to achieve long run growth, growth of money supply and inflation should be controlled, and government final consumption expenditure should be increased to boost economic activities.

Keywords: Money Growth; Economic Growth; Asymmetric Effects; NARDL; Nigeria

JEL Classification: E51

1. Introduction

Money supply is an intermediate instrument of monetary policy. Theoretical discourse on the effect of monetary expansion on economic growth has been inconclusive. Introduction of money into the neoclassical growth model as seen in the Levhari-Patikin (1968) model wherein money is considered as a consumer good, reveals that monetary expansion could lead to output growth. Within the IS-LM framework, extended by the Mundell-Fleming-Dornbush model, expansion in money supply all things being equal, could engender increase in income (albeit in the short-run) in both flexible and fixed exchange rate system under a condition of imperfect capital flows since wages and prices do not adjust instantaneously to changes in the money stock. Increase in money supply depicted by the outward shift of the LM curve engenders decrease in interest rate which in turn stimulates domestic investment, leading to expansion in output, aggregate demand and employment *ceteris paribus*. The expansion in output engendered by increase in money supply has also been attributed to the fact that wages and prices do not adjust immediately to changes in money supply (Mathai, 2009). This is the case where interest rate responds to change in money supply, i.e. interest rate is money supply-elastic.

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The effectiveness of monetary policy is limited during a depression or when the economy is in a so-called *liquidity trap*. Romer (1992) argued that the rapid rates of growth of real output in the period following the great depression (mid- and late 1930s) was due largely to monetary expansion without which the U.S. economy would have remained depressed far longer and far more deeply than it actually did. Thus monetary expansion could be deployed as a counter cyclical tool. However, it has also been argued that the effect of monetary expansion on output is neutral in the long-run as output is considered fixed in the long run and the economy is assumed to be at full employment level or at full capacity so that any expansion in money supply would only result in increase in prices (Lashkary & Kashani, 2011). This is the monetarists view: that money is non-neutral in the short run, but neutral in the medium to long run. Higher inflation rates induced by increase in money supply in the face of low level of output adversely affects economic growth.

In Nigeria, broad money has consistently trended upwards since 1981 as shown in Figure 1.

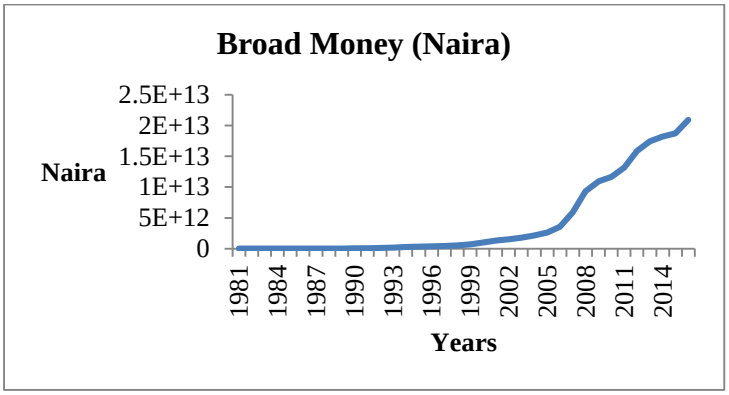

Figure 1. Broad Money Growth in Nigeria

Source: Data from the World Development Indicators 2017

At the same time, real GDP has been growing, albeit, slowly as shown in Figure 2.

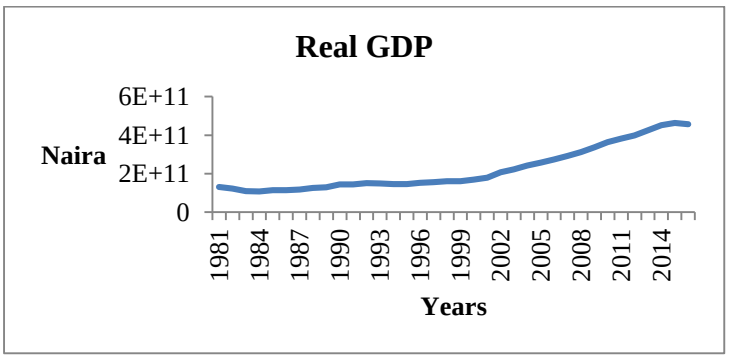

Figure 2. Trends in real GDP of Nigeria

Source: Data from the World Development Indicators 2017

From 1981-1992 broad money was less than real GDP annually, but from 1993 onwards, it was always greater than the real GDP. Generally, the annual growth rate of broad money has been higher than that of real GDP. This is shown in Figure 3.

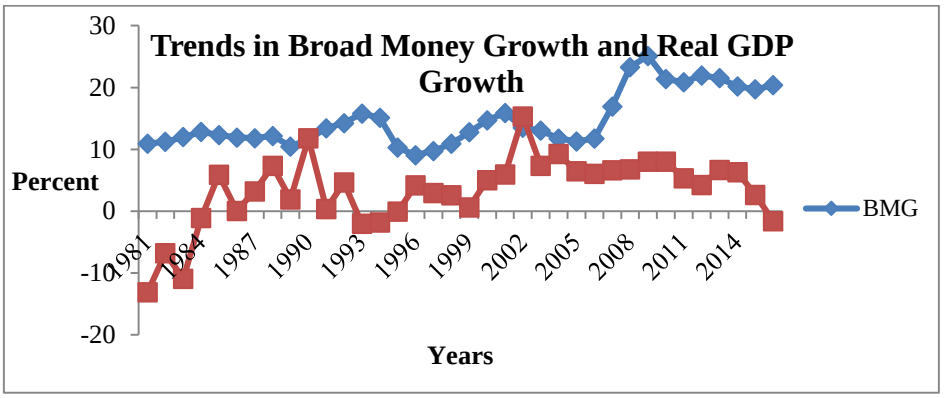

Figure 3. Trends in Broad Money Growth and Real GDP Growth in Nigeria

Source: Data from the World Development Indicators 2017

The growth in money supply has been attributed to the increased government revenues, the bulk of which were from oil exports and rentals, which were used to finance expenditure along with borrowed funds (Musa, Usman and Zoramawa, 2014). Other factors identified as contributory factors of growth of money supply in Nigeria especially since 2005 following the recapitalization exercise in the banking sector include increased credit to the private sector and increase in net foreign assets (West African Monetary Agency, 2009).

The objective of this study is to investigate the asymmetric effects of broad money growth on economic growth in Nigeria. The study is significant in that its outcome would aid policymakers to appropriately use monetary policy to influence economic growth in different economic conditions.

2. Brief Review of the Literature

Chuku (2009) estimated a structural vector autoregressive (SVAR) model to investigate the effects of monetary policy shocks on output and prices in Nigeria using quarterly data spanning the period from 1986:1 to 2008:4. The analysis shows that output rises rapidly and significantly in the first three quarters in response to expansionary shock to money supply before slowing down and stabilizing at a new level. The researcher notes that broad money (M2) has the most influential impact on output and prices. It was therefore recommended that the Central Bank of Nigeria to place more emphasis on M2 for managing the nation's economy.

Ogunmuyiwa and Ekone (2010) employed OLS estimation and Granger causality test to investigate money supply-economic growth nexus in Nigeria using data that spanned the period from 1980 – 2006. The analysis indicated that the effect of expansion in money supply on economic growth (measured as real GDP) was positive, but statistically not significant. It also shows that money supply did not Granger-cause economic growth in the country.

Lashkary and Kashani (2011) examined the effect of monetary variables on economic growth in Iran during the period from 1959 to 2008 using simple regression analysis. The analysis reveals that the effect of expansion in money supply on Iranian economic growth is not statistically significant. This suggests that money growth does not influence aggregate demand in the economy.

Aigheyisi (2011) investigated the relative effects of monetary and fiscal policy on economic growth in Nigeria in the period from 1981 to 2009 using the methodology of cointegration and error correction modeling. The empirical results indicated that expansion in broad money supply positively affected output expansion with a one-year lag in the short-run. This result is consistent with those of Ajisafe and Folorunso (2002) and Adefeso and Mobolaji (2010), which also found that the effect of monetary policy on economic growth was stronger than that of fiscal policy.

Babatunde and Shuaibu (2011) examined the impact of money supply on real output in Nigeria in the period from 1970 to 2005 using the ARDL approach to cointegration and error correction. The study found that money supply positively and significantly impacted real output in the short-run and in the long-run, though the short-run impact was more significant.

Inam (2014) employed the error correction mechanism to investigate the effect of money supply on output in Nigeria in the period from 1985 to 2012. The study found that money supply negatively and significantly impacted output in the country. However, the paper has the shortcoming of testing for cointegration using the Johansen approach in spite of the fact that the unit root test results show that the variables are of mixed order of integration. Inam and Ime (2014) also examined the effect of monetary policy on economic growth in Nigeria during the period from 1970 to 2012. The methodology employed included Granger causality test and estimation of a linear regression model using the OLS estimator. The study found no causal relationship between the variables. The empirical evidence also indicated no significant relationship between them.

Chipote and Makhetha-Kosi (2014) explored the role of monetary policy in the growth of South Africa's economy in the period 2000-2010 using the method of cointegration and error correction. The analysis indicated that the variables of the model specified for the investigation were cointegrated and that the effects of money supply, repo rate and exchange rate were not significant explanatory factors (variables) of the growth of South Africa's economy.

Takyi and Twum (2015) employed the autoregressive distributed lag (ARDL) approach to cointegration to investigate the effects of monetary, fiscal and trade policies on economic growth in Ghana using annual time series data for the period 1965 to 2013. The result indicated that the three variables are cointegrated and that the effects of monetary and fiscal policy on economic growth were positive and statistically significant in the long- and short-run, though the long-run effects were stronger than the short-run effects and monetary policy appeared to be more effective than fiscal policy in both the long run and the short-run. The long-run and short-run effects of trade policy on economic growth of Ghana were however, not statistically significant, pointing to the ineffectiveness of the country's trade policies within the period covered by the study.

Studies have also been conducted to investigate the asymmetric effects of money supply shock on output growth. Ülke and Berument (2015) estimated a nonlinear VAR in a study to examine the asymmetric effect of monetary policy shocks on macroeconomic variables including output, inflation and exchange rate in Turkey using monthly data for the period 1990 to 2014. Interest rate was used as a monetary policy variable in the study. The study found that tight monetary policy explained by sudden increase in (or positive shock to) interest rate (implying decrease in money supply) was resulted to decease in

output, exchange rate and prices. Loose monetary policy had the opposite and less significant effect on the macroeconomic variables.

Apanisile (2017) examined the asymmetric effects of money supply shocks on output (GDP) in Nigeria during the period from 1986 to 2015 using a NARDL model. The study found that both positive and negative shocks to money supply positively affected output in the long run in the country, but only the positive shocks was statistically significant. Olayiwola and Ogun (2019) examined the asymmetric impact of monetary policy (money supply) shock on output and price stability in Nigeria in the during the period from 1986Q1 to 2016Q4 using the NARDL approach. The study found that the impact of negative shock on output was more significant than that of positive shock in the short run, while the reverse was the case in the long run.

This study differs from previous studies in that while most of the previous related studies investigated the asymmetric effects of money supply shock or monetary policy shocks on output or output growth, its focus is on the asymmetric economic-growth effect of broad money growth which is more relevant for monetary policy than monetary policy shock which is quite unpredictable. Thus, to the best of our knowledge, this study represents the first attempt at examining the asymmetric growth effects of broad money growth in Nigeria.

3. Methodology

3.1. Model Specification

The objective of this study is to examine the asymmetric effect of growth of money supply on economic growth in Nigeria. To achieve this objective we begin the specification of our model by expressing real GDP annual growth (proxy for economic growth) as a function of broad money growth.

$$RGDP_{g,t} = f(BM_{g,t}) \quad [1]$$

The effect of broad money growth on economic growth is assumed in this study to be asymmetric, that is the effect of positive change in broad money growth on economic growth may differ from the effect of negative change in broad money growth on economic growth in the short run and in the long run. Thus $BM_{g,t}$ is subjected to partial sum decomposition yielding:

$$BM_{g,t} = BM_{g0} + BM_{g,t}^{+} + BM_{g,t}^{-} \quad [2]$$

Where $BM_{g,t}^{+}$ represents positive change in $BM_{g,t}$, and $BM_{g,t}^{-}$ represents negative change in $BM_{g,t}$. These are respectively defined as:

$$BM_{g,t}^{+} = \sum_{j=1}^{t} \Delta BM_{g,j}^{+} = \sum_{j=1}^{t} \max(\Delta BM_{g,j}, 0) \quad [3]$$

$$BM_{g,t}^{-} = \sum_{j=1}^{t} \Delta BM_{g,j}^{-} = \sum_{j=1}^{t} \min(\Delta BM_{g,j}, 0) \quad [4]$$

The partial sum processes according to Shin *et al* (2014, p. 288), "maintain an intuitively appealing and economically meaningful interpretation in a wide range of applications"

To capture these in a single model, Following Shin, *et al* (2014), we specify a nonlinear autoregressive distributed lag (NARDL) model. The NARDL modeling approach is an asymmetric extension of the linear autoregressive distributed lag (ARDL) approach popularized by Pesaran and Shin (1998) and Pesaran *et al*. (2001)**.** This approach assumes that negative and positive variations of the explanatory variable(s) of interest could have different effects on the dependent variable. It enables simultaneous analysis of the short-run and the long-run nonlinear relationship between the explanatory variables and the dependent variable within a single equation framework. Another major advantage it has over the symmetric ARDL is that it detects (hidden) cointegration where the symmetric ARDL does not. It also has the advantages of the symmetric ARDL in that it is suitable for estimation of model involving small finite data sample, it is applicable in cases of variables with mixed order of integration and yields efficient estimates even in the presence of endogenous regressors.

A subset of regressors (Z) explaining real output growth identified by growth theories particularly the neoclassical and endogenous growth theories can be incorporated symmetrically in the model (after substituting equation 2 into equation 1) so that the model is expanded as:

$$RGPD_{g,t} = \beta^{+'}BM^{+}_{g,t} + \beta^{-'}BM^{-}_{g,t} + \delta'Z_t + u_t \quad [5]$$

Where $BM_{g,t}$ (= BM_{g0} + $BM_{g,t}^{+}$ + $BM_{g,t}^{-}$) is a *k* X 1 vector of regressors entering the model asymmetrically and Z is a *g* x 1 vector of regressors incorporated symmetrically in the model. In this study, Z = (GCFg, GFCEg, TOPEN and INF). Where $RGDP_g$ = annual growth of real GDP; BM_g = broad money supply annual growth; GCF_g = growth capital formation annual growth (investment); $GFCE_g$ = general government final consumption expenditure annual growth; TOPEN = trade openness measured as total trade (export plus import) as a percentage of GDP; INF = inflation (annual percentage change in consumer price index).

Positive change in broad money growth is expected a priori to positively affect economic growth in the long run, while negative change is expected to negatively affect growth in the long run. In line with predictions of endogenous growth theories, investment (growth is gross capital formation), government final consumption expenditure and trade openness are expected to positively affect economic growth especially in the long run, while inflation is expected to adversely affect economic growth (Barro, 1990; Young, 1999; Barro, 2013).

An extension of the partial asymmetry concept to both long run and short run within the NARDL model yields:

$$\Delta RGDP_{g,t} = \phi\Delta RGDP_{g,t-1} + \theta^{+}BM^{+}_{g,t-1} + \theta^{-}BM^{-}_{g,t-1} + \theta_w Z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta RGDP_{g,t-1} + \sum_{i=0}^{q-1}(\pi_i^{+}\Delta BM^{+}_{g,t-i} + \pi_i^{-}\Delta BM^{-}_{g,t-i} + \pi_{z,i}\Delta Z_{t-i}) + \varepsilon_t \quad [6]$$

3.2. Estimation Approach

The NARDL model in equation 6 was estimated using the OLS procedure. Thereafter, asymmetric long-run relationship was tested using the F-*test* by testing the null hypothesis of no-cointegrtion ($\phi = \theta^{+} = \theta^{-} = \theta_{w}$ against the alternative hypothesis. As in the linear ARDL, the computed F-statistic from the estimation of the NARDL model is compared with the upper and lower bounds critical values computed by Pesaran *et al* (2001) at chosen significance level (for example, 1%, 2.5%, 5% or 10%). If the statistic is greater than the upper bounds critical value, then there is long run relationship and the null hypothesis of no-long run relationship is rejected. F-statistic between the upper and the lower bounds' critical values is inconclusive. F-statistics less than the lower bound critical value signals no-cointegration. Detection of cointegration relationship set the stage of stage for derivation of short-run and the long run model from the estimated NARDL. Prior to the foregoing processes, the variables were tested for stationarity to ascertain their times series properties. For this, the augmented Dickey Fuller (ADF) test and the Phillips-Perron test were employed.

3.3. Data and Sources

The study employed annual time series data covering the period from 1981 to 2016. The data were all sourced from the World Bank's World Development Indicators 2017.

4. Results and Discussions

The results of the unit root test for the variables and the cointegration test based on the estimated NARDL model are presented in this section. Also presented and discussed are the model estimation results and its implications, and the test for structural stability of the model

4.1. Unit Root and Cointegration Tests

The results of unit root tests for the variables are presented in Table 1. The test involves the ADF unit root test and the Phillips-Perron unit root test. The result shows that the variables are of mixed order of integration: some are stationary at levels, that is, they are integrated of order 0, while others are stationary at first difference; that is they are integrated of order 1.

Table 1. Summary Unit Root Test Result

ADF Unit Root Test							
Levels				**First Difference**			
Variables	ADF test stat	Critical Value (5%)	Inference	Variables	ADF test stat	Critical Value (5%)	Inference
$RGDP_g$	-3.75	-3.54	Stationary	$RGDP_g$	-10.00	-3.55	Stationary
BM_g	-3.54	-3.55	Nonstationary	BM_g	-4.85	-3.56	Stationary
GCF_g	-2.86	-3.56	Nonstationary	GCF_g	-11.86	-3.56	Stationary
$GFCE_g$	-5.92	-3.55	Stationary	$GFCE_g$	-7.12	-3.56	Stationary
TOPEN	-1.89	-3.54	Nonstationary	TOPEN	-7.52	-3.55	Stationary
INF	-3.84	-3.55	Stationary	INF	-5.34	-3.55	Stationary
PP Unit Root Test							
Levels				**First Difference**			
Variables	PP test stat	Critical Value (5%)	Inference	Variables	PP test stat	Critical Value (5%)	Inference
$RGDP_g$	-3.62	-3.54	Stationary	$RGDP_g$	-10.95	-3.55	Stationary
BM_g	-2.14	-3.54	Nonstationary	BM_g	-8.35	-3.55	Stationary
GCF_g	-4.96	-3.55	Stationary	GCF_g	-21.75	-3.55	Stationary
$GFCE_g$	-5.92	-3.55	Stationary	$GFCE_g$	-20.44	-3.55	Stationary
TOPEN	-1.76	-3.54	Nonstationary	TOPEN	-11.15	-3.55	Stationary
INF	-2.73	-3.54	Stationary	INF	-9.62	-3.55	Stationary

Source: Author's results using EVIEWS 9.

Considering that the variables are integrated of different orders, the long run relationship between them was tested using the NARDL approach to cointegration. The result of the test is presented in Table 2.

Table 2. NARDL Cointegration Test

Sample: 1984 2016		
Included observation: 33		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	5.19	6
Critical Value Bounds		
Significance	I0	I1
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

K = Number of explanatory variables

Source: Authors' estimation using Eviews 9

The cointegration test results indicate that the null hypothesis of "No long-run relationship" is rejected at even at the 1% level. Thus it can be reasonably inferred that the variables are cointegrated. Based on this, the short run and the long run relationship can be estimated.

4.2. Model Estimation

The result of estimation of the cointegrating form of the model and the long run estimates are presented in Table 3. The results are based on the estimated NARDL model presented in the appendix section of this paper.

Table 3. NARDL Cointegrating and Long Run Estimates

Dependent Variable: RGDPg			
Selected Model: NARDL(1, 0, 2, 1, 0, 2, 0)			
Sample: 1981 2016			
Included observations: 33			
Cointegrating Form			
Variable	Coefficient	t-Stat	Prob.
$D(BM_g^+)$	0.114	2.350	0.029
$D(BM_g^-)$	0.037	0.555	0.585
$D(BM_g^-(-1))$	-0.266	-3.819	0.001
$D(GCF_g)$	0.002	0.061	0.952
$D(GFCE_g)$	0.013	2.057	0.053
D(TOPEN)	-0.030	-0.414	0.683
D(TOPEN(-1))	0.105	1.459	0.160
D(INF)	-0.124	-3.253	0.004
CointEq(-1)	-0.621	-3.742	0.001
Long Run Coefficients			
Variable	Coefficient	t-Stat	Prob
BM_g^+	0.183	1.716	0.102
BM_g^-	0.179	1.750	0.095
GCF_g	-0.163	-1.482	0.154
$GFCE_g$	0.020	1.860	0.078
TOPEN	0.005	0.049	0.962
INF	-0.199	-2.289	0.033
C	1.796	0.592	0.561

Cointeq = RGDPG - (0.1831*BMG_POS + 0.1792*BMG_NEG -0.1626*GCFG + 0.0204*GFCEG + 0.0055*TOPEN -0.1993*INF + 1.7961)

Source: Authors' Estimation using Eviews 9.

The estimated cointegration form of the NARDL model reveals that increase in broad money growth positively affects economic growth in the short run, contemporaneously. A 1% rise in annual growth of broad money is associated with about 0.1% rise in annual growth rate of real GDP. The relationship is significant at the 5% level. However, decrease in the annual growth rate of money supply does not have any significant effect on economic growth, contemporaneously. It adversely affects economic growth with a lag of one year. A 1% decrease in growth rate of broad money is associated with a decrease in economic growth by about 0.3%. The lag effect is significant at the 1% level. These observations suggest that the short run relationship between money supply growth and economic growth in Nigeria is asymmetric. Also suggested is that the short run effect of a negative change in broad money growth on economic growth is larger and more significant than the short run growth effect of positive change in broad money growth as indicated by the coefficients and p-value of t-ratios of D(BMG_NEG(-1)) and D(BMG_POS) respectively. These findings are in sync with the empirical evidence from Karras and

Stokes (1999) which found that negative money supply shocks exert stronger impact on output than positive shocks.

The short run effect of annual growth of gross capital formation on economic growth is positive, but statistically not significant. This suggests that investment has not been played significant role in the short run growth of the nation's economy. It also suggests that the level of investment in the country has been quite low. The short-run growth effect of government final consumption expenditure growth is positive and significant at the 10% level. A 1% rise in growth rate of government final consumption expenditure is associated with about 0.01% increase in the growth rate of real GDP per capita. The effect of trade openness on real output growth is observed to be statistically not significant in the short run contemporaneously and with a one-year lag. Inflation adversely affects output growth in the short run, and the effect is statistically significant even at the 1% level. A 1% rise in inflation is associated with about 0.1% decrease in the growth rate of real output.

The error correction coefficient (CointEq) has the expected negative sign and passes the test of statistical significance at the 1% level. This further indicates that the variables are cointegrated, and suggests any short run deviation from the equilibrium position is adjusted in the subsequent year to restore equilibrium in the relationship. The value of the coefficient indicates that 62% of short run deviation from equilibrium is adjusted annually to restore equilibrium in the relationship.

The estimated long run model indicates that the effect of increase in broad money growth on real output growth is not significant. However, the long run growth effect of decrease in broad money growth passes the test of statistical significance at the 10% level. This corroborates the evidence from Cover (1992) which showed that positive money supply shock does not affect output, but negative supply shock does. The observation of no significant effect of positive change in broad money growth tends to give credence to the monetarist view that money is neutral in the middle to the long run.

As in the short run, the long run growth effect of investment (growth in gross capital formation) is not statistically significant. This implies that capital formation growth does not affect real output growth in both short run and long run in the country. Government consumption expenditure growth positively affects growth in the long run, though the effect is significant at the 10% level. This suggests that government expenditure on final consumption contributes to economic growth, not only in the short run, but also in the long run. The long run effect of trade openness on economic growth is positive, but statistically not significant. As in the short run, inflation negatively affects economic growth in the long run, and the effect is significant at the 5% level. Thus inflation adversely affects economic growth in the country.

4.3. Model Stability Test

The long run stability of a model enhances its reliability for policy. The plots of cumulative sum recursive residual (CUSUM) and the cumulative sum of squared recursive residual (CUSUMSQ) for testing the constancy of regression relationships overtime proposed by Brown, Durbin and Evans (1975) were employed to test the structural stability of the model. The plots are presented in Figures 4a and 4b respectively.

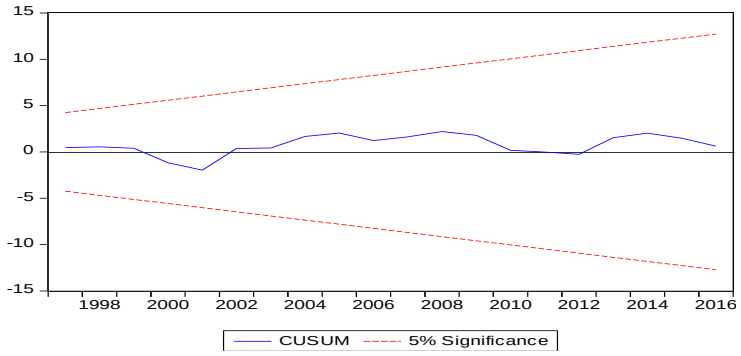

Figure 4a. Plot of Cumulative Sum of Recursive Residuals

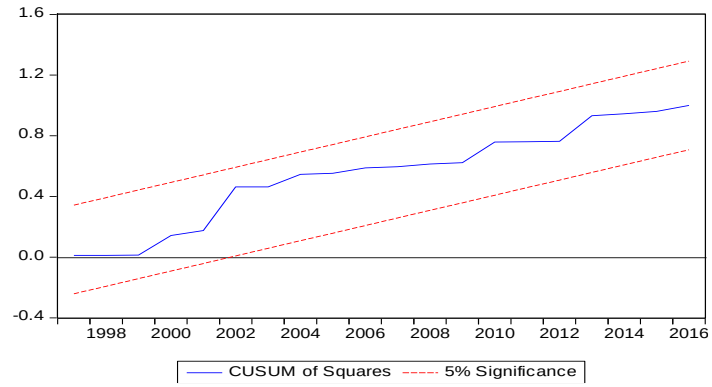

Figure 4b. Plot of Cumulative Sum of Squared Recursive Residuals

The figures show that both plots lie between the critical bounds at the 5% significance level. This implies that the model is structurally stable.

5. Conclusion and Recommendations

The study, using Nigeria's data demonstrated that the relationship between broad money growth and economic growth is asymmetric, especially in the short run. The analysis involving the NARDL modeling approach revealed that positive change in broad money growth positively affects economic growth contemporaneously in the short run, while negative change has a depressing effect on economic growth after a lag of one year. The adverse lag growth effect of negative change in broad money growth is more significant than the positive contemporaneous effect. This suggests that positive growth in money supply is desirable for growth in the short run in the country. The long run estimates however revealed that the growth effect of positive change in broad money growth is not statistically significant, while that of negative change is significant (though at the 10% level). Thus while positive change in broad money growth is desired for short run growth, negative change is desirable for long run growth. These results tend to uphold the monetarists' view that monetary expansion is non-neutral in the short-run, but neutral in the long run.

Further evidence from the study were that growth of government final consumption expenditure positively affect economic growth in the short- and long- run, implying that consumption expenditure

contributes to the growth of the nation's; and inflation adversely affects economic growth in both short- and long run.

Based on the empirical evidence, it is recommended that monetary expansion could be used as panacea to short-run growth deficiencies, but for long run growth, the growth in broad money should be brought under control by the monetary authority using appropriate policy instruments. There is also need for inflation to be checked as it adversely affects economic growth. There is also need to increase constantly increase government final consumption expenditure, but this should be cautiously done to ensure that it contributes significantly to raising the level of economic activities particularly through domestic firms in operating in the nation's private sector.

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Appendix

Dependent Variable: RGDPG
Method: NARDL
Date: 08/03/19 Time: 09:30
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): BMG_POS BMG_NEG GCFG GFCEG TOPEN INF
Fixed regressors: C
Number of models evalulated: 1458
Selected Model: NARDL(1, 0, 2, 1, 0, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDPG(-1)	0.379446	0.165846	2.287937	0.0332
BMG_POS	0.113602	0.048349	2.349614	0.0292
BMG_NEG	0.036542	0.065893	0.554572	0.5853
BMG_NEG(-1)	-0.191761	0.091390	-2.098272	0.0488
BMG_NEG(-2)	0.266413	0.069762	3.818899	0.0011
GCFG	0.001750	0.028696	0.060970	0.9520
GCFG(-1)	-0.102642	0.031572	-3.251020	0.0040
GFCEG	0.012637	0.006144	2.056850	0.0530
TOPEN	-0.030014	0.072459	-0.414220	0.6831
TOPEN(-1)	0.138765	0.082112	1.689939	0.1066
TOPEN(-2)	-0.105342	0.072222	-1.458589	0.1602
INF	-0.123654	0.038011	-3.253107	0.0040
C	1.114602	1.885536	0.591133	0.5611

R-squared	0.680707	Mean dependent var	4.508046
Adjusted R-squared	0.489131	S.D. dependent var	3.972721
S.E. of regression	2.839505	Akaike info criterion	5.212240
Sum squared resid	161.2558	Schwarz criterion	5.801773
Log likelihood	-73.00196	Hannan-Quinn criter.	5.410600
F-statistic	3.553201	Durbin-Watson stat	2.019566
Prob(F-statistic)	0.006044		

*Note: p-values and any subsequent tests do not account for model selection.