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- I. Title page
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- IV. Introduction
- V. Literature Review
- VI. Methodology
- VII. Results and Discussion
- VIII. Conclusion and Recommendations
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EFFECT OF MONETARY POLICY ON MANUFACTURING OUTPUTS IN NIGERIA: 1980-2024

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ABSTRACT

The Study examined the Impact of Monetary policy on the manufacturing outputs in Nigeria: 1980-2024. Augmented Dickey-Fuller (ADF) was employed to test for the stationarity of the variables under study. The result of the unit root test revealed that manufacturing outputs, interest rate (IR) and inflation rate (INF) are Stationary at level, while Money supply (MS) and monetary policy rate (MPR) were stationary at first difference. The study also employed Autoregressive Distributed Lag (ARDL) model as an estimation technique to ascertain the long run and short run relationship between the dependent variable and independent variables. In the long run, the ARDL estimation revealed that interest rate and money supply had positive and significant impact on the manufacturing outputs in Nigeria, while monetary policy rate and inflation rate impacted negatively and insignificantly on the manufacturing outputs in Nigeria. In the short run, ARDL estimation shows that interest rate at lags one to four had negative but significant impact on the manufacturing outputs in Nigeria, while money supply and monetary policy rate had a negative but significant impact on the manufacturing outputs in Nigeria during the period under review. The study recommends that Central Bank of Nigeria and other key stakeholders should embark on appropriate policies aimed at mopping up the excess money supply in circulation as such measures will control inflation and boost manufacturing sector output in Nigeria.

Keywords: Monetary Policy, Monetary policy rate, Augmented Dickey-Fuller, Autoregressive Distributed Lag, Manufacturing sector Output and Nigeria

1.0 Introduction

Central banks around the world mainly focus on creating and carrying out monetary policy. This is predicated on the use of monetary policy as a tool to enhance the macro-economic environment generally and in particular an efficient financial system/ market in order to promote economic growth in developing economies (Okoroafor, 2024). Central Banks are further entrusted with other developmental functions with a view to engendering rapid economic development, in pursuance of this objectives, central banks are usually given the core mandate of maintaining internal and external value of the currency which in the domestic economy translates to keeping inflation low and stable (Soludo, 2024).

Central banks evaluate the economy, which serves as

the foundation for creating and implementing monetary policy. Since monetary policy is a tool for managing the broader economy, its use varies from country to country and leads to different outcomes. It uses instruments which affects may be uncertain as well as information that may not be complete about the economic and its prospects especially in a market economic. Thus, sometimes the outcomes can have unintended consequences (Eze, 2023). Long histories of unintended outcomes and dissatisfactory performance of monetary policy often compel monetary policy designers to look for alternative frame works.

Monetary policy is an action of the Key players in the Apex Bank to control and influence the economic activities with the motive of achieving a desired

macroeconomic objectives such as economic stability, full employment, price stability, economic growth, balance of payment equilibrium among others (Adeleke and Ngalawa, 2022). It is a policy framework initiated by the monetary authorities with the collaboration of the monetary policy committee through the monetary policy rate to influence the economic activities with focus on how to mop up the excess liquidity in the economy (CBN, 2024).

Monetary Policy Rate (MPR) is a vital monetary policy tool adopted by the monetary authorities to influence the overall performance of the economy with the aim of boosting manufacturing sector output, stabilizing exchange rate, controlling inflation and enhancing industrial output in Nigeria (Nikhil & Deene, 2021). The MPR of the Central Bank is one of the key indicators considered by an entrepreneur or investor before taking any investment decision. When the Apex Bank increases the monetary policy rate, the commercial banks will also increase their lending rates to entrepreneurs, investors, manufactures, and consumers. Considering the high rate of MPR, this can increase the cost of borrowing and also slow down manufacturing sector activities thereby leading to drop-in GDP growth rate. On the other hand, when the monetary authorities lower the monetary policy rate, the commercial bank will also decrease their lending rates and this will encourage entrepreneurs, manufacturers and consumers to borrow more because the cost of borrowing has decreased. This can stimulate economic growth and also boost manufacturing sector output (Obi, 2021). In most modern economies, the manufacturing sector has been identified as the engine of growth, a major driving force, a creator of wealth and a channel for sustainable development capable of promoting industrialization in an economy (Ezie, 2021). Hence the need for the monetary authorities to initiate MPR that will favour manufacturers and other entrepreneurs.

Monetary policy transmission mechanisms are a key to conducting monetary policy effectively. As a result, monetary policy transmission mechanisms are critical to understanding how monetary policy actions impact price stability in Nigeria. Monetary policy transmission refers to the chain reaction that emanates from changes in monetary policy to impact prices and output. The chain of occurrences begins by impacting the manufacturing sector and financial markets first, which then gradually affects spending patterns, particularly in terms of private consumption and investment. Variations in domestic demand impact levels of production, salaries, and job availability, ultimately culminating in an alteration price levels, namely the inflation rate. The financial market is the primary path through which monetary policy impact transmits to the economy. Through financial market prices such as interest rates and exchange rates, and money supply to the real economy, effecting changes

in aggregating expenditure decisions of households and firms; and eventually affecting inflation and demand (Ajayi, 2022).

Monetary policy transmits its effect on the economy through various channels. These channels are the exchange rate, interest rate, asset price and credit channels. Monetary policy is transmitted through the interest rate channel when alterations to monetary policy causes changes in interest rates thereby influencing demand for credit and the availability of income for borrowers and lenders. Ultimately, monetary policy transmitted through the interest rate channels causes changes lending and savings/deposit rates thereby affecting aggregate savings and investments. However, the effectiveness of the interest rate channel is highly influenced by the depth and development of the money and capital markets (Ade, 2024).

1.2 Objectives of the Study

This study examines the impact of monetary policy on Manufacturing Output in Nigeria. Specifically, the objectives are to

- i. Assess the effect of inflation rate on Manufacturing Output in Nigeria
- ii. Evaluate the impact of interest rate on Manufacturing Output in Nigeria
- iii. Ascertain the influence of money supply on Manufacturing Output in Nigeria
- iv. Investigate the impact of treasury bill rate on Manufacturing Output in Nigeria
- v. Examine the impact of monetary policy rate on Manufacturing Output in Nigeria.

1.2 Statement of Hypotheses

- H₀₁:** Inflation rate is not significantly effective in influencing Manufacturing Output in Nigeria.
- H₀₂:** Interest rate has no significant impact on Manufacturing Output in Nigeria.
- H₀₃:** The impact of money supply on Manufacturing Output in Nigeria is statistically insignificant.
- H₀₄:** Treasury bill rate has an insignificant impact on Manufacturing Output in Nigeria.
- H₀₅:** Monetary policy rate has no significant impact on Manufacturing Output in Nigeria.

Considering some of the major challenges confronting the manufacturing sector in Nigeria such as high rate of inflation, unfavorable interest rate, epileptic power supply, unfavorable Government policy and harsh business environment among others. There is urgent need for the central bank of Nigeria to intervene through adoption of appropriate monetary policy to boost the manufacturing sector output in Nigeria.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Monetary policy

Monetary policy is an integral part of macro-economic management. It refers to the use of some combinations of instruments by the central bank to influence the availability and cost of credit and money in the domestic economy with a view to achieving macroeconomic balance (Nwankwo, 2023). According to Oxford Dictionary of Economics (2022), monetary policy serves as the tool utilized by the Nigerian government or its Central Bank to regulate the supply of money. In order to influence the economy. It is also a blend of measures and or set of instruments designed by the central bank to regulate the values, supply and cost of money consistent with the absorptive capacity of the economy or the expected level of economic activity without necessarily generating undue pressure on domestic prices and the exchange rate (Anyanwu, 2022).

Monetary policy encompasses a set of measures aimed at controlling the value, supply, and cost of money within an economy. It can be described as the art of controlling the direction and movement of credit facilities in pursuance of stable price and economy growth in an economy (Yimka, Ezekiel & Olusegun, 2024). Monetary policy refers to the actions of the Central Bank to regulate the money supply which could be through discretionary monetary policy instruments such as the open market operation (OMO), discount rate, reserve requirement, moral suasion, direct control of banking system credit, and direct regulation of interest rate (Ilugbemi, 2023). Monetary policy comprises the formulation and execution of policies by the central bank to achieve the desired objective or set of objectives; the policies and decisions are aimed at guiding bank lending rates to levels where credit demand and money growth are at a level consistent with aggregate supply elasticity (Ilugbemi, 2020).

Monetary policy implies the actions embarked by the apex bank (Central Bank) to control economic activities, mop-up excess money supply and influence other Key Financial Indicators such as Monetary Policy rate, interest rate, currency reverse ratio etc. with the motive of achieving Macro Economic objectives like Economic, Financial and Price Stability as well as full employment among others. (Hillary, Imo & Uche. 2018).

It is an integral part of Macroeconomic Management that deals with the use of some combinations of Monetary Instruments or tools by the Control Bank (Apex Bank) to influence the availability and accessibility cost of credits in the domestic economy with the aim of achieving Macroeconomic stability (Adams, 2022).

2.1.2 Monetary Policy Rate (MPR): This simply means the Apex Bank's benchmark for interest rate in any Economy. MPR implies the baseline interest rate introduced by the Governor of Central Bank that every other interest rate adds on to. It is the rate at which the Central Bank of Nigeria controls the amount of Money in circulation with the aim of mopping up the excess liquidity in the economy at any given time (Ogar, 2022). In the Nigerian context, the MPR is set by the Central Bank of Nigeria, In December, 2006, the former Central Bank of Nigeria Governor, Professor Chukwuma Charles Soludo introduced the MPR as a monetary policy indicator to replace the Minimum Rediscount Rate (MRR). MPR is the short-term interest rate that applies to transactions when the commercial bank borrows from the Central Bank at any given period. It refers to the amount of money charged by the Central Bank of Nigeria for lending to Commercial Banks in the performance of its function of tender of last resort and also as an indication of the desired direction of the monetary policy. The current Nigerian MPR as announced by the Apex Bank Governor is 27.50% (CBN, 2025).

2.1.3 Manufacturing Sector Output

Manufacturing can be defined as the Value-Added in the production of merchandise for the purpose of usage or sale via labour and machines, tools, chemical and bio-logical processing or formation. It consists of wide range of human activities namely handy-craft, advanced technologies, industrial production among others (Ezie, 2021). On the other hand, manufacturing sector output can be defined, as the total production output from industries that engages in the production of goods in factories for a specific time period. These manufacturing sector outputs are products produced by organizations or companies that involved in transforming the mechanical, physical or chemical renovation of substances, components or materials into new products. Manufacturing sector simply means these industries and activities that are engaged in the production and processing of items either in the creation of new goods or in value addition (Falade & Olagbaju, 2015).

Activities in the manufacturing sector includes; clothing, textile, footwears, agro-processing, metal/plastics among others. These activities contribute significantly to the economic growth of the country. Modern manufacturing sectors engages in all the intermediate processes required for the production and integration of a products component.

2.2 Theoretical Framework

2.2.1 Keynes's Monetary Policy/Interest Rate

Transmission Channel: This study is anchored on the Keynes's oldest interest rate transmission channel. As Propounded by Keynes in 1936, the theory emphasized that monetary policy can serve as a boost for industrial growth in any economy through the

short-term interest rates such as one-month and one-week rates, which is expected to have positive or negative impact on industrial sector. According to Keynes, the adoption of expansionary monetary policy will boost the supply of loanable funds available through the banking system thereby leading to decrease in interest rates. Keynes further explained that as interest rates decreases, entrepreneurs, manufacturers, and industrialists will be encouraged to borrow from commercial banks which eventually leads to increased manufacturing sector output, massive investment, and rise in households' purchasing power.

Also, Keynes believed that an increase in money supply will lead to rise in prices of goods and services which could in turn result to high inflation rate thereby leading to a decrease in the interest rate and a boost in aggregate demand that will increase manufacturing sector output level.

In summary, Keynes concludes that adoption and implementation of the appropriate monetary policy by the government, will boost manufacturing sector output level and also impact positively on the country's real GDP indirectly.

2.2.2 Monetarists' Theory

The monetarist contend that inflation is always a monetary phenomenon, the Classicals and the latter economists believe on the school of thought. They used a simple quantity theory of money as follows:

$$MV=PQ$$

where; M stands for money supply; V stands for the velocity of money, P stands for the price level and Q stands for level of real output.

Suppose V and Q remain constant, the price level (P) changes proportionately with the supply of money (M). With flexible wages, the economy was assumed to be at full employment where the productive resources are employed. The factors of production change but very slow overtime. Moreover, the money that will be spent did not affect the level of productivity, the amount of money that will be used will double the price level of goods and services. When the price increase by this proportion, individuals and business firms can have enough money which they can spend and this will lead to the rise in prices. Inflation emanates at the same proportion in which the money supply increases (Jhingan, 2006). Based on this preposition, the aggregate supply is presumed to be fixed.

However, the economy is assumed to operate at full employment. Ideally, when the money supply increases, it creates more demands of commodities, as a result the supply of goods and services cannot be increased due to the fact that economy operates at full

employment of resources. This leads to rise in prices, but it is a continuous and prolonged rise in the money supply that will lead to true inflation. According to Friedman, inflation is always and everywhere a monetary phenomenon which emanates when there is tremendous increase in money supply (stagflation) than in output. He opined those variations in the quantity of money in circulation work in order to cause changes in nominal income. Inflation everywhere is assumed to be as a result of an increased in the demand for goods and services, i.e., when people try to spend their cash balances. The demand for money is assumed to be fairly stable; this excess spending is as a result of an increase in the nominal quantity of money supplied to the economy. Therefore, inflation is considered as always, a monetary phenomenon.

2.3 Empirical Review

Several empirical works have been done to determine the impact of monetary policy on manufacturing output in Nigeria. Ogar (2022), examined the relationship among monetary policy rate, inflation and economic growth in Nigeria using quarterly data from 2007; Q1, to 2017; Q4. The study employed structural VAR method to ascertain the relationship among the variables. Results showed that the monetary policy rate had positive and significant impact on the economic growth in Nigeria, while inflation impacted negatively on the economic growth in Nigeria during the period under review. The study recommends that government, CBN and other relevant bodies should embark on policies aimed at controlling the high inflation rate in Nigeria.

Acha and Enow (2023), investigated the effect of indirect monetary policy on the performance of the Nigerian economy from 1993 to 2020, the study employed ordinary least squares (OLS) method to estimate the regression model. The results showed that open market operations and the cash reserve ratio have positive effect on the Nigerian Economy while monetary policy rate and liquidity ratio impacted negatively on the economic growth in Nigeria during the period under consideration. The study submits that the indirect monetary policy had positive impact on the performance of the Nigerian economy within the period under study.

Egbulonu and Ukwuoma, (2018), carried out a study on the impact of monetary policy on the manufacturing sector in Nigeria from 1980–2016, the variables of interest include; manufacturing sectors output, money supply, interest rate and exchange rate. The study employed Autoregressive Distributed Lag (ARDL) model as the estimation technique to ascertain the relationship between the variables. Findings revealed that money supply and interest rate had positive and significant impact on manufacturing sector outputs in Nigeria both in the short and long



run; while exchange rate impacted negatively and insignificantly on the manufacturing sector output in Nigeria during the period under review. Based on the findings, the study recommended that Central Bank of Nigeria and other relevant institutions should embark on appropriate monetary policy aimed at stabilizing the exchange rate as such measures will boost manufacturing sector outputs in Nigeria.

Osakwe, Ibenta and Ezeabasili (2019), investigated the effect of monetary policy on the performance of the manufacturing sector in Nigeria. The Autoregressive Distributed Lag (ARDL) model was employed as an estimation technique to determine the short-run and long-run relationship between the dependent and independent variables. The dependent variable was denoted as manufacturing sector output, while the independent variables are treasury bill rate, monetary policy rate, money supply and cash reserve requirement. Findings showed that all the independent variables had positive and significant impact on the manufacturing sector output in Nigeria only in the short run. It was recommended that the top management of the Central Bank of Nigeria and other relevant stakeholders should initiate policies geared towards sustaining the positive and significant impact already achieved.

Hillary, Imo and Uche (2018), examined the effects on monetary policy transmission channels on Nigeria's Industrial Sector from 1981 – 2016. The study used both Johansen cointegration and Error Correction Model (ECM) as techniques of data analysis. The key variables of interest include the real output growth, exchange rate, interest rate and private sector credit. The results revealed that interest rate, exchange rate and private sector credit impacted negatively on the real output growth in Nigeria both in the long run and in the short-run during the period under investigation. Based on the findings, the study recommended that government and other key stakeholders need to embark on policies aimed at effectively regulating interest rate, exchange rate and private sector credit in Nigeria.

Shobande (2019) investigated the impact of switching from direct to indirect monetary policy on industrial growth in Nigeria from 1960 – 2015. The study adopted the Autoregressive Distributed Lag (ARDL) model as an estimation technique to ascertain the long run and short run relationship between the variables. It was found that in the long-run interest rate, domestic credit and trade balance have positive and significant impact on the industrial output, while inflation, exchange rate and money supply impacted negatively and insignificantly on industrial growth in Nigeria within the period studied.

The time period of the data in some of the empirical reviews only goes up to 2023. It would be interesting to see how the results change if more recent data like 2024 were used. Most papers used VAR models, OLS and ARDL to examine the relationship between monetary policy and manufacturing sector output. However, the authors that employed ARDL technique failed to use inflation rate as one of the key independent variable, this study will fill the gap. The time period of the data is important because the monetary policy transmission channels can change over time. For example, the credit channel may have been more important in Nigeria in the past, but it may be less important now due to changes in the financial system. The methodology is important because different methods can produce different results. For example, ARDL models are based on the assumption that the variables will be stationary at level or first difference. Secondly, the sample size will be relatively large, over 30 observations.

3.0 Methodology

The study adopts secondary data because it is considered to be the most appropriate method for the needed information. Given the nature of this study as well as the data which suit the purpose of this study, data were obtained from the Central Bank of Nigeria Statistical publication (2024).

Table 1: Variables for the Study

S/N	Variables	Types of Variables	Expectations	Source
1	MAO	Dependent variable		CBN
2	INF	Independent variable	Negative	CBN
3	IR	Independent variable	Negative	CBN
4	MS	Independent variable	Positive	CBN
5	TBR	Independent variable	Positive	CBN
6	MPR	Independent variable	Positive	CBN

Source: Author’s Computation (2025)

Where: MAO=Manufacturing Output, INF = Inflation rate, IR=Interest Rate, MS=Money Supply, TBR=Treasury bill rate, MPR=Monetary policy rate

Model Specification: In an attempt to justify the topic under investigation, the study adopted the model of Osakwe, Ibenta and Ezeabasili (2019), but with

modification on the independent variables as shown below:

MAO=F(IR, MPR, MS,INF,TBR)-----3.1
The ARDL model is specified as:

Table 2: Descriptive statistics of all variables (1980-2024)

	MAO	INF	IR	MS	TBR	MPR
Mean	13.59136	19.78750	17.03045	9360.164	7.263636	8.161364
Median	13.93000	13.70500	17.18500	1387.640	7.100000	7.650000
Maximum	20.95000	72.84000	29.80000	56418.78	13.80000	15.90000
Minimum	6.550000	1.030000	7.500000	13.49000	2.800000	3.400000
Std. Dev.	4.090321	16.52694	4.773615	13722.69	2.491109	2.973387
Skewness	-0.032513	1.728470	0.212570	1.636736	0.505169	0.724413
Kurtosis	1.748345	5.127193	3.365608	5.176152	3.157137	2.949486
Jarque-Bera	2.879925	30.20487	0.576424	28.32730	1.916704	3.853021
Probability	0.236937	0.000000	0.749603	0.000001	0.383524	0.145656
Sum	598.0200	870.6500	749.3400	411847.2	319.6000	359.1000
Sum Sq. Dev.	719.4213	11745.01	979.8582	8.10E+09	266.8418	380.1643
Observations	45	45	45	45	45	45

Source: Author’s Computation (2025) using E-views 12

4.2 Unit Root Tests

Table 3 presents the unit root test results of the variables examined in this study using Augmented Dickey Fuller techniques. The essence of the unit root test is to examine the stationarity properties of the variables of interest which guide in choosing the

appropriate technique of analysis to avoid a misleading or spurious regression result. Apparently from the table, the stationary properties of the variables show the mixture of I(0) and I(1) which justifies the applicability of ARDL method.

Table 3: ADF Unit root test Results

Variable	ADF-Statistic	Critical value 1%	Critical value 5%	Critical value 10%	Oder of Integration	Interpretation
MAO	/-3.724066/	/-3.646342/	/-2.954021/	/-2.615817/	I(0)	Stationary at Level
IR	/ - 3.723742/	/-3.646342/	/-2.954021/	/-2.615817/	I(0)	Stationary at Level
INF	/ -8.487575/	/-3.689194/	/-2.971853/	/2.625121/	I(0)	Stationary at Level
MS	/-4.169711/	/-3.653730/	/-2.957110/	/-2.617434/	I(1)	Stationary at 1 st difference
MPR	/-5.401019/	/-3.653730/	/-2.957110/	/-2.617434/	I(1)	Stationary at 1 st difference

Source: Authors’ Computation (2025) Using E-views 12

Table 3 above shows the summary of the Augmented Dickey Unit root test result. It presents the level of integration of the variables. The table shows that manufacturing output(MAO), interest rate (IR) and inflation rate (INF) are Stationary at level, while monetary policy rate (MPR) and Money supply (MS) were stationary at first difference. The variables were significant at 1%, 5% and 10% respectively.

4.3 Regression Analysis ARDL Estimation

Table 4: ARDL Long Run Form and Bounds Test

ARDL Long Run Form and Bounds Test

Dependent Variable: D(MAO)

Selected Model: ARDL(4, 4, 4, 4, 2)

Case 2: Restricted Constant and No Trend

Date: 11/22/25 Time: 16:23

Sample: 1980 2024

Included observations: 38

Conditional Error Correction Regression

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	1.556869	4.048596	0.384545	0.7086
MAO(-1)*	-0.100260	0.149629	-0.670057	0.5180
INF(-1)	0.033825	0.050402	0.671106	0.5174
IR(-1)	0.115578	0.190211	0.607630	0.5570
MS(-1)	1.41E-05	0.000133	0.105823	0.9178
TBR(-1)	-0.735068	0.537924	-1.366489	0.2017
MPR(-1)	0.167259	0.530112	0.315516	0.7589
D(MAO(-1))	-0.532954	0.416607	-1.279273	0.2297
D(MAO(-2))	0.617291	0.331669	1.861167	0.0923
D(MAO(-3))	0.240512	0.420142	0.572453	0.5797
D(INF)	0.033338	0.019419	1.716757	0.1168
D(INF(-1))	-0.042941	0.033194	-1.293635	0.2249
D(INF(-2))	0.018283	0.029392	0.622026	0.5478
D(INF(-3))	0.005674	0.024115	0.235289	0.8187
D(IR)	0.081790	0.091644	0.892477	0.3931
D(IR(-1))	-0.126173	0.174276	-0.723984	0.4857
D(IR(-2))	0.008466	0.154388	0.054835	0.9573
D(IR(-3))	-0.051413	0.082226	-0.625264	0.5458
D(MS)	-0.000133	0.000208	-0.641628	0.5355
D(MS(-1))	-4.91E-05	0.000303	-0.162124	0.8744
D(MS(-2))	0.000386	0.000272	1.416440	0.1870
D(MS(-3))	0.000771	0.000328	2.353817	0.0404
D(TBR)	0.128513	0.142191	0.903807	0.3874
D(TBR(-1))	0.876544	0.441382	1.985908	0.0751
D(TBR(-2))	0.720265	0.311906	2.309235	0.0436
D(TBR(-3))	0.232031	0.181263	1.280082	0.2294
D(MPR)	-0.133790	0.282000	-0.474431	0.6454
D(MPR(-1))	-0.108827	0.250479	-0.434476	0.6732

* p-value incompatible with t-Bounds distribution.

Levels Equation Case 2: Restricted Constant and No Trend

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
INF	0.337371	0.301686	1.118284	0.2896
IR	1.152782	2.261428	2.509759	0.0213
MS	0.000140	0.001381	2.101621	0.0211
TBR	-7.331630	9.389366	-0.780844	0.4530
MPR	1.668253	5.096928	2.327306	0.0402
C	15.52834	39.93567	0.388834	0.7055



$$EC = MAO - (0.3374*INF + 1.1528*IR + 0.0001*MS - 7.3316*TBR + 1.6683 *MPR + 15.5283)$$

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic : n=1000				
F-statistic K	4.637465 5	10%	2.08	3
		5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Finite Sample: n=40				
Actual Sample Size	38	10%	2.306	3.353
		5%	2.734	3.92
		1%	3.657	5.256
Finite Sample: n=35				
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419

The above table 4 shows presence of long run relationship between the dependent and independent variables, this decision is based on the fact that the Calculated F-statistic (4.637465) is greater than the critical values for the upper and lower bound at 5% and 10% level of significance respectively. This further implies that there is a long run and cointegrating relationship between the dependent variable (MAO) and the independent variables (IR, INF, MS, TBR and MPR).

In addition, Table 4 revealed that in the long run, monetary policy rate, interest rate and Money supply had positive and significant impact on the manufacturing sector output in Nigeria, while treasury bill rate and inflation rate impacted negatively and insignificantly on the manufacturing sector output in Nigeria during the period under review.

Table 5 ARDL Short Run Estimation

Dependent Variable: MAO

Method: ARDL

Date: 11/22/25 Time: 16:21

Sample (adjusted): 1984 2024

Included observations: 38 after adjustments

Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (4 lags, automatic): INF IR MS TBR MPR

Fixed regressors: C

Number of models evaluated: 12500

Selected Model: ARDL (4, 4, 4, 4, 4, 2)

Note: final equation sample is larger than selection sample



Variable	Coefficient	Std. Error	t-Statistic	Prob.*
MAO(-1)	0.366786	0.428761	0.855456	0.4123
MAO(-2)	1.150245	0.490020	2.347343	0.0408
MAO(-3)	-0.376779	0.559274	-0.673693	0.5158
MAO(-4)	-0.240512	0.420142	-0.572453	0.5797
INF	0.033338	0.019419	1.716757	0.1168
INF(-1)	-0.042454	0.024725	-1.717080	0.1167
INF(-2)	0.061224	0.025231	2.426504	0.0357
INF(-3)	-0.012609	0.028223	-0.446754	0.6646
INF(-4)	-0.005674	0.024115	-0.235289	0.8187
IR	0.081790	0.091644	0.892477	0.3931
IR(-1)	-0.092385	0.102397	-0.902229	0.3882
IR(-2)	0.134639	0.124482	1.081594	0.3048
IR(-3)	-0.059879	0.102873	-0.582061	0.5734
IR(-4)	0.051413	0.082226	0.625264	0.5458
MS	-0.000133	0.000208	-0.641628	0.5355
MS(-1)	9.83E-05	0.000166	0.592334	0.5668
MS(-2)	0.000435	0.000276	1.577462	0.1458
MS(-3)	0.000386	0.000305	1.262208	0.2355
MS(-4)	-0.000771	0.000328	-2.353817	0.0404
TBR	0.128513	0.142191	0.903807	0.3874
TBR(-1)	0.012963	0.160409	0.080811	0.9372
TBR(-2)	-0.156279	0.189978	-0.822617	0.4299
TBR(-3)	-0.488234	0.181720	-2.686735	0.0228
TBR(-4)	-0.232031	0.181263	-1.280082	0.2294
MPR	-0.133790	0.282000	-0.474431	0.6454
MPR(-1)	0.192221	0.258369	0.743979	0.4740
MPR(-2)	0.108827	0.250479	0.434476	0.6732
C	1.556869	4.048596	0.384545	0.7086

		Mean dependent	13.9331
R-squared	0.987759	var	6
Adjusted R-squared			4.16415
	0.954708	S.D. dependent var	9
			2.73497
S.E. of regression	0.886218	Akaike info criterion	5
			3.94161
Sum squared resid	7.853819	Schwarz criterion	8
		Hannan-Quinn	3.16428
Log likelihood	-23.96453	criter.	9
			2.12658
F-statistic	29.88564	Durbin-Watson stat	8
Prob(F-statistic)	0.000002		

Source: Author's Computation (2025) using E-views 12



Table 5 revealed that in the short run interest rate at lags one to four had negative but significant impact on the manufacturing sector output in Nigeria, while money supply and monetary policy rate had a negative but significant impact on the manufacturing sector output in Nigeria. Inflation had a positive and insignificant impact at lags one and two, with negative but significant impact on manufacturing sector output at lags three and four during the period under review.

4.4 Post Estimation

Table 6: Diagnostic Analysis

Type	Diagnostic Test	F-stat.	Probability
Breusch-Godfrey LM Test	Serial Correlation	0.091562	0.9136
Breusch-Pagan-Godfrey Test	Heteroskedasticity	0.696691	0.7613
Ramsey RESET Test	Specification	0.172763	0.6886
Jarque-Bera Test	Normality	2.725007	0.256019

Source: Author’s computation (2025) using E-Views 12

The reliability of the regression results from our dynamic model was assessed through various diagnostic checks, the outcomes of which are presented in Table 6. The F-stats and probabilities obtained reflect positivity as they all suggest the rejection of null hypothesis for each category of diagnostic tests. Explicatively, the serial correlation test result shows the absence of serial correlation as an

econometric problem, BPG Test shows that the model is not characterized by homoskedasticity, Ramsey REST Test result justifies the model specification's goodness as previously established and given that the probability value of each variable is greater than 0.05 or 5%, the Jarque-Bera test indicates that the variables are normally distributed.

Table 7: Pairwise Granger Causality Tests
 Pairwise Granger Causality Tests
 Date: 11/22/25 Time: 16:30
 Sample: 1980 2024
 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
INF does not Granger Cause MAO	43	1.24481	0.2995
MAO does not Granger Cause INF		5.60367	0.0074
IR does not Granger Cause MAO	43	0.50701	0.6063
MAO does not Granger Cause IR		0.74897	0.4797
MS does not Granger Cause MAO	43	4.17624	0.0229
MAO does not Granger Cause MS		1.47327	0.2420
TBR does not Granger Cause MAO	43	1.47021	0.2427
MAO does not Granger Cause TBR		0.51212	0.6033
MPR does not Granger Cause MAO	40	0.70061	0.5031
MAO does not Granger Cause MPR		0.43754	0.6491
IR does not Granger Cause INF	43	0.21869	0.8046
INF does not Granger Cause IR		3.72365	0.0334
MS does not Granger Cause INF	43	0.16930	0.8449
INF does not Granger Cause MS		0.08747	0.9164
TBR does not Granger Cause INF	43	0.91448	0.4094
INF does not Granger Cause TBR		0.30993	0.7353
MPR does not Granger Cause INF	40	0.56986	0.5708
INF does not Granger Cause MPR		0.96756	0.3899
MS does not Granger Cause IR	43	1.13582	0.3318
IR does not Granger Cause MS		0.05284	0.9486
TBR does not Granger Cause IR	43	0.27393	0.7619
IR does not Granger Cause TBR		0.01376	0.9863
MPR does not Granger Cause IR	40	0.10817	0.8978
IR does not Granger Cause MPR		1.24220	0.3012
TBR does not Granger Cause MS	43	1.52780	0.2300
MS does not Granger Cause TBR		4.05191	0.0254
MPR does not Granger Cause MS	40	0.04953	0.9517
MS does not Granger Cause MPR		4.65075	0.0162
MPR does not Granger Cause TBR	40	3.17862	0.0539
TBR does not Granger Cause MPR		2.55394	0.0922

Table 7 presents the Granger causality test result. An attempt is made to establish the causal relationship among the variables under study as well as the direction of the causality if any. The results show that unidirectional relationship runs between the following variables; inflation rate and manufacturing output as well as money supply and manufacturing output, while there was no causality between manufacturing output and other remaining independent variables (MPR, TBR, IR).

In other words, manufacturing output does not Granger Cause Monetary policy rate, and monetary policy rate does not Granger Cause manufacturing output. Also, manufacturing output does not Granger Cause interest rate and interest rate does not Granger Cause manufacturing output. manufacturing output does not Granger Cause treasury bill rate and treasury bill rate does not Granger Cause manufacturing output. This is evidence by the p-values of the variables as shown in the above table 7.

4.5 Policy Implication of Findings

The results of this study have important policy implications. First, Government and other key stakeholders must adopt the appropriate policy measures aimed at addressing the challenges of excess money supply, high rate of inflation and fluctuating exchange rate. Secondly, the Apex bank intervention through the implementation of appropriate monetary policy is necessary because it plays a significant role in addressing exchange rate fluctuation, excess money supply, double digit inflation among other related macroeconomic challenges confronting the Nation.

Third, the Central Bank of Nigeria intervention measures will boost manufacturing sector output in Nigeria and by extension the money generated from the sale of manufacturing output can be put to productive uses which spur economic growth and contributes significantly to the Nation's GDP through job creation and other benefits associated with such positive intervention measures. Lastly, considering the current global digital economy, the Government and other key stakeholders should invest huge amount of money in advance technologies in order to boost manufacturing output productivity with a multiplier effects of job creation for the unemployed youths, industrial growth, increased revenue generation among others.

5.0 Conclusion and Recommendations

The study examined the impact of monetary policy on manufacturing output in Nigeria: 1980-2024.

Augmented Dickey-Fuller (ADF) was employed to test for the stationarity of the variables under study.

The result of the unit root test revealed that manufacturing output, interest rate (IR) and inflation rate (INF) are Stationary at level, while money supply (MS) and monetary policy rate (MPR) were stationary at first difference. The study also employed Autoregressive Distributed Lag (ARDL) model as an estimation technique to ascertain the long run and short run relationship between the dependent variable and independent variables. Based on the ARDL Bounds Test, findings showed present of long run relationship between the dependent and independent variables. In the long run, the ARDL estimation revealed that interest rate and money supply had positive and significant impact on the manufacturing output in Nigeria, while monetary policy rate and inflation rate impacted negatively and insignificantly on the manufacturing output in Nigeria during the period under review. In the short run, ARDL estimation shows that interest rate at lags one to four had negative but significant impact on the manufacturing output in Nigeria, while money supply and monetary policy rate had a negative but significant impact on the manufacturing output in Nigeria. Inflation had a positive and insignificant impact at lags one and two, with negative but significant impact on manufacturing output at lags three and four during the period under review. Based on the findings, the following recommendations are made:

- i. Government at all level, Central Bank of Nigeria and other key stakeholders should embark

on policies aimed at reducing the high inflation rate in Nigeria.

Efforts should be made by the Central Bank of Nigeria, policy makers and other relevant stakeholders to ensure that interest rate is reduced to the barest minimum in order to boost

iii. Governments at all level, Central Bank of Nigeria, policy makers and other key stakeholders should adopt appropriate policies aimed at mopping up the excess liquidity in circulation as such measures will reduce excess money in circulation and also reduce inflation rate to single digit.

iv. The key stakeholders in Apex bank, policy makers and other key agencies should embark on appropriate monetary policy geared towards regulating the monetary policy rate in Nigeria.

v. The Central Bank of Nigeria and other relevant agencies should adopt appropriate policy measures aimed at addressing the challenges associated with treasury bill rate, as such measures will boost manufacturing output in Nigeria.

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