

Monetary Policy and Manufacturing Sector Output in Nigeria

*Nwankwor, Valentine Afamuefuna; Prof. J. J. E. Ikeora & Ogini Promise

Department of Banking and Finance,
Faculty of Management Sciences
Chukwuemeka Odumegwu Ojukwu University, Anambra, Nigeria
[*mikevalex@yahoo.com](mailto:mikevalex@yahoo.com)

ABSTRACT

Manufacturing sector refers to those industries which are involved in the manufacturing and processing of items and indulge in either creation of new commodities or in value addition. Manufacturing involves the conversion of raw material into finished consumer goods or intermediate goods. The main objective of the study is to examine the effect of monetary policy on manufacturing sector output in Nigeria. Specifically, the study evaluate the effect of monetary policy rate on manufacturing sector output in Nigeria, examine the effect of treasury bill rate on manufacturing sector output in Nigeria, access the effect of cash reserve ratio on manufacturing sector output in Nigeria and to investigate the effect of money supply on manufacturing sector output in Nigeria. Time series data covering 33 years, from 1987 to 2019 was employed. Descriptive statistics were used to explain the nature of the variables used for the analyses. The data were subjected to Augmented Dickey Fuller Stationarity Test. The results showed that all the variables have stationarity at level 1(0). Thus, the most suitable tool of regression used is the ordinary Least Square which was employed for the analysis. Our findings among others revealed that money supply; monetary policy rate and treasury bill rate have positive significant policy effects on manufacturing sector output in Nigerian while cash reserve ratio had negative and insignificant policy effect on manufacturing sector output in Nigeria. The study therefore concludes that monetary policies have positive and significant effect on manufacturing sector output in Nigeria. The study recommended amongst others that the Central Bank of Nigeria should employ an expansionary monetary policy that can increase the money supply to the real sectors to boost economic development in Nigerian. Banks should negotiate a reduced cash reserve ratio with the Central Bank of Nigeria to improve performance. The monetary authorities in Nigeria should reduce monetary policy rate to attract low interest rates that can encourage credit and boost productivity across the sectors which will improve the manufacturing sector output in Nigeria. Concerted effort should be made by policy makers to increase the level of output in Nigeria by improving productivity in order to reduce the prices of goods and services (inflation) so as to enhance economic development in Nigeria. the study therefore suggest that further studies should increase the number of years of studies to ascertain a longer term result and include other variables, such as stock market index, consumer price index, investment per capita, savings and investment, public debt and grant.

Keywords: Monetary Policy, Manufacturing Sector Output, Nigeria

INTRODUCTION

Many developing economies specialise in the production of primary unprocessed raw materials like agricultural products and exploration of natural resources such as crude oil and gold. These economies are largely under-industrialised and prone to substantial shocks, which open the economies to enormous supply-side shocks (Adegbemi, 2018). Economic development theories have explained that industrialisation is the way to achieve faster growth and poverty reduction (Adekunle, Alalade, & Okulenu, 2016). Nigeria has made concerted efforts at diversifying her economy. These efforts are in

the form of policies that encourage growth of the different sectors of the economy. Monetary policy has been largely debated as an indispensable tool for industrialization. According to the classification by the Central Bank of Nigeria (CBN), an industrial sector is a group of firms engaged in similar business interest and production/service line. According to the CBN (2017), the industrial activities in Nigeria are grouped in terms of “activity sector”.

The term, monetary policy refers to instruments of monetary management involving a combination of measures designed by the Central Bank of a country to regulate the availability, value, supply and cost of credit/money in domestic economy with a view to achieving expected macroeconomic stability/targets (Akomolafe, Danladi, Babalola & Abah, 2015). Macroeconomic policy, on the other hand, refers to actions taken by government agencies responsible for the conduct of economic policy to achieve some desired objective of policy through the manipulation of a set of instrumental variables. This puts two set of concepts in perspective: “target variables” and “instrumental variables”, with the target variables being the ones for which the government seeks desirable values and are the immediate goals of macroeconomic policy (Siyasanga, & Hlalefang, 2017). These macroeconomic objectives for Nigeria and most developing countries include sustained rate of economic growth, price stability, balance of payment equilibrium, exchange rate stability and full employment

The growing potentials of manufacturing sector of an economy is strategic to the macroeconomic framework of a nation, to the extent that the sector plays a catalytic role and has many dynamic benefits that are crucial for economic transformation. It is an avenue for increasing productivity in relation to import substitution and export expansion, creating foreign exchange earning capacity, raising employment, promoting the growth of investment at a faster rate than any other sector of the economy, as well as wider and more efficient linkage among different sectors (Fakiyesi, 2005).

The CBN organizes monetary policy targets into three stages with the first being operational target: the manipulation of reserve money over which it has substantial direct control; intermediate target as the level of broad money supply (M_2) which has impact on the objective of monetary policy such as inflation and output. The third is the situation where the CBN in carrying out these functions with the use of nominal anchor in executing her monetary policy. The nominal anchor is an instrument used by the apex bank to pin down expectations of private agents about nominal price level or its path or about what the bank might do with respect to achieving the target path (CBN, 2018). The nominal anchor comes in two types: quality based nominal anchor where quality of money is the target and price-based nominal anchor, which targets exchange or interest rates. The CBN has been known to apply the broad money supply (M_2) as its nominal anchor for monetary policy.

Statement of the Problem

Since the introduction of the Structural Adjustment Programme and all the attendant liberalisation policies, the Nigerian economy has become more open to the market forces and its attendant problems. Some of these problems include high inflation, unstable economic growth, high and increasing rate of unemployment, trade imbalances, unstable exchange rate and high interest rate which suggest that the adoption of a more open economy and the application of price reliant monetary policy is more effective in boosting manufacturing sector output in developing economies like Nigeria.

Previous studies that examined the effect of monetary policy on manufacturing sector output have been conflicting. Some of the existing studies disagreed both in the line of significance and direction of relationship. Some of the studies like Osakwe, Ibenta and Ezeabasili, (2019); Osmond, Egbulonu and Emerenini, (2015) show a significant positive effects while the work of Alagh & Emeka (2014) Imoughele, (2014) found that all the variables of monetary policy employed have a negative effect on manufacturing output. The result of the study carried out by Omini, Ogbeba and Okoi, (2017) indicate that monetary policy has no effect on manufacturing sector output. The discrepancies in these results could be attributed to the use of different statistical techniques and time period, variables used for these studies. Any study that employed a more robust approach is most likely to produce better and more reliable empirical results as given by Hillary, Imo and Uche (2018) on the state of monetary policy and manufacturing sectorial output nexus in Nigeria. Consequently, this calls for a more robust monetary policy model that could be used to engender economic stability and enhance manufacturing output in Nigeria

REVIEW OF RELATED LITERATURE

Conceptual Framework

Monetary Policy

The essence of government control of an economy is to achieve a desired stability for sustainable economic development. Monetary policy is one of the economic strategies of the government undertaken through the apex bank in the country to foster macroeconomic stability in order to promote economic growth (Hillary, Imo & Uche (2018). The monetary authority, which is the Central Bank of Nigeria (CBN) in the case of Nigeria, aims to control the value of money in circulation. The Central Bank of Nigeria (1992) in Adegbelemi, (2018) defined monetary policy as the combination of measures designed to regulate the value, supply and cost of money in an economy, to match with the desired level of economic activities. The monetary authority acts to control the direction and movement of monetary policy and credit facilities in pursuance of stable price and economic growth in an economy. According to Akomolafe, Danladi, Babalola. and Abah, (2015) monetary policy is a deliberate effort of the government geared towards altering the volume and value of money supply, cost of credit, size of credit and direction of credit in order to influence the level of economic activities to achieve desired macroeconomic stability in an economy. Thus, monetary policy is a deliberate action to stabilise the economy by influencing the quantity, cost and availability of money credit.

The process of monetary policy is a complex one involving rigors of measures planned to regulate and control the volume, cost and availability of money and credit within an economy in order to achieve some specified macroeconomic policy objectives (Anyanwu, 1993). Ebikila, Agada, Lucky and Matthew, (2018) have succinctly averred that monetary authorities can effectively employ monetary policy instruments to determine the direction of real economic outcomes. The ability to use monetary policy tools to influence the economy depends on how far the monetary authority is able to control the cost and volume of money. This implies that money supply is the main anchor of monetary policy stance of every government (Ezeji & Michael, 2013).

In order to control money supply, two sets of monetary policies applicable is either expansionary or contractionary (restrictive) policy. An expansionary monetary policy is designed to stimulate the growth of aggregate demand through increase in the rate of money supply thereby making credit more available and interest rates lower. An expansionary monetary policy is more appropriate when aggregate demand is low in relation to the capacity of the economy to produce goods and services. On the contrary, if the quantity of money is reduced or restricted, money income will rise slowly so that consumers spend less and funds for investment are difficult to acquire thereby decreasing aggregate investment (restrictive monetary policy) (Fasanya, IONakoya & Agboluaje, 2013).

Basically, monetary policy aims at controlling money supply so as to counteract all undesirable trends in the economy, which may include unemployment, inflation, sluggish economic growth or disequilibrium in the Balance of Payments. The core objectives of monetary policy has been price stability, maintenance of balance of payments equilibrium, promotion of employment and output growth, with the aim of attaining a sustainable development. These objectives aim to enable the monetary authority to achieve internal and external balance, and the promotion of long-run economic growth. Specifically, the goal of monetary policy can be itemised as economic growth, price stability (inflation rate), interest rate, balance of payment, exchange rate and reduced unemployment (Gatawa, Akinola & Muftau, 2017).

Monetary Policy Rate

Monetary policy rate is the baseline interest rate that every other interest rate adds on to. The rate controls the amount of money in circulation at any given time. Monetary policy rate is set by the Apex bank of a country. Situating it to Nigeria context, it refers to the Central Bank of Nigeria benchmark for interest rate in the Nigerian economy. It is a short term interest rate at which banks can borrow from the apex bank. The MPR was introduced by the former CBN Governor, Professor Charles Soludo in December 2006 to replace the minimum rediscount rate (MRR). A rise in monetary policy rate will result in the shrinking of money in circulation and when you lower it, money supply will expand. The decision to tighten or loosen money supply in an economy rest on the apex bank and depends on its monetary policy focus. Monetary policy rate for Nigeria has remained at 14% since July 2016, but have been reviewed by the Central Bank of Nigeria to 13.5% in March, 2019

In the late 1970s and early 1980s, a number of central banks world-wide adopted monetary targets as a guide for monetary policy. Monetary targeting is an attempt by central banks to describe or

determine the optimum money stock that will yield the desired macroeconomic objectives. Theoretically, the choice of target is normally between the stock of monetary aggregates and interest rates. Whenever the money demand function is unstable, interest rate is generally the preferred target; otherwise, the money stock is the appropriate target (McCallum, 1989). In the early 1990s, some central banks adopted numerical inflation or nominal GDP targets as guides for monetary policy in contrast to the conventional choice of interest rate or money stock. Economists and analysts attribute this departure to the unreliability of monetary aggregates as guides for monetary policy (Osakwe, Ibenta & Nzotta, 2019).

Liquidity Ratio

Bank liquidity simply means the ability of the bank to maintain sufficient funds to pay for its maturing obligations. It is the banks' ability to immediately meet cash, cheques, and other withdrawal obligations and legitimate new loan demand while abiding by existing reserve requirements.

According to Olagunji, Adeyanuju and Olabode (2011), liquidity refers to the ability of a bank to ensure the availability of funds to meet financial commitments or maturing obligations at a reasonable price at all times. Put differently, bank liquidity means banks having money when they need it particularly to satisfy the withdrawal needs of their customers. The survival of deposit money banks depends greatly on how liquid they are, since illiquidity, being a sign of imminent distress, can easily erode the confidence of the public in the banking system and results to run on deposit.

Liquid assets should be marketable or transferable. This means, they are expected to be converted to cash easily and promptly, and are redeemable prior to maturity. Another quality of liquid assets is price stability. Based on this characteristic, bank deposits and short term securities are more liquid than equity investments due to the fact that the prices of the former are fixed than the prices and value of the later.

Liquidity is a financial term that means the amount of capital that is available for investment. Today, most of this capital is credit, not cash. Bank Liquidity simply means the ability of the bank to maintain sufficient funds to pay for its maturing obligations. It is the bank's ability to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demand while abiding by existing reserve requirements. Nwaezeaku (2006) defined liquidity as the degree of convertibility to cash or the ease with which any asset can be converted to cash (sold at a fair market price) (Aghada and Osuji, 2013).

Treasury Bill Rate

Treasury bill rate is used as a proxy for the return on the governments' debt instruments. It is expected that high Treasury bill rates can have a positive impact on commercial banks' investment in Government's instrument. Further, it is anticipated that the high Treasury bill rates could engineer upward pressure on commercial rates in the economy thereby leading to higher interest rates on loans and advances. In this regard, a positive impact is also expected on commercial banks' investment in loans. The inclusion of the Government's fiscal balance has merit in the fact that Government's debt financing activities are driven primarily by the balance on its fiscal accounts (Egbulonu & Ukwuoma, 2018).

These are instruments for short term borrowing issued by the Central Bank on behalf of the Federal Government to meet its short term treasury need. A Treasury Bill is a paperless short-term borrowing instrument issued by the Government through the Central Bank of Nigeria (as a fiscal agent) to raise money on short term basis – for a period of up to 1 year. Treasury bills are issued in maturities of 91, 182 and 364 days. Treasury bills are sold at a discounted price to reflect investor's return and redeemed at face (par) value (Anthony, 2015).

Cash Reserve Ratio

Cash Reserve Ratio refers to a certain percentage of total deposits the commercial banks are required to maintain in the form of cash reserve with the central bank of Nigeria

The objective of maintaining the cash reserve is to prevent the shortage of funds in meeting the demand by the depositors. The amount of reserve to be maintained depends on the bank's experience regarding the cash demand by the depositors. If there had been no government rules, the commercial banks would keep a very low percentage of their deposits in the form of reserves. Since cash reserve is non-interest bearing, i.e. no interest is paid on the deposits, therefore, the commercial banks often keep the reserve below the safe limits. This might lead to a financial crisis in the banking sector. Thus, in order to avoid such uncertainty the central bank imposes a cash reserve ratio or CRR on

commercial banks. The central bank has the legal power to change the CRR any time at its discretion. The cash reserve ratio is a legal requirement and therefore it is also called Statutory Reserve Ratio (SRR). Through a cash reserve ratio, the central bank Nigeria can change money supply in the economy. Such as, when the economy demands a contractionary monetary policy the central bank will raise the CRR. On the other hand, when the economic conditions, demand for an expansionary monetary policy the central bank Nigeria cuts down the CRR. The effect on the supply of money and credit due to the change in CRR is explained below:

Manufacturing Sector Output

The manufacturing sector industry played a significant role in the transformation of the economy for example; it is an avenue for increasing productivity related to import replacement and export expansion, creating foreign exchange earning capacity; and raising employment and per capital income which causes unique consumption patterns. Furthermore, Osakwe, Ibenta and Ezeabasili, (2019) opines that it creates investment capital at a faster rate than any other sector of the economy while promoting wider and more effective linkages among different sectors. Acknowledge this benefit of this sector; the Nigerian government has introduced various strategies to improve the sector such as import substitution strategy, export promotion strategy, the introduction of bank of industry to induced credit facility to the sector and the National Economic Empowerment and Development Strategy (NEEDS).

Loto (2012) revealed that the Structural Adjustment Programme (SAP) introduced in May 1986 was partly designed to revitalize the manufacturing sector by shifting emphasis to increased domestic sourcing of inputs through monetary and fiscal incentives. The deregulation of the foreign exchange market was also effected to make non-oil exports especially manufacturing sector more competitive even though, this also resulted in massive escalation in input costs. Examining the manufacturing sector over the years in Nigerian economy shows that the share of the manufacturing sector in the gross domestic product has not been impressive. The manufacturing sector contributes 34.94% to gross domestic product in 1986 after the structural adjustment programme. By 1990 and 1995 it decline to 22.84% and 10.17% respectively. The contribution of the Nigerian manufacturing sector to Gross domestic product is very insignificant between 1996 to2012. The year 2000, 2005 and 2012 recorded 6.97%, 2.80% and 1.88% respectively (Osakwe, Ibenta & Ezeabasili, 2019).

Theoretical Framework

This study is anchored on the Quantity Theory of Money by Irving Fisher's (1920) which state that the quantity of money is the main determinant of the price level or the value of money. Any change in the quantity of money produces an exactly proportionate change in the price level in the words of Irving Fisher, "Other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportion and the value of money decreases and as the quantity of money in circulation decreases, the price level also decreases in direct proportion and the value of money increase." If the quantity of money is doubled, the price level will also double and the value of money will be one half. On the other hand, if the quantity of money is reduced by one half, the price level will also be reduced by one half and the value of money will be twice. The quantity theory was first developed by Irving Fisher and is a basic theoretical explanation for the link between money and the general price level (Nasko, 2016). The quantity theory of money posit that short-run monetary control can be achieved by interest rates which were sticky but in the long-run the demand of influence was real cash balance (Irving Fisher, 1932). Fisher further assumed that the rise in commodity prices would precede the increase in interest rate which was regarded as main channel of the firms operation cost. Fisher also formulates his equation of exchange and specified that;

$$MV=PT----- (2.1)$$

Where m is the actual money stock, V is the transaction velocity of circulation of money, p is the average price level and T is the number of transaction made per the period. He contends that if the velocity of money changes the supply of money affects prices. An increase in the velocity of circulation will give rise to a proportionate increase in prices and vice versa, with M and T being constant. Prices rise because money moves faster to chase the same quantity of goods. Interest rate affect the velocity of money as rising interest rates and consequently prices will lead buyers to economise on their holdings of money, thus reducing the turnover of money. Fisher, imposes the assumption that the equilibrium values of V, and T will be fairly constant in the short run and

invariant with respect to change in the quantity of money. Given the assumption, equation (1) can be re-written as;

$$\bar{M}\bar{v}=\bar{P}\bar{t} \quad (2.2)$$

Where bars (-) signify that v and t are constant. Given that m is exogenous, there must be proportional relationship in equilibrium between money supply (m) and the general price level. The quantity theory of money with a simple growth model, the quantity theory of money is based on the link between the stock of money (M) and the market value of output that it finances (PY), where p is the price level and y is the output. M is related to p with a factor of proportionality k, the relationship is given by:

$$M=kPY \quad (2.3)$$

$$M/p=KY \quad (2.4)$$

K is assumed to be constant

Equation (2) can actually be written as;

$$MV=PY \quad (2.5)$$

Where $V= 1/k$ and this is the income velocity of money, the ratio of money income (nominal GDP) to the number of times the stock of money turns over in a given period in financing the flow of nominal income. The scenario here is that with the quantity theory, there is a link between monetary policy tools, money supply, it's velocity of circulation and general price level of the Industrial sector output. Therefore, V as income velocity of circulation of money is a very useful concept for monetary policy formulation.

Empirical Review

Osakwe , Ibenta and Ezeabasili (2019) examined the effect of monetary policy on the performance of the Manufacturing sector in Nigeria. The explanatory variables are monetary policy rate, Treasury bills rate, Cash reserve requirement and money supply; while the dependent variable is the Manufacturing (MANU) sector output. The study adopted an ex-post facto research design and used secondary data obtained from the CBN Statistical Bulletin. The study covered a period of 32 years (1986 to 2017). The data were subjected to Augmented Dicker Fuller stationarity test to determine the best suitable econometric tool of analyses. The Autoregressive Distributive Lag (ARDL) was used for the model estimation. The results indicate that: monetary policy tools have significant effect on the manufacturing sector output in Nigeria in the short run only.

Egbulonu and Ukwuoma, (2018) studied the impact of monetary policy on the growth of the manufacturing sector in Nigeria from 1980-2016. Secondary data were used for the study and were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin 2016 edition. Manufacturing sector's output was used as the dependent variable while Money Supply, Exchange rate and Interest rate were the independent variables. The test for stationarity of the data showed the data are integrated of mixed order thereby necessitating the Bounds test for cointegration. The bounds test confirmed the existence of a long run relationship amongst the variables. Analyses of the data was done using the Autoregressive Distributive lag model which estimated both the short run and long run forms of the model. The result showed that money supply has a positive and significant impact on manufacturing output in Nigeria in the short and long run. Exchange rate on the other hand remained negative both in the short and long run and not statistically significant. Interest rate was positive in the short and long run but not a significant determinant of manufacturing output.

Imoughele, (2014) examined the impact of monetary policy on Nigeria's manufacturing sector performance for the period 1986- 2012. Data were collected from the Statistical Bulletin and Annual Report and Statement of Accounts of the Central Bank of Nigeria as well as the Annual Abstracts of statistics (various issues) published by the National Bureau of Statistics (NBS). Unit root test, Granger Causality test, co integration and VAR model were some of the econometrics techniques used for data estimation. Augmented Dickey Fuller (ADF) test statistic revealed that the time series properties of the variables attained stationarity at level and first order. The variables were co integrated at most 2 with at least 3 co integrating equations. The individual variables: external reserve, exchange rate and inflation rate were statistically significant to manufacturing sector output while broad money supply and interest rate were not statistically significant to manufacturing sector output in the previous and current year.

Osmond, Egbulonu and Emerenini (2015) examined the impact of monetary policy variables on manufacturing in Nigeria from 1981 – 2012. The theoretical relationship between monetary policy

variables and manufacturing sector (that is, the real sector) was critically examined and established in this study. Hence, the researcher specified four explanatory variables for this study based on theoretical underpinnings. The Johansen cointegration test was employed in order to establish long run equilibrium relationship between the explained and the explanatory variables. The error correction model (ECM) was employed to estimate the model. The study revealed that money supply and credit to private sector exert tremendous influence on manufacturing in Nigeria.

Hillary, Imo and Uche (2018) assessed the industry effects of monetary policy transmission channels in Nigeria within the period 1981-2014. Techniques of analysis employed in the study are the Johansen cointegration and the error correction model (ECM). Our regression estimates reveal that the private sector credit, interest rate, and exchange rate channels have negative effects on real output growth, both in the long run and in the short run. The results further show that, relatively, the degrees of the established effects are higher in the long run than in the short run. We employed the Johansen cointegration approach to determine the nature of relationship that exists between our dependent variable and the independent variables. The results show that, in the Nigerian case, monetary policy transmission channels jointly have a long-run relationship with real output growth of the industrial sector, and disequilibrium in the system is corrected at the speed of 72.2% annually

Omini, Ogbeba and Okoi (2017) employed the VAR (VECM) model and Granger causality test to investigate the impact of monetary policy shocks on industrial output in Nigeria between 1970 and 2015. The data on the contribution of the manufacturing and solid minerals subsectors to GDP was employed as the dependent variable while explanatory variables included monetary policy rate, exchange rate and bank credit to the industrial sector. Findings from the study revealed that the manufacturing subsector had a positive influence on monetary policy rate, commercial bank credit to industrial sector and exchange rates, while contribution of solid minerals subsector to GDP responded positively to shocks in commercial bank credit to the industrial sector and exchange rate after the first year. The causality test indicated a unidirectional relationship running from monetary policy rate and exchange rate to the contribution of manufacturing sector to GDP on the one hand, and commercial bank credit to the industrial sector and exchange rate to the contribution of solid mineral sector to GDP.

Khaysy and Gan (2017) examined the impact of money supply on the economic development in Nigeria using annual time series data from 1989-2016. The unit root testing result suggests that all variables are stationary at first difference; therefore, the Johansen Cointegration and Error Correction Model were employed to analyze the association between variables. The finding shows that money supply, interest rate and inflation rate have negative effect on per capita income in the long run and only the real exchange rate has a positive sign. The error correction model result indicates the existence of short run causality between money supply, real exchange rate and per capita income

Summary of Empirical Literature

The empirical review of the effect of monetary policy on manufacturing output has shown conflicting findings. A number of the findings posit significant influence from monetary policy especially the moderating effect of money supply (Abate and Nandeeswara, 2015; Adegbelemi, 2018; Adekunle, Alalade and Okulenu, 2016; Ufoeze, Ezeabalisi & Udoka, 2018). Despite agreeing that monetary policy instruments enhances manufacturing sector output, these studies are at variance to the direction of the effects. For instance Akomolafe, Danladi, Babalola and Abah, (2015) and Charisma, Lucky and Matthew (2018) averred that all the variables of monetary policy it employed has a negative effect on manufacturing sector in both long and short run which implies that growing money supply and credit extension will rather hamper manufacturing in Nigeria; as against the belief from studies like Gatawa, Akinola and Muftau, (2017) and Egbulonu and Ukwuoma, (2018) that monetary policy instruments enhances manufacturing sector output in the economy. A number of studies out rightly argued that monetary policy has no effect on the manufacturing sector (Hammed, Irwan and Joel 2017; Khaysy, & Gang, 2017). These studies discovered that money supply has insignificant effect on the manufacturing sector output. Muhammad & Sahibzada, 2017 noted that monetary policy rate and cash reserve requirement are not statistically significant tools for enhancing manufacturing

METHODOLOGY

Research Design

The study employed the ex-post facto research design. The study employed secondary data covering thirty two years period from 1987 to 2019. The data were obtained from the CBN Statistical Bulletin, 2019 and National Bureau for Statistics (NBS).

Model Specification

The general bases for model specification is the quantity theory of money which posits that the velocity at which money is distributed has macroeconomic implication for an economy. This presupposes that monetary policy instruments can influence manufacturing sector output.

The model for the study is stated below;

The model is stated thus:

$$MST = f(MPR, TBR, CRR)$$

Where:

MST = Contribution of manufacturing subsector output to Gross Domestic Product.

MPR = Monetary policy rate

TBR = Treasury Bill Rate

CRR = Cash Reserve Ratio

The model was modified by introducing liquidity ratio as a new variable, thus:

$$MST = f(MPR, TBR, CRR, LDR)$$

Where:

MST = Contribution of manufacturing subsector output to Gross Domestic Product.

MPR = Monetary policy rate

TBR = Treasury Bill Rate

CRR = Cash Reserve Ratio

LDR= Liquidity Ratio.

The Econometric Equation Form of the Model is:

$$\ln MST = \beta_0 + \beta_1 \ln LDR + \beta_2 \ln CRR + \beta_3 \ln MPR + \beta_4 \ln TBR + \mu - - - - - 1$$

b_0 is the constant while b_{1-4} are the coefficients of the explanatory variables (MPR, TBR, CRR and LDR). μ is the error term.

Method of Data Analyses

The data were analyzed with econometric techniques such as Descriptive Statistics, Augmented Dickey Fuller Tests for Unit Roots, Ordinary Least Square (OLS). The OLS method of data analysis was done through the instrumentality of Econometric View (E-view 9) as statistical software. The technique (OLS) was employed because it has the criteria of being Best Linear Unbiased Estimator of linear relationship.

RESULTS AND PRESENTATION OF DATA

The data for the study was presented, analyzed and results taken. The results of the descriptive Statistics, Augmented Dickey Fuller Tests for Unit Roots, Ordinary Least Square and Diagnostics Test were presented and analyzed. The estimation was carried out using the E-views software version 9.0. The hypotheses were tested. Data for the analysis were presented below.

Table 4.1 Data Presentation

SN	Year	Liquidity Ratio	MRR/MPR (%)	Treasury Bill Rate (%)	Cash Reserve Ratio	MOT
1	1987	46.5	12.75	11.75	6.32	249.44
2	1988	45.0	12.75	11.75	10.53	320.33
3	1989	40.3	18.50	17.50	12.58	419.20
4	1990	44.3	18.50	17.50	13.56	499.68
5	1991	38.6	15.50	15.00	12.52	596.04
6	1992	29.1	17.50	21.00	10.49	909.80
7	1993	42.2	26.00	26.90	8.44	1,259.7
8	1994	48.5	13.50	12.50	6.43	1,762.8
9	1995	33.1	13.50	12.50	7.42	2,895.2
10	1996	43.1	13.50	12.25	12.41	3,779.1
11	1997	40.2	13.50	12.00	0.38	4,111.6
12	1998	46.8	13.50	12.95	0.34	4,588.9
13	1999	61.0	18.00	17.00	0.33	5,307.3
14	2000	64.1	14.00	12.00	0.33	6,897.4
15	2001	52.9	20.50	12.95	0.35	8,134.1
16	2002	52.5	16.50	18.88	0.36	11,332.
17	2003	50.9	15.00	15.02	0.45	13,301.
18	2004	50.5	15.00	14.21	0.46	17,321.
19	2005	50.2	13.00	7.00	0.47	22,269.
20	2006	81.42	10.00	8.80	0.48	28,662.
21	2007	41.56	9.50	6.91	0.48	32,995.
22	2008	37.72	9.75	9.55	0.49	39,157.
23	2009	26.39	6.00	1.30	0.49	44,285.
24	2010	27.39	6.25	0.95	0.5	54,612.
25	2011	42.02	12.00	5.56	0.51	62,980.
26	2012	49.72	12.00	10.00	0.51	71,713.
27	2013	46.23	12.00	7.50	50.00	80,092.
28	2014	38.27	13.00	8.00	75.00	89,043.
29	2015	42.35	11.00	2.00	20.00	94,144.
30	2016	45.95	14.00	3.00	22.50	101,48
31	2017	54.79	14.00	9.00	22.50	113,71
32	2018	65.04	14.00	9.80	22.50	127,73
33	2019	64.12	13.50	4.00	22.50	202.44

Source: CBN Statistical Bulletin, 2019

Unit Root Test

Table 3: Summary Unit Root test for Stationarity

Variables	At Level 1(0)	At First Difference 1(1)	At Second Difference	Order of Integration	Probability
LnMOT	-4.561864			1(0)	0.0012
Ln LDR	3.718454			1(0)	0.0037
Ln CRR	-3.907281			1(0)	0.0053
LnMPR	-4.968378			1(0)	0.0085
LnTBR	-5.045210			1(0)	0.0003

Source: Eviews 9.0

The variables were tested for stationarity. The test aimed at understanding the state at which the variables can be held stable for regression analyses. This test becomes pertinent because time series variables are often prone to non-stationarity which is capable of distorting the reliability of regression results. The variables used in the analysis were subjected to Augmented Dickey Fuller (ADF) Tests, to determine whether they are stationary series or non-stationary series. The variables were tested for stationarity at “intercept only” and at “intercept and trend

The result on Table 2 revealed that at level, under the “intercept only”, manufacturing sector output, liquidity ratio, cash ratio, monetary policy rate and treasury rate were stationary at level [1(0)]

From the analyses of stationarity of the variables, it was seen that the variables have stationarity of level. The implication of the result of the stationarity test is that the Ordinary Least Square technique which is capable of handling stationary at level I(0) should be used for the data analysis. Thus, the most suitable tool of analyses is the Ordinary Least Square method of analysis.

The Ordinary Least Square Regressions

In this section, we provide the benchmark test of the significance of the independent variables in explaining the effect of monetary policy on manufacturing sector output in Nigeria

The Ordinary Least Square

Dependent Variable: LNMST

Method: Least Squares

Date: 12/06/21 Time: 16:32

Sample: 1987 2019

Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.045556	0.414446	2.348503	0.0010
LNLDR	1.324803	0.027139	3.407683	0.0342
LNCRR	-0.004398	0.013946	-1.315386	0.7549
LNMPR	2.035757	0.013555	2.637984	0.0137
LNTBR	1.324435	0.130702	3.186949	0.0041
R-squared	0.766467	Mean dependent var		8.857538
Adjusted R-squared	0.725813	S.D. dependent var		2.090952
S.E. of regression	0.135299	Akaike info criterion		-0.999695
Sum squared resid	0.494256	Schwarz criterion		-0.727603
Log likelihood	22.49497	Hannan-Quinn criter.		-0.908144
F-statistic	15.23150	Durbin-Watson stat		2.976966
Prob(F-statistic)	0.000031			

Source: Eviews 9.0

Log of Liquidity Ratio (LNLDR): The coefficient for log of liquidity ratio is positive at 1.324803 with t-Statistic of 3.407683 and probability value of 0.0342 which means that liquidity ratio has positive and significant effect on manufacturing sector output in Nigeria

Log of Cash Reserve Ratio (LNCRR): The coefficient for log of cash reserve ratio is negative at -0.004398 with t-Statistic of -1.315386 and probability value of 0.7549 which means that cash reserve ratio has no significant effect on manufacturing sector output in Nigeria

Log of Monetary Policy Rate (LNMPR): The results showed that the coefficient for log of monetary policy rate (LNMPR) is positive at 2.035757 with t-Statistic of 2.637984 and probability value of

0.0137 which suggest that monetary policy rate has positive and significant effect on manufacturing sector output in Nigeria

Log of Treasury Bill Rate (LNTBR): The coefficient for log of treasury bill rate (LNTBR) is positive at 1.324435 with t-Statistic of 3.186949 and probability value of 0.0041 showing that treasury bill rate has significant effect on manufacturing sector output in Nigeria

CONCLUSION

Our findings revealed that liquidity ratio; monetary policy rate and treasury bill rate have positive significant policy effects on manufacturing sector output in Nigerian while cash reserve ratio had negative and insignificant policy effect on manufacturing sector output in Nigeria. The study therefore concludes that monetary policies have positive and significance effect on manufacturing sector output in Nigeria

RECOMMENDATIONS

The recommendations of the study are as follows:

1. Deposit money banks should avoid holding excess liquid assets, but to ensure increase in loan and advances to the real sectors to boost economic development in Nigerian.
2. Banks should negotiate a reduced cash reserve ratio with the Central Bank of Nigeria in order not to impact negatively on manufacturing sector performance.
3. The monetary authorities in Nigeria should reduce monetary policy rate to attract low interest rates that can encourage credit and boost productivity across the sectors which will improve the manufacturing sector output in Nigeria.
4. Output in Nigeria. Concerted effort should be made by policy makers to steer the use of Treasury bill in increasing the level of output in Nigeria by improving productivity in order to reduce the prices of goods and services (inflation) so as to enhance economic development in Nigeria.

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