



## IMPACT OF MONETARY POLICY ON PRIVATE SECTOR INVESTMENT IN NIGERIA

### ABSTRACT

*Monetary policy remains a viable policy measures employed by every government to achieve economic stabilization goals. The effectiveness of monetary policies could be assessed based on the private sector performance and key macroeconomic indicators. Recent developments in the Nigerian economy particularly as it's relate to constant increase inflation, dollar scarcity and high lending rates are worrisome, considering the attendance consequences to the private sector performance. Against the backdrop, this study examined the impact of monetary policy on private sector investment in Nigeria. Secondary data covering the period from 1981 to 2023 were used for the study. The data set were first tested for stationarity properties to avoid spurious regression estimates using Augmented Dickey Fuller (ADF) In addition, the study employed Autoregressive Distributed Lag Model (ARDL) Bound test technique to examine long-run relationship and impact of money supply (M2), lending interest rate (LNDR), real exchange rate (EXR) and inflation (INF) on private sector investment. The study further employed a threshold regression to ascertain optimal lending interest rate threshold consistent with private sector investment in Nigeria. The ARDL Bound testing confirmed that, there is long-run relationship between monetary policy and private domestic investment in Nigeria for the period of study. This was further confirmed by the ARDL long-run coefficients which indicated that; M2 has a significant positive impact on PSINV, as 1% increase in M2 increases PSINV in Nigeria by 77% in the long-run. On the other hand, the study confirmed that, exchange rate and inflation have negative long-run significant impact on private sector investment in Nigeria for the period of the study. A unit increase in EXR and INF decreases PSINV by 39% and 29% respectively. The threshold regression revealed that, the optimal lending interest rate threshold beyond which lending rate is dangerous to investment in Nigeria is 28.11%. In line with the findings, the study recommended for the monetary authority and relevant government agencies to; reduce the price for credit to the private sectors, maintain expansionary monetary policy, halt its continued less impactful devaluation policy and embrace more diversification commitments to acquire more forex and bridge its scarcity as well as improve the provision of basic infrastructure especially power supply to reduce the cost of doing business to halt inflationary tendency in Nigeria.*

**Keywords:** *ARDL, Monetary Policy, Private Sector Investment, Threshold Regression*

### 1. INTRODUCTION

In recent years, developing countries have attached serious priority to improving the performance of the private sector. This commitment has been

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attributed to the fact that the private sector has remained a good source of economic growth and development in most emerging economies. The private sector is the driver of economic growth and development because it produces and distributes goods and services that meet the aggregate demand in the economy. Over the years, Nigeria has embarked on various monetary policy frameworks to facilitate growth and development of the private sector led-economy.

The effectiveness of monetary policies could be assessed based on the private sector performance. According to the National Bureau of Statistics (NBS, 2023), Nigeria's private sector credit to GDP declined to 11.1% as of the second quarter of 2023, a sharp decrease from 13.5% as of the third quarter of 2022. The total loans stood at ₦19.86 trillion as a private sector loans as compared to the GDP of ₦146.69 trillion. Of this figure, 25.8% went to the oil and gas sector, while other sectors like the real estate, education and information and communication got 3.4%, 0.4%, and 8.4% respectively. The sharp decline above reflected decrease in lending by deposit banks amidst pandemic and fall in the crude oil prices as well as the Central Bank of Nigeria (CBN) tough monetary policy measures such as increase in minimum loan to deposit ratio – Loan to Deposit Ratios (LDR) of the deposit money banks from 58.5% to 60% to compel them to increases lending the private sector.

Nevertheless, the Monetary Policy Committee of the CBN decided at the 292nd meeting of the MPC held on 24 and 25th July 2023, to: raise the MPR from 18.5 per cent to 18.75 per cent; adjust the asymmetric corridor to +100/-300 basis points around the MPR; retain the CRR at 32.5 per cent; and retain the Liquidity Ratio at 30 per cent. According to a circular to banks, CBN (2023) stated that it would resume the enforcement of the LDR policy effective July 31, 2023. The move followed CBN's directive to banks to maintain a minimum LDR of 65 per cent, after the apex bank had in October 2019, raised the LDR from 60 per cent. Thus, all these measures have forced the commercial banks to increase lending to the private sector. Despite the above-stated increased lending at the end of the second quarter of 2023, it was still lower than the 13.7% recorded in 2015 and 15.7% in 2016. This cyclical nature of the ratios reflected the lack of correlation between the private sector lending and the driving economic expansion for the country.

There is no doubt that, private sector investment play key role in increasing capital formation and brings about long run economic growth. Through the control of monetary policy targets, such as the price of money (interest rate both short term and long term), the quantity of money and reserve money amongst others; monetary authorities directly and indirectly control the demand for money, money supply, or the availability of money and hence affect output and private sector investment. Thus, monetary policy that facilitates credit to private sector investment encourages the growth of private investment, whilst tight monetary policy that restricts credit to businesses discourages private sector growth.

It is however observed that, the Nigerian economy is characterized by inconsistency in government policies, political instability ineffective policy statements and deficit philosophical framework with its attendance consequences on the private sector performance. Monetary policies are designed to ensure that, money supply in the economy is adequate to support desirable and sustainable economic development without generating inflation pressure. It is however worrisome that, inflation has constantly been on the increase in Nigeria.

In the same vein, exchange rate remains a key price variable in any economy and performs the dual role of maintaining international competitiveness and serves as a nominal anchor for domestic investment. The complex web of exchange rates, coupled with constant intervention, had been a drag on the economy, creating significant distortions such as dollar scarcity, impeding foreign investment and led to substantial current account imbalances.

Similarly, Interest rate developments in the economy in the last decade indicate that the problem of high lending rates, against the background of declining deposit rates poses a key challenge to financial intermediation. The persistence of this problem had been observed by the Monetary Policy Committee in several communiqués, particularly following the downturn economic activities amidst galloping inflation in Nigeria and the ensuring measures taken to address liquidity challenges in the banking system. Over, the decades, lending rates have remained positive in real terms. The average maximum lending rate has hovered around 24 -30 percent. Similarly, the prime lending rate ranged between 16 -19 percent (CBN, 2022). Hence, this study examines the impact of monetary policy on domestic private sector investment and determine the optimal lending interest rate threshold consistent with private sector investment in Nigeria.

## **2 REVIEWS OF LITERATURE AND THEORETICAL FRAMEWORK**

### **Conceptual Clarification**

Here the researcher identifies various schools of thought held by scholars, authors and organizations with respect to the concept of, private sector investment and monetary policy

### **Monetary Policy**

Concept of monetary policy is a crucial notion for monetary economy theorists. However, because it might signify different things to different people, it is prone to ambiguity in public debate. According to Thomas (2020), monetary policy as the demand side of economic policy, refers to the actions undertaken by a nation's central bank to control money supply and achieve macroeconomic goals that promote sustainable economic growth. Monetary policy is the process of drafting, announcing, and implementing the plan of actions taken by the central bank, currency board, or other competent monetary authority of a country that controls the quantity of money in an economy and the channels by which new money is supplied. Monetary policy consists of the management of money supply and interest rates, aimed at meeting macroeconomic objectives such as controlling inflation, consumption, growth, and liquidity. In an attempt to clarify the concept of monetary policy, Kimberly (2020) defined monetary policy as a central bank's actions and communications that manage the money supply. The money supply includes forms of credit, cash, checks, and money market mutual funds. The most important of these forms of money is credit. Credit includes loans, bonds, and mortgages. Monetary policy increases liquidity to create economic growth. It reduces liquidity to prevent inflation. Central banks use interest rates, bank reserve requirements, and the number of government bonds that banks must hold. All these tools affect how much banks can lend. The volume of loans affects the money supply.

It can be deduced that, monetary policy is concerned with the changes in the supply of money and credit. It refers to the policy measures undertaken by the government or the central bank to influence the availability, cost and use of money and credit with the help of monetary techniques to achieve specific objectives.

Monetary policy aims at influencing the economic activity in the economy mainly through two major variables such money or credit supply and the rate of interest.

### **Private Sector Investment**

Concept of private sector investment also conveys different meaning to different school of thought at different levels. The concept of private sector investment has been defined differently by scholars; Nwankwo and Allison (2021) defined the term private sector as the part of the economy that is run by individuals and companies for profit and is not state owned. Therefore, it encompasses all for-profit businesses that are not owned or operated by the government. It worthy to note that companies and corporations that are government run are not part of public sector rather they are known as the public sector, while charities and other non-profit organizations are part of the voluntary sector. Furthermore, Keith (2023) defined private sector investment as the process of investing in a commodity that is not traded publicly. In many cases, this refers to a private business that has a limited number of shareholders, but the term can also be used to describe many other scenarios. For example, if an investor purchased a collection of valuables from another person, this would qualify as well. Another popular area for this type of investment is within the healthcare, regulation, and education fields to improve the standard of living for a certain region. In similar vein, Ben (2023) opined private sector is the part of a country's economic system that is run by individuals and companies, rather than a government entity. Most private sector organizations are run with the intention of making profit. The part of the economy under control of the government is known as the public sector. Charities, non-governmental organizations (NGOs) and nonprofit organizations are a third segment of the economy, known as the volunteer sector or voluntary sector. However, such organizations are more commonly considered part of the private sector as they typically operate without government control or oversight.

### **2.2 Theoretical Review**

The study was anchored on the Keynesian monetary theory which integrates monetary theory with value theory and also linked the theory of interest into monetary theory. Keynesian monetary theory was developed by English economist John Maynard Keynes (1936) in an attempt to understand the Great Depression considered a "demand-side" theory that focuses on changes in the economy over the short run. Keynes's theory was the first to sharply separate the study of economic behavior and markets based on individual incentives from the study of broad national economic aggregate variables and constructs. The theory presented a reformulated quantity theory of money which brought about a transition from a monetary theory of prices to a monetary theory of output. In doing this, Keynes made an attempt to integrate monetary theory with value theory and also linked the theory of interest into monetary theory. But "it is through the theory of output that value theory and monetary theory is brought into just a position with each other." Given these assumptions, the Keynesian chain of causation between changes in the quantity of money and in prices is an indirect one through the rate of interest. So when the quantity of money is increased, its first impact is on the rate of interest which tends to fall. Given the marginal efficiency of capital, a fall in the rate of interest will increase the volume of investment (Jhngan, 2009). The Keynesian theory provided a theoretical nexus between monetary policy rate (interest) which is the basic monetary policy tool used by the monetary authority to regulate economic activities targeting at achieving macroeconomic objectives among which is

sustainable economic growth. The theoretical nexus provided the need for the inclusion of the variables used for the study and hence the bases upon which the study was anchored.

### 2.3 Empirical Review

In a bid to investigate the link between monetary policy and private sector investment, scholars across the globe employed different methodologies at different point in time to arrive at a mix conclusion in respect of the relationship. Kabir (2022) investigates the impact of monetary policy on private sector performance in Nigeria. The study applies Autoregressive Distributive Lag (ARDL) method. The ARDL Bounds test shows that a long-run relationship exists among the variables. The ADF and PP Unit Root tests on the variables show that all the variables are I(1) process, with exception of real exchange rate which is I(0) process. The study uses annual time-series data from 1981-2021 on four variables – credit to private sector as a percentage of economic growth, broad money supply, real interest rate and real exchange rate. The result shows that the broad money supply has a significant positive impact on the private sector performance both in the short run and long run. The real interest rate and real exchange rate have a significant negative impact on private sector performance both in the short run and long run.

In the same vein, Olanrewaju (2015) examined the impact of monetary policy on private capital formation in Nigeria. The study made use of secondary data sourced from the Central Bank of Nigeria Statistical Bulletin for the period 1986-2013. The Ordinary Least Square Multiple regression technique was employed alongside the R<sup>2</sup> goodness of fit test, F- statistics and the Durbin-Watson tests. The OLS multiple regression obtained result showed that the GDP growth rate has not been attracting significant private investment given the period of study; this implies that the GDP has been growing at a level not sufficient to be able to attract private investment in the economy. Likewise, the money supply and the exchange rate have been relatively stable to also elicit increase in private investment which has in turn and to an extent promote sustainable economic growth in the country through private investment. The domestic credit from financial institutions to the private sector has made its own contribution to growth of Private Investment in the economy.

Investigating further, Olonila, Amassoma and Babatunde (2023) investigated the impact of monetary policy on bank credit and investment in Nigeria from 1981 to 2020. The central bank of Nigeria's statistics bulletin was the source of the data used in this study. Using the data gathered, the study used Auto-Regressive Distributed Lag (ARDL). The study's findings indicate that bank loans and investment have a long-term association with monetary policy. In addition, it was observed that while bank loans to the private sector and the liquidity ratio had short-term negative effects on investment, the cash reserve ratio, monetary policy, money supply, and inflation rate had long-term positive effects on investment. According to the study's findings, monetary policy significantly and favorably affects bank credit and investment in Nigeria.

More so, Oyakegha and Arepo (2022) examined the impact of monetary policy on private sector performance in Nigeria; for the period 1995- 2019. Secondary data were used and collected from the Central Bank of Nigeria Statistical Bulletin. Hypotheses were formulated and tested using time series econometric techniques. The study revealed a significant effect of credit ratio on private sector output in Nigeria. Liquidity ratio had a significant effect on private sector output in Nigeria. Broad money supply had a significant effect on private

sector output in Nigeria. Hence, there is a long-run equilibrium effect on monetary policy and the private sector economy in Nigeria; and, the result confirms that about 73% short-run adjustment speed from long-run disequilibrium.

Similarly, Lubo and Bigbo (2021) empirically examined the effect of monetary policy on domestic private investment in Nigeria from 1981 to 2018. Annual time series data were collected from secondary sources like CBN Statistical Bulletin and WDI. Thereafter, the data were analyzed using descriptive statistics and the econometrics technique of Vector Error Correction Mechanism (ECM) method of analysis. The results of analysis indicated that a long run relationship exists among the variables. Furthermore, the study revealed that money supply (MS), government domestic savings (GDS), interest rate (INT) and consumer price index (CPI) have a negative and insignificant effect on domestic private investment in the long run but interest rate is significant at 5%, while government domestic debt (GDD), has a positive and insignificant effect on domestic private investment (DPI) in the long run in Nigeria within the period.

Meanwhile, Leonard (2021) examined the impact of exchange rate on foreign private investment using quarterly time series data from Nigeria for the period 2007 to 2017. Foreign private investment in the study was disaggregated into foreign direct investment and foreign portfolio investment in order to ascertain their separate reactions to changes in the exchange rate of the naira against the US dollars. The empirical analysis was based on the VAR estimation procedure using three lagged periods adopted on the basis of various lag order selection criteria. The empirical result revealed that devaluation/depreciation of the naira adversely affects foreign direct investment and foreign portfolio investment in Nigeria. Increased in the size of the domestic market and development of the financial sector were found to stimulate foreign private investment while high inflation rate in the domestic economy discourages foreign private investment in Nigeria.

Similar study by Dang, Pham and Tran (2020) sheds light on the relationship between monetary policy and private investment using Vietnam's provincial data and a system generalized method of moment (GMM) framework. The study found that private investment is positively affected by respective monetary policies through broad money, domestic credit and interest rate channels, yet no credible evidence regarding the exchange rate's effect. In which, such a surprising co-movement between real interest rate and private investment was illuminated through analysis of the economy's distinctive characteristics over the two development stages (pre- and post-2012). Another notable finding is that economic development prospects of localities, which attract great attention and cause an intense competition between domestic and foreign investors, appear to be a major barrier to investment decisions of private firms.

In further study, Lorna (2018) investigates the effect of inflation volatility on private sector credit growth. The results indicate that private sector credit growth is positively linked to the one period lagged inflation volatility. Given that past monetary policy actions continue to affect the targeted variables due to the substantial lags in the transmission mechanism, the positive response of private sector credit growth to past inflation volatility suggests a credible monetary policy regime in Uganda, which has led to a reduction in the level of macroeconomic uncertainty and the restoration of favorable economic conditions and prospects, thus increasing the demand for credit. Further, the study finds that the lagged private sector credit growth, nominal

exchange rate, and inflation have a statistically significant effect on private sector credit growth while financial innovation, interest rates, and GDP growth appear not to be important determinants of private sector credit growth.

On the other hand, Evans (2019) establishes whether there is a threshold above which the effect of the interest rate on economic and investment growth changes. Hansen's (2000) threshold estimation approach is used for Nigeria over the period 2006-2017. The findings show that there are two thresholds that are well-identified by the data. The estimated values of the interest rate thresholds are 21.1% for GDP growth and 22.6% for investment growth. That is, the interest rate contributes positively to economic growth when it is below 21.1%, but becomes a major concern beyond the 21.1% level. Similarly, the interest rate contributes positively to investment growth when it is below 22.6%, but becomes a major concern beyond the 22.6% level.

In a related study, Moses, Tule, Audu, Oji, Oboh and Ajayi (2015) investigated factors responsible for high lending rates. It also identifies the floor and threshold for lending rate beyond which it becomes detrimental to growth and investment in the Nigerian economy. The study employed quarterly data set covering the period 2000-2013 using the Ordinary Least Square (OLS) method to investigate the key determinants of maximum lending rate. The quadratic function and the iterative model were employed for determining the threshold lending rate in Nigeria. The study followed the works of McKinnon (1973) and Shaw (1973) for the threshold model which suggested the likelihood of positive effect of interest rate on private investment particularly in developing economies. The study found more credible support for these Authors' work. The Results of the "quadratic model" estimated to determine the threshold found the threshold lending rate of 21.46% while the "iterative threshold method" identified 21% as the threshold lending rate. The study therefore, suggests a threshold lending rate band of between 21% - 21.5%.

In a narrower perspective, Solomon and Kofi (2020) investigate the effect of interest rate on private investment and determine the threshold level beyond which interest rate becomes detrimental to private investment in Ghana. The study employed annual time series data from 1986-2016. To investigate the effect of interest rate on private investment, the paper employed the autoregressive distributed lag (ARDL) model, while the quadratic function and conditional least square procedures were employed to estimate the interest rate threshold. Results from the ARDL model revealed positive long and short run effect of interest rate on private investment, thus confirming the McKinnon-Shaw hypothesis in Ghana. However, results from the quadratic function and conditional least square model found the threshold of 23.59% and 24% respectively, beyond which interest rate impacts negatively on private investment in Ghana.

In the same vein, Aizenman, Cheung and Ito (2017) using data on 135 countries from 1995 to 2014, shows that a low-interest rate environment can yield different effects on private saving across country groups under different economic environments. A well-developed financial market, an aging population, and output volatility can all contribute towards turning the relationship between interest rates and saving negative. Among developing countries, when the nominal interest rate is not too low, we detect the substitution effect of the real interest rate on private saving. However, among industrial and emerging economies, the substitution effect is detected only when the nominal interest rate is lower than 2.5%. In contrast, emerging-market Asian

countries are found to have the income effect when the nominal interest rate is below 2.5%. When we examine the interactive effects between the real interest rate and the variables for economic conditions and policies, it find that the real interest rate has a negative impact, income effect on private saving if any output volatility, old dependency, or financial development is above a certain threshold. Further, when the real interest rate is below 1.5%, greater output volatility would lead to higher private saving in developing countries.

### 3 METHODOLOGY

The research design for the study was be ex-post facto research design because the study employed methodology that looks into how independent variables with certain qualities that already exist prior to the study as its affects a dependent variable so as to establish a cause- effect relationship between monetary policy and private sector investment in Nigeria. The data used in this research was obtained from secondary sources, mainly the periodic publications of the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS), published journals and news dailies spanning the period of 1981 and 2023. This study employed statistical and econometric methods for data presentation and analyses. The statistical methods were; tables graphs, mean, median and standard deviation. In addition, the study employed other econometrics techniques such as; Augmented Dickey Fuller Test (ADF) for unit root testing. Autoregressive distributed lag Bound Test (ARDL) was also employed for long-run and short-run analysis while threshold regression model was used to determine optimal lending interest rate threshold consistent with private sector investment.

To examine the impact of money supply, inflation, exchange rate and lending interest rate on private sector investment in Nigeria, the study adopted the model by Kabir (2022) in accordance with central Bank of Nigeria (CBN) monetary policy instruments in line with the IS-LM model and in agreement with Keynesian monetary theoretical underpinnings. The IS-LM model presents an explicit description on how increase in the interest rate would depress investment, thereby reducing the private sector performance and vice versa. It also explains how the money supply affects the aggregate demand and output, thereby affecting the overall private sector performance. Similarly, it explains how the level of government spending affects the interest rate investment as well as the overall performance of private sector. The mathematical function is written as:

$$Y = (Q, Z) \dots\dots\dots 3.1$$

Where:  $Y$  = Private sector Investment

$Q$  = Vector of monetary policy instruments  $Z$  = Vector of other control variables

Based on the above function,  $Q$  represents the broad money supply and real interest rate, while  $Z$  represents the exchange rate and inflation rate

Thus, the functional relationship of the model becomes;

$$PSINV = f(M2, LNDR, EXR, INF)\dots\dots\dots 3.2$$

The stochastic form of the model specified in accordance to ARDL model specification is as thus;



$$\begin{aligned}
 PSINV_t = & \beta_0 + \sum_{i=1}^p \beta_1 PSINV_{t-i} + \sum_{i=0}^p \beta_2 M2_{t-i} + \sum_{i=0}^p \beta_3 LNDR_{t-i} + \sum_{i=0}^p \beta_4 EXR_{t-i} + \sum_{i=0}^p \beta_5 INF_{t-i} \\
 & + \sum_{i=1}^q \pi_1 \Delta PSINV_{t-i} + \sum_{i=0}^q \pi_2 \Delta M2_{t-i} + \sum_{i=0}^q \pi_3 \Delta LNDR_{t-i} + \sum_{i=0}^q \pi_4 \Delta EXR_{t-i} + \sum_{i=0}^q \pi_5 \Delta INF_{t-i} \\
 & + \varepsilon_t \dots \dots \dots (3.3)
 \end{aligned}$$

Where;

PSINV = Private Sector Investment

M2 = Broad Money Supply

LNDR = Lending Interest Rate

EXR = Real Exchange Rate

INF = Inflation Rate

$\beta_0$  = intercept or constant term;

$\beta_1 - \beta_5$  = long-run coefficients

$\pi_1 - \pi_5$  = short-run coefficients

$\varepsilon_t$  = Error term with the assumption of zero mean and constant variance.

To determine the optimal lending interest rate threshold consistent with private sector investment in Nigeria, the study adopted Moses, Audu, Oji, Oboh, Imam and Ajayi (2015) threshold model. The threshold lending interest rate was estimated using the equation below;

$$PSINV_{it} = \beta_1 + \beta_2 LNDR_{it}(-1) + \beta_3(LNDR_{it}[-1])D^*(LNDR_{it} > \pi a) + \beta_4 X_{it} + U \dots \dots \dots 3.4$$

$$(LNDR_{it} > \pi a) = \begin{cases} 1 & \text{if } LNDR_{it} > \pi a \\ 0 & \text{if } LNDR_{it} < \pi a \end{cases} \dots \dots \dots 3.5$$

Where;

PSINV<sub>it</sub> is the logarithm of Private domestic investment;

B1 is the fixed effect;

LNDR<sub>it</sub> (-1) it is the lagged value of maximum lending rate;

$\pi a$  is the lending rate threshold;

$D^*(LNDR_{it} > \pi a)$  is a dummy variable that assumes a value of one for observed lending rate greater than  $\pi a$  and zero otherwise;

$X_{it}$  is a vector of control variables which includes lagged values of exchange rate (EXR(-1)) and inflation (INF(-1)) lagged value private domestic investment (PSINV(-1)) and lagged of money supply (M2(-1)) while

$U_t$  is the error term.

The parameter “ $\pi a$ ” represents the threshold lending rate whose relationship between lending rate and private investment is expressed as: (i)  $B_2$  measures the low lending rate; (ii)  $B_3$  measures the incremental effect of lending rate on investment when it is greater than the arbitrary lending rate, that is, high lending rate. In other words,  $B_3$  indicates the difference in the effect of lending rate on investment between the two sides of the

structural break. By estimating regressions with different values of  $\pi_a$ , the optimal value of  $\pi_a$  is ascertained by obtaining the value that minimizes the sum of squared residuals and maximizes the adjusted  $R^2$  from the respective regressions.

#### 4 Empirical Findings

##### Unit Root Test

The variables of the study were subjected to unit root tests using the Augmented Dickey-Fuller (ADF) test to determine the stationarity levels of the series. The results of the tests are presented in Table 1.

**Table 1: ADF Unit Root Test Result**

Variables	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Order of Integration
PSINV	-5.098035	-4.219126	-3.533083	3.198312	0.0010	I(1)
M2	-5.755455	-4.205004	-3.526609	-3.194611	0.0001	I(1)
LNDR	-7.110696	-4.211868	-3.529758	-3.196411	0.0000	I(1)
EXR	-6.699111	-4.211868	-3.529758	-3.196411	0.0000	I(1)
INF	-3.955203	-3.205004	-3.526609	-3.194611	0.0186	I(0)

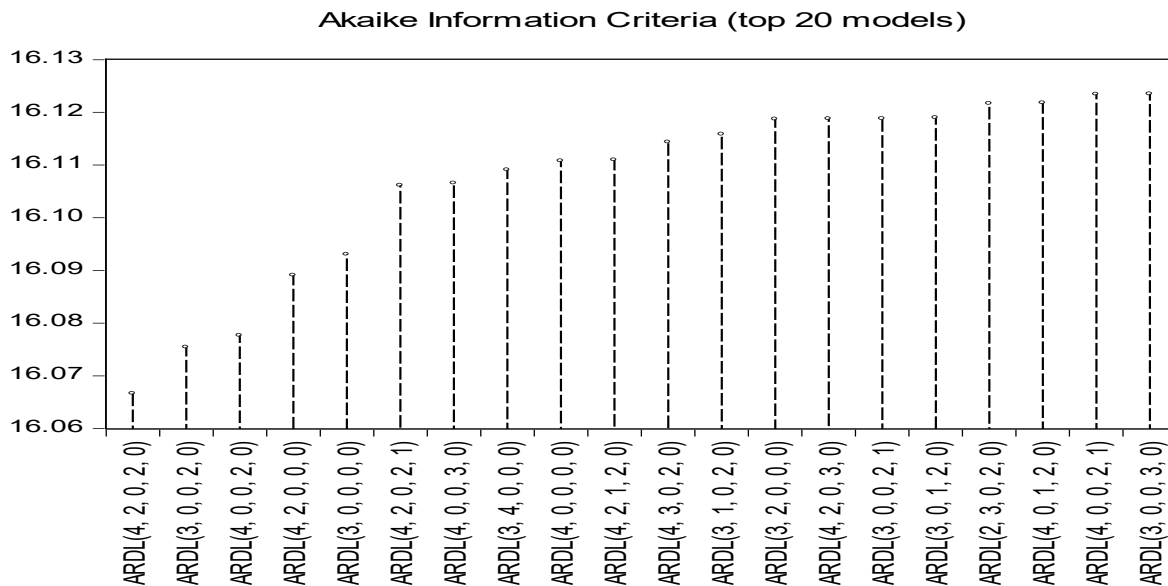
**Source: Authors' Computation using E-Views 9.0 Version**

Table 1 indicates that all the variables are integrated at order one with exception of inflation rate which happens to be stationary at level. This condition warrants the application of ARDL methods which accommodates series that are either I(1) or I(0) process or the mixture of both. The stationarity tests are necessary to guard against spurious regression and to ensure no variable is integrated of order two. The test was based on Akaike Information Criterion (AIC) which was selected automatically

##### ARDL Results

##### ARDL Optimal Lag Selection

The Akaike information Criterion was used to select the optimal lag for the models. The graph of the optimal model selection summary is presented in figure 1.



Source: Extraction from E-Views

**Figure 1: Akaike Information Criteria (AIC) Graph Showing Optimal Model Selection Summary**

Figure 1 shows that, top 20 ARDL model specifications were considered. Although an ARDL (4,2,0,2,0) was finally selected. However, it can also be seen how well some other specifications performed in terms of minimizing AIC.

**ARDL Bounds Test**

The Autoregressive Distributed Lag (ARDL) Bounds test approach to cointegration was employed to investigate if the variables used for the study converge in the long-run. The ARDL Bound test result is presented in Table 2

**Table 2: ARDL Bound Test to Cointegration**

Test Statistic	Value	K
F-statistic	4.734230	4
<b>Critical Value Bounds</b>		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	4.66

Source: Authors' computation using E-Views 9.0 Version

Table 2 shows that long-run relationships exist among the variables of the study because the F-Statistic (4.734230) is greater than the lower I(0) and upper I(1) bounds of the critical values at 5% critical value.

**ARDL Long Run Coefficients**

The ARDL long-run coefficients were estimated to examine the long-run impact of the independent variables on the endogenous variable having established that, long run relationship exist among the variables. The estimated result of the ARDL long-run coefficients are presented in Table 3.

**Table 3: ARDL Long-Run Coefficients**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	0.774304	0.021250	36.437296	0.0000
LNDR	-0.181303	1.7556408	-0.103267	0.0186
EXR	-0.385256	0.188385	-2.045040	0.0415
INF	-0.294550	5.192898	-0.056722	0.0352
C	0.825284	3.807101	0.216775	0.0129

**Source: Authors' computation using E-Views 9.0 Version**

Table 3 above shows that in the long run, if all other things were held constant, the broad money supply (M2) has a significant positive impact on the private sector investment. A unit increase in broad money supply (M2) would increase the private sector investment by about 77%. Given the decision criteria to reject null hypothesis ( $H_0$ ) if the probability value is  $< 0.05$ , it shows that probability values for money supply (M2) (0.0000) is statistically significant to reject the null hypothesis that, money supply has significant impact on private sector investment in Nigeria. Hence, we conclude that, money supply (M2) has long-run positive impact on private sector investment in Nigeria for the period of the study.

On the contrary, everything been equal, lending interest rate (LNDR) has a significant negative long-run impact on the private sector investment for the period of the study. This means that a unit increases in the lending interest rate (LNDR) would decrease the private sector investment in Nigeria by about 18%. Given the decision criteria to reject null hypothesis ( $H_0$ ) if the probability value is  $< 0.05$ , the result indicated that, the probability value for lending interest rate (LNDR) (0.0186) is statistically significant to reject the null hypothesis that, lending interest has a significant impact on private sector investment in Nigeria. Hence we conclude that, lending interest rate has a significant negative impact on private sector investment in Nigeria for the period of the study.

Similarly, the result indicated that, real exchange rate (EXR) has an significant long-run negative impact on the private sector investment in Nigeria. A unit increase in the exchange rate would decrease the private sector investment by 39% approximately. Given the decision criteria to reject null hypothesis ( $H_0$ ) if the probability value is  $< 0.05$ , the result indicated that, the probability value for exchange rate (EXR) (0.0415) is statistically significant to reject the null hypothesis that; exchange rate has no significant impact on private sector investment in Nigeria . Hence, we conclude that, exchange rate has a significant negative impact on private sector investment in Nigeria for the period of the study.

In the vein, ceteris paribus, inflation rate has a significant negative impact on the private sector investment. A unit increase in the inflation rate would decrease the private sector investment in Nigeria by 29% approximately. Given the decision criteria to reject null hypothesis ( $H_0$ ) if the probability value is  $< 0.05$ , the result indicated that, the probability value for inflation rate (INF) (0.0352) is statistically significant to reject

the null hypothesis that; inflation rate has no significant impact on private sector investment in Nigeria. Hence we conclude that, inflation rate has a significant long-run impact on private sector investment in Nigeria.

**ARDL Short-Run Coefficients**

ARDL short-run coefficients were further examined to establish the short-run dynamics and to ascertain the speed of converges to the long-run equilibrium. The result of ARDL short-run dynamics is presented in Table 4.

**Table 4: ARDL Short-Run Dynamics**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
D(PSINV(-1))	0.834807	0.241837	3.451937	0.0020
D(PSINV(-2))	0.549632	0.178723	3.075330	0.0050
D(PSINV(-3))	0.301633	0.172777	1.745796	0.0931
D(M2)	0.900338	0.081414	11.058821	0.0000
D(M2(-1))	-0.402433	0.229259	-1.755370	0.0314
D(LNDR)	0.277608	27.016206	0.102756	0.0190
D(EXR)	-0.409200	4.892958	-0.836305	0.0109
D(EXR(-1))	0.714263	3.885931	1.838076	0.0780
D(INF)	-0.451016	7.957382	-0.056679	0.0253
ECM(-1)	-0.153120	0.326730	-4.686449	0.0001

**Source: Authors’ Computation using E-Views 9.0 Version**

The short-run coefficients of the ARDL estimated model presented in Table 4 showed that, the short-run coefficient for 1 year lag, 2 year lag and 3 year lag PSINIV were positive and statistically significant. Hence, we conclude that 1, 2 and 3 year lags PSINV has positive short-run significant impact on current year PSINV in Nigeria for the period of the study.

Moreover, the short-run coefficients of the ARDL estimated model shown in Table 4 revealed that, current year M2 exhibit positive short-run impact on PSINV while 1 year lag M2 exhibit negative short-run impact on the current year PSINV in Nigeria. The probability value (0.0000) for the current year M2 was found to be statistically significant to conclude that, current year M2 has significant short-run positive impact on PSINV. Similarly, the probability value (0.0314) for the 1 year lag M2 was found to be statistically significant to conclude that, 1 year lag M2 has significant short-run negative impact on PSINV in Nigeria for the period of the study.

Furthermore, ARDL estimated model presented in Table 4 indicated that current year lending rate (LNDR) has exhibited short-run positive impact on PSINV in Nigeria. The probability value (0.0190) has shows that, the current year LNDR is statistically significant to conclude that, LNDR has positive significant short-run impact on PSINV in Nigeria for the period.

It was also revealed that current year exchange rate (EXR) indicated negative impact on PSINV in the short-run. The probability value (0.0109) for the current year EXR has shown to be statistically significant to conclude that, EXR has short-run negative impact on PSINV in Nigeria. On the contrary, 1 year lag EXR indicated positive impact on PSINV in the short-run. However, the probability value (0.0780) for the 1 year lag EXR has shown to be statistically insignificant to conclude that 1 year lag has a significant positive impact on PSINV in the short-run

for Nigeria within the period of the study. In the meantime, current year inflation rate (INF) indicated a negative and statistically significant short-run impact on PSINV in Nigeria for the period of the study.

The estimated co-integrating error correction term (ECT) is negative and statistically significant indicating that, the speed of adjustment at which the previous year’s shock of the explanatory variables converging back to the long-run equilibrium in the current year is approximately 15%.

**Threshold Regression Estimate**

To examine the optimal lending interest rate threshold consistent with private sector investment in Nigeria, a threshold regression model was estimated and the result of the estimated model is presented in Table 5.

**Table 5: Threshold Regression**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>LNDR &lt; 28.119999 -- 33 obs</b>				
PSINV	0.656150	2.399307	2.734749	0.0093
C	-0.925190	5.022790	-1.841986	0.0731
<b>28.119999 &lt;= LNDR -- 10 obs</b>				
PSINV	-0.409187	9.409220	-4.348794	0.0001
C	0.142623	2.842879	5.016864	0.0000
<b>R<sup>2</sup> = 0.60. F-Statistic = 22.05 F (Prob.) = 0.0000. Durbin-Watson = 1.46</b>				

**Source: Authors’ Computation using E-Views 9.0 Version**

Table 5 revealed that, the optimal lending interest rate threshold beyond which lending rate is dangerous to investment is 28.11%. Thus other things being equal, a lending interest rate of 28.11 or lower is a signal that investment is expected to thrive in the Nigerian economy. The result further revealed that, lending interest rate of 28.11% or lower will increase private sector investment in Nigeria by 66%. However, an increase in lending interest rate beyond the optimal threshold will cause investment to decrease by 41% approximately in the following year. The adjusted R<sup>2</sup> value of 60%, the F. Statistic value with P-value of 0.0000 and Durbin-Watson statistic of 1.46 indicate that the estimates are significant.

**Diagnostic Test Results**

The study employed post-estimation test to diagnose the residuals of the estimated model for valid and reliable outcomes. The test of serial correlation, Heteroskedasticity, Stability and normality test were conducted and the results presented in Table 6

**Table 6: Diagnostic Test Results**

Test	Null Hypothesis	F-statistics	Prob. Value
Beusch Godfrey Serial Correlation LM Test	No Serial Autocorrelation	4.311608	0.0657
Breusch-Pagan Godfrey	No Hetroscedasticity	1.856188	0.0930
Jarque-Bera	series residuals are normally distributed	0.562393	0.7548

Ramsey Reset	No Misspecification	6.566609	0.0571
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**Source: Authors' computation using E-Views 9.0 Version**

From Table 6 above, to confirm the validity or the opposite of the estimates, the model is subjected to serial correlation test. The null hypothesis is that there is no serial correlation in the residuals up to a specified lag order. The above results show that the null hypothesis cannot be rejected because the probability value F-statistics is greater than the 5% significance level. Thus, the model does not suffer from serial correlation. To test whether the variance of the disturbance term is not the same for all the observations, the heteroscedasticity test has been conducted. The null hypothesis of this test is that there is no heteroskedasticity. Therefore, the null hypothesis cannot be rejected since the p-value of the F-statistics is greater than 5% significance value. Hence, the model is homoscedastic. Ramsey reset test holds that the F-statistic test the hypothesis that the coefficients on the powers of the fitted values from the regression are jointly zero. Therefore, the null hypothesis cannot be rejected since the probability value of F-statistics is greater than 5% significant level. This implies that the model used in this study is well-specified. The JB statistic reveals that, the null hypothesis that the series residuals are normally distribution is accepted because the p-values is greater than 5% significant level.

### **Discussion of Findings**

The discussion of the findings of the study is based on the objectives and tested hypotheses of the study. Objective one of the study sought to assess the impact of money supply on private sector investment in Nigeria. The estimated ARDL model revealed that money supply (M2) has a significant positive impact on private sector investment as a unit increase in money supply (M2) indicated correspondent increase in the private sector investment by about 77%. The probability value for the estimated coefficient of the money supply (M2) was found to be statistically significant to reject the null hypothesis that; money supply has no significant impact on private sector investment in Nigeria. The implication of this finding is that; expansionary monetary policy via money supply instrument will thrive private sector investment for the Nigerian economy. The findings aligned with some of the empirical studies reviewed as it is in consistent with the findings of Kabir (2022), Olanrewaju (2015), Olonila, Amassoma and Babatunde (2023), as well as Oyakegha and Arepo (2022) who found that broad money supply has a significant positive impact on the private sector performance both in the short run and long run. The finding is however at variance with empirical evidence provided by Lubo and Bigbo (2021) who found that money supply (MS) has a negative and insignificant effect on domestic private investment in Nigeria.

The second objective of the study was to evaluate the impact of real exchange rate on private sector investment in Nigeria. The long-run coefficient of the estimated ARDL model revealed that; real exchange rate (EXR) has long-run negative impact on the private sector investment in Nigeria. The probability value for the estimated coefficient of the real exchange rate (EXR) was found to be statistically significant to reject the null hypothesis that; exchange rate has no significant impact on private sector investment in Nigeria. It was further confirmed by the ARDL short-run estimated model as both current and 1 year lag indicated negative and positive significant impact respectively on private sector investment in Nigeria. This suggests that, continuous depreciation in the value of naira, the disequilibrium in the foreign exchange market and the

external imbalances experience in Nigeria over the years discourage private sector investment as investors lost confidence in the local currency to bring in more investment portfolio for the economy. In addition, Nigeria being an import dependent nation, the continuous depreciation of the naira increases prices for imported raw materials needed by the private sector which in turn affect private sector performance in Nigeria.

The result is in consonance with Leonard (2021) whose empirical result revealed that devaluation/depreciation of the naira adversely affects foreign direct investment and foreign portfolio investment in Nigeria. It is also in tune with Kabir (2022) who found that, real exchange rate has a significant negative impact on private sector performance both in the short run and long run. It is also in agreement with similar study by Dang, Pham and Tran (2020) for the Vietnam economy who established that private investment is positively affected by respective monetary policies through broad money, domestic credit and interest rate channels, yet no credible evidence regarding the exchange rate's effect. The result however does support the finding by Olanrewaju (2015) who revealed that, exchange rate have been relatively stable to elicit increase in private investment in Nigeria.

The objective three of the study sought to analyse the impact of inflation on private sector investment in Nigeria for the period of the study. The long-run estimated coefficients of the ARDL model indicated that, inflation rate has negative impact on the private sector investment. The test statistic probability for the estimate coefficient of inflation has shown a significant value to reject the null hypothesis correspondence to the objective three hence rejecting the null hypothesis that, inflation has no significant impact on private sector investment in Nigeria. The estimated short-run coefficient for the inflation rate also confirmed a negative and insignificant value, implying that, inflation rate has negative and significant impact on private sector investment in Nigeria both in the long and short-run period.

The findings aligned with similar studies by Lubo and Bigbo (2021) who revealed that consumer price index (CPI) has proxied for inflation has a negative and insignificant effect on domestic private investment. The finding also supported the empirical report of Fashagba, Atsanan, Yadok and Adebayo (2022) who found that rate of inflation is significantly high and reduces real return on investment to negative value. The finding is however at variance with Olonila, Amassoma and Babatunde (2023) who found that inflation rate had long-term positive effects on investment in Nigeria. It is also conflicting with similar study carried out by Lorna (2018) in Uganda who established that, there is a positive response of private sector growth to past inflation volatility. Though, the positive response of private sector growth to inflation volatility was attributed to credible monetary policy regime in Uganda, which has led to a reduction in the level of macroeconomic uncertainty and the restoration of favorable economic conditions and prospects, thus increasing the demand for credit and private sector growth for the economy.

The fourth objective of the study was to ascertain the optimal lending interest rate threshold consistent with private sector investment in Nigeria. The threshold estimated model suggests that, the optimal lending interest rate threshold beyond which lending rate is dangerous to investment is 28.11%. The implication of this finding is that, lending interest rate of 28.11% or lower will increase private sector investment in Nigeria while an increase in lending interest rate beyond the optimal threshold will be detrimental to the private sector investment. The finding however contradict with similar study by Evans (2019) which established that,



interest rate contributes positively to investment growth when it is below 22.6%, but becomes a major concern beyond the 22.6% level. The finding is also at variance with the result obtained by Moses et al. (2015) who established with a “quadratic model” the threshold lending rate of 21.46% and identified with an “iterative threshold method” 21% as the threshold lending rate. With reference to other economy, the finding is at variance with similar study by Solomon and Kofi (2020) which found the threshold of 23.59% and 24% respectively, beyond which interest rate impacts negatively on private investment in Ghana. Among the industrial and emerging economies, Aizenman, Cheung and Ito (2017) established that, the substitution effect is detected only when the nominal interest rate is lower than 2.5%. In contrast, emerging-market Asian countries are found to have the income effect when the nominal interest rate is below 2.5%. Though there could be inconsistency regarding the optimal lending interest rate threshold consistent with private sector investment in Nigeria as established by previous empirical studies for the economy, all the lending interest rate threshold found are within the threshold established by this study. The inconsistency could be attributed to differences in the scope of the studies.

### Conclusion and Recommendations

In line with findings of the study, the study concluded that, there is long-run relationship between monetary policies and private sector investment in Nigeria. However, *poorly executed* monetary policy can impede private sector investment. It was further concludes that, expansionary monetary policy via money supply instrument will thrive private sector investment for the Nigerian economy. The study also concludes that, continuous depreciation in the value of naira, the disequilibrium in the foreign exchange market, the external imbalances and uncertainty in price movement experience in Nigeria over the years discourage private sector investment, hence had adversely impacted on private sector investment in Nigeria over the period of the study. it was further concluded that, persistence increase in the price for goods and services is detrimental to private sector investment in Nigeria while lending interest rate above 28.11% will also be detrimental to private sector investment in Nigeria.

In line with the study findings, the following recommendations are proposed:

1. Monetary policy authority should engage expansionary monetary policy via money supply instrument to allow for the injection of optimal money supply into the system.
2. The government should halt its continued less impactful devaluation policy and embrace more diversification commitments to acquire more forex and bridge its scarcity, thereby improving the value of Naira against the value of other currencies. There is also urgent need for structural reforms to clear some backlogs in the market and ensure consistency in foreign exchange policies that will provide clarity, restore confidence in our economy and attract more private sector investment.
3. There is need for government to improve on the provision of basic infrastructure especially power supply to reduce the cost of doing business and invariably reduce inflationary tendency for the economy. This will go a long way to increase consumers’ real income, purchasing power, patronage for goods and services and improve private sector returns on investments.
4. Central Bank of Nigeria, should try to understand the role of credit to the private sector in enhancing private sector investment and come up with monetary policies that will encourage private sector credit to drive the private sector performance. One of such policies is by reducing the price for credit to the

private sectors. This will be achieved when the lending interest rate level as a monetary policy instrument is brought low to a single digit to encourage investors' access to cheap funds for investments. An increase in lending interest rate beyond the optimal threshold of 28.11% will be detrimental to the private sector investment in Nigeria.

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