Estimated Relationship between Monetary Policy Variables and Real Sector Growth: Evidence from Nigeria

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Abstract
This study examined the relationship between monetary policy variables and growth of the real sector in Nigeria. Time series data were sourced from Central Bank of Nigeria statistical bulletin from 1987-2021. Manufacturing sector gross domestic product was used as dependent variables while open market operation, monetary policy rate, Treasury bill rate and real interest rate were used as independent variables. Multiple regressions with econometrics view statistical package were used as data analysis techniques. Co-integration, Granger Causality Test and Augmented Unit Root Test were used to determine the long and the short run relationship that exist among the variables. The adjusted R^2 from the model proved that the independent variables can explain 73 percent changes on the growth of manufacturing sector. The study conclude that open market operation have positive and significant relationship with growth of the manufacturing sector, that monetary policy rate have positive and significant relationship with growth of the manufacturing sector, that treasury bill rate have positive and significant relationship with growth of the manufacturing sector while real interest rate have negative and significant relationship with growth of the manufacturing sector. The study recommend that the monetary authority should devise measures of managing the variation in indirect monetary policy variables. The regulatory authorities should strengthen its operational structure to enhance the operational efficiency of the financial market to attract foreign investors. The monetary authorities should strengthen indirect monetary policy variables as well as macroeconomic environment that encourages stability in the variables. Government through Central Bank of Nigeria should strengthen existing policies on the monetary policy instruments so as to increase and stabilize money supply in the economy.

Keywords: *Monetary Policy Variables, Real Sector Growth, Monetary Policy Rate, Treasury Bill Rate*

Introduction

The need for government intervention in the working of economic variables to achieve macroeconomic objectives has been long established. This dates back to the 1930s as a result of Keynes (1936) General Theory of Employment, Money and Interest in response to the Great Depression of 1936 in Great Britain. Other economists such as Pigout, (1933), Schumpeter, (1947); Friedman (1956) have posited other theories on how government should intervene in the management of economic variables to achieve general equilibrium in the economy. Monetary policy is one of the intervention measures applied for the promotion of economic growth and development, full employment, price stability (low level of inflation), healthy balance of payment,

exchange rate stability and general economic stability. These objectives have been expanded by Mishra and Pradhan (2008) to include smoothing of the business cycle, prevention of financial crisis and long-term stabilization of interest rates and real exchange rate. Anyawu (1993) opined that monetary policy involves a discretionary effort by the monetary authority (central banks) to control the money supply and credit conditions for the purpose of achieving macroeconomic objectives. Monetary policy instruments are classified as direct and indirect instruments.

The primary goal of monetary policy is the maintenance of domestic price and exchange rate stability as critical condition for the achievement of sustainable economic growth and external viability. Essentially, a stable macroeconomic environment will catalyze output and employment growth such that the standard of living of the citizenry would improve. However, the question as to whether monetary policy can or cannot achieve these objectives is at the centre of the controversy between Monetarist and Keynesians. What is important from the submissions of both schools of thought is that the policy strategy for the achievement of these goals in any economy is often influenced by the stage of development of the economy,including its financial infrastructure.

The real sector of Nigerias' economy appears far separated from the monetary and financial sector, sometimes manifesting an elusive characteristic in monetary policy management. For example, it has been observed that while the financial services sector has grown robustly, especially since the regime of economic liberalization, the real sector, particularly the manufacturing sub-sector, has not grown correspondingly. At best, the real sector typically lags behind the financial services sector (Ndekwu, 2013). The Nigerian real sector faces insurmountable challenges ranging from infrastructural woes to highly unstable business environment and this may be because the Nigerian's the real sector seems to be somehow delinked with the financial sector. And bridging the funding gap depends mainly on both availability and cost of fund, which is largely determined by money supply through monetary policy action. The importance cannot be over emphasized in the economic growth of the country. The real sector output is measured quantitatively as the contribution of the sector to total gross domestic product. The sector is important for variety of reasons, it produces and distributes tangible goods required to satisfy aggregate demand and aggregate supply in the economy (Adegbite, 2010). The performance of the sector can be used to measure the effectiveness of monetary and macroeconomic policies (Adediran & Obasan, 2010). A vibrant industrial sector is capable of generating income, create employment, absorb idle resources and increase capacity utilization which is a prerequisite for economic growth (Mike, 2010). The manufacturing sub-sector act as a catalyst that accelerates the pace of structural transformation and diversification of the economy, thus enabling the country to utilize its factor endowments and to depend less on the foreign supply of finished goods or raw materials (Adediran&Obasam, 2010), the sector also creates investment capital at faster rate than other sector of the economy while promoting wider and more effective linkages among different sectors and facilitate the formation of capital (Tobby&Thompson, 2013).

The relationship between monetary policies and real sector growth can be illustrated through the credit channel which states that monetary policy works by affecting bank assets (loans) as well as banks' liabilities (deposits). The key point is that monetary policy besides shifting the supply of deposits also shifts the supply of bank loans. For instance, an expansionary monetary policy that

increases bank reserves and bank deposits increase the quantity of bank loans available (Bernanke and Blinder (1992). Where many borrowers are dependent on bank loans to finance their activities, this increase in bank loans will cause a rise in investment (and also consumer) spending, leading ultimately to an increase in aggregate output. When monetary policy tightens, the reduction in available bank reserves forces banks to create fewer reservable deposits, banks must then either replace the lost reservable deposits with non-reservable liabilities, or shrink their assets, such as loans and securities, in order to keep total assets in line with the reduced volume of liabilities. Generally, the aim of monetary policy is to ensure that money supply is at a level that is consistent with the desired growth rate of the economy.The effectiveness of monetary policy on real sector growth most especially in developing financial market has been controversial among scholars. The controversies centers largely on the complexity of the medium of transmission, the difficulty in quantifying the overall effect of policy change and the problem of imperfect knowledge among private investors about the effect of monetary policy and private sector funding which is likely to adversely affect the cost of capital and perception of private investors (Ajayi, 2007). According to Mbutor (2009), monetary policy transmission through the monetary policy rate affects cost of funds. From the above, this study focused on the effect of selected monetary policy variables on the growth of real sector in Nigeria.

REVIEW OF RELATED LITERATURE

Monetary Policy

Monetary policy refers to the combination of measures designed to regulate the value, supply and cost of money in an economy, to match with the level of economic activities. It can also be described as the act of controlling the direction and movement of monetary policy and credit facilities in pursuance of stable price and economic growth in an economy (CBN, 1992). In theory, Monetary Policy manipulates the money supply and rate of interest in such a way to achieve the goals of monetary policy (Shoaib, 2010). Monetary Policy defines logical relationship between its instruments (variables) use to affect the outcomes regarding how the Central Bank applies these monetary tools to economic activities to enhance credit availability, targeting the interest rate that will effectively manage the pace of monetary circulation.

The primary goal of monetary policy is to ensure that money supply is at a level that is consistent with economic growth. Without mincing words, the literature stipulates that the pursuant of price stability therefore encompasses all main areas in which the central bank can contribute towards stabilizing the macroeconomic environment of the country. Another impulsive evidence as reported by Christopher, Minsoo, HuaHwa and Jun (2006) is that investors generally believe that monetary policy and macroeconomic events have a large influence on the unpredictability of the stock price, which further implies that macroeconomic variables could exert shocks on share returns and thereafter influence inventors' investment decision (CBN, 1992).

The Central Bank of Nigeria (2011) defined monetary policy as the specific actions taken by it to regulate the value, supply and cost of money in the economy with a view to achieving predetermined macroeconomic goals. Thus, to achieve predetermined economic goals, the CBN

embarks on monetary controls. In doing this, it classifies money into Narrow Money (M1) and Broad Money (M2). M1 is made up of currency in circulation with the non-bank public; and demand deposits (current accounts in the banks). This category of money represents money used for daily transactions and short-term monetary needs. The broad money consists of narrow money and savings as well as time deposits (that is, call money). It also includes foreign currency-denominated deposits.

This categorization measures the total volume of money in supply in the economy. It is via the broad money that liquidity and inflation issues are tackled by the Central Bank of Nigeria. The need to regulate money supply arises from the observed direct relationship that exists between it and economic activities. This means that when the supply of money rises above required levels or falls below required levels, economic activities are negatively affected owing to inflation or illiquidity as the case may be; and this in turn can hamper economic growth of industries.

Monetary Policy Rate

Monetary Policy Rate (MPR) is the rate which central banks lend to Deposit Money Banks in performing their duties as lenders of last resort. It is usually set at a level that is consistent with the objective of price stability of central banks. The monetary policy rate is expected to communicate the stance of monetary policy and acts as a guide for all other market interest rates (CBN 2016). The monetary policy rate is used as a monetary authority policy tool that defines the focal point of a standing facility meant to steer market interest rates. While the upper bound corridor of the monetary policy rate represents monetary authority (CBN) lending rate to deposit money banks, the lower bound corridor represent the deposit rate at which the monetary authority (CBN) accepts deposits from deposit money banks under the Standing Lending Facility (SLF) and Standing Deposit Facility (SDF) of the central bank.

There is general agreement among economists and policymakers that monetary policy works mainly through interest rates. When the central bank policy is tightened through a decrease in reserve provision, for instance, interest rates rise. Interest rate rise means that the banks have to adjust their lending rates upwards. The rise in interest rates leads to a reduction in spending by interest sensitive sectors of the economy, such as housing and consumer purchases of durable goods. Therefore, the cost of credit becomes high and in most cases becomes unaffordable reducing demand for credit. Some economists and policymakers have argued that an additional policy channel works through bank credit (Keeton, 1979; Stiglitz and Weiss, 2001). In this view, monetary policy directly constrains the ability of banks to make new loans, making credit less available to borrowers who depend on bank financing. Thus, in the credit channel, restrictive monetary policy works not only by raising interest rates, but also by directly restricting bank credit.

Treasury Bill Rate

Treasury Bills (NTB) are short-term debt instruments that mature in one year or less and are issued by the CBN on behalf of the Federal Government, to raise surplus funds from both banks and non-bank publics. Rufino (2008) defined Treasury Bills as short term instruments issued by the government under varying tenor to finance its operations. Treasury bills are basically government

own and guaranteed debt instruments issued by the monetary authority of a country to control money supply (CBN 2016). Treasury Bills are securitized government debt securities used to finance deficit budget and features as a veritable tool in the liquidity management. Treasury bills in Nigeria are governed by the Treasury Bills ordinance of 1959 and were first issued in April 1960. The bills become the first major money market instruments issued by the CBN in April 1960 and were issued in fixed tenors of 91 days, 182 days and 364 days. Treasury bills are issued (auctions) in different denominations to potential investors via authorized dealers. Treasury bills are issued in bear form and are negotiable. The Nigeria Treasury Bills also serve as monetary policy instruments employed by the CBN to control the liquidity level in the banking system through Open Market Operation (OMO). They are the most liquid and marketable of all the money market instruments due to its ease of access, affordability and safety (CBN, 2008). The demand for Treasury bills in Nigeria transcends various types of investors, corporations, domestic financial intermediaries (commercial and merchant banks), international investors, firms, individuals etc. The CBN participate majorly in the Treasury bill market vis-à-vis its monetary policy implementation and monetary transmission mechanism.

Interest Rate

The transmission of monetary policy to the final objective occurs in different stages and over various channels. Key among these channels is the interest rate channel which "transmits changes in policy rates to retail rates via the money markets (Gigineishvili, 2011). Hence, the interest rate channel can be broken down with respect to the link between policy and market (or interbank) rate, on the one hand and between market and retail rates on the other hand. At each stage, the pass-through in these interest rates is usually assumed to be complete; thus, implying that 100 per cent of the changes in policy rate is reflected in the response rates. Effectiveness of the interest rate channel requires that pass-through is not only complete but relatively fast, as a quicker response rate reduces the overall response lag of monetary policy. This channel is believed to be dominant in countries with advanced and sophisticated financial market vis-à-vis those with underdeveloped markets (Gigineishvili, op.cit). Thus, for developing countries with weak and rudimentary financial markets monetary policy, via this channel, may be less effective (Weeks, 2009; 2010).

Growth of the Real Sector

The real sector comprises of the productive sector of the economy. The sectors are agricultural sector, manufacturing sector and the service industries.This sector is one of the sectors that is capable, if vibrant, of fast-tracking economic growth and development coupled with high level of massive employment creation. Financing the sector is an issue of main concern considering the slow pace of growth in the financial sector which is further aggravated by the incessant money market (banks) collapses, caused by the malfeasance of corporate insiders. The slow pace of growth is also further worsened recently by the global economic meltdown that almost ruin the Nigerian stock market and those of other nations of the world (Ibadin, Moni&Eikhomun, 2014)

Monetarist Theory of Monetary Policy

Monetarists link the economic growth and price level through monetary growth. Friedman (1956) emphasizes the role of money growth in determining inflation, by way of quantity theory of money and the neutrality of money. He reports that inflation occurs when an increase in money supply

growth (or velocity of money) is greater than the output growth rate, but that inflation would not hamper the gross domestic product growth rate when the neutrality of money holds. Hence, real variables including the output growth rate are independent of the level of the money supply. However, in practice, inflation has real consequences on other macroeconomic variables, through its effect on the levels of physical capital, investments and trade (Gokal&Hanif, 2004).Monetary growth theory emphasizes that the money growth rate does have an effect on prices in the long term, even though it does not have a real effect on the gross domestic product growth rate. Using the cash-in-advance model, Stockman (1981) suggested that money is complementary to capital, and that it causes an inverse correlation between inflation and the output growth rate. This implies that an increase in inflation reduces the purchasing power of money balances and that this in turn tends to reduce the purchase of consumption and capital goods and thereby reduces the long-term output.

Empirical Review

Obi (2021) examined the effect of monetary policy instruments on manufacturing sector output in Nigeria. The specific objectives are to: 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 investigate the effect of money supply on manufacturing sector output in Nigeria. The study employed an ex-post facto research design because the data for the study were secondary data which were obtained from Central bank of Nigeria Statistical Bulletin, 2020. The result of the study indicates that manufacturing subsector output is an endogenous variable in the explanation of the effect of monetary policy on manufacturing sector output in Nigeria in the short run, monetary policy rate, money supply has positive and significant effect on manufacturing sector output in the short run while treasury bill rate has no significant effect on manufacturing sector output in the short run. Amongst the recommendations of the study is that the Central Bank Nigeria should employ an expansionary monetary policy that can increase the money supply to the real sectors and boost performance of the Nigerian economy. The Central Bank Nigeria should reduce the MPR to attract low interest rates that can encourage credit and boost productivity across the sectors in Nigeria. As seen from the results, the various monetary policy tools have diverse effects on manufacturing outputs in Nigeria. The Central Bank of Nigeria should employ different set of monetary policy directives under guided deregulation for each of the sectors in Nigeria. Financial institutions, especially the Deposit Money Banks, should not be constrained by CRR as this might hinder growth in the economy

Shobande (2019) examined the impact of switching from direct to indirect monetary policy on industrial growth in Nigeria, using the annual time series data sourced from the Central Bank of Nigeria's (CBN) statistical bulletin between 1960 and 2015. The study adopts the Autoregressive Distributed Lag (ARDL) bound testing approach developed by Pesaran, Shin and Smith (2001) for estimating the relevant relationships. The result of the long-run estimates shows that domestic credit, interest rate and trade balance have positive impact on industrial output while money supply, inflation and exchange rate have negative impact on industrial growth. The result of the short-run dynamics shows that change in the previous (one and second lagged) periods of indirect

monetary policy (interest rate, money supply, domestic credit and exchange rate) and industrial output were negatively related to change in industrial output. The error correction term indicates the speed of adjustment of equilibrium to their longrun position, which was found to be negative and significant. The study recommends that policy makers use both conventional and non-conventional monetary policies to speed up industrial output growth and enhance economic recovery by manipulating the macro-economic fundamentals.

Ezeaku, Ibe, Ugwuanyi, Modebe and Agbaeze (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. The study employed the Johansen cointegration approach to determine the nature of the 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.

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Siagwu, Utalorand Anaele (2021) analyzed monetary policy and industrial growth in Nigeria with data spanning from 1996-2019. The Statistical Bulletin of the Central Bank of Nigeria (CBN) and World Development Indicators were used to compile the data. Descriptive statistics, Augmented Dickey Fuller (ADF) test, Granger causality, and Ordinary Least Square (OLS) were analytical tool used to test the hypotheses. E-Views 9.0 is used as the statistical tool for this study and Log of Industry Sector Gross domestic product (LogINGDP) as the dependent variable, Lending Rate (LR), Deposit interest rate (DPIR) and Money Supply annual growth Rate (M2) as the independent/explanatory variables. The study concludes that lending rate (LR), deposit interest rate (DPIR) and money supply growth rate (M2) as proxies for monetary policy have significant impact on industrial growth of developing countries, Nigeria in particular. That is, monetary policy is an effective means of improving industry growth as well as growth of the economy. The study recommends that Federal Government should review its monetary policies through the Central Bank on its instruments to boost industry sector growth of Nigeria.

Literature Gaps

Most of the existing studies reviewed examined monetary policy effect vis-à-vis the aggregate economy or a particular industry in a sector, hence creating a gap in the frontiers of knowledge regarding to explain the real output response, from a disaggregated point of view to monetary policy variables in Nigeria. Existing literature has focused more on the effect of monetary policy and credit to the real sector of the economy, measuring the relationship between bank credit variables and economic growth. This study focused on the existing relationship between indirect monetary policy variables on growth of the manufacturing sector in Nigeria

METHODOLOGY

Research design refers to the choices researchers make regarding the methodology and methods required to address identified research question(s) (Bryman and Bell, 2015). According to Collis and Hussey (2014), justifying the methodology and methods choices in a positivist paradigm requires less energy in comparison to interpretivist paradigm. This assertion can be attributable to the existence of logical reasoning guiding positivist studies which does not apply in interpretivist studies. In research, there are three types of research design: quantitative, qualitative and mixed method. Following the objective, this study will collect secondary data in order to achieve the research aim. According to Saunders, Lewis and Thornhill (2018), the specific type of secondary data relevant for this study is longitudinal raw data as it is applicable for studies based on time series analysis. In this regard, the secondary data for this study will be collected from Central Bank of Nigeria statistical bulletins and World Bank database. The technique used in this study is the Ordinary Least Square (OLS) estimation technique. The test instruments in the OLS are the T-statistics and F-test which were used to test the significance of variables and the overall significance of the regression respectively. Other test instruments also employed were the Durbin Watson test which will be used to test the presence or absence of auto correlation between and among the explanatory variables and the adjusted R square used to test the percentage variation of the dependent and the independent variables.

Model Specifications

MSGDP = f(OMO, MPR, TBR,RIR) (1)

Transforming equation 1 to 2 to econometrics form

$$MSG = \alpha + \beta_1 OMO + \beta_2 + MPR + \beta_3 TBR + \beta_4 RIR + e_i \quad (2)$$

Where;

MSGDP = Manufacturing sector growth measured as percentage of total gross domestic product

OMO = Open market operation measured as value of Treasury bill to gross domestic product

MPR = Monetary policy rate

TBR = Treasury bill rate

RIR = Real interest rate

$\phi_0 \alpha_0$ = Constant

β_1 - β_5 = Coefficients of independent variables

ε = Error Term

Unit Root Tests

In econometrics, broad variety of economic time series is characterized by trending performance which raises an essential question about statistical modeling of variables in the long run (Wolters and Hassler, 2006). As such, since the seminal literature of Nelson and Plosser (1982), economists are aware that modelling the long-run behaviour of variables by trend or difference has significant consequences for economic interpretation.

Test for Cointegration or Long-run Relationship

Over the past decade, two main approaches to examine cointegration have gained considerable attention of scholars in empirical economics: the two-step residualbased approach of Engle and Granger (1987), Phillips and Ouliaris (1990) and system-based reduced rank approach of Johansen (1991). As such, these approaches concentrate on situations where underlying variables are integrated of order one or I(1). Hence, a newly test of cointegration was initially proposed in the study of Pesaran and Shin (1999) and further extended in Pesaran, Shin and Smith (2001). In this regard, the approach of Pesaran, Shin and Smith (2001) is applicable to test cointegration irrespective the order of integration among underlying regressors: purely I(0), purely I(1) or mutually cointegrated, but not I(2) to ensure its validity.

Granger Causality

Test In addition to the ARDL and VAR models as applied where necessary to examine relationship, this study followed the common phrase in statistics that 'correlation does not imply causation' to provide further empirical evidence for this study. In this regard, this study further adopted Granger causality using Wald tests to determine the direction of causality between variables in both aggregated and disaggregated empirical models. Thus, this output aided the researcher to examine the existing four causality views between finance and growth. The Granger causality tests provide answers to the questions: 'is it gY that causes each independent variable (x) [gY x] or each independent variable causes gY [x gY] As such, the Granger causality test assumes that information pertinent to predict the variables is contained only in the time series data of the variables (Gujarati and Porter, 2010). The null and alternative hypotheses for causality are defined as: H0 (Null Hypothesis): There is no causality between monetary policy variables and growth of the industrial sector Nigeria. H1 (Alternative Hypothesis): There is causality between monetary policy variables and growth of the manufacturing sector Nigeria.

RESULTS AND DISCUSSION OF FINDINGS

The estimates and results of the models and techniques as formulated in chapter three of this work are presented in this chapter. The short run regression results of the direct monetary policy variables, the unit roots test, and the test of co-integration are presented. The granger causality test was used to examine the causal relationship running from the independent variables to dependents variable and from dependents to independent variables. Vector Error correction model was used to estimate the long-run relationship between monetary policy variables and private sector funding variables. The Ordinary Least Square (OLS) estimates for the models and the discussion of hypotheses and findings were also presented.

Table 1: Unit Root Test

Variable	ADF Statistics	MacKinnon @ 1%	MacKinnon @ 5%	MacKinnon @ 10%	Order of Integration	Conclusion
GMS	-12.44898	-3.653730	-2.957110	-2.617434	1(1)	Stationary
OMO	-5.334013	-3.679322	-2.967767	-2.622989	1(1)	Stationary
MPR	-8.711265	-3.661661	-2.960411	-2.619160	1(1)	Stationary
TBR	-11.81939	-3.646342	-2.954021	-2.615817	1(1)	Stationary
RIR	-8.11839	-3.679322	-2.967767	-2.622989	1(1)	Stationary

Source: Extract from E-view 9.0

The time series properties of the variables used in the analysis was investigated using Augmented Dickey-Fuller test. The test was run with specification of trend and intercept in the model. The ADF statistics for the test are presented in the table above. It can be seen from the table 1 above that the unit root test results, using the ADF unit root test suggest that growth of manufacturing sector and treasury bill rate are both stationary at level and difference however, all series are stationary at order I (1).

Table 2: Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.724876	111.8714	69.81889	0.0000
At most 1 *	0.574534	70.57430	47.85613	0.0001
At most 2 *	0.449876	43.22808	29.79707	0.0008
At most 3 *	0.367083	24.10449	15.49471	0.0020
At most 4 *	0.256100	9.467173	3.841466	0.0021

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.724876	41.29709	33.87687	0.0054
At most 1	0.574534	27.34621	27.58434	0.0536
At most 2	0.449876	19.12360	21.13162	0.0933
At most 3 *	0.367083	14.63731	14.26460	0.0436
At most 4 *	0.256100	9.467173	3.841466	0.0021

Source: Extract from E-view 9.0

Table 2 presents the cointegration test of the relationship between assets pricing channels and the growth of the manufacturing sector in Nigeria. The results of the Johansen co-integration test show that we reject the null hypotheses of no co-integrating equation at the 5% level of significance. This implies that, there is linear combination of the variables that are stationary in the long run and also confirms the existence of a long-run relationship between the dependent and the independent variables.

Table 3: Pairwise Granger Causality Tests

Hypothesis	Obs	F-Statistic	Prob.	Conclusion
OMO does not Granger Cause GMS	32	4.56141	0.0196	causal relationship Reject HO
GMS does not Granger Cause OMO	32	0.15575	0.8565	No causal relationship Accept HO
MPR does not Granger Cause GMS	32	1.64348	0.2121	No causal relationship Accept HO
GMS does not Granger Cause MPR	32	0.52241	0.5990	No causal relationship Accept HO
TBR does not Granger Cause GMS	32	0.15139	0.8602	No causal relationship Accept HO
GMS does not Granger Cause TBR	32	1.66894	0.2073	No causal relationship Accept HO
RIR does not Granger Cause GMS	32	0.87723	0.4275	No causal relationship Accept HO
GMS does not Granger Cause RIR	32	0.13526	0.8741	No causal relationship Accept HO

Source: Extract from E-view 9.0

Table 3 summaries the pairwise granger causality tests relationship between assets pricing channel and the growth of Nigeria manufacturing sector.

Table 4: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-799.0776	NA	4.60e+15*	50.25485*	50.48387*	50.33077*
1	-774.9389	39.22549*	4.97e+15	50.30868	51.68281	50.76416
2	-757.8314	22.45350	9.20e+15	50.80197	53.32120	51.63702

Source: Extract from E-view 9.0

Table 4 presents the Var Lag Order Selection Criteria on the relationship between asset pricing channel and growth of Nigeria manufacturing sector. The most popular of the information criteria are the Akaike information criteria (AIC), and Bayesian information criteria (BIC) (Stock and Watson, 2012). Since the value proposed by both AIC, HQIC is lag 1, the optimal lag length in this study is 1

Table 6: Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GMS(-1))	-0.247220	0.271893	-0.909254	0.3746
D(GMS(-2))	0.000213	0.173906	0.001226	0.9990
D(OMO(-1))	3.684166	0.808428	4.557194	0.0002
D(OMO(-2))	0.760491	1.043585	0.728729	0.4751
D(MPR(-1))	-1.749860	1.100498	-1.990061	0.0283
D(MPR(-2))	-2.082446	1.042433	-1.997679	0.0603
D(TBR(-1))	-2.826921	0.886541	-3.188707	0.0048
D(TBR(-2))	-0.097726	1.037564	-0.094188	0.9259
D(RIR(-1))	-0.518191	0.734667	-0.705342	0.4892
D(RIR(-2))	0.875912	0.802582	1.091367	0.2888
ECM(-1)	-0.722820	0.309177	-2.337886	0.0305
C	-1.115092	20.98319	-0.053142	0.9582
R-squared	0.829488	Mean dependent var		0.669469
Adjusted R-squared	0.730770	S.D. dependent var		224.4518
S.E. of regression	116.4620	Akaike info criterion		12.63765
Sum squared resid	257704.7	Schwarz criterion		13.19274
Log likelihood	-183.8836	Hannan-Quinn criter.		12.81860
F-statistic	8.402644	Durbin-Watson stat		2.215732
Prob(F-statistic)	0.000035			

Source: Extract from E-view 9.0

Table 6 presents the relationship between indirect monetary policy and the growth of Nigeria manufacturing sector. The corresponding sign of Error Correction Term (ECT) is negative but not significant. The negative sign of (ECT) indicates a move back towards equilibrium following a shock to the system in the previous year. The adjusted R^2 from the model proved that the independent variables can explain 73 percent changes on the growth of manufacturing sector. The model is statistically significant from the value of f-statistics and probability. However, the ECM coefficient indicates that the models can adjust at the speed of 72.2 percent annually. The

coefficient of the variables defines the effect of the independent variables on the dependent variables at various lags.

Discussion of Findings

The estimated regression model found that open market operation, Treasury bill rate and real interest rate has negative and significant effect on the growth of Nigeria manufacturing sector. Coefficient of the variables indicates that the variables reduced growth of the manufacturing sector by 1.7, 2.8 and 0.51 percent. The negative effect of the variables contradicts our a-priori expectations and not in line with regulatory policies to encourage investment such as the deregulation of interest rate in the last quarter of 1986. The negative effect of the variables further contradicts demand and supply for loanable fund theory. Empirically, the negative effect of the variables contradicts the findings of D'Pola, and Touk, (2016) that commercial bank credit and real interest rate have a negative and significant impact on the performance of SMEs in Cameroon, the findings of Sesay and Abdulai (2017) that money supply and gross domestic saving exert positive and statistically significant effect on private sector investments whereas treasury bill rate, inflation and gross domestic debt exert a negative effect and the findings of João, Barroso and Gonzalez (2017).

Furthermore, the study established that monetary policy rate have positive and significant effect on the growth of Nigeria manufacturing sector. The estimated model justifies that the variables added 3.7 percent on the growth of Nigeria manufacturing sector. The positive effect of the variables confirms our a-priori expectations.it is in line with financial sector reforms. and the empirically the findings is in line with the findings of Karimo and Ogbonna (2017) that financial deepening leads to growth and not growth leading financial deepening, Daniel (2017) that there is a significant relationship between liquidity management and the performance of Deposit Money Banks in Nigeria and the findings of Ezeaku, Ibe, Ugwuanyi, Modebe and Agbaeze (2018) 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 and the findings of Adelegan (2018) that the relationship between growth and domestic credit to the private sector is positive and insignificant. Also, the results show that increase in PLR reduces output for the period under study, but this was not statistically significant.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined the relationship between indirect monetary policy and the growth of Nigeria manufacturing sector.Section one of the study has detail of the background, statement of the problem, objectives of the study, statement of hypotheses and study question. Section two contains the review of related literature. The study presented the methodology in section three, section four of the study contain the data, results and discussion. In this section, the researcher summaries draw conclusion and make recommendations. From the model, the study found that 73 percent variation in the growth of Nigeria manufacturing sector could be traced to variation in the indirect monetary policy variables. The model was found to be statistically significant in explaining the relationship between indirect monetary policy variables and growth of the manufacturing sector, the variables were all stationary at difference, the cointegartion result proved that there was linear combination

of the variables in the long run while the granger causality test proved that, there was no causal relationship among the variables. Beta coefficient of the variables proved that the variables were statistically not significant in determining variation in the growth of the agricultural sector; this implies that we accept the null hypotheses.

From the findings, the study conclude that open market operation have positive and significant relationship with growth of the manufacturing sector, the study conclude that monetary policy rate have positive and significant relationship with growth of the manufacturing sector. The study conclude that treasury bills rate have positive and significant relationship with growth of the manufacturing sector while real interest rate have negative and significant relationship with growth of the manufacturing sector.

Recommendations

1. This study therefore recommends that the monetary authority should devise measures of managing the variation in indirect monetary policy variables.
2. The regulatory authorities should strengthen its operational structure to enhance the operational efficiency of the financial market to attract foreign investors for stability in indirect monetary policy variables
3. The study recommends macroeconomic and monetary policy environment that encourages stability in the variables and government through Central Bank of Nigeria should strengthen existing policies on the monetary policy instruments so as to increase and stabilize money supply in the economy.

REFERENCES

Abdullahi, B. M. (2014). *Monetary policy transmission mechanism and the Nigerian economy.*University of Nigeria Virtual Library.

Adelegan, A.E. (2018). Private domestic investment, Domestic Credit to the private sector and economic performance: Nigeria in perspective. *IOSR Journal of Economics and Finance (IOSR-JEF)*. 9 (3), 22-31.

Adeniyi, A.M., Adeyemi, A.K, Salawudeen O.S. and Fagbemi, T.O. (2018). Monetary Policy and Bank Credit in Nigeria: A Toda-Yamamoto Approach. *ACTA UNIVERSITATIS DANUBIUS, 14, (5), 718729.*

Adesola, W. A. (2019) Testing static tradeoff theory against pecking order models of capital structure in Nigerian Quoted Firms. *Global Journal of Social Sciences 8(1), 61-76.*

Agbonkhese, A.O. &Asekome, M.O. (2013).The impact of monetary policy on bank credit creation in Nigeria.*International Journal of Business and Social Science, 4(15), pp. 160-165.*

Agu, C.C &Chukwu, J.O. (2008). Toda and Yamamoto causality tests between bank-based financial deepening and economic growth in Nigeria. *European Journal of Social Sciences, 7 (2), 189-198*

Alphonce, T.S., Silvanos C. &Ziska, F. (2015). Determinants of Commercial Bank Profitability from Prior- to Post-Hyperinflation: Evidence from Zimbabwe. *J Economics, 6(2): 129-139.*

Amassoma, J.D., Nwosa, P.I. and Ofere, A.F. (2011). The nexus of interest rate, deregulation lending rate and agricultural productivity in Nigeria. *Current Research Journal of Economic Theory,3, (2):53-60.*

Anigbogu, T. U., Okoli, I. M. &Nwakoby, N. P. (2015).Financial intermediation and small and medium enterprises performance in Nigeria (An aggregated analysis: 1980-2013).*European Scientific Journal, 11(28), 257-272.*

Assefa, M. (2014). Determinants of Growth in Bank Credit to the Private Sector in Ethiopia: A Supply Side Approach. *Research Journal of Finance and Accounting.Vol.5, No.17.*

Ayub, G. &Seyed, A.M. (2016). The relationship between monetary policy and bank lending behavior and the influence of bank specific features on this relationship in the banks listed on the Tehran Stock Exchange. *International Journal of Advanced Biotechnology and Research (IJBR), 7(2).115-125.*

Borio, C. (2012). Capital regulation, risk-taking and monetary policy: A missing link in the transmission mechanism? *Journal of Financial Stability 8(4), 236–251.*

Bornhorst, F., M. (2015).Indebtedness and deleveraging in the euro area. 2013 Article IV Consultation on euro area policies: *IMF Country Report No. 13/206.*

Central Bank of Nigeria (2017).Monetary Policy at a Glance.Monetary Policy Department Series.Accessed at https://www .cbn.gov.ng/Out/20 17/CCD/MONETAR Y%20P OLICY % 20 AT%20A%20GLANCE.pdf.

Central Bank of Nigeria (2017). Understanding Monetary Policy Series No. 1: What is Monetary Policy? Central Bank of Nigeria, Abuja, Nigeria, Retrieved from http//:www.cbn.org.ng

Chimobi, O.P., &Igwe, O.L. (2010).Budget deficit, money supply, and inflation in Nigeria.*European Journal of Economics, Finance and Administrative Sciences, 19(5), 52-60.*

Chithambo, L.W., (2013). Determinants of risk disclosure compliance in Malawi: A mixed method approach. *Journal of Accounting in Emerging Economies.6 (2), 111- 137.*

D'pola, K. U. and Touk, M.C. (2016). The Effect of Commercial Bank credit on the output of small and medium enterprises in Cameroon: Empirical evidence from 1980-2014. *Maghreb Review of Economic Management,* 03 - N° 02.

Daniel, B. C., & Jones, J. B. (2007).Financial liberalization and banking crises in emerging economies.*Journal of International Economics, 72(1), 202-221.*

Daniel, B.E. (2017). Liquidity Management and Performance of Deposit Money Banks in Nigeria (1986 – 2011): An Investigation. *International Journal of Economics, Finance and Management Sciences 5(3), 146-161.*

Echekoba, F.N. &Ubesie M.C. (2018) Assessment of Financial Deepening on the Growth of Nigerian Economy: 1990-2016. *International Journal of Academic Management Science Research (IJAMSR).* Vol. 2 Issue 11, Pages: 70-82.

Economic Review 59, 850–72.

Enyioko N. (2012) Impact of Interest Rate Policy and Performance of Deposit Money Banks in Nigerian.*Global Journal of Management and Business Research* Volume 12 Issue 21 Online ISSN: 2249-4588 & Print ISSN: 0975-5853.

Eyas G. A. Osman, (2014). The impact of private sector credit on Saudi Arabia economic growth (GDP): An econometrics model using (ARDL) approach to cointegration. *American International Journal of Social Science, 3,(6),890-899.*

Ezeaku H.C, Ibe I.G, Ugwuanyi U.B, Modebe N.J. &Agbaeze E.K. (2018) Monetary policy transmission and industrial sector growth: Empirical evidence from Nigeria. *SAGE*.doi:10.1177/2158244018769369

Fountas, S, Karanasos, M, and Kim, J, (2006). Inflation uncertainty, output growth uncertainty and macroeconomic performance.*Oxford Bulletin of Economic and Statistics, 68 (2006), pp. 319-343.*

Freimer, M., & Gordon, M. (1965). Why bankers ration credit. *Quarterly Journal of Economics, 7(9), 397–410.*

Friedman, M. (1956).The quantity theory of money: A restatement" in studies in the quantity theory of money, edited by M. Friedman.Reprinted in M. Friedman The Optimum Quantity of Money, pp. 51-67.

Hammed, Y.S. (2020).Monetary policy shock and manufacturing output in Nigeria (1981-2018).*Advance Journal of Social Science 7(1); 27-37*

Hyunggeun P., Hyunwoo J., Dokyung, L. (2015). Evaluation on the usefulness of the loan-to-deposit ratio regulation - From the macroprudential policy perspective.Financial Research Team, Financial Stability Department, Bank of Korea working paper.

Iddrisu, S, Harvey, S. K., and Amidu, .M, (2017). The Impact of Monetary Policy on Stock Markey Performance: Evidence from Twelve (12) African Countries. *Research in International Business and Finance http://dx.doi.org/10.1016/j.ribaf.2017.07.075.*

Ifeakachukwu, P., Olufemi, M., & Saibu, O. (2012). The monetary transmission mechanism in Nigeria: A sectoral output analysis. *The International Journal of Economic and Finance (IJEF). 4. 204-212. 10.5539*/ijef.V4n1p204.

Imoughele, L. E. &Ismaila, M. (2014). The impact of commercial bank credit on the growth of small and medium scale enterprises: An econometric evidence from Nigeria (1986 - 2012). *Journal of Educational Policy and Entrepreneurial Research, 1(2), 251-261.*

Isola L, A., Somoye, R.O., Babajide, A.A. and Nwanji,T.I. (2017). The effect of fiscal and monetary policies interaction on stock market performance: Evidence from Nigeria. *Future Business Journal (2017), https://doi.org/10.1016/j.fbj.2019.11.004.*

Johansen, S. (1988).Statistical analysis of cointegration vectors. *Journal of Economics Dynamic and Control, 12, 231 – 254.*

Kuttner, K.N. &Mosser, P.C. (2002). The monetary transmission mechanism: Some Answers and Further Questions." *Federal Reserve Bank of New York Economic Review 8: 1: 15−24.*

Lawal, A.I., Somoye, R.O. &Babajide, A.A. (2017). The effect of monetary and fiscal policies interaction on stock market performance: Evidence from Nigeria. *Elsevier Future Business Journal.2(3).*

Leorne N. (2014). Implications of monetary policy for credit and investment in Sub-Saharan African (SSA) countries.*Political Economy Research Institute (PERI), Working Paper Series 356.*

Mafimisebi, T.E. (2009). Spatial price equilibrium and fish market integration in Nigeria: Pricing contacts of spatially separated markets. *LAP Lambert Publishing Company, Germany, 3(4),157-187.*

Malede, M. (2014). Determinants of commercial banks' lending: evidence from Ethiopian commercial banks. *European Journal of Business and Management, 2(2), 304-318.*

Masuko, L., &Marufu, D. (2013). The determinants of transactions cost and access to credit by SMEs and the poor in Zimbabwe. *Research Paper No. 3-9.*

Mbutor, M. O. (2009). The dominant channels of monetary policy transmission in Nigeria: An empirical investigation. *CBN Economic and Financial review, 47(1).*

McKinnon, R., (1973). *Money and capital in economic development. Washington, DC: Brookings Institution.*

Mohammed, O. (2014). Re-positioning commercial banks to enhance the productive capacities of Small and Medium – Scale Enterprises (SMEs) for economic growth of developing nations: A focus on Nigeria. *International Journal of Public Administration and Management Research, 2(2): 193-198*

Nanyondo.M. (2014).Quality of financial statements, information asymmetry, perceived risk and access to finance by Ugandan SMEs.*International Journal of Management Practice, 7(4), 324-340.*

Nasko, A. M. (2016). Impact of Monetary Policy on the Economy of Nigeria.*Pyrex Journal of Business and Finance Management Research* Vol 2.Pp.163-179.

Ndebbio, J.E.U. (2004). Financial deepening, economic growth and development: Evidence from selected Sub- Saharan African Countries. *African Economic Research Consortium (AERC) Research Paper 142, Nairobi, August.*

Ndekwu, E. C. (2013). An analysis of the monetary policy transmission mechanism and the real economy in Nigeria. *Central Bank of Nigeria occasional papers No. 43*.

Nwosu, F. O., (2010). The agricultural credit guarantee scheme: its role, problems and prospects in Nigeria's quest for agricultural development. *Researchers, 2 (2); 120-135.*

Nzomoi, J., &Rutto, N. (2012).Assessing the Impact of Private Sector Credit on Economic Performance: Evidence from Sectoral Panel Data for Kenya.*International Journal of Economics and Finance, 4(3), 78-97.*

Nzotta, S. M., &Okereke, E. J. (2009). Financial deepening and economic development of Nigeria: An Empirical Investigation. *African Journal of Accounting, Economics, Finance and Banking Research, 5*(5).

Obi, C. O. (2021). Monetary policy instruments and manufacturing sector output in Nigeria. *International Journal of Innovative Finance and Economics Research 9(2):85-100,*

Ohwofasa, B.O. and Aiyedogbon, J.O. (2013). Financial deepening and economic growth in Nigeria, 1986-2011: An Empirical Investigation *Journal of Economics and Development Studies 1(1); 24-42.*

Olorunmade, G., Samuel, O.J., and Adewole, J. A. (2019). Determinant of private sector credit and its implication on economic growth in Nigeria: 2000-2017. *American Economic and Social Review, 5 (1), 45-60.*

Olukayode, R., &Somoye, C. (2018). The impact of finance on entrepreneurship growth in Nigeria: *International Journal of Small and Medium Enterprises, 1(2); 117-227.*

Osakwe, A., Ibenta, S. N. ., &Ezeabasili, V. N. (2019).Monetary policy and the performance of the manufacturing sector in Nigeria (1986-2017).*International Journal of Academic Research in Business and Social Sciences, 9(2),* 399–413

Oshikoya, T. W., (1992). Interest rate liberalization, savings, investment and growth: *The case of Kenya savings and development 16, (3): 305-320.*

Otalu, Aladesanmi& Mary (2014). Monetary policy and commercial banks performance in Nigeria: an assessment of credit creation role. *The International Journal of Business and Management, 2(7), pp. 45 -51.*

Ovat, O. O. (2016). Commercial banks' credit and the growth of small and medium scale enterprises: The Nigerian experience. *Journal of Economics and Finance, 7(6), 23-30*

Owolabi, A.U., &Adegbite, T. A.(2014).Impact of Monetary Policy on Industrial Growth in Nigeria. *International Journal of Academic Research in Business and Social Sciences, 4(1), 55-74.*

Sesay, B., &Abdulai,B.S. (2017). Monetary policy effects on private sector investment: Evidence from Sierra Leone. *International Journal of Economics and Financial Issues,* 7(1), 476-488.

Shaw, E. (1973). *Financial deepening in economic development*.London Oxford University Press.

Toby, A. J., &Peterside, D. B. (2014).Analysis of the role of banks in financing the agriculture and manufacturing sectors in Nigeria.impact: *International Journal of Research in Business Management* (*IMPACT: IJRBM), 2(2), 9-22.*

Toby, A. J., &Zaagha, A.S, (2020). Central Bank Policy and Private Sector Funding in Nigeria: A Multi-Variant Study. *Journal of Strategic and Internet Business, 4 (2), 899-923.*

Ubesie1, C.M., Echekoba, F.N., Chris-Ejiogu, U.G. and Ananwude, A.C. (2019).Sectoral allocation of deposit money banks' credit and the growth of Nigerian real economy: A

Zaagha, A. S. (2020). Money Supply and Private Sector Funding in Nigeria: A Multi-Variant Study. *Asian Finance & Banking Review; 4(2), 24-41.*

Zang, H., & Kim, Y.C. (2007). Does financial development precede growth? Robinson and Lucas might be right. *Applied Economics Letters, 14:15–19.*

Zuzana, F., Riikka, N. & Laurent, W. (2015). Reserve requirements and the bank lending channel in china (september 21, 2015). *BOFIT Discussion Paper No. 26/2015*.