MONETARY POLICY AND REAL SECTORS IN NIGERIA

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Abstract

This study examined the relative effectiveness of selected monetary policy instruments on the performance of two key real sectors in the Nigerian economy. The paper focused on the period 1981-2016 due to its significance in the history of monetary policy in Nigeria (financial sector liberalization started in the year 1986). Time series data sourced from the Central Bank of Nigeria (CBN) statistical bulletin and the World Development Indicator Database published by the World Bank were used in this study. Agricultural and manufacturing sector output were used as the proxies for real sector performance; while money supply, interest rate, broad money growth rate, and credit to the sectors were the predicting variables. The pre-estimation tests (i.e. unit root and cointegration) shows the time series are a mix of order of integration and a long run relationship was also revealed by the ARDL Bounds cointegration tests conducted on the estimated models. The estimated models revealed that money supply had positive and significant effect on performance of the real sectors in the short run and also expected to have a positive effect on the both sectors in the long run. Interest rate proved to be an insignificant predictor of the performance of the agricultural and manufacturing sector. Broad money growth rate impacted positively and significantly on the output from both sectors in the short run; but negatively in the long run. Credit to the both sectors had positive impact on both sectors in the short run but a negative and significant impact in the long run. The study recommends that money supply should increase to these sectors as flow of bank credits to the sector should also continue to increase. Moreover, a single digit interest rate on loan from the commercial banks to help encourage investment in the agriculture and manufacturing sector in Nigeria.

Keyword: Autoregressive Distributive Lags (ARDL), Bounds Test, Real Sectors, Broad Money Growth Rate, Monetary Policy.

Introduction

The real sector of the economy plays a vital role and also strategic in the entire growth process of a nation. There are a lot of benefits it confers to a nation as it has been confirmed to possess enormous influence on growth and employment generation (Anyanwu, 2010). The contribution of the real sectors to countries' economy have been the yardstick for appraising the effectiveness of macroeconomic policies such as fiscal and monetary policies. Jhingan (2011) sees fiscal policy as a powerful instrument of government actions affecting its pattern of expenditure and revenue, ordinarily the difference between expenditure and revenue is measured by the government's net income, which indicates either a surplus or deficit budget. On the other hand, Gbosi (2016) reported that monetary policy is a measures put in place by monetary authorities or by the central bank to control and checkmate banks and other financial institution. Also it could be seen as a deliberate action of the government put in place to control and strengthen the volume and size of money supply to achieve some specified macroeconomic objectives such as full utilization of resources, stability in price level, desired growth level, and exchange rate balance of payment equilibrium (Gbanador, 2007). Monetary policy is known to be one of the macroeconomic management instruments used by the monetary authority to influence what would be the outcomes in the real economy to its expected direction. The monetary policy objectives are basically geared towards the promotion of stable prices, sustainable output and employment. In the words of Mishkin (1995 and 1996), monetary policy affects the economic progress through monetary instruments such as money supply, interest rate, monetary policy rate, cash reserve requirement, asset prices via exchange rates, equity and housing prices and more.

Statement of Problem

Money supply in a developing or emerging economy has been a controversial issue over the years. The amount of money supply that is permitted to be in circulation in an economy has been a discussion of opposing opinions of the monetary authorities. Excess money causes inflation but when there is a reduction in money supply it causes a rise in interest rate (Yakubu, Umar & Aminu, 2014). There is a presumption that the connection between inflation

and output gap, or in general perspective, excess aggregate demand is as a result of excess money supply.

Interest rate in Nigeria has not been stable over the years. The minimum discount rate (MDR) was initially used as a bench mark for interest rate. It was later change to the monetary policy rate in 2006.The instability of interest rate has made it difficult for investors to borrow funds (Obute, Adyorough and Idoko, 2012). The consideration of economic growth as an objective of monetary policy is the main problem of how changes in monetary instruments affect aggregate output level and hence, the overall performance of the economy specifically, the real sectors.

Conflicting results have been observed from different studies (Ogbuabor & Nwosu, 2017; Adeyefa & Obamuyi, 2018; Kyari, 2015). This served as the motivation for this paper. This study is therefore set out to comparatively examine the relative effectiveness of selected monetary policy instruments on the performance of two key real sectors in Nigeria.

Aim, Objectives & Hypotheses

The aim of this paper is to investigate the relative effectiveness of some selected monetary policy instruments (money supply, broad money growth rate, interest rate, and deposit money bank credits to the selected sectors) on the performance of two key sectors of the economy. Specifically, the study examined the:

i. relative effectiveness of selected monetary policy instruments on the performance of the agricultural sector; and
ii. relative effectiveness of selected monetary policy instruments on the performance of the manufacturing sector.

The following null hypotheses were also tested:

i. H_0: Selected monetary policy instruments had no significant effect on the performance of the agricultural sector.
ii. H_0: Selected monetary policy instruments had no significant effect on the performance of the manufacturing sector.

Theoretical Literature

The Classical Quantity Theory of Money

The classical economists such as Adam Smith (1723), Ricardo (1823), Jean Baptist Say (1832), Piguo (1877) and other notable classical economist explain the relationship between money supply, average price level and the real output. The relationship is positive, meaning the higher the level of money supply, the higher the level of saving and investment demand, and the higher the real output. In the classical theory, Say's law precisely 'supply create its own demand'. In relation to the classical believe, the economy assumed to tends to full employment level since wage is flexible to accommodate the fluctuation in the system. In the classical model, the general price level is being determine by the quantity of money supply. Mathematically, the model is stated as follows:

MV = PQ
Where
M = Money Supply
V = Velocity
P = Average Price Level
Q = Real Output (GDP)
PQ = Nominal GDP

Velocity represents the number of times (per year) money (one unit of currency) is used to purchase goods and services. The classical theory assumes that velocity is constant. Money is used to buy goods and services. An increase in money supply (M) will lead to an increase in the desired level of transactions or real output (i.e. PQ). The classical quantity theory of money is considered fitting since it relates money supply with real output (i.e. output from the real sector). A positive relationship is expected between money supply and output from real sectors.

The Classical Theory of Interest Rate

This theory of interest rate was propounded by Marshall, Pigou, Walras and some other classical economists. This theory as explained by Hansen (1951) stated that interest rate is influenced by total reserve, level of supply and

demand for capital. Time preference determined the level of fund to be supply in the economy while the total demand for capital is influenced by the marginal productivity of capital. Therefore, in this manner, interest rate theory can be regarded as the model of saving for demand and supply. On demand side, the demand for capital is for productivity and consumption purposes. Capital is very crucial for investors because is productive that's why is being demanded for. But the law of variable proportion hinders the capital productivity. This means that capital demand has a negative relationship with interest rate. There are however certain other factors which control the demand for capital, such as the population growth, technical progress, process of rationalization, and living standard of the community. On the other hand, supply of capital relies on savings. Some persons save irrespective of the rate of the interest. They keep saving at the zero rate of interest while others might save when the benefit derived from saving is adequate to cause them to withhold consumption. This could be seen as expansionary monetary policy where the policy is measured by the level of total demand in the system in accordance with supply of money. The classical theory of interest rate explains an indirect relationship between interest rate and real output. A fall in demand for capital due to high interest rate will reduce investment and real GDP. Interest rate is therefore expected to have a negative relationship with output from the real sector. Hence this theory is also adopted for this paper.

Debt-Intermediation Hypothesis

The 'debt-intermediation' hypothesis proposed by Shaw (1973) is based on an inside money model. He argues that high interest rates are essential in attracting more savings. With more supply of credit, financial intermediaries promote investment and raise output growth through borrowing and lending. Also, King & Levine (1993) find that higher levels of financial development are associated with faster economic growth and conclude that finance seems to lead growth. Neusser & Kugler (1998) and Choe & Moosa (1999) reach the same conclusion. This hypothesis is also deemed applicable to this study as it explains the role supply of credit by financial intermediaries (i.e. banks) plays in boosting growth of real output.

Definition of Concepts

Monetary Policy

Monetary policy is defined as the combinations of tools, instrument, and policies formulated to guide the inflow of money in an economy. It can be seen as the act of controlling the behaviour of money to ensure price stability and economic growth in an economy. Shoaib (2010) insists that the monetary authority uses these instruments to direct the kind of supply of money and target the interest rate that will ensure sanity in the system. The main objective is to ensure a good price stability, full employment "balance economic growth" and balance of payment in other to maintain a stable exchange rate and positive interest rate and to promote non-inflationary growth in output. The instrument and techniques to achieve this objective varied over the year. There are two phases instruments of monetary policy, direct era (Pre-sap) and indirect era (Post-Sap) the era of direct money policy instruments tend to place restriction and involved the use of monetary measures, whereas the indirect era depends on price mechanism. Monetary policy relied on intermediate targets to influence the ultimate objective of policy. The minimum rediscount rate (MRR) was the back born rate for monetary policy instruments. Direct and indirect policy regime have the funds from surplus to deficit sectors with the aim of enhancing growth and development.

The Real Sector

This sector is defined in line with those activities that brings about the production of traded and non-traded goods and services (CBN, 2012). In other words, the productive sector is of the sectors of the economy where raw materials and other factors of production are combined together for production of goods and services. The productive sector also processed unfinished goods to finished goods. Basically the real sectors are agricultural, manufacturing (industry) construction, trade and service sectors. In the agricultural sector, the activities compose land cultivation, animals raising and rearing for the benefit of man. Livestock production cropping, fishing, and forestry processing and marketing of these agricultural products is also part of agricultural sector activities. Agriculture involves crop production, livestock, forestry and fishing. It generates the income, food and also create employment

opportunities for individual households and raw material for industrial sector inputs. In the area of government, the exported products from agricultural outputs are used to raise government revenue and reduces the balance of payment disequilibrium. Anyanwu (1997) argued that agriculture transformation in other to support the socio-economic system of the economic cannot be undermined.

Empirical Review

Monetary Policy and Agricultural Sector Performance.

Ehinomen and Charles (2012) examined the effect of monetary policy on agricultural development in Nigeria from 1970 to 2010. Employing the ordinary least squares (OLS) econometric technique, the authors revealed that monetary policy did not record significant progress in terms of providing enabling environment for better performance in the agricultural sector. Musa (2015) analysed the impact of monetary policy on agricultural sector output in Nigeria from 1986 to 2012. The resulting impulse response function and variance decomposition from the estimated vector autoregressive (VAR) model shows that while monetary policy rate did not impact significantly on agricultural sector, lending rate was found to significantly impact on the agricultural sector. Ajudua et al (2015) reviewed the relationship between money supply and the Nigerian agricultural sector performance within 1986 and 2013 by using the ordinary least square (OLS) econometric techniques, the findings from the study therefore showed that there is a connection between money supply and performance of agricultural sector in the economy. Uma, Ogbonna, and Obidike (2014) on the effectiveness of monetary policy transmission mechanism in Nigeria, it was noticed that rate of exchange, loanable funds and rate of interest are the most effectives monetary policy instruments in the economy. Therefore, the researchers suggested that low interest rate should be implemented to encourage investment in agricultural sector productivity. Chandio et al (2015) studied the link between financial institutions credits and performance of the agricultural sector within the period of 1996 and 2015 with the analysis of the ordinary least square method of economic analysis. The results indicated that a 1 percent rise in credit will cause agricultural output to falls by 0.86% which shows that credit to agriculture is positive and significant in the Nigerian economy. Udoka, Mbat

& Duke (2016) used multiple regression OLS model to estimate the effect of bank credit on agricultural sector out in Nigeria for the period 1970-2014. The authors observed that an increase in loans to agriculture sector will increase the contribution of agriculture sector to economic growth in Nigeria and therefore, they recommended that adequate effort should made in other to improve the loanable funds to the agricultural sector. Ogbuabor and Nwosu (2017) estimated an error correction model to examine the output of the agricultural sector with regard to the credits from the deposit money banks in Nigeria between 1981 and 2014. Their study found that credits raised to support agricultural sector turns to increase the level of economic growth through agricultural output. Funding to the agricultural sector should be encourage in other sustained the economy through this sector, this was the policy recommendation from the authors.

Monetary Policy and Manufacturing Sector Performance.

Musa (2015) analysed the impact of monetary policy on the manufacturing sector, M2 was the most important variable that explains variation in its output, followed by lending rate and M1. The most important variable that explains variation in services sector output was Ml, followed by M2, credit to private sector and lending rate. Okonkwo, Egbulonu & Mmaduabuchi (2015) investigated the effect of monetary policy on the manufacturing sector in Nigeria from 1981 to 2012. The estimated error correction (ECM) model revealed that money supply and credit to private sector exert tremendous influence on manufacturing sector in Nigeria. Okoye, Nwakoby & Modebe, (2015) examined the link between the industrial sector performance and interest rate liberalization in the Nigerian economy with the help of vector error correction model as an analytical technique. The findings showed that exchange rate volatility has an insignificant positive impact on industrial output performance. There was equally a significant positive impact of lending rate and financial depth on industrial output growth, that means that interest rate liberalization made impact on industrial sector. Olarewaju, et al (2015) investigated the manufacturing sector performance due to banking sector reform between 1970 and 2011 in Nigerian economy using the co-integration an error correction model. The researchers revealed through their results that manufacturing sector is really influenced by the action of the monetary

authority through real interest rate, exchange rate bank credit. Kalu (2017) assessed the relative performance of the manufacturing sector regarding to the credit obtains from the financial institution credit in Nigerian. This assessment was done with the help of the Autoregressive Distributed Lag (ARDL) bound (Co-integration) test approach and error correction method. They found out that in the short run relationship, that the independent variable influenced the volume of the credit from money deposit bank at five percent. Both interest and exchange rate and its lags in the long run affects manufacturing sector negatively with five percent level of significant. Increase in the volume of bank credit was recommended by the study. Nnamocha & Eke (2015) investigated Bank credit and Agricultural Output in Nigeria between 1970 and 2013 using an error correction model Approach. This study found out that credit from deposit money bank and industrial output influence the performance of agricultural sector in the long-run but in the short-run industrial output influence agricultural output. The study recommended that the government through its relevant authorities should design a favorable policy that will enable banks to make credit more available to the agricultural sector as this will lead to development and create jobs for the youths. Oluwafemi et al (2014) examined the link between bank and real sectors (agriculture and manufacturing) productivity using the error correction modeling techniques. The result from this study showed that in both the short run and long-run bank credit have significant impact on manufacturing output while inflation and exchange rate have negative impact on manufacturing output in both short run and long run. The study recommended that policies that will enhance manufacturing output growth should be put in place.

Gap in Literature

The empirical reviewed showed that some studies (e.g. Okoye et al, 2015) only examined impact of just one monetary policy instruments (e.g. interest rate) on agricultural sector performance. This study considers this as a gap that needs to be filled. Hence, a combination of different monetary policy instruments for the purpose of comparative analysis was done in this paper. and real sector performance. Moreover, Oluwafemi et al (2014) only focused on investment without including cost of investment (i.e. interest rate) as determinants of manufacturing sector performance in Nigeria. This study also

considers this a gap and included interest rate as determinant of manufacturing sector performance in Nigeria. Lastly, volume of money in supply at a particular period of time was the most frequently used monetary policy instrument. But this study considers this inadequate and a gap. Hence, the growth rate in money supply was considered more appropriate as it shows rate of increase in percentage terms. Hence this study also fills this gap by including broad money growth rate as a key variable in the model.

Research Method

Research Design

The study is a major a predictive study; hence it employed quasi-experimental research design. It is best suitable when variables that cannot be controlled in a laboratory are to be used. Hence, the best experimental is quasi experimental design.

Data Required and Sources

The study employed secondary data that were collected from Statistical Bulletin of the Central Bank of Nigeria and the World Banks covering the period 1981 to 2016. From these sources, annual time series on agricultural sector output, manufacturing sector output, interest rates, money supply, bank credit to agricultural and manufacturing sector, and broad money growth rate.

Model Specification

The models estimated are premised on the work of Kyari (2015) who specified and estimated the model represented by equation 3.1. The model was modified to reflect the focus of this study. While Kyari (2015) used income as a proxy for measuring real sector, this study opted for contribution of the agriculture and manufacturing sector to real output as proxies for measuring real sector performance.

LNINV = f (IR, MS, EXR, MRR, TB) 3.1
AGRIC = f (MS, INR, CREDAGR, BROADMGR) 3.2
MANUF = f (MS, INR, CREDMANF, BROADMGR, MIMPT) 3.2

Where;
AGRIC = Agricultural Sector Output
MANUF = Manufacturing Sector Output
INR = Interest Rate movement
MSS = Money Supply
CREDAGR = Bank Credits to Agricultural Sector
CREDMANF = Bank Credits to the manufacturing sector
MIMPT = Merchandise Import
BROADMGR= Broad money growth rate

Estimation Techniques and Procedures

Pre-estimation Tests

- Unit Root Test: The unit root process is concern with stationarity of the time series employed in the models. We limited our test of stationary to the unit root approach and adopted the model augmented by Dickey & Fuller (1979).

- Cointegration Tests: The ARDL or bound testing cointegrating techniques was adopted. We limited our test to the bound testing cointegrating techniques because or series are of different order of integration. Thus the Pesaran, Smith & Shin model of 2001 was used.

Model Estimation

Model I: Agricultural Sector Output ARDL Model Estimation

$$AGRRIC = \alpha_0 + \beta_t + \beta_1 \log MSS + \beta_1 \log MSS_{t-1} + ... + \beta_1 \log MSS_{t-n} + \beta_2 INR + \beta_2 INR_{t-1} + ... + \beta_2 INR_{t-n} + \beta_3 \log CREDAGR + \beta_3 CREDAGR_{t-1} + ... + \beta_3 CREDAGR_{t-n} + \beta_4 BROADMGR + \beta_4 BROADMGR_{t-1} + ... + \beta_1 BROADMGR_{t-n} + \varepsilon_t \quad 3.3$$

Model II: Manufacturing Sector Output ARDL Model Estimation

$$MANUF = \alpha_0 + \beta_t + \beta_1 \log MSS + \beta_1 \log MSS_{t-1} + ... + \beta_1 \log MSS_{t-n} + \beta_2 INR + \beta_2 INR_{t-1} + ... + \beta_2 INR_{t-n} + \beta_3 \log CREDMANUF + \beta_3 CREDMANUF_{t-1} + ... + \beta_3 CREDMANUF_{t-n} + \beta_4 BROADMGR + \beta_4 BROADMGR_{t-1} + ... + \beta_2 BROADMGR_{t-n} + \beta_4 MIMPT + \beta_4 MIMPT_{t-1} + ... + \beta_2 MIMPT_{t-n} + \varepsilon_t \quad 3.4$$

Here, n is the number of years for lag, ε_t is the disturbance terms and βi's are coefficient for short run and αi's are coefficients for long run relationship.

Post-Estimation Tests

Three post-estimation tests were conducted on the estimated models. They are:

i. **Serial Correlation Test**: Serial correlation is evident when error terms in a time series transfer from one period to another (i.e. error for one-time period *a* is correlated with the error for a subsequent time period *b*). Serial correlation leads to an inefficient ordinary least squares estimates and any forecast based on those estimates.

ii. **Heteroscedasticity Test**: The concept of heteroscedasticity - the opposite being homoscedasticity - is used to describe the case where the variance of errors or the model is not the same for all observations, while often one of the basic assumption in modeling is that the variances are homogeneous and that the errors of the model are identically distributed. In linear regression analysis, the fact that the errors of the model (also named residuals) are not homoscedastic has the consequence that the model coefficients estimated using ordinary least squares (OLS) are neither unbiased nor those with minimum variance. The estimation of their variance is not reliable. So the test is conducted to ensure that the estimates of the model are unbiased.

iii. **Ramsey RESET Test**: this test is a general test used to detect functional form misspecification. This test is designed to detect if there are any neglected nonlinearities in the model. Any evidence of neglected nonlinearities in the models estimated will imply misspecification and estimates unreliable.

Results and Discussion

Pre-estimation Tests

Unit Roots Tests

Table 4.1 below shows the Augmented Dickey-Fuller (ADF) unit root test results for all the time series used in this study. The test for each time series was conducted based with reference to the properties (i.e. intercept, trend, or even both). The result shows that while some time series were stationary at levels, the others only became stationary after first differencing. Hence, we have a mixed order of integration [i.e. I(0) and I(1)]. In a situation like this, Pesaran *et al.*, (2001) provided a test method for testing cointegrating relationship among variables in a single equation model, if the series in the model have different order of integration. The ARDL bounds cointegration test was recommended (Pesaran *et al*, 2001). Hence, the cointegration test results is presented and discussed in section 4.1.2.

Table 4.1 Unit Root Test Results for all Time Series (Levels & 1st Difference)

Time Series	Levels ADF Test Results	1st Diff. ADF Test Results	5% Critical Values
LOG(AGRIC)	0.23	5.72*	2.95
LOG(MANUF)	0.33	4.77*	2.95
LOG(MSS)	1.12	3.30*	2.96
INR	3.06*	-	2.95
BROADMGR	3.62*	-	2.95
LOG(CREDAGR)	1.02	6.84*	2.95
LOG(CREDMANF)	0.64	5.52*	2.95
LOG(IMPT)	0.70	4.76*	2.95

Source: Authors' Computation

Note: * signifies stationarity and the statistics are all in absolute term.

Cointegration Test

The ARDL Bounds cointegration test results presented in Table 4.2 shows that the computed f-statistics from the cointegration tests were all greater than the 5% critical higher bound (i.e. 4.73 > 4.01 and 4.76 > 3.37). With this result, we can decide that a long relationship exists between the time series in the agriculture and manufacturing sector performance models. The short run dynamics and long run ARDL model becomes the most appropriate models to be estimated.

Table 4.2: Co-integration Test Result for Specified Models

Models	Computed F-Statistics	5% Critical Lower [I(0)] Bound	5% Critical Higher [I(1)] Bound	Decision
Agriculture Sector Performance	4.73	2.86	4.01	Long run exists
Manufacturing Sector Performance	4.76	2.62	3.37	Long run exists

Source: Authors' Computation

Model Estimation

The ARDL short and long run behaviors of the explanatory variables are reported respectively in the upper and lower panels of Table 4.3. Schwarz information criterion (SIC) was used as autoregressive order selection criteria. Schwarz (1978) derived an information criterion, known as Schwarz information criterion (SIC).SIC is also called Schwarz-Rissanen criterion as Rissanen (1978) also arrived at the same criterion independently, using different methodology. However, SIC has the advantage of being consistent over AIC (Basci and Zaman, 1998). The result presented in panel A and B is discussed thus:

From the result, money supply had positive and significant impact on both the agricultural and manufacturing sectors. But it was observed that the period required for significant positive impact varied. While at least a three lag of

money supplied impacted significantly on agricultural sector output, money supply instantly impacted significantly on the manufacturing sector output. Moreover, the magnitude of the impact of money supply on agricultural sector was greater than its impact on the manufacturing sector. Secondly, interest rate failed to significantly impact on both of the sectors. Thirdly, while broad money growth rate had mixed (positive and negative) impact on manufacturing sector, its impact on the agricultural sector was positive and significant at different lags (i.e. one and three periods lags). Credit to both sectors also positively and significantly impacted on the both sectors at different lags. While it impacted positively and significantly on the manufacturing sector at one period lag, it impacted significantly on the agricultural sector at three period lag. It was also observed that the error correction terms appeared with the expected negative sign and are statistically significant.

Table 4.3: Autoregressive Distributive Lag (ARDL) Models

Panel A: Short-Run Dynamics		
Predictors	Agricultural Sector Model [Coefficient]	Manufacturing Sector Model [Coefficient]
DLOG(MSS)	[0.3578]	[0.3444]**
DLOG(MSS(-1))	[0.0654]	-
DLOG(MSS(-2))	[-0.0167]	-
DLOG(MSS(-3))	[0.9302]***	-
D(INR)	[0.0053]	[0.0025]
D(INR(-1))	-	[0.0006]
D(INR(-2))	-	[0.0042]
D(BROADMGR)	[0.0004]	[-0.0003]***
D(BROADMGR(-1))	[0.0083]**	[0.0024]**
D(BROADMGR(-2))	[0.0047]	[0.0026]***
D(BROADMGR(-3))	[0.0045]**	-
DLOG(CREDMANF)	-	[-0.0701]
DLOG(CREDMANF (-1))	-	[0.2833]**
DLOG(CREDMANF(-2))	-	[0.1656]
DLOG(CREDAGR)	[-0.0573]	-
DLOG(CREDAGR(-1))	[0.0717]	-
DLOG(CREDAGR(-2))	[0.0438]	-
DLOG(CREDAGR(-3))	[0.1811]**	-
DLOG(MIMPT)		[0.1329]***
Cointeg(-1)	[-0.6272]***	[-0.6300]***
Panel B: Long Run		
LOG(MSS)	[0.7055]***	[1.069]***
INR	[0.0085]	[0.0051]
BROADMGR	[-0.0406]**	[-0.0176]***
LOG(CREDAGR)	[-0.5405]***	-
LOG(CREDMANF)	-	[-1.0425]***
LOG(MIMPT)	-	[0.2110]***
C	[5.5667]***	[5.0084]***

Source: Author's Computation

NB: *, **, *** signifies 10%, 5%, and 1% significance level.

Money supply is expected to positive and significantly impact on both sectors in the long run. Again, interest rate is not expected to significantly have any effect on both sectors in the long run. Broad money growth rate is expected to have negative and significant impact on the both sectors. Lastly, credit to both sectors are expected to have negative and significant impact on output from both sectors.

Post Estimation Tests

Table 4.4 Diagnostic Test Results

Diagnostic Tests	Agricultural	Manufacturing	Decision
Normality Test	3.81	1.40	Normally Distributed
Serial Correlation	0.11	0.50	No Serial Correlation
Heteroscedasticity	0.62	1.36	Homoscedasticity
Ramsey Reset	0.36	0.42	Correctly Specified

Source: Author's Computation

The post-estimation tests results are presented in Table 4.4 above. The normality tests for both model shows that the null cannot be rejected, hence well conclude that the residuals are normally distributed around its mean. The Breusch-Godfrey LM test result reveals the failure of rejecting the null hypothesis; thus, the residuals are not serially dependent. The Breusch-Pagan-Godfrey Test shows that we cannot be reject the null hypothesis; hence we conclude that the residuals are not heteroscedastic. That is the variance of the residual are constant Lastly, the Ramsey Reset test result shows that the null hypothesis cannot be rejected; hence, the model is correctly specified.

Conclusion and Recommendations

On the premise of our analysis, money supply was found to have positive and significant impact on the manufacturing sector output in Nigeria in both the short and long run. This shows that money supply as a monetary policy measure has been a very important monetary policy instruments in the performance of the both sectors. Interest rate is not a significant predictor of the performance of the agricultural and manufacturing sector. Broad money growth rate impacted positively and significantly on the output from both sectors in the short run; but negatively in the long run. Credit to the both sectors had positive impact on both sectors in the short run but a negative and

significant impact in the long run. The study recommends that money supply should increase to these sectors as flow of bank credits to the sector should also continue to increase. Moreover, a single digit interest rate on loan from the commercial banks to help encourage investment in the agriculture and manufacturing sector in Nigeria.

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APPENDIX

YEAR	MSS	INR	CRED SGR	AGRIC	BROA DGRT	NIMPT	CRED MANUF	MANUF
1981	14.47	7.75	0.6	2364.37	5.9	20.88	2.7	1558.7
1982	15.79	10.25	0.8	2425.96	9.55	16.06	3	1764.89
1983	17.69	10	0.9	2409.08	14.02	12.25	3.1	1167.89
1984	20.11	12.5	1.1	2303.51	11.6	9.36	3.1	1018.91
1985	22.3	9.25	1.3	2731.06	8.99	8.88	3.2	1416.79
1986	23.81	10.5	1.8	2986.84	1.95	4.03	4.5	1373.66
1987	27.57	17.5	2.4	2891.67	22.41	3.91	5	1398.1
1988	38.36	16.5	3.1	3174.57	32.91	4.72	6.1	1618.25
1989	45.9	26.8	3.5	3325.95	12.93	4.19	6.7	1665.09
1990	52.86	25.5	4.2	3464.72	32.7	5.63	7.9	1670.73
1991	75.4	20.01	5	3590.84	37.38	8.99	10.9	1829.34
1992	111.11	29.8	7	3674.79	63.26	8.28	15.4	1758.61
1993	165.34	18.32	10.8	3743.67	53.76	7.51	23.1	1706.7
1994	230.29	21	17.8	3839.68	34.5	6.61	34.8	1670.72
1995	289.09	20.18	25.3	3977.38	19.41	8.22	58.1	1592.49
1996	345.85	19.74	33.3	4133.55	16.18	6.44	72.2	1599.94
1997	413.28	13.54	27.9	4305.68	16.04	9.5	82.8	1609.83
1998	488.15	18.29	27.2	4475.24	22.32	9.21	96.7	1412.44
1999	628.95	21.32	31	4703.64	33.12	8.59	115.8	1459.02
2000	878.46	17.98	41	4840.97	48.07	8.72	141.3	1505.66
2001	1269.32	18.29	55.8	5024.54	26.38	11.59	206.9	1666.49
2002	1505.96	24.85	59.8	7817.08	18.82	7.55	233.5	1813.81
2003	1952.92	20.71	62.1	8364.83	13.51	10.85	294.3	1918.09
2004	2131.82	19.18	67.7	8888.57	20.68	14.16	332.1	2143.45
2005	2637.91	17.95	48.6	9516.99	22.6	20.75	352	2350.99
2006	3797.91	17.26	49.4	10222.47	36.35	26.52	445.8	2574.29
2007	5127.4	16.94	149.6	10958.47	64.92	34.83	487.6	2823.53
2008	8008.2	15.14	106.4	11645.37	58.53	49.95	932.8	3079.04
2009	9411.11	18.99	135.7	12330.33	17.21	33.91	993.5	3323.41
2010	11034.94	17.59	128.4	13048.89	6.79	44.24	987.6	3578.64
2011	12172.49	16.02	255.2	13429.38	12.99	56	1,053.20	4216.19
2012	13895.39	16.79	316.4	14329.71	20.6	51	1,068.30	4783.66

2013	15160.29	16.72	343.7	14750.52	9.66	56	1,179.70	5826.36
2014	17679.29	16.55	478.9	15380.39	4.44	60	1,647.50	6684.22
2015	18901.3	16.85	449.3	15952.22	3	48	1,736.20	6586.62
2016	21607.68	16.87	525.9	16607.34	11.55	39	2,215.70	6302.23

Source: CBN Statistical Bulletin and World Development Indicators published by World Bank.