Lending Rate and Commercial Bank Lending in Nigeria

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DOI: 10.51558/2303-680X.2021.19.2.65

Abstract

The increase in the lending rate in Nigeria has affected the borrowers in the financial system and it has invariably reduced the pace of economic activities in the country. Such a situation created the need to examine the impact of the lending rate on bank lending in Nigeria. The study made use of ex-post facto research design. The data collected from the Central Bank of Nigeria Statistical Bulletin in the period 1981-2018 were subjected to Autoregressive Distributed Lag (ARDL) method of regression analysis. The analysis included the macroeconomic variable growth of bank lending, which is a proxy for bank lending, and the independent variables: lending rate, deposit growth, foreign exchange rate, liquidity rate, money supply, and GDP growth. The findings revealed there is a long-run relationship among the variables of the study. It was also discovered that the lending rate and liquidity ratio are inversely related to the growth of bank lending. Deposit growth and money supply both have a positive significant impact on the growth of bank lending. The monetary authorities should encourage banks to attract more deposit as this has a significant impact on the credit ability of the banks. A periodic review of the lending rate and liquidity ratio of the banks in the economy should also be carried out as these have a significant impact on the lending in the economy. Future researchers could extend the research by carrying out a cross country study in order to ascertain whether these variables will generate the same or a contradicting result.

Keywords: lending rate, bank lending, ARDL

JEL Classification: E43, E51, G21, C32

1. Introduction

Efficient distribution of financial resources for productive purposes is a very crucial issue faced by every nation. Financial institutions through their intermediation role help to ensure the provision of resources for the sectors in need of funds. Banks in the economy link both, the deficit and surplus unit in the economy for intermediation activities to take place; this service is offered to the government, corporate organizations and individuals. The revenue generated by banks from lending to their customers is the major source of income known as the interest income. Therefore, regardless of the economic condition, banks would always be interested in issuing loans and advances to their customers with the aim of profitability (Cheboi, 2012).

However, banks must take caution in maintaining a balance between liquidity and profitability. Theoretically, it is believed that an inverse relationship exists between liquidity and profitability (Irawan, and Faturohman, 2015). Previous studies like (Jegede, 2014; Eke *et al*., 2015) asserted that liquidity affects bank lending inversely, which is contrary to the findings of Olokoyo (2011) who showed that liquidity impacts bank lending positively.

For commercial banks to meet their short-term obligations, adequate liquidity must be maintained by these banks. The higher the liquidity ratio of a bank, the higher the ability of a bank to meet its obligations, which is a corollary of the risk-return theory which states that the higher the risk, the higher the expected return and vice versa.

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Contrarily, a higher liquidity ratio indicates that funds are restricted into liquid assets rather than productive activities like loans and advances which will generate profit. This restriction affects the profitability of a bank, which informed the assertion of (Panigrahi, 2014) that trade-off between liquidity and profitability needs to be maintained by banks to maximize profit.

Previous studies opined a negative influence of interest rate on a bank loan (Alper *et al*., 2012; Ojeaga *et al*., 2014; Beutler *et al*., 2017; Onaolapo and Habeeb, 2017) while interest rate influences bank loans positively (Jegede, 2014; Eke *et al*., 2015). Afolabi *et al*. (2018) found a bidirectional relationship of interest rate on bank credit. A divergent opinion on the influence of interest rates on bank loans and advances has been documented. However, the impact of lending rates on bank loans remains scarce in Nigeria. Previous studies used bank loans and advances as a proxy for bank lending (Eke *et al*., 2015; Jegede, 2014; Onaolapo and Habeeb, 2017; Olokoyo, 2011; Alper *et al*., 2012). this study proxied bank lending by the growth of bank lending and introduced deposit growth and loan growth to the lending rate variables. It is on this backdrop that this study seeks to unleash the impact of lending rates on commercial bank lending in Nigeria. Forecasting the cost of credit is one of the challenges encountered by the deficit unit in an economy. The flow of funds will continue between borrower and lender in terms of projects that are viable and have a high yield, in as much as lender and borrower can forecast the lending rate (Caglayan and Xu, 2016). Ewert *et al*. (2000) opine that knowledge of lending rate is expected to decrease the probability of the occurrence of moral hazard and adverse selection. Moral hazard occurs when a party engages in activities that increase one's default rate while adverse selection occurs when a borrower has no information about the outcome of an event. The loan lending rate charged by banks in Nigeria and advances granted to their customers have always been a double-digit, which was not the case in the 1990s. The lending rate charged by banks in 1981 was 7.75% which increased to 16.72% in 2013, 16.87% in 2016 and kept on increasing to 16.91% in 2018 (CBN Statistical Bulletin, 2018). Borrowers, most especially corporate borrowers, transfer the burden of the increasing interest rate on customer, which pushes up the cost of goods and services, thus resulting in inflation in the economy.

Olokoyo (2011) identified some variables that affect banks' decision to give out loans and advances to borrowers: lending rate, interest rate, bank liquidity ratio, volume of deposits, level of their domestic and foreign investment, prestige, and public recognition. Empirically, the ability of banks to lend is influenced by cash reserve requirement, liquidity ratio, open market operations, and primary operations which also affect the cost lending as well as the availability of loanable funds (Jegede, 2014).

Despite all the efforts devoted to maintaining stability in Nigeria by the monetary authority, the problem is yet to be resolved as evidenced by the previous studies in Nigeria (Chioma *et al*., 2014; Omondi, 2014; Olokoyo, 2011; Somoye and Ilo, 2009). Some works on bank lending such as those of (Chioma *et al*., 2014; Eke *et al*., 2015) failed to incorporate lending rate as one of the determinants of borrower's decision whether to borrow or look for other sources of financing profitable project. This study, therefore, includes lending rate, which most of the previous studies failed to do. The study, therefore, seeks to ascertain the impact of lending rate on bank lending in Nigeria. The rest of this paper is organized as follows: the second part discusses the literature review, the third part is dealing with methodology, while part four presents the empirical results and the last part brings the conclusion.

2. Literature review

The allocation of scarce resources to the efficient channel for usage is one of the pressing issues faced by most economies (Caglayan and Xu, 2016). The price system is viewed to translate to the allocation of resources efficiently under certainty but under uncertainty, the reverse seems to be the case. Credit is the money lent by a bank to a borrower who admits to paying back in future, the principal plus the interest which is a percentage of the principal (Jegede, 2014). Nwankwo (1991) views credit as one of the

largest single income-earning assets in bank's portfolio, which explains the reason why banks allocate huge resources in monitoring, estimating, and managing credit quality. In executing their intermediation function, banks accept deposits, grant loans, and carry out the operation of the payment and settlement mechanism. Loan granted by banks is a source of finance to the deficit sector, which is usually at a cost to the deficit. This could be corroborated by the assertion of Adedoyin and Sobodun (1996) that "lending is undoubtedly the heart of banking business." Bank generates interest income from lending activities which could either stimulate or worsen bank revenue, depending on the level of administration of the loan. Bank lending is influenced by different factors as identified by (Olokoyo, 2011), one of which is the lending rate.

The interest rate was identified by various researchers as one of the factors that determine bank lending in an economy (Beutler *et al*., 2017; Onaolapo and Habeeb, 2017; Jegede, 2014; Alper *et al*., 2012). Borio and Zritz (1995) opined that the prime rate (Central Bank's rate) has a transmission mechanism on interest rates in the financial market. Interest rate is viewed to be very rigid because it does not move in line with the market trend due to credit rationing to borrowers which is as a result of the fact that there are problems of asymmetric information (Blinder and Stiglitz, 1983).

Bank lending techniques can be classified into transaction-based lending and relationship-based lending (Berger and Udell, 2006). Transaction-based lending is lending in which verification of borrowers' information is easier and faster. It is further classified by Berger and Udell into four types: financial statement lending, asset-based lending, fixed-asset lending, and credit scoring (see Berger and Udell, 2006).

Relationship-based lending is based on the past relationship between a customer and a bank. The assessment of borrower's creditworthiness is based on the bank's previous dealings with the borrower using past loan granted, deposit and information from the analysis of the viability of the project to be executed. The information obtained using relationship-based lending is believed to have a more significant value than financial statement, credit score and collateral, thus helping the bank to reduce the risk inherent in the lending activities (Berger and Udell, 2006).

In determining the lending rate, the bank needs to consider the customers' ease of repayment. Banks have to take caution with their decision concerning lending as they cannot charge a very low interest on loan because the revenue from the interest income will not be able to cater for depositors' return, general expenses, and the loss of revenue from some borrowers that do not pay. More so, a very high interest on loan may also create an adverse selection situation and moral hazard problems for borrowers (Chodechai, 2004). Bank lending decisions are therefore generally affected by a series of risks, which calls for a high level of caution in this aspect of banking operation. The success of any lending activity depends on a credit analyst to carry out good credit analysis, presentation, structuring, and reporting (Ezirim, 2005).

Osayameh (1991) buttressed this view by stressing that the era of armchair banking has gone. The increasing level of bad debt and the absence of basic business advisory service in most Nigerian commercial banks indicate that lending and credit administration techniques are ineffective. Additionally, the lending rate charged by banks in Nigeria on credits granted to their customers is hardly negotiated between a bank and a customer. When the lending rate is increased by the Central Bank of Nigeria (CBN), most banks automatically apply the new rate to the outstanding loan without informing the borrower (Okafor, 2011). Oddly, if the rate is decreased by the CBN, the same bank will hide the information as regards the downward review of the lending rate from the borrower, thereby illegally exposing the customer to payment of a higher interest rate on loan.

An increase in inflation results in a consequent increase in the interest rate charged by banks to borrowers because commercial banks want

to earn a higher interest income on the credit granted. The presence of inflation reduces the real value of investor's money at the annual inflation rate, which simply means that there is a positive relationship between inflation and interest rate (Kamisky and Reinhart, 2006). This is corroborated by the assertion of Nicholas (2011) who stated that lenders will demand a higher interest rate on credit as a result of the reduction in the purchasing power of money in the economy. This is simply because banks want to be compensated for the anticipated reduction in the purchasing power of money during the life of the credit and not only for assuming the risk and the time sacrificed for the usage of their money by borrowers.

Beutler *et al*. (2017) empirically analyzed the transmission of realized interest rate risk, gain or loss in bank's economic capital caused by movements in interest rates to bank lending. The results suggest that individual bank loan growth has likely become more sensitive to changes in interest rates than it was prior to the recent increase in interest rate risk exposure. Alper *et al*. (2012) reported that real GDP growth and inflation have positive and significant effects on nominal credit growth. Short term policy interest rate and liquidity both have a statistically negative impact on credit growth. Also, open market operation (OMO) which represents system liquidity has a positive impact on loan growth.

Omondi (2014) found that the inflation rate is positively related to the base lending rate charged by a bank, while inflation is inversely related to the lending volumes. Lastly, the study found that a rise in inflation leads to a high rate of loan defaulting activities in a bank. Afolabi *et al*. (2018) investigated the relationship between monetary policy instruments and bank loans and advances in Nigeria. The results revealed that Monetary Policy Rate (MPR) has a bidirectional causal relationship with bank loan and advances. Jegede (2014) found that the exchange rate and interest rate are positively related to commercial bank lending while liquidity ratio and money supply exert a negative impact on commercial banks' lending. Ojeaga *et al*. (2014) investigated the effect of bank lending on growth in Nigeria and the findings showed that bank lending, regulation, and the interest rate have a negative effect on growth while bank loan losses and money supply are positively related to growth.

Onaolapo and Habeeb (2017) also found that volume of deposit, foreign exchange, and GDP are positively related to loan and advances while the interest rate and reserve requirement are inversely related to loan and advances. Eke *et al*. (2015) in his study found that interest rate spread, fixed exchange rate and statutory liquidity ratio are inversely related to the volume of commercial bank loans in the interest rate deregulation era. MPR and the inflation rate are positively related to bank loans. For the deregulation era, the results showed that MPR is inversely related to bank loan while the exchange rate is positively related to bank loan.

Olokoyo (2011) investigated the determinants of commercial bank lending behavior in Nigeria. The results revealed that the lending rate, minimum cash requirement ratio, liquidity ratio, volume of deposits, investment portfolios of banks, foreign exchange, and GDP have a positive impact on bank loan and advances. Somoye and Ilo (2009) investigated the impact of macroeconomic instability on the banking sector lending behavior in Nigeria. The results of the study revealed that broad money supply and inflation are inversely related to bank lending while exchange rate depreciation increases bank lending. More so, deposit mobilization capacity of banks and bank size were the most important bank characteristics that explained their lending behavior.

3. Theoretical framework

In estimating the impact of lending rate on commercial bank lending in Nigeria, it is indispensable to identify the theories important for this study, the Keynesian theory of interest rate and the loan pricing theory. Keynes (1936) in his theory identified three motives of holding money namely, transaction, precautionary and speculative motives. He asserted that income is the determinant of both

transaction and precautionary motive, while the interest rate is the determinant of the speculative motive of holding money. The major concern of the Keynesian model is the speculative motive. Keynes asserted that as the supply of money increases, the interest rate decreases.

If the reduction in the interest rate persists, the amount of money in circulation will keep increasing, which could lead to inflation in the economy. Conversely, if the supply of money decreases, the interest rate increases, which simply indicates a negative relationship between the supply of money and the interest rate, which makes the demand curve to be negatively sloped.

The Loan pricing theory states that banks should be cautious of the setting of the interest rate because of its effect on the borrower attitude. The inability of a bank to dictate an appropriate lending rate and ascertain the behavior of a borrower at the inception of the banking relationship could trigger moral hazard or adverse selection, which could lead to a lending problem (Stiglitz and Weiss, 1981).

They further postulated that the charging of the exorbitant interest rate may create a problem of adverse selection because borrowers with a high preference for risk will always take up the high interest rate.

However, after the granting of a loan, a borrower will most likely take up projects that are risky to meet the repayment of the high lending rate charged by a bank, which could lead to moral hazard (Chodecai, 2004).

Stiglitz and Weiss concluded that the risk taken up by the borrower and the bank interest rate are not often equal

4. Methodology

The data used for this study is mainly secondary data in the time series from 1981 to 2018, which was obtained from the CBN and World Bank Development Indicators (WDI).

The bank loan is represented by the growth of bank lending which is the dependent variable, while the independent variables are lending rate, deposit growth, foreign exchange rate, liquidity ratio, and money supply growth and GDP growth rate.

The study makes use of inferential analysis with the Phillips-Perron test (P-P) for unit root and the Autoregressive Distributed Lag (ARDL) to determine the existence of a long-run relationship among the variables. The error correction model (ECM) is also used to determine the short-run relationship between the dependent and independent variables.

Model specification

The model for this study was adopted from the work of Eke *et al*. (2015).

The model for this study is specified below in order to examine the effect of the lending rate on commercial bank lending in Nigeria, which is explained as follows:

$$lnLNG = \alpha_0 + \alpha_1 lnLER_t + \alpha_2 DEG_t + \alpha_3 LIQ_t + \alpha_4 lnMOS_t + \alpha_5 GDP_t + \alpha_6 FER_t + U_t \ldots \quad (3.3)$$

where:
LNG is growth of bank lending
LER is lending rate
DEG is deposit growth
FER is foreign exchange rate
LIQ is liquidity ratio
MOS is money supply growth
GDP is gross domestic product growth rate

Table 1 shows the variables of the model and description of each variable.

Table 1. *Variable description and measurement*

Type of variables	Variables	Description	Measurement/Justification	Motivating study
Dependent	LNG	Growth of bank lending	This is the money lent by a bank to a borrower (private individual, corporate organization or government) which will be repaid in future. It is measured by previous year loan minus present loan divided by previous year loan.	Eke *et al*. (2015)
Independent	GDP	GDP growth	GDP growth rate is a measure of how fast the economy is growing. It is measured by comparing the present quarter of GDP to the previous quarter GDP.	Olokoyo (2011); Onaolapo and Habeeb (2017)
	DEG	Deposit growth	This is the money deposited by the bank customers (private individual, corporate organization and government). It is measured by previous year deposit minus present year deposit divided by previous year deposit.	Onaolapo and Habeeb (2017); Somoye and Ilo (2009)
	FER	Foreign exchange rate	This is the rate at which foreign currency will be exchanged for a local currency. The foreign exchange is measured using the US dollars to Naira exchange rate	Eke *et al*. (2015); Jegede (2014)
	LIQ	Liquidity ratio	This measures the ability of the bank to meet its obligation to the customers. It is measured by the total liquid assets of banks divided by the total current liabilities	Eke *et al*. (2015); Jegede (2014)
	LER	Lending rate	The lending rate is the percentage of the principal which serves as compensation to a bank for time and risk taken on the money lent to a borrower on a short-term basis.	Olokoyo (2011)
	MOS	Money supply	This is the measure of the broad money in circulation in the economy.	Jegede (2014)

Source: Authors' compilation

Table 2 shows the variables of the model and the expected effect of various variables on consumer deposits.

As Table 2 shows, when the exchange rate between Naira to US dollar decreases (Naira appreciate), it is expected that the growth of bank lending should increase, which means a negative relationship is expected between the foreign exchange rate and growth of bank lending.

A negative relationship is expected between liquidity ratio and growth of bank lending, which means the higher the liquidity ratio, the better the ability of the banks to meet up with their customers' requirements.

Money supply is expected to increase the growth of bank lending, which means a positive relationship is expected. More so, the lending rate is expected to have an inverse relationship with the growth of bank lending which means the lower the lending rate, the higher the loan and advances to be requested by the borrower. GDP growth rate is expected to increase the lending ability of the banks, which means a positive relationship is expected between GDP growth rate and the growth of bank lending.

Deposit growth rate is also expected to have a positive relationship with the growth of bank lending and the increase in bank deposit increases the amount which the bank can give out as loan and advances

Table 2. *Variables, Denotations and Expected Signs*

Variable	Denotation	Unit	Expected sign
Foreign exchange rate	FER	Rate	(-)
Liquidity ratio	LIQ	Ratio	(+)
Money supply	MOS	Naira	(+)
Lending rate	LER	Rate	(-)
GDP	GDP Growth	Rate	(+)
DEG	Deposit Growth	Ratio	(+)

Source: Authors' compilation

5. Empirical results

This part of the paper presents the correlation matrix, unit root test result, ARDL estimates, and the ARDL Cointegration long-run analysis.

5.1 Correlation Matrix

Table 3 below shows the correlation that exists among the variables captured in this paper. This helps in determining the level of the relationship between the variables in the study.

Table 3 shows the correlation analysis of the variables employed. LNG is positively correlated to DEG, GDP and MOS but negatively related to LER, LIQ and FER. LER is negatively correlated to DEG, GDP and MOS but positively related to FER. DEG is positively correlated to GDP, LIQ and MOS but negatively related to FER. GDP is positively related to LIQ and MOS but negatively related to FER. LIQ is positively related to FER but negatively related to MOS. FER is positively related to MOS.

The correlation coefficient shows that there is no tendency of multicollinearity among the variables because the coefficients are below 0.95, which is evidenced by (Iyoha, 2005) that multicollinearity will occur among variables when the correlation coefficient result is above 0.95.

5.2 Unit root test

The unit root test helps to determine the nature of data used in order to prevent spurious results and it aids the technique appropriate for the analysis. The Phillips-Perron test (P-P) was employed for this study in order to determine the order of integration of the time series data. The unit root result is presented in Table 4.

The Phillips-Perron (P-P) test result showed that variables DEG, GDP, LER, LIQ and LNG are stationary at level but FER and MOS are both non-stationary at levels but after first differencing, they become stationary at first difference I(1) and none of the variable is integrated at order 1(2). The ARDL method was used to investigate both short and long-run relationship among the variables. This will help to avoid spurious results.

5.3 Optimal Lag Length Selection

The implication of the lag length selected explains the effect of the outcome of the previous year on the current year.

The selection of an optimal lag length was very essential before carrying out the ARDL test, the result of which is presented in Table 5 below.

The results in Table 5 show different lag length criteria (LR, FPE, AIC, SC and HQ). The Schwarz information criterion depicting the lag order length of one (1) for the model is selected. After establishing the lag order length, the ARDL short and long-run equations were estimated in order to determine the relationship between the dependent and the independent variables as explained in the next sections.

Table 3. *Correlation Matrix of the Data Set*

Variables	LNG	LER	DEG	GDP	LIQ	FER	MOS
LNG	1.000000						
LER	-0.054784	1.000000					
DEG	0.600845	-0.24696	1.000000				
GDP	0.010727	-0.51908	0.176215	1.000000			
LIQ	-0.233689	-0.19937	0.038315	0.060006	1.000000		
FER	-0.186889	0.06821	-0.20255	-0.27153	0.261602	1.000000	
MOS	0.310384	-0.13676	0.186109	0.31339	-0.10944	0.138063	1.000000

Source: Authors' compilation

Table 4. *Unit Root Test: Phillips-Perron Test*

Variables	Level T-Stat	Critical Value @ 5%	First Difference T-Stat	Critical Value @ 5%	Order of Integration
DEG	-3.464967	-2.943427	-10.38482	-2.945842	I(0)
FER	2.360795	-2.943427	-3.324554	-2.945842	I(1)
GDP	-4.120840	-2.943427	-10.25103	-2.945842	I(0)
LER	-3.483797	-2.943427	-9.657455	-2.945842	I(0)
LIQ	-3.223066	-2.943427	-9.466231	-2.945842	I(0)
LNG	-4.419958	-2.943427	-15.63056	-2.945842	I(0)
MOS	-2.212247	-2.943427	-5.839320	-2.945842	I(1)

Source: Authors' compilation

Table 5. *Lag length selection criteria*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-601.2328	NA	2931812.	34.75616	35.06723	34.86354
1	-475.1536	194.5222	37950.53	30.35164	32.84019*	31.21068
2	-412.5780	71.51498*	24953.81*	29.57589	34.24193	31.18660
3	-346.3879	49.16980	29003.39	28.59359*	35.43713	30.95598*

Source: Authors' compilation

The result of ARDL revealed *LER* has a negative insignificant effect on *LNG*. One period lag of *LER* has a positive insignificant effect on LNG in Nigeria. DEG has a positive insignificant impact on *LNG*. One period lag of *DEG* has a positive insignificant effect on *LNG*. *FER* has a negative insignificant effect on *LNG*. *GDP* has a positive significant impact on *LNG*. *LIQ* has negative insignificant impact on *LNG* while the first period lag of *LIQ* has a negative insignificant effect on *LNG*. *MOS* has a positive insignificant effect on *LNG*, while the first period lag of *MOS* has a negative insignificant effect on *LNG*.

The Durbin Watson value of 2.126010 indicates no serial autocorrelation among the explanatory variables in the model. The R-Square of 62.80% implies that 62.80% variation in the dependent variable can be explained by the independent variables. The Adjusted R-square depicts that if an additional variable is added to the independent variable, the independent variable will still be able to explain for 46.44% variation in the dependent variable.

Table 6. *ADRL Estimates*

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LER	-0.015226	0.010073	-1.511546	0.1432
$LER(-1)$	0.011220	0.009355	1.199319	0.2416
DEG	0.492463	0.260446	1.890843	0.0703
$DEG(-1)$	0.591709	0.314558	1.881081	0.0717
FER	-4.000005	0.000386	-0.103565	0.9183
GDP	0.000685	0.008973	0.076307	0.9398
LIQ	-0.003061	0.003882	-0.788415	0.4379
$LIQ(-1)$	-0.007632	0.004171	-1.829681	0.0792
MOS	0.015262	0.011036	1.382864	0.1789
$MOS(-1)$	-0.010987	0.009047	-1.214413	0.2359
C	0.553022	0.401441	1.377594	0.1805
$R-squared$	0.628074	Mean dependent var		0.254304
$Adjusted\ R-squared$	0.464426	S.D. dependent var		0.233205
$S.E.\ of\ regression$	0.170666	Akaike info criterion		-0.441612
$Sum\ squared\ resid$	0.728170	Schwarz criterion		0.080847
$Log\ likelihood$	20.16983	Hannan-Quinn criter.		-0.257421
$F-statistic$	3.837969	Durbin-Watson stat		2.126010
$Prob(F-statistic)$	0.002572			

Source: Authors' compilation

5.4 ARDL bounds test

The ARDL bounds test is an improvement on the ARDL modeling which makes use of both *F* and *t*-statistics to test the significance of the lagged level of the variable in a univariate equilibrium correction system when it is difficult to ascertain whether the time series data is trend or first difference stationary. The ARDL bounds test will help to ascertain whether there is a long-run cointegration relationship between the dependent variable (LOA) and the independent variable (LER, EXC, LIQ and MOS).

The traditional rule of the bounds test result is that the critical value I(1) which is the upper bound at 5% level of significance must be greater than the F-Statistics for the null hypothesis of no co-movement to be accepted. The bounds test result of this study shows that the F-Statistics is 6.205723, which is greater than the critical value I(1) which is 3.28. However, Narayan (2005), as cited in Persaran *et al*. (2001) asserted that the critical value can only be used for a large sample size because its assumption is on a larger sample. Narayan further provided a critical value for sample size between 30 to 80 observations, which are 2.496-3.346 at 10% level of significance, 2.962-3.910 at 5% level of significance and 4.068-5.250 at 1% level of significance.

The critical value I(1) of this study is greater than 5% critical value provided by Narayan and the null hypothesis of no co-movement is rejected. Therefore, there is co-movement among the variables, loan growth, lending rate, deposit growth, foreign exchange rate, GDP growth rate, liquidity ratio, and money supply.

5.5 ARDL long run result

The ARDL long-run analysis will help to determine the existence of a long-run relationship among the variables in question. If the variables are cointegrated, this means that the variables have a stochastic trend in common.

The long-run coefficient further showed that one period lag of growth of bank lending has a negative significant impact on the growth of bank lending. One period lag of the lending rate has a significant negative effect on the growth of bank lending, which implies that a percentage increase in the lending rate will lead to 0.004006 unit decrease in loan growth. One period lag of deposit growth has a positive significant impact on the growth of bank lending, which implies that as deposit increases, the loan and advances granted by a bank increase. Exchange rate has a negative insignificant effect on the growth of bank lending, which means that as foreign exchange rate reduces, the growth of loan reduces. GDP has a positive insignificant impact on the growth of bank lending, which means that an increase in economic growth brings about an increase in the amount of credit to be advanced by the banks. One period lag of liquidity has a negative significant impact on the growth of bank lending, which implies that the more liquidity a bank possesses, the less the amount of credit a bank can advance to a borrower. The lending rate has a negative significant impact on the growth of bank lending, which means as the lending rate decreases, the loan keeps increasing. Deposit growth has a positive significant impact on the growth of bank lending, which means that an increase in the level of deposit increases the amount of credit given out by a bank. Liquidity ratio has a negative insignificant impact on the growth of bank lending, which means the higher the liquidity ratio of a bank, the lower the level of loan growth. Money supply has a positive significant impact on the growth of bank lending, which means that as the amount of money supply increases, the growth of loan increases. The results in Table 8 show that the coefficient of cointegration, which is an indication of the error correction term, is negative and significant. The value of the cointegration coefficient is -1.192938, which is the short run estimate and has a negative significant value. This means that the error correction term is the speed of adjustment correcting back the shock at the rate of 1.192938 annually. This means that 1.192938 gap between the long-run equilibrium value and the actual value of the dependent variable (LNG) has been corrected. The negative sign signifies the existence of cointegration among the variables. The negative significant vector shows that the vector is in line with the a priori expectation and statistically significant.

The short run coefficient further shows that the lending rate has a significant negative effect on the growth of bank lending, which implies that a percentage increase in the lending rate will lead to 0.015226 unit decrease in loan growth. Deposit growth has a positive significant impact on the growth of bank lending, which implies that a percentage increase in deposit growth will lead to 0.492463 unit increase in the loan growth. Liquidity ratio has a negative significant impact on growth of bank lending, which implies that a ratio increase in liquidity will lead to 0.003061 unit decrease in the growth of bank lending. Money supply has a positive significant impact on the growth of bank lending, which implies that a unit increase in money supply will lead to 0.015262 unit increase in the growth of bank lending.

5.6 Discussion of findings

The empirical results depicts that there is a long-run relationship between the growth of bank lending, lending rate, deposit growth, foreign exchange rate, GDP growth rate, liquidity ratio, and money supply in Nigeria. The short run results revealed that the lending rate has an inverse and significant impact on the growth of bank lending, which means one (1) percent increase in the lending rate will reduce the loan growth by 1.5 percent. This result is in line with the economic theory and work of Onaolapo and Habeeb (2017) but contrary to the work of Olokoyo (2011); Jegede (2014); Eke *et al*. (2015). Liquidity ratio has a negative significant impact on the growth of bank lending, which implies that a ratio increase in liquidity ratio will lead to 0.003061 unit decrease in bank loan growth. This implies that a ratio increase in liquidity ratio of banks will decrease the commercial bank ability to extend credit to their customers. Increasing liquidity could lead to a decrease in the banks profit because the interest income of a bank is generated from bank loan and advances. Money supply has a positive significant impact

on growth of bank lending. This simply implies that a unit increase in money supply will increase the growth in bank loan by 1.5%. This could be as a result of an expansionary policy embarked on by the monetary authority. This result is contrary with the work of Jegede (2014) but in line with economic theory.

6. Conclusion

The study examined the impact of the lending rate on bank lending in Nigeria for the period from 1981 to 2018. Previous studies in Nigeria employed various methodological techniques while this study employed the ARDL as dictated by the stationarity level of the data. The short-run results revealed that the lending rate and liquidity ratio have a significant negative effect on loan growth, which implies that the lending rate and liquidity ratio are inversely related to the growth of bank lending in Nigeria. Deposit growth and money supply both have a positive significant impact on loan growth in Nigeria.

It is therefore important that the short-run policy on the lending rate should be geared toward the expansion of economic activities by reducing the lending rate charged by banks on the borrowers. The liquidity ratio depicts a negative insignificant impact on the growth of bank lending, which implies that the higher the liquidity ratio, the lower the lending ability of a bank. Large liquidity ratio helps a bank to meet its short-term obligations. Contrarily, a larger liquidity ratio affects the lending ability of a bank negatively. The monetary authority should also encourage banks to attract more deposit as this has a significant impact on the credit ability of the banks in Nigeria. Money supply has a positive significant impact on the growth of bank lending, which means that the more money in circulation, the more a bank will be able to extend credit to the borrowers. The study recommends that the CBN carry out a periodic review of lending rate, liquidity ratio of the banks in the economy as these ratios have significant impact on the lending in the Nigeria. Monetary authority should also manage the lending rate properly for it to be attractive and affordable for investors to invest and easy for the deficit unit to borrow money from the bank. The findings of this study will be useful for the monetary authority, banks, investors, customers shareholders and other stakeholders. The limitation of this study lies in the fact that it is a single country study. Hence, future researchers might examine the impact of lending rate on commercial bank lending by using cross country data in order to ascertain whether these variables will generate the same or a contradicting result.

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