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Effect of Monetary Policy Instruments on the Lending Behaviour of Quoted Deposit Money Banks in Nigeria

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Abstract

The study examined the effect of monetary policy instruments and the lending behaviour of deposit money banks (DMB's) in Nigeria using a monthly time series data-set spanning the period of 2010-2019. To carry out its empirical analysis, the study used the Autoregressive Distributed Lag (ARDL) model. Loans and advances of DMBs were used as proxy for the lending behaviour of DMBs. The variables used to capture monetary policy instruments in the study were monetary policy rate, cash reserve ratio, broad money supply (M_3), deposit rate and exchange rate. Findings from the study revealed that all the monetary policy instruments adversely affected the lending behaviour of DMBs in the short-run. In the long-run however, cash reserve ratio, deposit rate and the M_3 positively stimulated the lending behaviour of DMBs. To spur DMB lending through the use of monetary policy, the study recommended a downward review of monetary policy instruments by the Central Bank of Nigeria, while also placing emphasis on the cash reserve ratio and the M_3 as policy instruments over the long-run.

Keywords: *Monetary policy, monetary policy instruments, Deposit Money Banks (DMB), Bound Test*

JEL code E59

Contribution to/Originality Knowledge
This study using a recent approach to bounds testing, establishes the long run relationship between monetary policy instruments and lending behavior of quoted deposit money banks in Nigeria, confirming the findings in previous studies.

1.0 Introduction

Deposit money banks have over time helped in providing loans and advances to customers which are vital for the proper functioning of the economy (Ayodele, 2016). Although some scholars and authors argued that loans and advances depends on the volume of deposits available (Ayieyo,2016), however, credit availability by deposit money banks has been a vital tool for economic recovery globally as countries used this to revamp their ailing economy devastated by war, global financial crisis global pandemic, disaster or credit crunch. Every country in the world Nigeria inclusive, desired set of macroeconomic objectives to achieve such as reducing inflation, unemployment and price stability through deposit money banks.

Deposit money banks play crucial roles such as encouraging savings, provision of required capital for development, and encouraging trading activities in the country. The Central Bank of Nigeria uses some monetary policy instruments to achieve the objectives of reducing inflation, unemployment, and ensuring sustainable economic growth. One of the major challenges facing monetary policy transmission mechanism in Nigeria is the disruptions in the flow of financial credits from the commercial banks to the customers. New loans are being restricted directly by monetary tools and this eventually reduces the availability and accessibility of credits to intending borrowers who may depend solely on banks finances to do businesses especially the small scale businesses which are engine of industrialisation, (Alade, Mubarak, Lukman & Segun, 2020). This disruption in the flow of credit can lead to rise in

interest rates which will eventually lead to reduced spending especially investment spending (Afolabi, Adeyemi & Fagbemi, 2018).

Although there are two major policies to be used to manage the economy such as monetary and fiscal policies, however, the study would focus on monetary policy instruments and its effects on lending behaviour of Deposit Money Banks (DMBs) in Nigeria considering the vital role they play in price stability, promoting sustained economic growth and solving the problem of macroeconomic instability all over the world and Nigeria in particular (Bhattarai, 2016). For Nigeria to achieve healthy balance of payment and other macroeconomic objectives, there is need for intervention by the deposit money banks, in ensuring that finances are available and directed to the right places or people, that is, after government must have provided a stable political and economic atmosphere, peace as well as provision of functional legal system that regulates and supervises the business environment. The adoption of monetary policy instruments such as open market operations, credit reserve ratio, and monetary policy rate, is not all that is required but how effective the instruments are in realizing the desired set macroeconomic goals and most especially their effects on the lending behaviour of deposit money banks in Nigeria, hence the paper attempts to examine the effects of monetary policy instruments on reserve ratio, broad money supply, deposit and exchange rate as variables in the study. The paper is divided into five sections: section one is introduction, section two covers both theoretical and empirical literature review, section three has to do with research methodology, section four covers results and discussion of findings and finally section five covers conclusion and policy recommendations.

2.0 Literature Review

2.1 Conceptual Definitions

2.1.1 Monetary Policy

According to Anyanwu (1993), monetary policies are those policy measures designed by government or its agency such as the central bank of Nigeria (CBN), in case of Nigeria, with the aim of controlling and regulating the amount of money, cost, and direction of money in circulation and bank credits in a particular economy in order to achieve some set macroeconomic policy goals, otherwise referred to as proximate targets. Monetary policy ensures that money and credits are expanded in such a way that the need of the growing economy is met in the long-run and also to ensure stable price of goods and services.

Other ultimate targets otherwise called economic stabilisation are sustainable economic growth, stable exchange rate, full employment and sustainable balance of payment. However, for these desired targets to be achieved, there is need for proper coordination of monetary policies with other economic policies such as fiscal policies, income policies and exchange rate policies as well as use of some policy instruments such as monetary policy rate, open market operations, exchange rate, the discount rate, reserve requirement, liquidity requirement and others which do not only influence credit expansion but also the direction as it determines the proportion of DMBs' loans to indigenous borrowers, prioritized sectors, small and medium scale indigenous enterprises as well as rural dwellers (Ujuju & Etale, 2016).

2.1.2 Deposit Money Banks

These are depository financial institutions and the like that have the liabilities in form of deposits that are payable on demand, transferrable through cheques or used for making payment aimed at facilitating the flow of funds amongst economic units examples are First Bank plc, Guaranty Trust Bank plc, Zenith Bank plc and United Bank for Africa plc.

2.2 Theoretical Literature

The loan pricing theory forms the underpinning theoretical framework of this paper as given by Stiglitz and Weiss (1981). Deposit Money Banks that advance loans, advances and overdrafts always make sure that they get profit in return because of the risk involved in it. Loan pricing model explains that loans from financial institutions to customers should not be on the basis of beating other competitors' rates but to ensure that best loans and terms are given to customers so that the DMBs make profit and at the same time retain their customers. Such decisions mostly depend on the financial institutions' goals most of which are profitability targets, however, it also depends on the money available at DMBs vaults (Ayieyo, 2016). Stiglitz and Weiss (1981) suggested that commercial banks should not fix high interest rate on loans and advances just to increase their profit margin but should consider their customers in any of their banking decisions so as to avoid moral hazards and adverse selection problems associated with such high rates. This idea was equally supported by Timsina (2016) that fixing high interest rates by commercial banks to maximise profit means only high risk takers will borrow irrespective of the consequences and that is capable of creating moral hazard problem making the investors to invest the borrowed money in highly risky business or projects hoping to pay the high rate and make profit from it.

This Loan pricing theory is indeed relevant and important as it helps the DMBs to optimise capital, that is, the theory gives them the freedom and ability to allocate certain capital for development of new products and markets and also solve some financial problems of access and availability of credits to demanding customers in the macroeconomic environment (Alhassan, Brobbery and Asamo, 2013), (Cucineli, 2015) and (Afolabi et al.,2018).

2.3 Empirical Literature

Alade et al. (2020) empirically examined the effect of monetary policy on the ability of deposit money banks to create or make credits available using liquidity ratio, money supply, monetary policy rate and the lending rate between 2007-2019.The results revealed that money supply and liquidity ratio do influence deposit money banks' credit creation in Nigeria but monetary policy rate does not and therefore recommended lowering liquidity ratio and increase in money supply so as to encourage banks to create more credits that will stimulate economic growth.

Osakwe, Igwebuike and Jude (2019) examined how monetary policy instruments affects banking sector credits in Nigeria with data collected from 1986-2016. The variables used were monetary policy ratio, cash reserve ratio,, and treasury bill rate while liquidity ratio was used as a control variable. The data were analysed with Augmented Dickey Fuller test, Johanson Co-integration test, vector correction model and impulse response function (IRF). The results of co-integration test revealed that a long-run relationship exists between the monetary policy instrument used and the bank credits with monetary policy rate and liquidity ratio having

significant effects on lending habit of commercial banks in Nigeria while treasury bill ratio and cash reserve ratio having negative effects and therefore recommends a price-based system of monetary policy to control and regulate the banking sector.

A study conducted by Udoka and Arikpo (2015) between 1980- 2013 to examined the effect of interest rate on the lending behaviour of commercial banks in Nigeria where loans and advances were used as dependent variables to represent the lending behaviour of quoted deposit money banks in Nigeria whereas treasury bill rate, monetary policy rate, deposit and lending rate represented independent variables. Time series data collected from CBN bulletins were used with Ordinary Least Square (OLS) regression method adopted. The results revealed that all other variables that is, monetary policy rate, deposit rate, Treasury bill rate are all found to be negatively significant to lending behaviour of quoted deposit money banks (DMBs) in Nigeria whereas lending rate was found to be positively significant to advances and loans. This study is indeed a good one however, considering the peculiarities of banking institutions in Nigeria, the use of panel data and panel regression model would have been better to solve the above issues of peculiarities associated with the sampled banks in Nigeria.

A similar research was conducted by Sheyin (2015), titled "impact of treasury bill returns on financial intermediation in Nigeria" (2003-2013) that used vector error correction model where advances and loans were used to represent financial intermediation, that is, dependent variables and the treasury bills, total deposits, government bonds, and interbank rate are all proxies of independent variables. The results and analysis led to the conclusion that financial intermediation in Nigeria although a run more through federal government bonds is reduced by government's deficit financial instruments. The paper though similar to the above study in terms of scope, however both of them are good attempt aimed at examining the effects of monetary policy instruments on lending behaviour of quoted deposit money banks in Nigeria. The above studies were all conducted in Nigeria, hence there is need for researching if similar research and results can be obtained outside the shores of Nigeria.

Garba, Akwe, and Dang (2018) examine the effects of monetary policy instruments on lending behaviour of quoted deposit money banks in Nigeria where monetary policy rate (MPR), Cash reserve ratio (CRR), and open market operation (OMO) were used. Data were collected from annual reports of some selected DMBs from 2007-2016 while panel regression was used to examine the influence of monetary policy instruments on the lending behaviour of some selected banks in Nigeria using ex-post facto and casual research designs. The results revealed that the above instruments are negatively correlated with lending behaviour of DMBs but a statistical significant relationship was found between MPR and lending behaviour of DMBs whereas a positive relationship exists between exchange rate and lending behaviour of commercial banks and therefore recommended for reassessment of CRR and OMO if government intends to positively change the lending behaviour of DMBs.

A study conducted in Zambia by Simpasa, Nandwa and Nabassaga (2014) with the title "bank lending channel of monetary policy transmission in Zambia", where data were obtained from Zambian commercial banks prudential reports on balance sheets and capital positions. The results revealed that monetary policy has a moderate lagged effect on loans supply by banks in

Zambia. Again, it was discovered that the effect of treasury bills on lending behaviour of quoted Zambian deposit money banks is negative and insignificant at 5% but significant at 10% significance level. The results further revealed that all macroeconomic variables and global economic meltdown are insignificant but ownership of some banks in Zambia with two different variables are significant.

Another study was conducted in Nepal to assess what determines lending behaviour of deposit money banks, with panel data collected from 1996 -2015 from about twenty-four commercial banks of Nepal. Using correlation matrix, descriptive statistics, it was discovered that cash reserve ratio and open market operations are negatively related to advances and loans. Another study conducted by Timsina (2016) in Nepal discovered that bank assets, bank rate, capitalisation and liquidity have positive and significant effects on loans and advances.

Tsenkwo and Longdu'ut (2013) conducted a research to find out some of the reactions as to how change in monetary policy rate affects bank lending rate, savings rate, and others. The paper used both descriptive and econometrics analysis. After all the diagnostic tests have conducted on secondary data sourced from CBN and NBS bulletins, the results revealed that almost all except bank savings rate, revealed long-run correlation with tendency of converging and further indicated a unidirectional causality between monetary policy rate and lending rate, bank lending rate and bank savings rate. Also bi directional relationship exists between monetary policy rate and bank savings rate. The paper therefore concluded that the relationship between monetary policy rate and others depends on what the monetary authority wants to achieve. Government should therefore policies on commercial banks instead of persuasion.

Lucky and Lyndon (2016) in their research spanning the period of 1985-2014, to examine the factors that determine deposit money banks' lending policy, used Gross Domestic Product (GDP), exchange rate, inflation rate and prime lending rate as the major determinants. The Ordinary Least square (OLS) regression method was adopted with the data collected from CBN bulletins, where the results revealed that there is significant and positive relationship that exists between GDP and lending behaviour of commercial banks in Nigeria. This may not be unconnected with the common knowledge that as GDP increases commercial banks are likely going to have enough money deposit to lend out to their demanding customers. The results further revealed that exchange and inflation rates have positive and significant influence on commercial banks' lending behaviour but negative correlation was discovered between prime lending rate and lending behaviour of deposit money banks in Nigeria. Although the analysis was done without proper diagnostic tests conducted, and inclusion of some variable like open market operations that will have given a robust regression that will reduce the chance of having spurious results, the study is still a leeway to further research.

Another research was conducted in Ghana where Jonas and Samuel (2013) in their collective paper to examine monetary policy and of bank lending behaviour of commercial banks, using a Generalised Method of Moments (GMM)-system estimator discovered that there is statistically significant and positive correlation between capital structure and bank size. Invariably, there is a negative effect discovered between central bank's lending rate and exchange rate on commercial banks' behaviour in Ghana. The results also confirmed that a

good working relationship between the central bank and commercial banks is capable of influencing DMBs lending behaviour in Ghana. This may be true considering the fact that the existence of good working relationship between the apex bank and the commercial banks in a country is capable of reducing cost of borrowing by commercial banks from central bank and this will equally reduce lending rate between these (commercial) banks and their customers, thereby affecting their lending behaviour positively.

Mukhanyi (2016) conducted a study in Kenya between 2006-2015 to ascertain the determinants of lending behaviour of DMBs in Kenya used bank size, advances and loans, cash reserve ratio, interest rate spread, bank capitalisation, and real GDP and deposit volume. With data collected from the central bank of Kenya (CBK) among thirty-five commercial banks and using panel regression model, it was discovered that lending behaviour of commercial banks and bank size are positively and insignificantly related whereas bank capitalisation, interest rate spread, and deposit volume all have significant positive influence on DMBs lending behaviour. The results further revealed that only GDP has negative effect on lending behaviour of commercial banks in Kenya.

Similar research was conducted but in Nigeria by Olokoyo (2011) aimed at knowing what determine lending behaviour among commercial banks in Nigeria. Loans and advances were used to represent dependent variables while interest rate, deposit volume, GDP, investment portfolio, cash reserve ratio, exchange rate and liquidity ratio all represented explanatory variables. With data collected from CBN and National Bureau of Statistics (NBS) from 1980-2005, OLS method was used and the results revealed that bank deposit influences lending behaviour of DMBs more than any other variable. Although the study did not use open market operation which some earlier researchers and scholars argued that influences lending behaviour of DMBs more than any variable studied, however, this all depends on the model and the variables used in the research. Such results can be true since commercial banks only lend out money deposited by their customers. This means the more deposits in their vaults, the more they are likely to advance loan facilities.

The above results informed the decision of Bingilar and Andabai (2014) to conduct research on effects of deposit mobilisation on commercial banks' lending behaviour from 1996-2014, where multiple regression, correlation and percentage methods were used for analysis of secondary data that were collected from CBN and NBS over nineteen years. Aggregate bank capital represented deposit mobilisation and loans to agriculture and manufacturing sector were used to ascertain the lending behaviour of commercial banks. The result of the analysis revealed that there is positive correlation between deposit mobilisation and loans to manufacturing sector with statistical significance. However, insignificant positive relationship was discovered between deposit mobilisation and agriculture sector. To address the issues of peculiarities of the respective banks, the panel data would have been applied with proper diagnostic tests to tackle those sophisticated issues instead of using OLS and pure time series, with time extended.

Dare and Okeya (2017) assessed the impact of monetary policy on the performance of commercial banks in Nigeria empirically and UBA as case study from 2009-2014. Panel cross-sectional data was used and multi linear regression model adopted. The modes see banks

performance as a function of monetary policy rate, cash reserve ratio, liquidity ratio (LR), where return on asset represents banks credit performance. The results revealed that there is positive but statistically insignificant relationship between monetary policy and return on assets in UBA. It further indicated negative and statistically insignificant relationship between cash reserve ratio, liquidity ratio, and return on assets. The study therefore concludes that the statistical insignificant observed might not be unconnected with the low rate of compliance with monetary policy guidelines by deposit money banks.

Ahmed (2015) examined the effects of foreign exchange exposure on financial performance of commercial banks in Kenya. But the research used both primary and secondary data on some sampled Kenyan commercial banks while data were collected from Nairobi stock exchange. The results after using descriptive research design method and required regression analysis, it was revealed that the financial performance of Kenyan commercial banks has been insignificantly and positively affected by interest rate. Furthermore, it was indicated that foreign exchange exposure has negative influence on financial performance of DMBs in Kenya.

Bhattarai (2016) assessed the lending actions of Nepalese deposit money banks using loans and advances as dependent variables and investment portfolio, bank size, liquidity, cash reserve ratio, deposit to capital ratio as explanatory variables conducted among four commercial banks between 2007-2014. The study used OLS Multiple regression analysis. It was discovered that bank size is related with loans and advances positively with statistical significance. That commercial banks in Nepal are ever ready to expand their credit share as long as their asset expands. However, the results indicated that there is negative relationship among cash reserve ratio, liquidity, investment portfolio which reduce the willingness of commercial banks to lend out money to their customers. But a significant positive relationship was observed between deposit to capital ratio and lending behaviour deposit money banks.

This study uniquely extends the study in Nigeria to 2019, while also using a monthly data-set as against other studies better captures the relationship.

3.0 Research Methodology

3.1 Type and Source of Data

The study employed secondary data. It used a monthly time series data-set spanning 2010M1-2019M12. The study is an attempt to examine the effect monetary policy instruments on lending behaviour of deposit money banks in Nigeria, and make choice of the base and terminal years of 2010 and 2019 respectively. Data for the study was obtained from the 2020 annual CBN statistical bulletins, and the Trading Economics 2020 database.

3.2 Method of data Analysis

The study used auto-regressive distributed lag (ARDL) model. The model is superior over conventional co-integration technics when used on a small sample size; it allows for both short-run and long-run relation to be tested simultaneously; it provides unbiased estimates for long-run and valid *t* test when some variables are endogenous. The model can be applied irrespective of whether the variables are found to be stationary at I(0), I(1) or both (Pesaran et al., 2001).

3.3 Model Specification

To carry out the empirical analysis, this study adopted the work of Garba *et al.* (2018) and modelled the loans and advances of deposit money banks (*LAD*) as a function of the monetary policy rate (*MPR*), the cash reserve ratio (*CRR*), broad money supply (M_3), deposit rate (*DER*) and exchange rate (*EXR*). The functional form of the model is given as;

$$LAD = f\left(MPR, CRR, M_3, DER, EXR\right) \tag{1}$$

The econometrics form of the model is given as:

$$\ln LAD = \alpha_0 + \alpha_1 \ln MPR_t + \alpha_2 \ln CRR_t + \alpha_3 \ln M_t + \alpha_4 \ln DER_t + \alpha_5 \ln EXR_t + \varepsilon_t \tag{2}$$

where, α_0 is the intercept; α_1 to α_5 are the coefficients of the variables; ε_t represents the error term, *LnLAD* represents the log of deposit money bank loans and advances, *MPR* is the monetary policy rate.

3.4 Estimation Procedure

3.4.1 Unit Root Test

The Phillips-Perron (PP) unit root test was carried out to test for the presence of unit root in the time series data. Here, the PP test builds on the Dickey-Fuller test, that is, the null of unit root exists: $H_0 = \alpha = 0$, but it proposes a nonparametric approach. Therefore the PP unit root test is applicable on wider categories of time series.

3.4.2 The ARDL Approach to Co-integration

After undergoing the PP unit test, the next test is to examine the presence of co-integration using the bounds testing procedure. Then, the estimate of the long-run coefficient is carried out. This is followed by carrying out the short-run dynamic coefficient estimates. The model ends by testing for the stability of the model.

In general, the ARDL model can be defined as ARDL (p, q), where the p and q are lag of the parameter as formed in Equation 3;

$$y_t = \alpha_0 + \sum_{i=0}^{p} \varphi_i y_{t-1} + \sum_{j=0}^{q} \beta_j x_{t-1} + \varepsilon_t \tag{3}$$

Following Equation 3, the ARDL model used in this study is given as;

$$\begin{aligned} \Delta \ln LAD_t = {} & \alpha_0 + \sum_{t=0}^{p} \phi_1 \ln LAD_{t-1} + \sum_{t=1}^{p} \phi_2 \ln MPR_{t-1} \\ & + \sum_{t=1}^{p} \phi_3 \ln LCRR_{t-1} + \sum_{t=1}^{p} \phi_4 \ln M_{3t-1} + \sum_{t=1}^{p} \phi_5 \ln DER_{t-1} + \sum_{t=1}^{p} \phi_6 \ln EXR_{t-1} \\ & + \alpha_1 \ln LAD_{t-1} + \alpha_2 \ln MPR_{t-1} + \alpha_3 \ln LCRR_{t-1} + \alpha_4 \ln M_{3t-1} + \alpha_5 \ln DER_{t-1} \\ & + \alpha_6 \ln EXR_{t-1} + \varepsilon_t \end{aligned} \tag{4}$$

From Equation 4, α_0 is intercept, t is the time dimension while Δ is difference operator and ε_t is the error term.

The long-run co-integration is estimated using;

$$In\ LAD_t = \alpha_0 \sum_{t-0}^{p} \Phi_1\, In\ LAD_{t-1} + \sum_{t-0}^{p} \Phi_2\, In\, MPR_{t-1} + \sum_{t-0}^{p} \Phi_3\, In\, LCRR_{t-1} + \sum_{t-0}^{p} \Phi_4 In\, M_{3t-1} + \sum_{t-0}^{p} \Phi_5\, In\, DER_{t-1} + \sum_{t-0}^{p} \Phi_6\, EXR_{t-1} + \Psi ECM_{t-1} + \mathcal{E}_t \quad (5)$$

For the ARDL estimation, the selection of the maximum lag (p q) follows the automatic lag length selection process in the E-views program. Subsequently, the study derived the short-run dynamic parameter from the Error Correction Model (ECM) estimation which is associated with the long-run result.

$$In\ LAD_t = \alpha_0 \sum_{t-0}^{p} \Phi_1\, In\ LAD_{t-1} + \sum_{t-0}^{p} \Phi_2\, In\, \Delta MPR_{t-1} + \sum_{t-0}^{p} \Phi_3\, In\, \Delta LCRR_{t-1} + \sum_{t-0}^{p} \Phi_4 In\, \Delta M_{3t-1} + \sum_{t-0}^{p} \Phi_5\, In\, \Delta DER_{t-1} + \sum_{t-0}^{p} \Phi_6\, \Delta EXR_{t-1} + \Psi ECM_{t-1} + \mathcal{E}_t \quad (6)$$

From Equation [6], ϕ_1, $\phi_2, \phi_3, \phi_4, \phi_5$ and ϕ_6 represent the short-run dynamic coefficients converging to long-run equilibrium, while the ECT_{t-1} component represents the speed of adjustment parameter originating from the estimated equilibrium relationship.

3.4.3 The Bound Test

The ARDL Bound test models the ARDL equation using the least square procedure in order to investigate the existence of long-run relationship among the variables. For this, the *F*-statistics test is conducted for the joint significance of the coefficient of lagged variables, $H_0 : \phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = \phi_6 = 0$ against an alternative of $H_0 : \phi_1 \neq \phi_2 \neq \phi_3 = \phi_4 = \phi_5 = \phi_6 \neq 0$. For the Bound test, the calculated F-statistics is compared to the critical value. In practice, if the *F*-statistics value lies above the bound of critical value, the null hypothesis is rejected; where it falls below the lower bound of critical value, the null hypotheses cannot be rejected, that is, there exist no long-run relationship among the variables;

however, if the *F*-statistic value lies between the upper and lower critical bound values, the result is inconclusive.

3.4.4 Residual Diagnostic Tests

The residual diagnostic tests were conducted to validate the results of ARDL model. Here, the Breusch-Godfrey serial correlation LM test tested for serial correlation.

4.0 Results & Discussion

4.1 Unit Root Test

The result of the Phillips-Perron (PP) unit root test is presented on Table 1.

Table 1: *PP Unit Root Test Results*

Variable	Order	PP calc.	Critical Value	Conclusion
LAD	At levels	-3.3642	-2.9117	1(0)
MPR	At levels	-2.0764	-2.9117	
	First Difference	-7.5720	-2.9126	1(1)
CRR	At levels	-3.5014	-2.9117	1(0)
M_3	At level	-0.2679	-2.9117	
	First Difference	-3.2905	-2.9126	1(1)
DER	At level	-1.8236	-2.9117	
	First Difference	-5.9622	-2.9126	1(1)
EXR	At Level	-1.9643	-2.9117	
	First Difference	-3.7578	-2.9126	1(1)

Source: *Author's Computation using E-views 10*

Conducted at the 5% critical levels, the PP unit root test results showed that *LAD* and *CRR* were stationary at levels. However, the variables of *MPR*, M_3, *DER*, and *EXR* were stationary after taking their first difference.

4.2 The ARDL Bound Test

The ARDL optimal model given by the automatic lag length selection in the E-view was reported to be (1, 1, 3, 1, 2, 0). Following this optimal model, the ARDL Bound test is presented on Table 2.

Table 2: *ARDL Bound Test Result*

F-Bounds Test		**H_0: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	9.9815	10%	2.08	3
K	5	5%	2.39	3.38

2.5%	2.7	3.73
1%	3.06	4.15

Source: *Author's Computation using E-views 10*

The Bound test result revealed the existence of long-run relationship among the variables because the F-statistics value of 9.98 is greater than the upper bound critical values of I(1) at all the levels of significance. The study then proceeded to conduct the short and long-run ARDL models.

4.3 Long-run Coefficient Estimates.

The result of the ARDL long-run coefficient estimate is presented on Table 3.

Table 3: *Long-run Coefficient Estimates*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.0750	0.3063	-0.2449	0.8076
CRR	0.3982	0.1899	2.0956	0.0420
LnM3	0.3924	0.1553	2.5269	0.0153
DER	-0.6885	0.1425	-4.8327	0.0000
EXR	-0.0640	0.1438	-0.4452	0.6584
C	6.4977	1.1716	5.5460	0.0000

Source: *Author's Computed using E-views 10*

The long-run result on Table 4 revealed that MPR inversely affected loans and advances of DMBs. The result points to the fact that the double digit MPR over the years adversely affected the lending behaviour of DMBs through the inter-bank lending rate. The result of the monetary policy instruments of cash reserve ratio and broad money supply positively and significantly affected the lending behaviour of DMBs in Nigeria over the long-run period. The result of the deposit rate and the exchange rate adversely affected the lending behaviour of DMBs. The deposit rate in the country significantly limited DMBs lending behaviour. Exchange rate on the other hand, although adversely affected DMBs' lending behaviour, it was however not significant. This result indicates that these monetary policy instruments with the exception of *CRR* and M_3 adversely affected the lending behaviour of DMBs in Nigeria over the long-run as confirmed by the work of Afolabi et al. (2018) and Osakwe et al.(2019) and the economic implication is that a relatively high rate of interest negatively affects the lending ability and behaviour of DMBs as only the high risk taker will borrow, the default of which will negatively affect such lending financial institutions.

4.3 Short-run Coefficient Estimates.

The results of the ARDL short-run coefficient estimates are presented in Table 4 respectively.

Table 4: *Short-run Coefficient Estimates*

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
D(LnMPR)	-0.1587	0.0679	-2.3351	0.0243
D(LnCRR)	-0.0123	0.0229	-0.5364	0.5945
D(LnCRR(-1))	-0.0975	0.0299	-3.2653	0.0022

D(LnM3)	-0.5334	0.1129	-4.7243	0.0000
D(DER)	0.0099	0.0249	0.3965	0.6937
D(DER(-1))	-0.1036	0.0373	-2.7787	0.0081
D(EXR)	-0.0640	0.1438	-0.4452	0.6584
CointEq(-1)*	-0.2139	0.02310	-8.9230	0.0000

Source: *Author's Computation using E-views 10*

The result of the short-run coefficient estimate revealed that, most monetary policy instruments used inversely affected the lending behaviour of deposit money banks in Nigeria with the exception of exchange rate which is not significant within the short-run period. They were majorly statistically significant. Although they adversely affected the lending behaviour of DMBs within the period under analysis, the implication of this is that, lower rates in monetary policy instruments have the desired effect of stimulating the lending behaviour of DMBs in the country within the short-run period. The result of the error correction term (*CointEq(-1)**) had an estimated coefficient of -0.21 and it was highly statistically significant, indicating that deviations from equilibrium path in the model was corrected by 21% monthly.

4.4 Residual Diagnostic Test Results

The residual diagnostic test for this study tested for serial correlation and the stability of ARDL model. The result of the Breusch-Godfrey Serial Correlation LM test and CUSUM Plot are presented on Table 5 and Figure 1 respectively.

Table 5: *Breusch-Godfrey Serial Correlation LM Test Result*

F-statistic	0.031632	Prob. F(2,41)	0.9689
Obs*R-squared	0.087817	Prob. Chi-Square(2)	0.9570

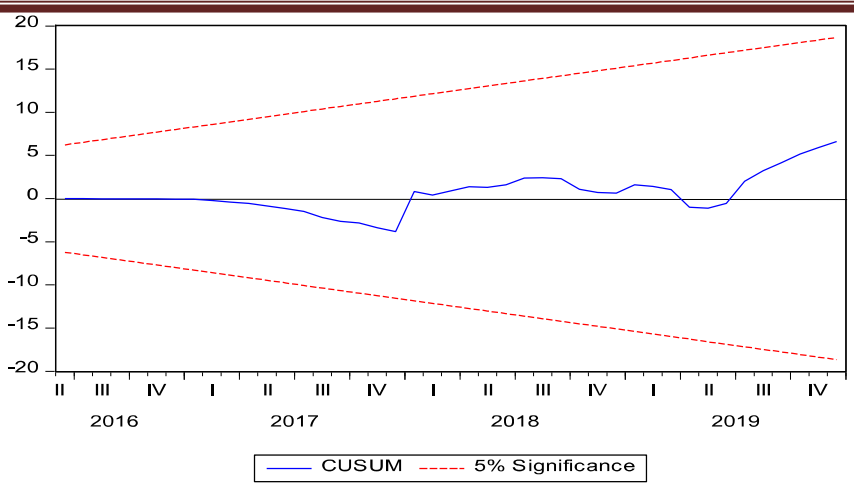

Figure 1: *CUSUM Plot*

The diagnostic residual tests showed that the model was free from serial correlation because the Breusch-Godfrey serial correlation LM test accepted the null hypothesis of no serial correlation in the residual since its probability values were greater than the 5% level. Similarly, the result of the CUSUM test on Figure 1 had plots all within the two straight line indicating that the ARDL model was stable.

5.0 Conclusion and Recommendations

5.1 Conclusion

This study attempts to examine the effects of monetary policy instruments on lending behaviour of quoted deposit money banks in Nigeria. Time series data were used within the time frame of 2010-2019. The analysis is based on ARDL econometric model where loans and advances were used to represent dependent variables and Money supply, monetary policy rate, deposit rate and exchange rate represent independent variables.

The study therefore concluded that monetary policy instruments adversely affected the lending behaviour of DMBs in Nigeria for the period under analysis. The short-run result showed that monetary policy rate, cash reserve ratio, M_3, deposit rate and exchange rate adversely limited the lending behaviour of DMBs. In the long-run however, only cash reserve ratio and M_3 positively stimulated the lending behaviour of DMBs for the period under analysis. The study concludes that the relatively high rates of the identified monetary instrument adversely affected the ability of DMBs to carry out significant lending activities.

5.2 Policy recommendations

To reverse the inverse relationship, the study recommends that a downward review of monetary policy instruments by the Central Bank of Nigeria would significantly stimulate the lending behaviour of DMBs in the country. Similarly, emphasis should be placed on the cash reserve ratio and the M_3 as policy instruments over the long-run so as to effectively spur the lending behaviour of DMBs. It also recommends that the Federal Government of Nigeria through its monetary agency, the central bank of Nigeria (CBN), should strengthen the banking sector to ensure an improved credit flow to different sectors of the economy because of its strategic importance in creating and generating economic growth. It should as well as ensure the financial stability of the Nigerian economy by initiating policies and programmes that would

enhance the economic growth, operation, and quality of commercial banks in Nigeria in line with international best practices.

References

Afolabi, M. A. Adeyemi, K. K., Salawudeen, O. S. & Fagbemi, T. O. (2018). Monetary policy and bank credit in Nigeria: A Toda-yamamoto approach. Economica, 14(5), 717–735.

Ahmed, L.(2015).The effect of foreign exchange exposure on the financial performance of commercial banks in Kenya. *International Journal of Scientific and Research Publications*, *5*(11), 15-122.

Alade, A. A. Mubaraq S. Lukman A. O., & Segun A. (2020).Impact of monetary policy on bank credit in Nigeria. Journal of Accounting Research, Organization and Economics Vol. 3 (3), 2020: 196-205. http://www.jurnal.unsyiah.ac.id/JAROE.

Alhassan, A.L. Brobbey,F.O., & Asamoah, M.E. (2013). Does asset quality persist on bank lending behaviour? Evidence from Ghana. *Global Journal of management and Business Research Finance Vol. 13,* No. 4, pp1-18.

Anyanwu, J. C. (1993). *Monetary Economics: Theory, policy and Institution*. Onitsha: Hybrid publishers.

Ayodele, J.C. (2016). Effects of monetary policies on commercial banks' lending in Nigeria. A review of Public Administration and Management, Vol.3, No. 5, pp 134-146.

Ayieyo, J.O. (2016). Determinants of lending behaviour in selected commercial banks in Kenya. Journal of Business, Economics and Accountancy, Vol. 4, No. 4, pp143-152

Bhattarai, Y. R. (2016). Determinant of lending behaviour of Nepalese commercial banks. The Journal of India Management, 6(3), 28-36.

Bingilar, P. F., & Andabai, P. W. (2014). Deposit mobilization and lending behaviour of banks in Nigeria. International Journal of Advanced Studies in Business Strategies and Management, 3(1), 255-266. Central Bank of Nigeria (2020). *Annual statement of statistics*. Abuja: Author

Cucineli, D. (2015). The impact of non-performing loans on bank lending behaviour: Evidence from Italian banking sector. *European Journal of Business and Economic, Vol. 8, No.16, pp69-71.*

Dare, J., & Okeya, T. R. (2017). Monetary policy and commercial bank's credit performance: Evidence from UBA plc. *Journal of Economics and Finance*, *8*(4), 60-67.

Garba, S. A., Akwe, J. A.,& Dang, Y. D. (2018). Effects of monetary policy instruments on lending behaviour of quoted deposit money banks in Nigeria. *RA Journal of Applied Research*, *4*(10), 2009-2020.

Jonas D. & Samuel K.. (2013). Monetary Policy And Bank lending in Nigeria. NDIC Quarterly Volume 35, Nos. 1 & 2 Mar. & June., 2013.

Lucky, E. U., & Lyndon, M. E. (2016). Determinants of commercial bank lending policy in Nigeria: An econometric approach. *Innovative Journal of Business and management*, *5*(4), 89-93.

Mukhanyi, M. (2016). *Determinants of lending behaviour of commercial banks in Kenya* (Master's Thesis).Department of Economic, Universities of Nairobi.

Olokoyo, F.O.(2011).Determinants of commercial banks' lending behaviour in Nigeria. *International Journal of Financial Research*, 2(2), 61-72.

Osakwe, A. C., Igwebuike, A. L., & Jude, O. E. (2019). Effect of monetary policy instruments on banking sector credit in Nigeria. Advance Journal of Management, Accounting and Finance, 4(4), 32–45.

Pesaran, H.M.,Shin, Y. & Smith, R. (2001). Bound testing approaches to the analysis of level relationships. Journal of Applied Econometrics,16(3)289-326.

Sheyin, S. H. (2015). Impact of treasury bills returns on financial intermediation in Nigeria (Master's thesis). Department of Economics, Ahmadu Bello University, Zaria.

Simpasa, A., Nandwa, B., & Nabassaga, T. (2014). Bank lending channel of monetary policy transmission in Zambia. Working Paper Series, African Development Bank, Tunis, Tunisia

Stiglitz, S., & Weiss, L. (1981). Analysis of loan and disbursement in the commercial bank (2nd ed.). Uhomoibhi: Macgraw Hill.

Timsina, N. (2016). Determinants of lending behaviour in Nepal. The International Journal of Business and Management, 4(8), 64-77. Trading economics. (2020).*Money market rates*. Retrieved from https://tradingeconomics.com/nigeria/

Tsenkwo, B. J., & Londu'ut, D. T (2013).The relationship between monetary policy rate and banking rate: Evidence from regression and multivariate causality analysis. *An international journal of Arts and Humanities*, *2*(5), 67-79.

Udoka, C. O., Bassey, I. I., & Arikpo, O. F. (2015). Interest rate: A key variable in deposit money banks' lending behaviour in Nigeria. Archives of Business Research, 3(4), 152-161.

Ujuju, L. E., & Etale, L. M. (2016). Determinants of commercial banks' lending policy in Nigeria: An econometric approach. *Innovative Journal of Business and Management*, 5(2), 542-551.