

MONETARY POLICY AND PROFITABILITY OF DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

The importance of the banking sector in the economic development of a nation cannot be overemphasized. Therefore, the profitability of Nigerian banking sector has declined over the years. Hence, this study examined the impact of monetary policy on the profitability of deposit money banks in Nigeria. The data obtained for the study is from 2012 to 2022 and were sourced from the annual reports of the selected banks and Central Bank Statistical Bulletin. Static Panel data Estimator and Dumitrescu and Hurlin Panel Causality Tests were used to estimate the obtained data. The study revealed that monetary policy rate is a significant determinant of return on equity across banks in Nigeria at 1% level of significance. Furthermore, this research found that cash reserve ratio is a significant determinant of return on assets across banks in Nigeria at 5% level of significance. It was concluded that monetary policy is a significant determinant of profitability of banks in Nigeria. The study therefore recommends that administration of monetary policy by the central bank should be such that it is flexible to enable the commercial banks to discharge their duties effectively to the public.

1.0 Introduction

Monetary policy is an important tool used by the government to influence any country's economic activities. The usual goals of monetary policy are to achieve or maintain full employment, to achieve or maintain a high rate of economic growth, and to stabilize prices and wages. The creation of the Bank of England in 1964, which was granted the authority to print notes backed by gold, established the idea of monetary policy being independent of executive and administrative action (Bamforth, 2021).

Monetary policy is widely used to either reduce or increase the money in circulation depending on the prevailing state of the economy. Some of the monetary policy strategies includes: revision of the monetary policy rates, changing of the bank reserve requirements, increasing or decreasing the interest rates, etc. (Osoma, 2022). The use of

monetary policy cannot be undermined due to its significant effects on the financial sector of a country which happens to be so important that any negative performance in the sector will likely result in a drastic downturn of a nation's economy (Okere, 2015). The implementation of monetary policy in Nigeria is done by the Central Bank of Nigeria through its directives to the banking sector.

The ultimate goal of banks like any other corporation is to maximize profits. Hence, they engage in numerous activities like acceptance of deposits, advancing of loans, safekeeping of valuables, etc. to achieve this objective (Osakwe, Okeke, George & Okoye, 2021). The commonest and most important service performed by banks is the giving out of loans to borrowers in need of funds. The borrowers are then expected to pay back the principal amount borrowed along with interest charged on it. This interest received serves as a

form of profit to the banking sector. Profitability is very important in banks' business just as in other businesses as they need to generate sufficient profit so as to maximize shareholders wealth in form of dividend payment or capital appreciation of shares and for growth and expansion (Wasiu, Trimisiu, Gbadebo & Afeez, 2019).

The role of the banking sector in the economic development of a nation cannot be overstressed. It is the channel through which idle funds are made available to the productive sector, thereby facilitating the use of surpluses in the economy to generate employment and promote economic welfare. The banking sector provides strong confidence for depositors, thereby motivating and encouraging savings in the economy. A strong financial sector also helps to sustain an economy against external shock that may arise from fall in external capital flow (Aginam & Obi-Nwosu, 2019). However, According to Alalade, Oseni and Adekunle (2020), Nigerian banks has been noted that despite the steady increase in the net worth of various deposit money banks, there have been several declines in total credit during the period of 1984 to 2018 in Nigeria.

Increase in monetary policy rate leads to increase in the interest rate on loans given out to customers which results in high rate of banks' non-performing assets. There was an upsurge of 78.8% in the rate of non-performing loans of deposit money banks in Nigeria after an increase in the monetary policy rate from 12% to 13% in 2015 (Akwe, 2018). The Nigerian monetary policy committee also noted the risk of another global financial contagion from the recent bank failures on the 1st of May, 2023 in the United States (US) and Switzerland which occurred following the persistent interest rate hikes and its adverse effects on the broad portfolio of banks in the US (Central Bank of Nigeria, 2023).

Several studies (Udeh (2015), Ekpung, Udude and Uwalaka (2015), Andabai, Ikeora and Anah (2019)) examined the impact of monetary policy on the profitability of banks using the monetary policy rate, cash reserve ratio, liquidity ratio and exchange rate

as proxies for monetary policy and return on equity as proxy for profitability while neglecting broad money supply as monetary policy variable and net interest margin as profitability variable. These aforementioned researches all gave inconsistent findings indicating that there are still gaps yet to be utilized in the studies. To fill this gap, this study employed the use of the above-mentioned measurements along with additional ones including broad money supply for the independent variable. Net interest margin was uniquely considered in this study. Therefore, this study aims at examining the extent to which monetary policy explains the fluctuations in the financial performance of deposit money banks.

2.0 Literature Review

2.1.1 Concept of Monetary policy

Monetary policy refers to the policy adopted by the monetary authority of a nation to control the quantity and supply of money in the economy in order to promote price stability, reduce inflation and improve economic growth. The Central Bank of Nigeria (2018) defines money supply as the total value of money in the economy and this consists of currency outside banks, with the non-bank public (notes and coins), and deposits with the deposit money banks. For monetary policy purposes, money supply can be divided into two variants: M1 and M2. M1 is the narrow measure of money supply which includes currency outside banks with the non-bank public and demand deposits (current accounts) at the deposit money banks. M2 is the broad measure of money supply and it includes M1, savings and time deposits and foreign currency deposits at the deposit money banks. M2 measures total liquidity in the economy.

The monetary policy is usually in two forms: Expansionary and Contractionary policy. Monetary policy is expansionary when the policy thrust of the authorities increases the supply of money in the system while the contractionary is the policy when the action and measures taken by the government reduces the quantity of money supply available in the

economy or constrains the growth or ability of the deposit money banks to grant further credits (Udeh, 2015). Anwar and Okorie (2016) added that if the economy experiences a decline in economic activities and employment declines, policy makers will be moved to soften monetary policy so as to stimulate aggregate demand. This act of softening the monetary policy is called the expansionary monetary policy. In Contrast, if the economy is showing signs of overheating or inflationary pressures are building, the Central Bank will be propelled to counter those pressures by tightening the economy in order to bring growth in aggregate demand below that of the economy's potential to produce. This action of tightening is known as the Contractionary policy.

The Tools or instruments put together by the monetary authorities to regulate money supply are known as the monetary policy instruments. Ulorua (2017) asserted that the monetary policy instruments can be categorized into: Direct and Indirect monetary policy instruments. The Direct monetary policy instruments include: reserve requirements, special deposits, moral suasion, credit control and prudential guidelines. The indirect or quantitative monetary policy instruments includes: Open market operations, Lending by the apex bank, interest rates, Exchange rate, rediscount rate and cash reserve requirements. According to Osakwe, Ibenta and Ezeabasili (2019), monetary policy in Nigeria has experienced two main phases which are the Era of direct control from 1959 to 1986 and the Era of market-based controls from 1986 till date. In the era of direct control, the CBN used directives targeted at specific sectors to fix or control interest rate, exchange rate and to determine credit allocation to real sectors while in the era of market based controls, the CBN used policies targeted at all sectors in the country in order to control interest rate.

A monetary policy decision that cuts interest rate, for example, lowers the cost of borrowing, resulting in higher investment activity and the purchase of consumer durables. The expectation that economic

activity will strengthen may also prompt banks to ease lending policy, which in turn enables business and households to boost spending. In a low interest rate regime, stocks become more attractive to buy, raising households' financial assets. This may also contribute to higher consumer spending, and makes companies' investment projects more attractive. Low interest rates also tend to cause currency to depreciate because the demand for domestic goods rises when imported goods become more expensive. The combination of these factors raises output and employment as well as investment and consumer spending.

2.1.2 Concept of Financial Performance and Profitability

Financial performance refers to the evaluation of a company's financial health by analyzing various financial metrics. These metrics provide insights into the profitability, liquidity, efficiency, and solvency of the company. Financial performance analysis is crucial for both internal management and external stakeholders, such as investors, creditors, and regulators (Akinroluyo & Adeniti, 2022). A company's financial performance can be measured using several metrics, including profitability ratios, liquidity ratios, efficiency ratios, and solvency ratios.

Financial performance analysis helps in identifying the strengths and weaknesses of a company's financial position. Financial analysis also contributes to identifying areas where an organization can improve its profitability, and solvency (Dereje & Dvilyang, 2022). With a firm performance, the risks associated with the company's financial position can be discovered leading to taking corrective measures to mitigate those risks.

Investors use financial performance metrics to evaluate a company's financial position and make investment decisions. Creditors use financial performance metrics to assess the company's ability to pay back its debts. Regulators use financial performance metrics to monitor the financial health of companies and ensure compliance with regulation (Abiola & Olausi, 2014).

2.2 Theoretical Review

Macro-economic factors such as monetary policies which directly influence bank performance stand on certain economic theories. The theories that were considered in this study are:

2.2.1 Keynesian Theory of Money and Prices

This theory was propounded by John Maynard Keynes in 1936 and it states that a change in the supply of money can permanently change such variables as the rate of interest, the aggregate demand and the level of employment, output and income. In a situation of unemployment, Keynes advocated a cheap monetary policy. (Udeh 2015). The theory viewed money supply as one of the main determinants of the real economy (International monetary fund, 2014).

The theory assumes that all factors of production are in perfectly elastic supply so long as there is any unemployment and that all unemployed factors are homogenous. It also assumes that there are constant returns to scale so that prices do not rise or fall as output increases and that effective demand and quantity of money change in the same proportion so long as there are any unemployed resources.

Keynes criticized the theory by stating that effective demand will not change in exact proportion to the quantity of money and that since resources are homogenous, there will be diminishing and not constant returns as employment gradually increases.

2.3 Empirical Review

Numerous researchers have embarked on the study of the relationship between monetary policy and financial performance of deposit money banks. Different measurements have been employed during the study which led to myriads of outcomes and conclusions. Few of those researches has been summarized below:

Borio, Gambacorta and Hofmann (2015) investigated how monetary policy affects banks' profitability. They used data from 109 large international banks

headquartered in 14 major advanced economies for the period 1995- 2012. They used interest rates and return on assets as proxies for their variables. They found a positive relationship between the level of short-term rates and the slope of the yield curve. They suggested that the positive impact of the interest rate structure on net income dominates the negative one on loan loss provisions and on non-interest income. They also found that the effect is stronger when the interest rate level is lower and the slope less steep, that is, when non-linearities are present. All this suggests that, over time, usually low interest rates and an unusually flat term structure erodes bank profitability.

Ekpung, Udude and Uwalaka (2015) investigated the effect of monetary policy on banking sector performance in Nigeria using bank's deposit liabilities as proxy for bank performance. The study period of their research covered 36 years from 1970 to 2006, using selected indicators and employing the OLS regression technique on the secondary data they obtained from Federal Ministry of Finance, World Bank Publications, Economic and Financial Review, Editorials from News Papers, Internet Materials, some published economic textbooks and library data from the period 1970 to 2006 from Central Bank of Nigeria (CBN) statistical Bulletin. They tested their hypothesis using chosen indices of banking performance namely Exchange rate, deposit rate, and minimum discount rate. They concluded therefore that monetary policy plays a vital role in determining the volume of bank's deposit liabilities in Nigeria. They also recommended that government and its monetary authorities should strive to create a conducive environment for banking sectors to grow in the country by packaging appropriate monetary policies that would guarantee and enhance growth and development of the banking sectors in Nigeria.

Ndugbu and Okere (2015) investigated the impact of monetary policy on the performance of deposit money banks – the Nigerian Experience (1993-2013). Data for this study were collected from the Central Bank of Nigeria (CBN) statistical bulletin,

annual reports and statement of accounts. The Augmented Dicker Fuller (ADF), Ordinary Least Square and co integration were used to evaluate the impact of monetary policy on the performance of deposit money banks. They revealed that amongst all the monetary policy variables (bank deposit rate, bank lending rate, cash reserve ratio and liquidity ratio) considered in the calculations, only bank deposit rate has significant relationship though inverse relationship. The study recommended among others, that the Central Bank of Nigeria (CBN) should moderate the deposit rate as a tool for regulating deposit money banks operation and also that, there is need to modify the monetary policy instruments to reflect and respond more rapidly and easily to local economic conditions.

Udeh (2015) examined the impact of monetary policy instruments on profitability of commercial banks in Nigeria using the Zenith Bank Plc as case study. He employed a descriptive research design, analyzed his data with the use of Pearson product correlation technique and tested his formulated hypothesis using t-test statistics on the time series data derived from published financial statements of Zenith bank and the CBN bulletin from 2005 to 2012. The study discovered that cash reserve ratio, liquidity ratio and interest rate, which were the measures used to measure the monetary policy, did not have significant impact on the profit before tax of Zenith Bank Plc. However, minimum rediscount rate was found to have significant effect on the profit before tax of the bank. The paper concluded that a good number of monetary policy instruments do not impact significantly on profitability of commercial banks in Nigeria. The paper recommended that management of commercial banks in Nigeria should look beyond monetary policy instruments to enhance their profits.

Altavilla, Boucinha and Peydro (2017) analyzed the impact of monetary policy and bank profitability in a low interest rate environment. Proprietary and commercial data on individual bank balance sheets were used. Their studies showed that Monetary policy easing is not associated with bank profits once

the endogeneity of the policy measures to expected macroeconomic and financial conditions are controlled. Their analysis also showed that the main components of banks profitability are asymmetrically affected by accommodative monetary conditions, with a positive impact on loan loss provisions and non-interest income largely offsetting the negative one on net interest income.

Nhan, Houg and Thu (2017) examined the impact of monetary policy on commercial banks' profit in Vietnam by using panel data regression. In their study, the data was collected from 20 commercial banks which were doing business in Vietnam's banking market, ranging from 2007 to 2014 in annually frequency. Monetary base (MB), discount rate (DIS) and required reserve ratio (RRR) were used as proxies for monetary policy. Profit before tax (PROFIT) was used to represent commercial banks' performance. The results showed that there is a positive relationship between banks' profits and monetary policies. Among those chosen variables representing SBV's monetary policy, only MB has a significant positive impact on bank's profit at the significance level of 10%. On this premise, the study recommended that MB should be one of the variables in the center of being concerned in the SBV's policies regarding the banking performance and stability.

Adeşina, Nwiodobie and Amadi (2019) investigated in their research, monetary policy and financial performance of Nigerian deposit money banks, the monetary policy instruments of the Central Bank of Nigeria (CBN) during and after the bank consolidation exercise (2000 – 2016) and determine the effects of these policies on the financial performance of deposit money banks (DMBs) in Nigeria. The variables were measured using Return on Assets, Net Interest Margin, Monetary Policy Rate, Cash Reserve Ratio and Liquidity Ratio. An Autoregressive Lag Model (ADL) analysis of secondary data obtained from the CBN Statistical Bulletin, 2016 showed that monetary policies of the CBN had a significant effect on the performance of DMBs in the

short-run but an insignificant effect in the long-run.

Andabai, Ikeora and Anah (2019) investigated the impact of monetary policy on the economic growth in Nigeria. They used Gross Domestic Product as proxy for economic growth which was the dependent variable and used monetary policy rate, liquidity rate and Treasury Bills as the explanatory variables to measure monetary policy i.e. the independent variable. The hypothesis they formulated was tested using the Ordinary Least Square (OLS) technique on the secondary data they acquired from the CBN bulletin and it revealed that monetary policy rate, treasury bills and liquidity rate has significant impact on the economic growth in Nigeria. Their calculations showed that about 62% of the changes in the private sector growth can be traced to the variations in the monetary policies. They further recommended that the policy makers should review the monetary policy rate downwards so as to reduce the cost of credit and increase the flow of investible funds to the economy.

Aginam and Obi- Nwonso (2019) examined the effect of monetary policy on banks performance in Nigeria. The variables of monetary policy rate, liquidity ratio, broad money supply and interest rate were regressed on return on equity (ROE) for the period of 30 years (1987- 2017). Their study adopted an ex-post facto research design because the data for the study are secondary data that already existed. Econometric techniques, including Augmented Dicker Fuller and Philip Perron tests for unit roots and Ordinary Least Square (OLS) were employed for the analysis. The study thus concluded that monetary policy can be used to influence the performance of deposit money banks in Nigeria and recommended that interest rate should be reduced to a single digit, bank management should ensure that capital is properly channeled to the productive sector of the economy and the relevant monetary authorities should apply with caution monetary policy variables to significantly influence commercial banks loans and advances. They further suggested that the expansionary monetary

policy should be adopted by the CBN to force down interest rate and increase money supply because a fall in the bank rate will reduce interest on loans made by commercial banks as that will encourage more customers to secure loans from their banks thereby, increasing investment opportunities in the country, *ceteris paribus*.

Alalade, Oseni and Adekunle (2020) in their study considered the influence of monetary policy on the financial performance of deposit money banks in Nigeria with the use of a time series data for 35 years, from the period 1984 to 2018. The effect of liquidity ratio, lending rate, loan to deposit ratio and cash reserve ratio were examined on the financial performance of deposit money banks measured by their net worth and total credits. The data was analyzed using descriptive and inferential statistics and Based on the result of stationary test, the ordinary least square method and the Autoregressive Distributed Lag method were employed. The study concluded that monetary policy significantly influences the financial performance of deposit money banks both in the short and long run.

Garcia (2020) analyzed the effect of the monetary policy on bank profitability. Panel data from 31 countries over the period 2000- 2017 was used. The main results showed that expansionary monetary policy measures adopted in numerous economies had a negative impact on net interest margins and therefore on banks profitability. The relationship between the interest rates and the slope of the yield curve with both the net interest margin and profitability is non-linear, more specifically concave. They suggested that the negative impacts of low interest rates and the flat yield curve is greater, the lower and flattened they are respectively. They also stated that a potential normalization of monetary policy would have highly beneficial effects on restoring margins and profitability.

Hamilton, Ogbuide, Adeboje and Mande (2020) in their research called Monetary Policy and Banking System Distress in Nigeria concluded that monetary policy does have the possibility of triggering banking distress sometimes. The study employed the Z-

Score to measure the probability of banking system distress, using institutional and macroeconomic indicators as control variables for banking system distress and monetary policy rate as measurement for monetary policy. They concluded in their investigation that monetary policy has mixed influence, both negative and positive, on the probable occurrence of banking distress in Nigeria and also recommended that monetary authorities should undertake economic and institutional reforms to generate a non-declining contribution of monetary policy instruments to the development of an inclusive financial system in Nigeria.

Mbabazize, Turyareeba, Ainomugisha and Rumanzi (2020) investigated the Monetary Policy and Profitability of Commercial Banks in Uganda while adopting a causal relationship research design. Data, covering 9 years from 2010-2018, were collected from all the registered commercial banks which were in operation over the study period. Return on Assets was used as a measure of bank profitability. A dynamic two-step System Generalized Method of Moments panel estimator was applied to estimate the empirical model. Estimates showed that monetary policy in terms of its link to the lending rate has a significant causal effect on Return on Assets, suggesting that interest rate changes predict bank profitability of commercial banks in Uganda. Further, results show that a rise in core inflation has a significant negative causal effect on the banks' profitability and that there is a significant lagged effect of Return on Assets. The 91-day treasury bill rate and money supply were insignificant in predicting bank profitability. They suggested that the central bank should promote low and stable core inflation in order to enhance bank profitability, and should ensure that the monetary policy transmission to interest rates is efficient.

Belavadi and Shivakumar (2021) examined the impact of monetary policy tools on the performance of banks in India. They adopted a descriptive and analytical research design using a correlation and regression analysis to determine the relationship between

bank rate (BR) and the performance of public sector banks in India. The sample chosen for this study is the public sector banks actively performing in India. The performance was measured by taking three factors, and they are deposits, loans and advances (L&A) and total asset value of the banks. All three factors showed an impact of BR on them during the five years. L&A affected the least amongst the three factors, but the other two were significantly impacted by the change in BR by the Reserve Bank of India. They recommended that apart from qualitative tools, there are qualitative tools which also helps in regulating the flow/fluctuation of money supply and inflation in the economy, hence, should not be neglected.

Osakwe, Okeke, George and Okoye (2021) examined the effect of monetary policy instruments on the performance of deposit money banks in Nigeria from 2000 to 2020 using Monetary policy rate, liquidity ratio, cash reserve ratio and loan to deposit ratio as proxies for monetary policy and Total private sector credit of deposit money banks as proxy for the performance of deposit money banks. The ex-post facto research design was adopted in this study and the data analyzed was obtained from the Central Bank of Nigeria statistical bulletin (2020). The hypotheses of this study were tested using the Ordinary Least Square regression statistics. Their findings revealed that total private sector credit of deposit money banks has a significant relationship on monetary policy rate; liquidity ratio and cash reserve ratio; while loan to deposit ratio has an insignificant relationship with total private sector credit of deposit money banks. The researchers recommended among other things that the central bank of Nigeria should redefine these monetary policy instruments to make them more attractive to the banks.

Bala, Godiya, Bala and Maijama'a (2022) in their study examined the effects of monetary policy on the performance of Deposit money banks in Nigeria. They used secondary data extracted from the CBN statistical bulletin and index mundi and analyzed the data using the Autoregressive

Distributed lag approach. Using Bank Lending rate, liquidity rate and interest rate as variables for monetary policy, they concluded in the project that monetary policy has significant influence on the profitability of banks though, their impact on it is at different levels. Their study further recommended that the central bank of Nigeria should redefine its monetary policy instruments to make them more attractive to the banks as that will make banks to embrace them beyond more.

Hoffman and Assifuah-Nunoo (2023) investigated the Effect of Monetary Policy Rate on the Performance of Listed Banks in Ghana over Five-year Period. The study employed Monetary policy rate, Cash reserve rate, Minimum rediscount rate, Interest rate, Liquidity rate as proxies for the dependent and independent variables. This study used a descriptive research design and a census sampling technique with a sample size of nine banks. The standard deviation of 4.8666 indicates that there is a considerable variation in monetary policy rates, which could make it difficult for banks to plan and make decisions. The study further revealed that banks are required to hold only a small percentage of their deposits in reserve with the central bank. Based on the findings of the study, it was recommended that banks in Ghana should closely monitor and analyse the monetary policy rates set by the central bank, as these rates have a significant impact on their performance. Banks should pay close attention to the interest rate, as it has a moderate positive effect on the monetary policy rate.

Shirya, Njoka and Abdul (2023) examined the relationship between monetary policy instruments and financial performance of commercial banks in Nigeria. The study was anchored on Keynesian theory and employed causal research design. The Nigerian banking populace is 21 commercial banks, so census approach was adopted. Panel data was utilized and inferential statistical methods were used to analyze the data. The result of regression analysis showed that open market operations had a coefficient of $\beta = 4.851167$, $***p = 0.000$ implying that it had positive and significant effect on the

earning performance of commercial banks in Nigeria. The results also show that monetary policy reforms had positively and significantly intervened on the relationship between open market operations and financial performance of commercial banks in Nigeria of a most distinctive finding of the study. The study concluded that monetary policy instruments adopted by Central Bank of Nigeria are critical and heavily influenced the performance of banking sector players in Nigeria. The study recommended that Central Bank of Nigeria should be meticulous and involve management of commercial banks when designing policy instruments to enhance the earnings of the commercial banks in Nigeria.

3.0 Methodology

This study adopted ex-post facto research design. Secondary data was used in this study. It was extracted from the 2021 Central Bank of Nigeria statistical bulletin, the Central Bank of Nigeria annual report and statement of accounts and other various editions, annual reports and financial statement of selected deposit money banks in Nigeria. Thirteen (13) banks were selected from the population of the study. The selected banks are the banks listed on the stock exchange market. The selected banks include: Access Bank PLC, Fidelity Bank PLC, First City Monument Bank (FCMB) PLC, Guaranty Trust Bank PLC, Union Bank of Nigeria PLC, United Bank of Africa (UBA) PLC, Zenith Bank PLC, Ecobank Nigeria PLC, Polaris Bank PLC, Stanbic IBTC Bank PLC, Sterling Bank PLC, Unity Bank PLC, and Wema Bank PLC. Panel data analysis was used due to the nature of the data used in this research. Hausman test was conducted in order to choose the most appropriate panel estimation between fixed effect and random effect (Greene, 2002). The fixed effect model assumes that the individual-specific effect is correlated to the independent variable while the random effect allows making inferences on the population data based on the assumption of the normal distribution (Ajtesh, 2022).

Post estimation regression diagnostic tests were conducted to ascertain the validity

of the statistical inferences for the study. The Variance Inflation Factor (VIF) was also used to measure the strength of the correlation between the independent variables. The Breusch-Pagan Serial Correlation LM Test will be used in this study because it is a more general test for autocorrelation up to the n^{th} order unlike others which are tests only of

Model Specification

The model used for the study was stated thus:

$$\text{ROE} = f(\text{MPR}, \text{LQR}, \text{CRR}, \text{ER}, \text{M2}) \dots \dots \dots \text{Equation 1}$$

$$\text{NIM} = f(\text{MPR}, \text{LQR}, \text{CRR}, \text{ER}, \text{M2}) \dots \dots \dots \text{Equation 2}$$

Econometrically, the model is stated as:

$$\text{ROE}_{it} = \beta_0 + \beta_1 \text{MPR}_{it} + \beta_2 \text{LQR}_{it} + \beta_3 \text{CRR}_{it} + \beta_4 \text{ER}_{it} + \beta_5 \text{M2}_{it} + \mu \dots \dots \dots \text{Equation 3}$$

$$\text{NIM}_{it} = \beta_0 + \beta_1 \text{MPR}_{it} + \beta_2 \text{LQR}_{it} + \beta_3 \text{CRR}_{it} + \beta_4 \text{ER}_{it} + \beta_5 \text{M2}_{it} + \mu \dots \dots \dots \text{Equation 4}$$

Where;

ROE= Return on Equity

NIM= Net Interest Margin

MPR= Monetary Policy Rate

LQR= Liquidity Ratio

CRR= Cash Reserve Ratio

ER = Exchange Rate

M2= Broad money supply

β = Constant Intercept

μ = Error Term

Dumitrescu and Hurlin Panel Causality Tests Model

Using the following Granger causality model, one can analyse the association between both dependent and independent variables:

$$Y_{it} = \sum_{i=1}^n \alpha_{11i} X_{t-1} + \sum_{j=1}^n \beta_{11i} Y_{t-j} + \mu_{11t} \dots \dots \dots \text{equation 4}$$

$$X_{it} = \sum_{i=1}^n \alpha_{21i} Y_{t-1} + \sum_{j=1}^n \beta_{21i} X_{t-j} + \mu_{21t} \dots \dots \dots \text{equation 5}$$

For this analysis, the two primary Granger causality models are shown in equations (4) and (5). Y stands for profitability of banks (Return on equity and net interest margin) while X stands for monetary policy rates, cash reserve ratios, liquidity ratio, money supply and exchange rate.

Measurement of the Variables

The model aims to regress the independent variable (the monetary policy), on the dependent variable (profitability) of deposit money banks in Nigeria. The measurements of the variables are presented in the table below:

Dependent variables	Variables	Contractions	Explanation
	Return on Equity	ROE	This is the net income divided by total equity
Independent Variables	Net interest Margin	NJM	This is the ratio of interest income minus interest expense divided by earning assets
	Monetary policy rate	MPR	The baseline interest rate in an economy
	Cash reserve ratio	CRR	The percentage of total deposits a bank must have in cash to operate risk-free
	Liquidity ratio	LQ	The minimum percentage of deposits that a commercial bank has to maintain in the form of liquid cash or other securities
	Broad money supply	M2	The total volume of money supply in the economy and is defined as narrow money plus savings and time deposits with banks including foreign denominated deposits
	Exchange rate	ER	The relative price of one currency expressed in terms of another currency

4.0 Data Presentation, Analysis and Interpretation of Results

4.1 Data Analysis

Table 4.1 Descriptive Statistic Results

	CRR	M2	MPR	RQ	ER
Mean	161.4312	27557.18	18.20968	1293.139	184.9420
Median	53.04750	21177.92	13.00000	477.7339	148.8127
Maximum	828.1020	63218.72	26.00000	7118.979	307.0000
Minimum	1.007078	13779.26	6.000000	11.19260	74.62500
Std. Dev.	217.9343	14940.64	4.323914	1968.783	89.10856
Skewness	1.574698	1.197266	0.751949	1.920761	0.494126
Kurtosis	4.674576	3.115756	3.888334	5.516973	1.562923
Jarque-Bera	16.43375	7.423445	3.940674	27.24441	3.929036
Probability	0.000270	0.024435	0.139410	0.000001	0.140223
Sum	5004.367	854272.7	409.5000	40087.32	5733.203
Sum Sq. Dev.	1424861.	6.70E+09	560.8871	1.16E+08	238210.0
Observations	130	130	130	130	130

Source: Author's Computation, 2023

As can be seen in Table 4.1, all the variables in the series (except trade openness) are non-normally distributed as indicated by the JarqueBera values. The null hypothesis of normal distribution is rejected for all other

variables at the 1% level, and at the 5% level for the rest of the series. The mean and median of all the variables are positive and high above 100% respectively. This suggests that all the variables especially at the beginning of

each fiscal quarter were significantly positive. The variables from the table

also do not show evidence of fat tails.

Table 4.2: Correlation Matrix

Variables	1	2	3	4	5	VIF
1. MPR	1.000					1.24
2. CRR	0.099	1.000				1.65
3. RQ	0.329	0.164	1.000			1.55
4. M2	0.133	0.128	0.033	1.000		1.30
5. ER	0.126	0.118	-0.128	0.102	1.000	1.20

Source: Authors' Computation (2023)

The presence of multicollinearity in independent variables renders analysis spurious. Although, the results may look good but such results must not be used for policy recommendation. It is because of this, that this study conducted two correlation tests; pairwise and variance inflation factor so as to know if

the models suffer from multicollinearity. The results shows that all the variables are less than 0.8 which is the benchmark. Hence the models do not suffer from multicollinearity. Similarly, the result of the variance inflation factor which is less than 5 shows that the models do not suffers from multicollinearity.

Table 4.3 Results of Fixed Effect and Random Effect Models for Return on Equity

Dependent Variable: Return on Equity		
Independent variables	Fixed Effects Coefficients (standard errors)	Random Effects Coefficients (standard errors)
MPR	-.205701*** (.054064)	.648337*** (.045942)
CRR	-.626673** (.279739)	-.4133073*** (.019086)
LQ	.0789221 (.1581194)	.00003302 (.000813)
M2	5.460195*** (1.701846)	6.301194** (2.141087)
ER	8.627458*** (.133037)	6.0768362 (.1473292)
_cons	-5.198839*** (2.151421)	-1.262239*** (.019218)
Observations	130	
Number of CID	13	

Source: Author's computations using STATA 14, 2023.

Standard errors in parentheses***, ** and * denotes 1%, 5% and 10% level of significance respectively

Interpretation of Random Effect Models for Return on Equity

Panel data regression was used to investigate the effects of monetary policy on profitability of deposit money banks in Nigeria. The result is displayed in the table above. The dependent variable is return on equity while monetary policy rates, cash reserve ratios, liquidity ratio, money supply and exchange rate are the independent variables.

The results of random effect model revealed that monetary policy rate, cash reserve ratio and money supply are significant determinant of return on equity at 1% and 5% level of significance. This is due to the fact that half the values of the coefficients of these variables are greater than the standard errors of the coefficients. The coefficients value of monetary policy rate, cash reserve ratio and money supply are .648337, .4133073 and

6.301194 while the standard error shows .045942, .019086 and 2.141087 respectively. When, coefficients are divided by two gives a value higher than the standard deviations.

Hence, the monetary policy rate, cash reserve ratio and money supply are significant determinants of return on equity. However, monetary policy and money supply have positive relationship with return on equity while cash reserve ratio has negative effect on return on equity. Thus, increase in monetary policy rate and money supply will improve the profitability of deposit money banks in Nigeria. This implies an increase in monetary policy rate will increase the profitability of banks due to increase in charges on loan. Similarly, it was revealed that cash reserve ratio has a negative impact on the return on equity of deposit money banks. Thus, increase 1% increase cash reserve ratio will lead to decrease by .4133073 in return on equity.

Table 4.4 Results of Fixed Effect and Random Effect Models for Net Interest Margin

Dependent Variable: Net Interest Margin		
Independent variables	Fixed Effects Coefficients (standard errors)	Random Effects Coefficients (standard errors)
MRR	-.52671*** (.04654)	7.37644*** (.28421)
CRR	-.42674** (.12799)	-.27142*** (.69089)
LQ	.347147** (.062581)	-.43284*** (.04136)
M2	5.14595*** (1.78416)	6.43134** (5.36147)
ER	6.45268*** (.073239)	-6.30814** (.56231)
_cons	-6.97519*** (2.35421)	-2.57289*** (.04215)
Observations	20	
Number of CID	4	

Source: Author's computations using STATA 14, 2023.

Standard errors in parentheses***, ** and * denotes 1%, 5% and 10% level of significance respectively

Interpretation of Random Effect Models for Return on Equity

Panel data regression was used to investigate the effects of monetary policy on profitability of deposit money banks in Nigeria. The result is displayed in the table above. The dependent variable is net interest margin while monetary policy rate, cash reserve ratio, liquidity ratio, money supply and exchange rate are the independent variables.

The results of random effect model revealed that monetary policy rate, cash reserve ratio, liquidity ratio, money supply and exchange rate are significant determinant of net interest margin at 1% and 5% level of significance. This is due to the fact that half the values of the coefficients of these variables

are greater than the standard errors of the coefficients. The coefficients value of monetary policy rate, cash reserve ratio and money supply are 7.37644, .27142, .43284, 6.43134 and 6.30814 while the standard error shows .28421, .69089, .04136, 5.36147, .56231 respectively. When, coefficients are divided by two gives a value higher than the standard deviations. Hence, the monetary policy rate, cash reserve ratio, liquidity ratio, money supply and exchange rate are significant determinants of net interest margin. However, monetary policy, and money supply have positive relationship with net interest margin. Thus, increase in monetary policy rate, cash reserve ratio and money supply will improve the profitability of deposit money banks in Nigeria. This implies an increase in monetary policy rate will increase the profitability of banks due to increase in charges on loan.

Table 4.6 Dumitrescu-Hurlin Panel Causality Tests for ROE considered for the Banks

Return on Equity (ROE)	W-Stat.	Zbar-Stat.	P-Value.
Null Hypothesis:			
MPR does not homogeneously cause ROE	6.74525	0.75188	0.4521
ROE does not homogeneously cause MPR	5.07958	-2.22305	0.0213
CRR does not homogeneously cause ROE	8.70659	3.07735	0.0021
ROE does not homogeneously cause CRR	4.77701	-1.58179	0.1137
LQ does not Granger Cause ROE	6.06165	0.21407	0.4566
ROE does not Granger Cause LQ	5.09916	0.20641	0.3598
M2 does not Granger Cause ROE	4.9200	0.47675	0.7938
ROE does not Granger Cause M2	3.2401	0.19776	0.9634
ER does not Granger Cause ROE	2.70659	0.20214	0.6219
ROE does not Granger Cause ER	3.1324	0.83630	0.5615

Source: Author's computation, 2023

To investigate the direction of causality between monetary policy on performance of deposit money banks, causality test was used and the result for all the banks considered in the study. The outcomes of the results are presented in Table above. According to the results of the causality

relationship of all the variables, there is a unidirectional causality from return on equity and monetary policy rate. Similarly, there exist a unidirectional causality from cash reserve ratio to return on equity.

Table 4.7 Dumitrescu-Hurlin Panel Causality Tests for NIM considered for Banks

Net Interest Margin (NIM)	W-Stat.	Zbar-Stat.	P-value.
Null Hypothesis:			
MPR does not homogeneously cause NIM	5.07708	-2.66524	0.0109
NIM does not homogeneously cause MPR	5.67238	-0.24080	0.8097
CRR does not homogeneously cause NIM	4.71072	-0.76461	0.4421
NIM does not homogeneously cause CRR	5.36186	-0.41123	0.6809
LQ does not homogeneously cause NIM	5.21373	-0.49253	0.6221
NIM does not homogeneously cause LQ	9.43852	1.82626	0.0678
M2 does not homogeneously cause NIM	2.74818	0.63509	0.5254
NIM does not homogeneously cause M2	2.10263	-0.14460	0.8872
ER does not homogeneously cause NIM	2.60752	0.34677	0.7288
NIM does not homogeneously cause ER	1.86323	-0.32310	0.7466

Source: Author's computations, 2023

To investigate the direction of causality between monetary policy on performance of deposit money banks, causality test was used and the result for all the banks considered in the study. The outcomes of the results are presented in Table above. According to the results of the causality relationship of all the variables, there is a unidirectional causality from monetary policy rate to net interest margin.

Table 4.8 Result of Tests for ROE

	Breusch-Pagan Lagrange Multiplier (BP) Test	Hausman Test
chi2(3)	4.33	0.31
Prob	0.22	0.57

Source: Author's Computation, (2023)

Interpretation of Result of Breusch-Pagan Lagrange Multiplier (BP) Test

The BP test is not without its caveats, as it requires the independent variables to be linearly related and assumes heteroskedasticity. The null hypothesis of homoskedasticity is consistently rejected by

the BP tests, as shown in Table 4.2. Therefore, the statistical evidence suggests that the models would benefit most from panel data regression with fixed and random effects.

Interpretation of Result of Hausman Test

In cases where both the fixed and random effects models are equally well-fitting, the Hausman test is used to make a direct comparison between them. The Hausman test's chi-square statistics for the return on equity

come in at 0.31, with significance levels of 0.57. The null hypothesis is not rejected (P-value > 5%) and the result from the random effect model takes precedence.

Table 4.9 Result of Tests for NIM Model

	Breusch-Pagan Lagrange Multiplier (BP) Test	Hausman Test
chi2(3)	3.63	0.25
Prob	0.24	0.86

Source: Author's Computation, (2023)

Interpretation of Result of Breusch-Pagan Lagrange Multiplier (BP) Test

The BP test is not without its caveats, as it requires the independent variables to be linearly related and assumes heteroskedasticity. The null hypothesis of homoskedasticity is consistently rejected by the BP tests, as shown in Table 4.2. Therefore, the statistical evidence suggests that the models would benefit most from panel data regression with fixed and random effects.

Interpretation of Result of Hausman Test

In cases where both the fixed and random effects models are equally well-fitting, the Hausman test is used to make a direct comparison between them. The Hausman test's chi-square statistics for the return on equity come in at 0.25, with significance levels of 0.86. The null hypothesis is not rejected (P-value > 5%) and the result from the random effect model takes precedence.

4.2 Summary of Findings

The study revealed that there exist a positive and significant relationship between monetary policy rate and return on equity of deposit money banks in Nigeria. This is consistent with the works of Bala, Godiya, Bala and Majjama'a (2022). Hence, the null hypothesis that there is no significant relationship between monetary policy rate and

return on equity of deposit money banks in Nigeria should be rejected. Therefore, the performance of banks will depend on monetary policy rates.

Furthermore, the study revealed that there exist a positive and significant relationship between monetary policy rate and net interest margin of deposit money banks in Nigeria. Hence, the null hypothesis that there is no significant relationship between monetary policy rate and return on equity of deposit money banks in Nigeria should be rejected.

The study revealed that there exist a bi-directional between monetary policy rate and return on equity of deposit money banks in Nigeria. This study is consistent with the studies of Osakwe, Okeke, George and Okoye (2021); Belavadi and Shivakumar (2021) and Hoffman and Assifuah-Nunoo (2023).

5.0 Conclusion and Recommendations

It was concluded that return on equity of banks in Nigeria is influenced by the monetary policy rates. The research concludes further that the net interest margin of banks in Nigeria is influenced by the monetary policy rates. Finally, the study concluded that profitability of banks in Nigeria is influenced by the monetary policy of Central Bank of Nigeria. The study recommends that monetary authority should make efforts to develop

indirect monetary instruments and exercise appropriate control over the monetary sector. Furthermore, exchange rate policy should be looked into by the monetary authority in a way that will improve the profitability of banks in Nigeria.

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