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MONETARY POLICY AND FINANCIAL PERFORMANCE OF NIGERIAN DEPOSIT MONEY BANKS

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ABSTRACT

This paper aims to ascertain 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. An Autoregressive Lag Model (ADL) analysis of secondary data obtained from the CBN Statistical Bulletin, 2016 shows 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.

Contribution/ Originality: This paper is a contribution to existing knowledge as it ascertains the monetary policy instruments of the Central Bank of Nigeria during and after the bank consolidation exercise (2000 - 2016) and determines the effects of these instruments on the financial performance of deposit money banks in Nigeria.

1. INTRODUCTION

The need for government intervention in the working of economic variables to achieve macroeconomic objectives have been long established, this dates back to the 1930s as a result of Keynes (1936) "General Theory of Employment, Money and Interest", in response to the Great Depression of 1936 in Great Britain. Other economists (Pigou, 1933; Schumpeter, 1947; Friedman, 1956;1963;1968) have posited other theories on how government should intervene in the management of a country's economic variables to achieve general equilibrium in the economy.

Monetary policy is one of the intervention measures which have the objective of promotion of economic growth and development, full employment, price stability (low level of inflation), healthy balance of payment, exchange rate stability and general economic stability. These objectives have recently been expanded by Mishra and Pradhan (2008) to include smoothing of the business cycle, prevention of financial crisis and long-term stabilization of

interest rates and real exchange rate. Monetary policy measures are usually administered on behalf of the government by the monetary authority, in Nigeria, which is the Central Bank. In the view of Abata *et al.* (2012) monetary policy is the tool being used by the monetary authority (central bank) for the control of money supply so as to achieve desired macroeconomic objectives. They see monetary policy tools as instruments at the disposal of monetary authority, which help to achieve macroeconomic stability.

Anyawu (1993) opined that monetary policy involves a discretionary effort by the monetary authority (central banks) to control the money supply and credit conditions for the purpose of achieving macroeconomic objectives.

In Nigeria, monetary policy is administered by the Central Bank of Nigeria (CBN). The CBN uses policy instruments: Open Market Operations (OMO), cash reserve requirements, liquidity ratio, monetary policy rate (MPR) and moral suasion to achieve the objectives of monetary policy. Deposit money banks in Nigeria are expected to adhere to these monetary policy directives as determined by CBN from time to time.

Deposit money banks (DMBs) are institutions that act as financial intermediaries in the economy. They mobilized deposits from where there is surplus and give this out as loans to areas where there is shortage. Consequently, DMBs have the potential to increase the money supply in the economy through their role in mobilizing financial resources from where there is surplus and giving it out as loans to those in need of financial resources for investments.

Usman (1999) asserted that a major regulatory control of the monetary authority affecting DMBs' operations in Nigeria is the restriction on the rates of interest they are allowed to charge for their lending and the rates of interest they are allowed to pay on customers' deposits.

Monetary policy and ability of banks to attract deposits and give out loans are linked together. According to Olokoyo (2011) the volume of loans DMBs give out depends on many factors such as their liquidity ratio, interest rate, volume of customers' deposit, their investments (domestic and foreign), the customer's prestige and public recognition. While Ajie and Nenbe (2010) contended that reserves of the DMBs are influenced by the Central Bank through its monetary policy instruments.

CBN affects the operations of DMBs through monetary policy transmission mechanism. The CBN, through monetary policy, controls the short-term interest rates and liquidity of DMBs, thus, CBN determines the ability of DMBs to increase money supply through creation of credit. This in turn determines the total loans that can be given out and the extent DMBs can attract deposits. When interest rate is high, although this will attract money customers to bring deposit but on the other hand, it will discourage investments because of high cost of funds, thus reducing the amount of loans DMBs can give out. This is likely to reduce the interest income of DMBs as they are required to pay high interest rate on deposits but have a reduced loan portfolio from which they can earn interest income.

In the same vein, when CBN increases DMBs' liquidity ratio, the ratio of liquid assets of DMBs to their total assets, it will reduce the cash available to DMBs from which they can give out loans and earn interest income. The same goes for cash reserve requirements. If this is increased by CBN, it will reduce the cash available to DMBs from which they can give out loans and earn interest income. However, if liquidity ratio and cash reserve requirements are reduced, these will increase cash available for DMBs from which they can give out loans and earn interest income.

Several researchers have studied the relationship between monetary policy and banks' performance, (Punita and Somaiya, 2006; Van den Heuvel, 2006; Yonnus and Aklita, 2009; Abdurrahman, 2010; Ajayi and Atanda, 2012; Akanbi and Ajagbe, 2012; Enyioko, 2012; Olweny and Chiluwe, 2012; Ekpung *et al.*, 2015; Ndugbu and Okere, 2015; Udeh, 2015; Onodugo *et al.*, 2016; Ndubuaku *et al.*, 2017). However, none of these researchers considered the trend and pattern of monetary policies and financial performance of deposit money banks in Nigeria while looking, at the same time, the effect of monetary policy on the financial performance of deposit money banks. The objective of this study is to examine the nature, trend and pattern of selected monetary policy instruments, trend and pattern of the

financial performance of money deposit banks (MDBs) and the effect of monetary policy on the financial performance of deposit money banks in Nigeria between 2000 and 2016.

2. LITERATURE REVIEW

2.1. Theoretical Framework

Many macroeconomics theories have been developed, starting with the classical economists led by Adam (1776). All these theories were aimed at solving macroeconomic problems that were prevalent during their time. Some of these problems are unemployment, instability of prices, stagnant economic growth, etc.

2.1.1. Keynesian Economic Theory

Before Keynes (1936) in response to the Great Depression, experienced in Great Britain, wrote his book, "General Theory of Employment, Interest and Money, the classical economists held that in the capitalist market, economies which are subject to periodic shocks, the market mechanism, called the invisible hand, would operate quickly and efficiently to restore full economic equilibrium. They believe that government intervention to stabilise the economy was neither necessary nor desirable. This assumption, by the classical economists, that full employment was the normal state of affairs was shattered by the experience of Britain and other major capitalist economies in 1920s and 1930s. Unemployment rate went as high as 20% in Britain in 1932 and as much as 25% in United States in 1933 (Snowdon and Vane, 2005).

According to Snowdon and Vane (2005) more than anything else, it was the experience of the Great Depression that drove Keynes to write his most important book on economic theory, "The General Theory of Employment, Interest and Money". In the book Keynes placed a great deal of emphasis on the role of expectations and uncertainty in his explanation of aggregate instability.

The central theme of Keynes's analysis is his contention that "capitalist market economies are inherently unstable and are capable of coming to rest in a chronic condition of sub- normal activity for considerable period without any marked tendency, either towards recovery or towards complete collapse" (Keynes (1936) cited in Snowdon and Vane (2005)). In the opinion of Keynes, this instability was predominantly the result of fluctuations in aggregate demand and the Great Depression resulted from a sharp fall in investment expenditure occasioned by a cyclical change in the marginal efficiency of capital. He further said that the resulting unemployment was involuntary and reflected a state of low aggregate demand. He asserted that, given the weak equilibrating powers of the market mechanism, in these circumstances, the implication was that only fiscal and monetary policy could correct the aggregate instability exhibited by market economies and help stablise the economy at full employment. And this requires government intervention, and once full employment is restored, the classical theory can operate effectively again. Keynes's conclusion therefore, is that, "limited government intervention could remedy the shortcomings of the invisible hand (market forces) (Keynes (1936) as cited by Snowdon and Vane (2005)).The implication of this theory is that there is a need for government intervention in the economy through fiscal and monetary policies.

2.1.2. Monetarists' Economic Theory

Due to the criticism that was leveled against the Keynesian theory, the monetarist theory was propounded by Friedman (1956). However, the role of monetary policy with sole purpose of influencing the volume, cost and direction of money supply was advocated by Friedman (1968) when he opines that inflation is always and everywhere a monetary phenomenon. He recognised that in the short run increase in money supply can reduce unemployment but can also create inflation and so the monetary authorities should increase money supply with caution. Monetarist theory adopted Fisher's equation of exchange to illustrate their theory. The fisher's equation states that:

MV = PQ

Where: M = money supply in the economy; V = velocity of circulation; P = price level in the economy; and Q = output produced by the economy.

The import of this equation is that "if the money supply in the economy doubles so will the price level. And if the money supply increases by 10%, so will price level".

Monetarists like Friedman (1956;1963) emphasized money supply as the key factor affecting the well-being of the economy. Thus, in order to promote steady growth rate, the money supply should grow at a fixed rate, instead of being regulated and altered by the monetary authority. He, at the same time, argued that since money supply is substitutive not just for bonds but also for many goods and services, changes in money supply will therefore, have both direct and indirect effects on spending and investment respectively. It is the belief of the monetarists that change in the money supply leads directly to a change in the real magnitude of money. The monetarist are of the opinion that the central bank, through open market operations, can affect the real sector of the economy.

2.2. Conceptual Framework

2.2.1. Monetary Policy

Monetary policy, as a major economic stabilization weapon, as opined by Ayodele (2014) involves measures taken by the Central Bank to regulate and control the supply of money and credit in an economy to achieve some desired macroeconomic policy objectives and to counter all undesirable inflationary trends in the economy. Monetary policy is the process by which the Government, through the Monetary Authority or Central Bank controls the supply of money, availability of money and cost of money or interest rate to attain a set of objectives geared towards the growth and stability of the economy. While Ayodele (2014) defined monetary policy as "a combination of measures design to regulate and control volume of money and credits in order to achieve certain macroeconomic objectives". In its Annual Report, CBN (2004) defined monetary policy as "a measure introduces by the monetary authority on monetary targeting and the mopping up of excess liquidity, aimed at ensuring a non-inflationary macroeconomic environment". Similarly, CBN (2009) in its Annual Report, refers to it as "specific action taken by the Central Bank to regulate the value, supply and cost of money in the economy with a view to achieving Government's macroeconomic objectives". The aims of monetary policy therefore, are control of inflation to achieve price stability, exchange rate stability, equilibrium balance of payments position sustainable level of economic growth and development.

The various tools or instruments of monetary policy are usually grouped under two categories. These are direct or indirect monetary policy instruments. Direct monetary policy instruments include Central bank's directive to Deposit Money Banks on the maximum percentage or amount of loans (credit ceilings) to different economic sectors or activities, interest rate caps, liquid asset ratio and issue of credit guarantee to preferred loans.

Indirect monetary policy instruments are open market operations (OMO), cash reserve requirements, monetary policy rate (MPR), liquidity ratio, moral suasion and selective credit

2.2.2. DBMs' Financial Performance

Several authors (Chen *et al.*, 1986; Al – Tamini, 2010; Ongore and Kusa, 2013; Khan and Sattar, 2014) have written on those factors that determine DMBs' financial performance. Generally, these factors are divided into two broad categories, macroeconomics factors (external factors) and bank specific factors (internal factors). Internal factors are specific to each bank as they are influenced by the internal management and board of directors. The macroeconomics factors are not within the control of the management of the banks but they are factors that are given in the macroeconomics environment. They include macroeconomics variables such as inflation rate, interest rate, exchange rate, other monetary policy tools and regulatory pronouncements by the monetary authority.

The purpose of monetary policy instruments is to restrict the activities and operations of deposit money banks so as to manage macroeconomics variables to achieve price stability and economic growth. However, the process of applying these monetary instruments affects DMBs' profit making abilities. But, like every other private enterprise, profit maximization is the most important objective of deposit money banks (KPMG, 2005; Damilola, 2007; Raheman and Nsar, 2007). So also, in a competitive market situation, profit is a tool for efficient resources allocation because it is the most appropriate measure of corporate financial performance.

Generally, financial performance is usually measured by ratios, such as return on equity (ROE), return on assets (ROA), return on capital employed (ROCE), return on sales and operating margin. Financial performance analysis shows how profitable a firm is relative to its total assets (Irungu, 2013).

In this study, financial performance will be measured by return on assets (ROA) and net interest margin (NIM). ROA measures the relationship of net income to a firm's total assets. It reveals the ability of a firm in utilizing its assets to gain a net profit (Kiarie, 2011) therefore operating profit before tax will be used. It is generally agreed that interest rates impact bank's earnings through net interest margin and it is a key factor that derives bank's net earnings and stock performance (Hayes, 2013). Net interest margin is determined by subtracting interest cost from interest income of a bank.

2.3. Review of Empirical Literature

Several scholars (Van den Heuvel, 2005; Punita and Somaiya, 2006; Amidu and Wolfe, 2008; Somoye and Ilo, 2009; Chigbu and Njoku, 2013; Okoye and Eze, 2013; Ekpung *et al*., 2015; Ndugbu and Okere, 2015; Udeh, 2015; Onodugo *et al*., 2016; Ndubuaku *et al*., 2017) have carried out studies to explain how monetary policy affects DMBs' operations and performance. However, most of these studies have not considered the trend and pattern of monetary policy and DMBs' financial performance.

In his study, Van den Heuvel (2005) asserted that monetary policy affects bank lending through two channels. He argued that by lowering bank reserves, central bank's contractionary monetary policy reduces the extent to which banks can accept reservable deposits, if reserve requirements are binding. He further stated that decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch to alternative forms of finance or liquidate assets other than loans.

In their study, Punita and Somaiya (2006) looked at the impact of monetary policy on the profitability of Indian banks between 1995 and 2000. Their study, using monetary policy variables of banks' rate, lending rates, cash reserve ratio and statutory ratio which they regressed independently with bank profitability. They discovered that only lending rates has a positive and significant influence on banks' profitability while bank rates, cash reserve ratio and statutory ratio have negative but significant influence on banks' profitability. This means that an increase in lending rates will increase the profitability of the banks and vice versa.

In their own study, Somoye and Ilo (2009) looked at the impact of macroeconomic instability on the banking sector's lending behaviour in Nigeria between 1986 to 2005. They found out that cointegration and Vector Error correction suggests a long-run relationship between bank lending and macroeconomic instability.

Yonnus and Aklita (2009) investigated the monetary policy variables in Bangladesh using descriptive analysis techniques. The results show that statutory liquidity requirement (SLR) has experienced infrequent changes and past evidence showed that reduction in SLR produced positive impact on bank credit and investment prior to 1990s. Also, SLR and cash reserve requirement (CRR) were found to be significant tools for reducing inflation.

Abdurrahman (2010) investigated the role of monetary policy on the economic activities of Sudan between 1990 and 2004. He concluded that monetary policy has a little effect on Sudan economic activities during the period of investigation. Mangani (2011) studied the effect of monetary policy on Malawi. He looked at the monetary transmission mechanism channels while recognizing the variables that were prevalent in the economy such as, market imperfections, fiscal dominance and vulnerability to external shocks. He employed vector autoregressive

modeling, Granger – causality and innovation accounting analyses in his investigation. The results showed lack of unequivocal evidence to support the conventional channel of the monetary policy transmission mechanism and concluded that exchange rate was the most important variable in predicting prices.

Ajayi and Atanda (2012) studied the effects of monetary policy instruments on banks' performance between 1980 and 2008. They used Engle – granger two – step cointegration techniques. The study showed that bank rate, inflation rate and interest rate have positive and significant impact on banks' total credit. It was further discovered that liquidity ratio and cash reserve ratio have negative effects on banks' total credit. Their final conclusion from the study was that monetary policy instruments are not effective to stimulate credit on the long run.

Agbonkhese and Asekome (2013) investigated the impact of monetary policy on bank credit creation in Nigeria for the period 1980 to 2010. The Ordinary Least Square (OLS) method of econometric analysis was used and results of the analysis indicate a positive linear relationship between total credit creation and the explanatory variables consisting of total deposits and treasury bills rate while the reserve requirement ratio and interest rate had a negative relationship with total credit creation.

Ayodele (2014) examined the effect of monetary policy on commercial bank lending in Nigeria between 1988 and 2008, using macroeconomic time series variables of exchange rate, interest rate, liquidity ratio, money supply, and commercial bank loan and advances. Vector Error Correction Mechanism of Ordinary Least Square econometric technique was employed as the estimation method. The result shows that there exists a long run relationship among the variables in the model. Exchange rate and interest was found to significantly influenced commercial banks' lending, while liquidity ratio and money supply exert negative effect on commercial banks' loan and advances. He therefore concluded that monetary policy instruments are not effective to stimulate commercial bank loans and advances in the long-run, while banks' total credit is more responsive to cash reserve ratio.

Ekpung *et al.* (2015) examined the effect of monetary policy on banking sector performance in Nigeria for the period 1970 to 2006. They used selected indicator and employed the ordinary least square (OLS) regression technique. Results showed that monetary policy has a significant effect on banks' deposit liabilities. However, specifically it was discovered that Deposit Rate (DR) and Minimum Discount Rate (MDR) have a negative influence on the banks deposit liabilities in Nigeria, whereas Exchange Rate (EXR) had a positive and significant influence on the banks deposit liabilities in Nigeria. Therefore, from these results, they concluded that monetary policy plays a vital role in determining the volume of banks' deposit liabilities in Nigeria.

Nguyen and Le (2017) investigated the impact of monetary policy on commercial banks' profit in Vietnam. Data were collected from 20 commercial banks doing business in Vietnam's banking market for the period 2007 to 2014, panel data was used for the regression. Monetary base (MB), discount rate (DIS) and required reserve ratio (RRR) were used as proxies for monetary policy. Profit before tax was used to represent commercial banks' performance. The results showed that there is a positive relationship between banks' profits and monetary policies.

3. METHODOLOGY

The research design employed for this study is the survey design which describes the monetary policy variables employed by the CBN between 2000 and 2016 and the financial performance of deposit money banks to ascertain their trend and pattern over the period. The population for the study consists of 21 deposit money banks and quoted on the Nigerian Stock Exchange. All the 21 deposit money banks are sampled for the study using the purposive sampling technique.

4. PRESENTATION OF DATA/DATA ANALYSIS

4.1. Data Presentation

Data were collected for Return on Assets (ROA), Net Interest Margin (NIM), Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR) and Liquidity Ratio (LR).

Data for the study is secondary aggregate data for the identified variables for all deposit money banks in Nigeria and data on monetary policy variables obtained from the CBN 2016 Statistical Bulletin and Nigerian Deposit Insurance Corporation's report and Financial Statements.

4.2. Data Analysis and Results

Appraisal of the Trend and Pattern of Monetary Policy Instruments in Nigeria from 2000 To 2016

Statistics of data on the variables are shown in figure 1.

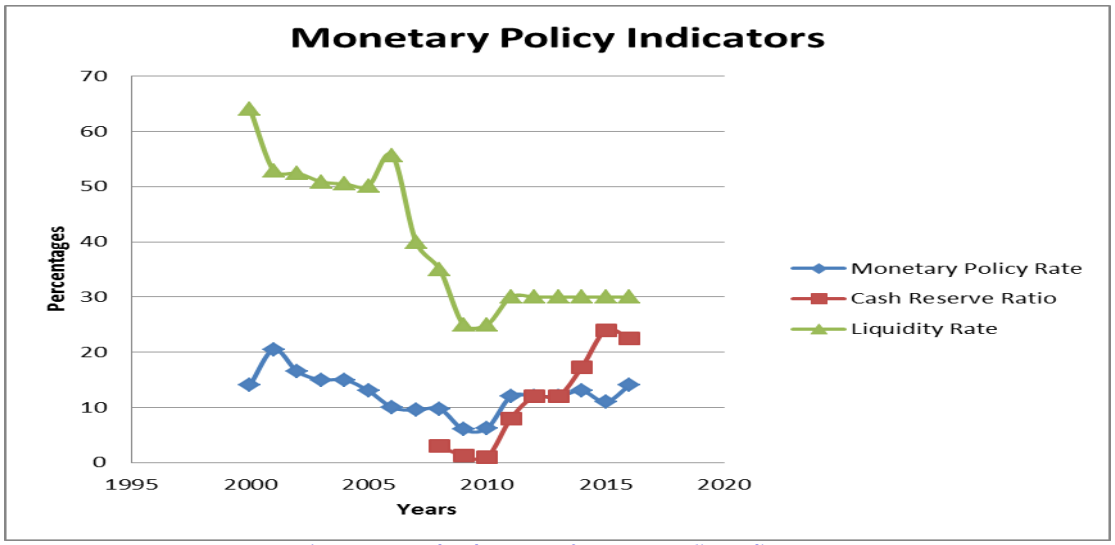

Figure-1. Trend and Pattern of Monetary Policy Indicators

Source: Statistical Bulletin, 2016

Cash Reserve Ratio (CRR) was not in operation from 2000 having been introduced in 2008. CRR had grown over the period of introduction as depicted in Figure 4.1, although it dropped in 2010 to a minimum of 1% but recorded a rising trend which maxes at 2015 at 24%. The average cash reserve ratio was put at 11.23% for the period between 2008 and 2016 while, the spread about the mean value of this variable stood at 8.74% which denotes a wide spread about its mean value. A look at the value of Skewness (0.215), discloses that the series is fairly symmetric, depicting a fairly normal distribution around the mean value. However, the value of Kurtosis (1.68) depicting a leptokurtic distribution, suggests that the series is not normally distributed. But the Jarque-Bera (0.723) test revealed in its probability (0.697) that shows that the distribution is normal.

The case of Monetary Policy Rate (MPR) was different in that, there was a rise from 2000 to its peak for the considered period in 2001 but fell continuously over the period to its trough in 2009 before it rose in 2010 accompanied with a stable rise before it slightly fell in 2015 but rose again in 2016. This scenario brought an average of 12.32% having a minimum of 6% in 2009from its maximum of 20.5% in 2001. Over the period, the spread of this variable about its mean stood at 3.57% while, the value of skewness reveals a fairly symmetric distribution, that is, a fairly normally distributed series around its mean value. Similarly, the value of Kurtosis standing at 3.261 confirms the normal distribution of the series, so also is the probability of the Jarque-Bera test of normality which reveals a figure of0.929.

Appraisal of the Trend and Pattern of Financial Performances of Deposit Money Banks in Nigeria from 2000 To 2016

Figure 2 shows an unstable performance of the banking sector over the past sixteen years, from 2000 to 2016. The figure reveals that Return on Assets (ROA) rose in 2002 but declined in 2003 which went further down till 2006 before it rose in 2007 to its ever-maximum value (0.0476 or 4.76%) for the period but later fell drastically in

2008 as it touched its minimum value (-0.0788 or -7.88%) in 2009 but rose in 2010. This was short lived as it dropped in 2011, rose again in 2012 from where it began to fall continuously to 2016.

The average ROA was put at 0.0175 (or 1.75%) for the period between 2000 and 2016 while, the spread about the mean value of this variable stood at 0.0276 (or 2.77%) which denotes a wide spread about its mean value. A look at the value of Skewness (-2.604), discloses that the series is not symmetric, depicting that the series is not normally distributed. However, the value of Kurtosis (10.017) also suggests that the series is not normally distributed, which was also established by the Jarque-Bera (54.103) test as revealed in its probability (0.000) that the distribution is not normally distributed.

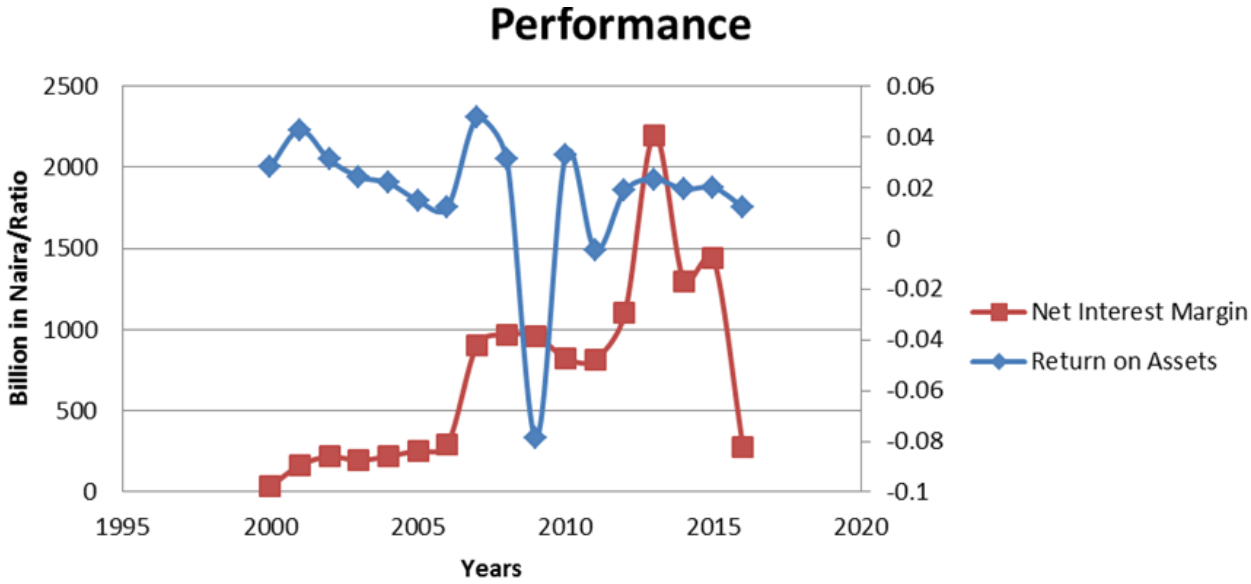

Figure-2. Trend of Returns on Assets and Net Interest Margin

Source: Statistical Bulletin, 2016

In the case of Net Interest Margin (NIM), there has been a continuous rise from its minimum (₦32.8 billion) in 2000 to 2008 where it slightly reduced but picked up again in 2011 to max (₦22 trillion) in 2013, however, this was short lived as it fell in 2014. Though it made an attempt to rise in 2015, but this was truncated in 2016 as a result of a fall. Within this period, 2000 – 2016, the average value of net interest margin was put at ₦716.34 billion while the spread about the mean value of this variable stood at ₦586.964 billion which denotes a very wide spread about its mean value. Thus, the value of Skewness (0.895), discloses that the series is fairly symmetric, portraying normally distributed series which was supported by the value of Kurtosis (3.293) and also established by the Jarque-Bera (2.330) test as revealed in its probability (0.312) that the distribution is normally distributed.

Appraisal Of monetary Policy and Financial Performances of Deposit Money Banks in Nigeria from 2000 to 2016

4.3. Unit Root Test

The unit root result is a possibility of either I(0) variable or I(1) variable. If a variable is I(0), then it can be concluded that it revert around its mean as a shock is introduced into the variable thus, the shock is not permanent but temporary. However, when the variable is not found to be I(0), such is differenced as much times as it will make the variable stationary (that is revert around its mean value) where, when a variable is differenced once, it is said that the variable is I(1). Using the Augmented Dickey-Fuller (ADF) test, under the null hypothesis that variable include unit root, all variable is tested and the results there from it presented below.

Table-1. Unit Root Test Results

Variables	At Levels		At First Difference		Conclusion
	T – statistics	ADF test statistics	T – statistics	ADF test statistics	
CRR	-2.801384	-0.168764	-5.119808	-6.811470***	I(1)
LR	-2.673459	-1.905163	-3.959148	-4.011306***	I(1)
MPR	-2.673459	-1.680258	-3.959148	-5.131871***	I(1)
ROA	-3.920350	-4.489665***	-	-	I(0)
LNIM	-2.673459	-3.049712*	-	-	I(0)

Source: EViews output, 2018

From the result in Table 1, we concluded that the included variables are a combination of I(0) and I(1) variables. That is, CRR, LR and MPR are I(1) variables while ROA and the Log of NIM (LNIM) are I(0) variables.

4.4. Lag Length Selection Criteria

The result of the unit root test gives a necessary condition to estimate an Autoregressive Distributed Lag (ARDL) model. However, there is need to establish the cointegration test as a sufficient condition to estimate the ARDL model. Thus, before this test is carried out, the number of lags to be used need be determined. The result is in Table 2.

Table-2. VAR Lag Order Selection Criteria

Endogenous Variables ROA LR MPR						
Lag	**Log L**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-57.6637	NA	0.654065	8.088488	8.230098	8.086980
1	-34.4611	34.03041*	0.102368*	6.194814*	6.761254*	6.188781*
2	-25.9285	9.101437	0.132431	6.257135	7.248405	6.246576
Endogenous Variables ROA CRR						
Lag	Log L	LR	FPE	AIC	SC	HQ
0	-2.07914	NA	0.011039	1.165469	1.150015	0.974457
1	9.563199	13.30553*	0.001394*	-1.018057*	-1.06442	-1.59109
2	13.54556	2.275632	0.002574	-1.01302	-1.090287*	-1.968073*

* indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

The result of the first model of ROA (which estimated only variables LR and MPR) reveals that lag one (1) is optimal for the model as suggested by all the criteria but the criterion used in this study is the AIC for its consistency attribute. The second model of ROA, which estimated only CRR, based on AIC suggested an optimal lag length of one (1) also.

Table-3. VAR Lag Order Selection Criteria

Endogenous Variables LNIM LR MPR						
Lag	**Log L**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-87.57513	NA	226.3126	13.93463	14.06501	13.90784
1	-70.73253	23.32052*	71.97097	12.72808	13.24957	12.62089
2	-64.43076	5.817021	150.0114	13.14319	14.05580	12.95561
3	-38.40497	12.01190	33.29715*	10.52384	11.82757	10.25587
4	1026.524	0.000000	NA	-151.9267*	-150.2319*	-152.2751*
Endogenous Variables LNIM CRR						
Lag	Log L	LR	FPE	AIC	SC	HQ
0	-30.35735	NA*	35.62821	9.244956	9.229502	9.053945
1	-23.44847	7.895860	17.39860*	8.413848	8.367486	7.840814
2	-19.08279	2.494673	28.78892	8.309369*	8.232098*	7.354311*

* indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

The result of the first model of NIM (which estimated only variables LR and MPR) reveals that lag four (4) is optimal for the model as suggested by all the criteria but the criterion used in this study is the AIC for its consistency attribute. The second model of ROA, which estimated only CRR, based on AIC suggested an optimal lag length of two (2). It should be borne in mind that both optimal lags were not able to be estimated given the limitation placed on the data by the amount of period under investigation (hence, more years could be added to circumvent this).

4.5. Cointegration Test

To conduct the cointegration test using the Bounds approach first, an ARDL model is estimated and a Wald test is carried out where the F statistics was observed and compared with the Pesaran *et al.* (2001) Bounds Tabulated Critical F statistics on page 300 and page 301, Table CI(iii) Case III: Unrestricted intercept and no trend and Table CI(v) Case V: Unrestricted intercept and unrestricted trend, respectively. The result of this test is presented in Table 4.6 for all the models estimated.

Table-4. Bounds Approach to Cointegration

Model	K	F statistics	Bounds Tabulated Critical F statistics					
			10%		5%		1%	
			I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
ROA LR MPR	8	32.29885*** (3, 3)	2.26	3.34	2.55	3.68	3.15	4.43
ROA CRR	2	53.22476*** (2, 3)	4.04	4.78	4.94	5.73	6.84	7.84
LNIM LR MPR	8	5.154386 (3, 3)	2.26	3.34	2.55	3.68	3.15	4.43
LNIM CRR	4	3.571154 (2, 1)	2.45	3.52	3.25	4.49	3.41	4.68

***, ** and * represents 1%, 5% and 10%, respectively

The result reveals that the variable in all the models to be estimated have a long run relationship hence, they are cointegrated. This is seen from the F statistics presented for the models (32.29885, 53.22476, 5.154386 and 3.571154, respectively) to be greater than the I(1) Bounds Tabulated Critical F statistics (4.43, 7.84, 4.43 and 3.52) at 1%, 1%, 1% and 10%, respectively.

4.6. Long Run Model

These results give the sufficient condition to estimate the ARDL model whose results are presented in Tables 5 and 6 and the post estimation test is presented in Table 9.

From the model of ROA which estimated MPR and LR, the diagnostics tests reveal that only 22.07% of variation in the ROA was explained by MPR and LR in the long run while, when the degree of freedom is considered, 10.94% variation in ROA was explained by MPR and LR in the long run. The F statistics (1.983) with its probability (0.175) suggests that these included variables were not jointly significant in explaining ROA between 2000 and 2016. However, there is a negative correlation in the residual as seen in the Durbin-Watson value of 2.89. From the result, it is revealed that LR and MPR had no effect on ROA where a 1% increase in LR and MPR brings about a 0.0004% and 0.0028% increase to ROA nonetheless; neither of the variables was found to be statistically insignificant.

Table-5. Long Run Model Results on the effect of monetary policy on the performance of deposit money banks in Nigeria

Variables	ROA		LNIM	
LR	0.000353 [0.000636] (0.555226)	-	-0.06908*** [0.014202] (-4.863668)	-
MPR	0.002753 [0.002252] (1.222892)	-	-0.02416 [0.050257] (-0.480706)	
CRR	-	0.001237 [0.001414] (0.874912)	-	-0.006766 [0.024177] (-0.279864)
CONSTANT	-0.030595 [0.025101] (-1.218858)	-0.005613 [0.019696] (-0.284997)	9.22218*** [0.560291] (16.45961)	6.958422*** [0.336763] (20.66264)
R-squared	0.220727	0.098574	0.743627	0.011065
Adjusted R-squared	0.109403	-0.0302	0.707003	-0.13021
S.E. of regression	0.026048	0.034949	0.581418	0.597574
Sum squared residue	0.009499	0.00855	4.732664	2.499665
F-statistic	1.982737	0.765471	20.304	0.078324
Prob(F-statistic)	0.174512	0.410634	0.000073	0.787671
Durbin-Watson stat	2.892902	3.135622	1.166237	1.435624

[] and () is represents Standard Error and T statistics
***, ** and * represents 1%, 5% and 10%, respectively

In the case of the model of ROA which estimated CRR, the diagnostics tests reveal that only 9.86% of variation in the ROA was explained by CRR in the long run. The F statistics (0.765) with its probability (0.411) suggests that CRR is not significant in explaining ROA between 2008 and 2016. However, Durbin-Watson statistics (3.136) reveals that there is the presence of a negative correlation in the residual. Further, the result showed that CRR had no effect on ROA such that an increase of 1% in CRR results to about a 0.00124% increase to ROA, however, it was found not to be statistically significant.

In the model estimated for NIM with MPR and LR, the diagnostics tests reveal that only 74.36% of variation in the NIM was explained by MPR and LR in the long run, while when the degree of freedom is considered, 70.70% variation in NIM was explained by MPR and LR in the long run. The F statistics (20.304) with its probability (0.000) suggests that these included variables were jointly significant in explaining NIM between 2000 and 2016 and 1% level of significance. However, there is a positive correlation in the residual as seen in the Durbin-Watson value of 1.166. The result revealed that LR and MPR had little or no effect on NIM where a 1% increase in LR and MPR brings about a 0.069% and 0.024% decrease to NIM nonetheless; LR was significant in explaining NIM at 1% level of significance, MPR remains statistically insignificant.

In the case of the model of NIM which estimated CRR, the diagnostics tests reveal that only 1.11% of variation in the NIM was explained by CRR in the long run. While the F statistics (0.078) with its probability (0.788) suggests that CRR is not significant in explaining NIM between 2008 and 2016, Durbin-Watson statistics (1.436) reveals that there is the presence of a positive correlation in the residual. Further, the result showed that CRR had no effect on NIM such that an increase of 1% in CRR results to about a 0.0068% decrease to NIM however, it was found to be statistically insignificant.

4.7. Short Run Model

From the model of ROA which estimated MPR and LR for the short run, the diagnostics tests reveal that only 93.12% of variation in the ROA was explained by MPR and LR while, when the degree of freedom is considered, 85.10% variation in ROA was explained by MPR and LR in the short run. The F statistics (11.608) with its probability (0.0041) suggests that these included variables were jointly significant in explaining ROA between 2000 and 2016 at 1% level of significance. As expected, there is no presence of first order serial correlation in the residual as seen in the Durbin-Watson value of 1.89. Further, it is shown that the error correction term implies that there

was over correction in the system five times over and is significant at 1% level of significance. In like manner, the variation in ROA depends on time where, as years increase, ROA increase at 0.0048% revealing a 5% level of significance.

Table 8 shows that ROA in the last two periods significantly affect current ROA significantly at 5% and 1%, respectively. It can be seen that a 1% increase in ROA two years ago and last year makes ROA in the current year increase by 1.138% and 2.781%, respectively. However, a percentage change in LR and MPR last year brings about a 0.004% and 0.011% decrease in ROA, respectively. These effects are seen to be statistically significant in explaining ROA. Although current period LR is statistically significant at 10%, a 1% increase in LR produces a 0.002% decrease in ROA.

Table-6. Short Run Model Results on the effect of monetary policy on the performance of deposit money banks in Nigeria

Variables	ROA		LNIM	
D(LR)	-0.00246* [0.001162] (-2.120866)	-	-0.047944** [0.015519] (3.089473)	-
D(MPR)	-	-	0.047408 [0.038974] (1.216395)	-
D(CRR)	-	0.005304* (0.00234) [2.266824]	-	-0.32624** [0.021884] (-14.90766)
D(ROA(-1))	2.781363*** [0.642333] (4.330098)	-	-	-
D(LNIM(-1))			-0.618802** [0.224502] (-2.756328)	-
D(LR(-1))	-0.00436** [0.001364] (-3.20057)		-0.026326 [0.018515] (-1.421876)	-
D(MPR(-1))	-0.01086** [0.003982] (-2.727609)	-	0.061849* [0.030517] (2.02674)	-
D(CRR(-1))	-	-	-	-0.090839* [0.010972] (-8.279196)
D(CRR(-2))	-	-	-	-0.317774** [0.018187] (-17.47256)
D(ROA(-2))	1.138196** [0.346232] (3.287384)	-	-	-
@TREND	0.004825** [0.001516] (3.183218)	-	-0.060544** [0.021421] (-2.826368)	-
ECM(-1)	-5.01576*** [0.835751] (-6.001503)	-1.769113*** [0.249181] (-7.099717)	0.929091*** [0.167898] (5.53365)	1.559589** [0.046445] (33.57921)
C	-0.05672** [0.017155] (-3.306143)	-0.013123 [0.009561] (-1.372573)	0.578274** [0.233053] (2.481295)	1.993515 [0.152972] (13.03187)
R-squared	0.931236	0.909809	0.889794	0.999276
Adjusted R-squared	0.851011	0.873733	0.779589	0.996382
S.E. of regression	0.017966	0.021875	0.279390	0.049189
Sum squared residue	0.001937	0.002393	0.546413	0.00242
F-statistic	11.60781	25.21896	8.073954	345.2038
Prob(F-statistic)	0.004114	0.002443	0.006621	0.040342
Durbin-Watson stat	1.89837	1.507351	1.697696	3.03052

[] and () is represents Standard Error and T statistics
***, ** and * represents 1%, 5% and 10%, respectively

The model of ROA which estimated CRR for the short run shows from the diagnostics tests the R-squared of 90.98% reveals that variation in the ROA was explained by CRR while 87.37% variation in ROA was explained by CRR in the short run when the degree of freedom was considered. The F statistics (25.219) with its probability (0.0024) suggests that these included variables were jointly significant in explaining ROA between 2008 and 2016 at 1% level of significance. In the same vein, there is no presence of first order serial correlation in the residual as seen in the Durbin-Watson value of 1.51. Hence, it can be depicted that the error correction term implies an over correction of past errors to the tune of 177% in the system was made and is significant at 1% level of significance. Thus, the result disclosed that CRR had ignorable impact on ROA in the short run which is significant at 10% level.

In the model estimated for NIM with MPR and LR, the diagnostics tests reveal that only 88.98% of variation in the NIM was explained by MPR and LR in the short run while 77.96% variation in NIM was explained by MPR and LR when degree of freedom is considered in the short run. The F statistics (8.074) with its probability (0.007) suggests that these included variables were jointly significant in explaining variations in NIM between 2000 and 2016 at 1% level of significance. Likewise, there is no serial correlation in the residual as seen in the Durbin-Watson value of 1.698. The result depicts that as the years increased, NIM reduced over the period to the tune of 0.061% at 5% level of significance. Further, the result explains that 1% increase in last year's NIM leads to 0.619% decrease in the current year NIM which is significant at 5% level. As for MPR, a percentage change in MPR last year brings about 0.062% increase to current year NIM and is significant at 10% while, in the current year, no statistical significance was found for MPR although had a positive effect on NIM in the current year such that a percentage increase in MPR this year causes NIM to insignificantly increase by 0.047%. In the case of LR, an increase in LR last year resulted into a decrease in NIM this year. As depicted thus, a 1% increase in LR last year brings about 0.026% reduction in NIM this year. Whereas in the current period, although a change in LR this year had a negative effect on NIM in the current period, it shows significance at 5% level of significance. Thus, a 1% increase in LR this year brings about 0.048% decrease to NIM this year.

The model of NIM which estimated CRR in the short run shows from the diagnostics tests, the R-squared of 99.93% reveals that variation in the ROA was explained by CRR while 99.64% variation in NIM was explained by CRR in the short run when the degree of freedom was considered. The F statistics (345.20) with its probability (0.040) suggests that these included variables were jointly significant in explaining ROA between 2008 and 2016 at 5% level of significance. There is the presence of first order negative serial correlation in the residual as seen in the Durbin-Watson value of 3.030. Thus, the result disclosed that CRR in the last two periods had a negative but significant impact on NIM in the current period. The result depicted that 1% increase in CRR two year ago resulted into 0.3178% reduction in NIM this year and is significant at 5% level of significance while, a percentage increase in CRR last year makes NIM this year to reduce by 0.91% which is significant at 10% level of significance. As for CRR in the current year, 1% increase brings about 0.326% in NIM this year in the short run which is significant at 5% level.

4.8. Post Estimation Tests

As presented in Table 4.9, the post estimation result reveals that all the estimated models have a residual that is normally distrusted absence of serial correlation, no heteroskedasticity, and a stable model (as shown by CUSUM and CUSUM Square). However, the models specified are not correctly done as seen in the Ramsey reset test except for the LNIM model which was estimated using LR and MPR (as depicted in column 4).

Table-7. Post-Estimation Tests Result

Tests	ROA		LNIM	
NORMALITY: (Jarque-Bera)	0.181762 (0.913127)	0.142568 (0.931198)	0.665357 (0.717001)	0.600063 (0.740795)
SERIAL CORRELATION (Breusch-Godfrey LM Test)	0.284389 (0.8675)	0.567821 (0.7528)	7.352830 (0.0253)	-
HETEROSKEDASTICITY (Breusch-Pagan-Godfrey Test)	8.239623 (0.3119)	3.529260 (0.1713)	7.402100 (0.3882)	4.439390 (0.3498)
MODEL SPECIFICATION (RAMSEY RESET TEST)	27.17019 (0.0000)	2.805987 (0.0939)	0.062678 (0.8023)	-
CUSUM	STABLE	STABLE	STABLE	-
CUSUM SQUARE	STABLE	STABLE	STABLE	-

() represents the probability of the test statistics

5. DISCUSSION OF FINDINGS AND POLICY IMPLICATION

5.1. Research Results

The long run model shows that MPR and LR were not jointly significant in explaining ROA between 2000 and 2016. As only 22.07% variation in ROA was explained by MPR and LR in the long run, while, only 10.94% variation in ROA was explained by MPR and LR when the degree of freedom is considered. Therefore, LR and MPR had no effect on ROA during the period under study as 1% increase in LR and MPR will bring about 0.0004% and 0.0028% increase in ROA respectively. Also, CRR is found not to be statistically significant in explaining ROA between 2008 and 2016 as 1% increase in CRR results in 0.000124% increase in ROA and only 9.86% variation in ROA was explained by CRR. However, MPR and LR were found to be jointly significant in explaining NIM between 2000 and 2016 as 74.36% variations in NIM were explained by MPR and LR and 70.7% variations in NIM were explained by MPR and LR when the degree of freedom is considered. And 1% increase in MPR and LR bring about a 0.069% and 0.024% decrease in NIM respectively. At 1% level of significance, LR was found to be significant while MPR was found insignificant in explaining NIM. CRR was found to have no effect on NIM during the period under study as 1% increase in CRR brings about 0.0068% decrease in NIM. However, this was found to be statistically significant.

Looking at the short run model, MPR and LR were found to be jointly significant in explaining changes in ROA as 93.12% variations in ROA was explained by MPR and LR and 85.1% variations in ROA was explained by MPR and LR when the degree of freedom is considered. While 90.98% variations in ROA was explained by CRR but when the degree of freedom is considered, 87.3% variations in ROA was explained by CRR. However, the variation in ROA depends on time where, as years increase, ROA increase at 0.0048% revealing a 5% level of significance. The results show that ROA in the last two periods significantly affect current ROA at 5% and 1%, significant level respectively. It can be seen that a 1% increase in ROA two years ago and last year makes ROA in the current year increase by 1.138% and 2.781%, respectively. However, a percentage change in LR and MPR last year brings about a 0.004% and 0.011% decrease in ROA, respectively. These effects are seen to be statistically significant in explaining ROA. Although current period LR is statistically significant at 10%, a 1% increase in LR produces a 0.002% decrease in ROA.

Also, 88.98% variations in NIM was explained by MPR and LR and 77.96% variations in NIM was explained by MPR and LR when the degree of freedom is considered. The short run model show that 99.93% of NIM was explained by CRR while, when the degree of freedom is considered, 99.645 of NIM was explained by CRR during the study period. But the result depicts that as the years increase, NIM reduced over the period to the tune of 0.061% at 5% level of significance. Further, the result explains that 1% increase in last year's NIM leads to 0.619% decrease in the current year NIM which is significant at 5% level. As for MPR, a percentage change in MPR last year brings about 0.062% increase to current year NIM and is significant at 10% while, in the current year, no statistical significance was found for MPR although it had a positive effect on NIM in the current year such that a percentage increase in MPR this year causes NIM to insignificantly increase by 0.047%. In the case of LR, an

increase in LR last year resulted into a decrease in NIM this year. As depicted thus, a 1% increase in LR last year brings about 0.026% reduction in NIM this year. Whereas in the current period a change in LR this year had a negative effect on NIM in the current period, it shows significance at 5% level of significance. Thus, a 1% increase in LR this year brings about 0.048% decrease to NIM this year.

The result disclosed that CRR in the last two periods had a negative but significant impact on NIM in the current period. The result depicted that 1% increase in CRR two year ago resulted into 0.3178% reduction in NIM this year and is significant at 5% level of significance while, a percentage increase in CRR last year makes NIM this year to reduce by 0.91% which is significant at 10% level of significance. As for CRR in the current year, 1% increase brings about 0.326% in NIM this year in the short run which is significant at 5% level.

5.2. Implications of Findings

Based on the findings in this study, it is recommended as follows:

The CBN should intensifies its monetary policy strategies in controlling the activities of money deposit banks in the short run as this policy has been found effective. However, in the long run, CBN should make use of other regulatory tools to control the activities of deposit money banks for the achievement of macroeconomic objectives.

Deposit money banks should explore other means of boosting their earnings apart from the traditional customers' loans and risk assets. It is also recommended that deposit money banks' management should try to boost their net interest margin through effective management of their deposits mobilisation and loans portfolio strategies as these will result in better performance, that is, increase in profit before tax of the banks.

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