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Analysis of Monetary Policy and Bank Lending Nexus in Nigeria

Gbenga Festus BABARINDE ^{1*} & Matthew Oladapo GIDIGBI ²

¹Department of Banking and Finance, Faculty of Social and Management Sciences, Modibbo Adama University, Nigeria

²Department of Economics, Faculty of Social and Management Sciences, Modibbo Adama University, Nigeria

ABSTRACT

In this study, we examined monetary policy nexus with lending behaviour of deposit money banks in Nigeria between 1987 and 2020 using ARDL method. This study empirically established that monetary policy rate has a negative and significant impact on bank lending in Nigeria in both short and long runs in the covered period. Both the liquidity ratio and inflation rate have significant positive impact in the long-run and negative in the short-run in Nigeria. The lending rate exerts a positive and significant impact on bank lending in Nigeria. Monetary policy rate Granger-caused liquidity ratio but not vice versa. Similarly, liquidity ratio Granger-caused loan to deposit ratio but not vice versa. Furthermore, there is a unidirectional causality flow from monetary policy rate to the inflation rate. Inflation rate and lending rate Granger-cause each other. This study, therefore, posits that monetary policy is a significant predictor of bank lending in Nigeria such that the tighter the policy, the lower the lending ability of deposit money banks and vice versa, the cheaper the monetary policy, the higher the lending ability of deposit money banks in Nigeria.

Keywords: Bank lending, monetary policy, lending rate, deposit money banks, liquidity ratio

*Corresponding liftedfgb@gmail.com

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1. Introduction

Lending is the crops of activities and processes involved in the extension of credit facilities like overdraft, short term, medium-term, long-term loans and advances to borrowers by financial institutions. The sum of money lent by a bank to a borrower who agrees to pay back with interest at a future date is termed credit (Jegede, 2014). This function of lending has been adjudged to be one of the most essential services rendered by the bank to its customers (Yunusa et al., 2020). Through lending, capital needed for business, investment, and trade are made available to individuals, firms and the public sector, that is, mobilization of financial resources from the surplus unit and reallocation to the deficit unit, where the resources could earn a better return compared to utility of holding among alternative uses that may be present. Monetary policy as administered by the government's agent usually referred as the apex bank in a country, is one of the main factors that influences availability of credit from the Deposit Money Banks (DMBs). This policy is a deliberate action of the monetary authority to regulate the amount, cost and availability of credit in the economy. Monetary policy (Uruakpa, 2019) relates to the supply of money and credit allocation, which is controlled via

tools factors such as interest rates, reserve requirements; exchange rate, discount window, quantitative easing, open market operations and signaling, and cash reserve requirements for banks by the Central Bank of Nigeria (CBN) to achieve certain ends like economic growth, prevention of inflation, exchange rates stability and reduction in unemployment. Promotion and maintenance of monetary stability and a sound and efficient financial system in Nigeria is one of the four key functions of the CBN as provided by the Central Bank Act 2007 as amended (Central Bank of Nigeria Act, 2007). This suggests that it is the CBN that has the authority to ensure proper monetary policy formulation. The implementation of this policy, however, is mostly via the DMBs in the country.

Monetary policy being a major economic stabilization weapon involves measures taken by the Central Bank to regulate and control the volume, cost, availability and direction of money and credit in an economy to achieve some specified macroeconomic policy objectives like full employment, domestic price stability, adequate economic growth and external sector stability (Jegade, 2014). Monetary policy measures could be direct or indirect. In Nigeria, the direct control measures had included ceilings on domestic credit expansion, ceilings on interest rates, selective credit policies, exchange rate policy, liquidity ratios, supplementary reserve requirements and special deposits maintained by the banks (Enahoro et al., 2013). The indirect approach entails the use of market-based instruments to regulate the volume, cost, availability and direction of money and credit in the country. Meanwhile, Open Market Operations (OMO) is the key tool under this approach.

According to Agbonkhese and Azekome (2013), there were two major phases in the conduct of monetary policy in Nigeria, namely the pre-Structural Adjustment Programme (SAP) in 1986, and the period since the introduction of SAP. They affirmed that the apex bank emphasized direct monetary policy control in the pre-SAP era but thereafter, the focus in monetary policy framework shifted to indirect tools when entails the use of market instruments in monetary management with the dominance of OMO was the principal instrument of liquidity management (Agbonkhese & Azekome, 2013; Omorokunwa & Adegboye, 2011). This era is parallel to the inception of Apex Bank's inflationary target monetary policy approach. A widespread wave of new dynamic in the monetary policy target.

Research Problem

Bank lending (credit) has been instrumented to growth in most economies of the world (Akpansung & Babalola, 2012; Mamman, & Hashim, 2014; Sayedi & Ringim, 2019). However, lending activities of banks are bisected by several challenges, a case in point being the unpredictable influence of government policy, particularly, monetary policy of the government. Another problem observed by Uruakpa (2019) is the poor credit creation of banks. This challenge involves the abandonment of the core function of lending by banks for other non-traditional functions of banking in a bid to boost the bottom-line of the institution.

Furthermore, monetary policy rate has been remained double digit in Nigeria. This tends to have effect on the credit made available by the banking sector. Although, there have been considerable number of empirics on the effect of monetary policy on bank lending, but there is yet to be a consensus on the magnitude and direction of impact of monetary policy on bank lending. The empirical findings of previous studies towed three lines of thoughts, namely significant positive, significant negative and non-significant impact of monetary policy on bank lending. Specifically, the impact of monetary policy on bank lending/performance in Nigeria has been researched upon by some researchers with each scholar having different results whereby some researchers found non-significant impact of monetary policy rate (Ademokoya et al (2020), Chukwu and Ogbonnaya-Udo (2020)); negative significant impact of monetary policy rate (Abuka et al (2019)); and some other authors (like Abere et al (2020) and Demehin (2021)) found a positive significant impact monetary policy rate on bank lending/performance. Although, the credit channel is one of the major transmission mechanisms of monetary policy through the instrumentality of the banking system (Agbonkhese & Azekome, 2013). However, the extent of this validity/veracity of this assertion in Nigeria has not attained empirical consensus.

The question remains whether or not monetary policy significantly affect bank loans. Abuka et al. (2019) observed that extant studies have shown a weak or non-existent traditional bank lending channel, but is confronted with data and methodological challenges. In other words, there is widespread agreement that banks play a key part in the transmission of monetary policy actions to the economy, but there still exists a level of reservation over the precise role that banks play (Omorokunwa & Adegboye, 2011).

Research Questions

This study is guided by the following research questions:

- i. Does monetary policy rate have significant impact on the loan-to-deposit ratio of deposit money banks in Nigeria?
- ii. Is liquidity ratio significantly impactful on the loan-to-deposit ratio of deposit money banks in Nigeria?
- iii. What is the impact of lending rate on the loan-to-deposit ratio of deposit money banks in Nigeria?

Objectives of the Study

This study is set out to evaluate the impact of monetary policy on bank lending in Nigeria and to specifically:

- i. evaluate the impact of the monetary policy rate on bank lending in Nigeria with a particular reference to the DMBs in the economy.
- ii. examine the impact of liquidity ratio on bank lending in Nigeria with a particular reference to the DMBs in the economy.
- iii. assess the impact of lending rate on bank lending in Nigeria with a particular reference to the DMBs in the economy.

This study focuses on the deposit money banks in the Nigerian financial system. This is because these banks constitute the conduit pipe for the implementation of the CBN monetary policy and it is also the largest in the nation's banking industry. The period of study, 1987 to 2020 is chosen to narrow the study only to the behaviour of lending operations of banks in reaction to the monetary policy in the post-SAP era. Although 1986 is the birth year of the SAP, a one-year gap was allowed to realistically assess the extent to which full-fledged implementation of monetary policy on lending operations of deposit money banks in Nigeria.

2. Literature Review

2.1 Conceptual Review

Monetary policy is any measure taken by the government to control the amount of money in circulation and the cost of credit (Agbonkhese & Azekome, 2013). Monetary policy has been described as the use of different instruments to control the cost and availability of money in the economy to affect the level of economic activities and growth (Demehin, 2021). Monetary policy instruments could be classified into two, direct (otherwise called quantitative) instruments which include tools like reserve requirement, special deposits; direct control, and prudential guidelines. On the other hand, the indirect or qualitative instruments include the tools like lending by a central bank, open market operations, interest rate, exchange rate, rediscount rate, and cash reserve requirements.

The cash reserve ratio is the proportion of total deposit liabilities (demand, savings and time deposits) which banks are mandated to keep as deposits with the CBN. The liquidity ratio is the quotient of banks' liquid assets to total deposit liabilities. Chukwu and Ogbonnaya-Udo (2020) describe monetary policy rate which was christened minimum rediscount rate in 2006, as the fee which the Central Bank charges financial operators for rediscounting first-class bills of exchange before the maturity date. Monetary policy (Demehin, 2021) could be either expansionary or contractionary. An expansionary policy connotes decreases in the monetary policy rate and cash reserve ratio which are expected to lead to a fall in the lending rates, while a contractionary policy does the exact opposite of expansionary policy.

Bank Lending Channel of Monetary Policy Transmission

The transmission mechanism of monetary policy is the different channels through which monetary policy influences changes in the nominal money stock or the short-term nominal rate of interest that affects prices and output in the economy (CBN, 2011). The transmission mechanism infers how a change in the money supply is channelled through particular models to influence real and nominal variables (Agbonkhese & Azekome, 2013). In other words, monetary policy transmission mechanism refers to the routes through which monetary impulses are communicated to the real sector of the economy (Jegede, 2014). These channels according to Ebire and Ogunyinka (2018) include aggregate money supply, monetary base, interest rate channel, exchange rate channel, asset price channel and credit channel (which includes bank lending channel and balance sheet channel).

According to Agbonkhese and Azekome (2013), the bank lending channel as part of the credit view of monetary policy mechanism is based on the fact that monetary policy works by affecting bank assets (supply of loans) as well as banks' liabilities (supply of deposits). Furthermore, an expansionary monetary policy that increases bank reserves and bank deposits increase the number of bank loans available. Where many borrowers are dependent on bank loans to finance their activities, this increase in bank loans will cause a rise in investment (and also consumer) spending, leading ultimately to an increase in aggregate output (Agbonkhese & Azekome, 2013).

The bank lending channel assumes restrictive monetary policy to reduce the liquidity of the entire commercial banking system or to make the procurement of liquidity associated with lending costlier (Agbonkhese & Azekome, 2013). This channel according to Ebire and Ogunyinka (2018) is based on the notion that banks are the dominant source of intermediate credit in most countries that specialize in overcoming informational problems and other frictions in credit markets. When the supply of bank loans is disrupted, bank-dependent borrowers may not be cut off from credit, but they are certain to incur the costs associated with finding a new lender, establishing a credit relationship etc. Hence, a decrease in the supply of bank credit, relative to other forms of credit, is likely to increase the external finance premium and reduce real activity (Ebire & Ogunyinka, 2018).

An earlier proponent of the bank lending channel is the seminal work of Bernanke and Blinder (1988), the study ignores the perfect substitutability assumption of the money view and develops a three-asset view in recognition of bank loans as a separate asset: money, bonds, and intermediated loans. Bernanke and Blinder (1988) highlight that three essential conditions must prevail to ensure the existence of a distinct bank lending channel of monetary policy transmission: open-market bonds and intermediated loans must not be perfect substitutes; monetary authorities should be able to influence the supply of intermediated loans by altering the number of reserves in the banking system; and there must be imperfect price adjustment that prevents the neutrality of any monetary policy shock (Oyebowale, 2020). Omorokunwa and Adegboye (2011) describe the lending channel otherwise called the 'bank channel, as a situation where some of the total borrowings in the financial markets occurs in the form of loans by banks to firms and individual customers. A lending channel of monetary policy transmission is based on the existence of three financial assets - money, publicly issued bonds and intermediated 'loans'. In this nexus, the banking sector can now be special in two relevant ways: in addition to creating money, it makes loans which, unlike buying bonds, the household sector cannot do. In this three- assets world, monetary policy can work not only through its impact on the bond market rate of interest but also through the independent impact on the supply of intermediated loans (Omorokunwa & Adegboye, 2011).

2.2 Theoretical Review

Monetarist School of Thought

According to Friedman and Schwartz (1963), an expansive open market operation by the Central Bank,

increases the stock of money, which also leads to an increase in commercial bank reserves and the ability to create credit and hence increase the money supply through the multiplier effect. Thereby, the monetarist postulates that change in the money supply leads directly to a change in the real magnitude of money (Uruakpa, 2019). Describing this transmission mechanism, the bank and non-bank organizations purchase securities -with characteristics of the type sold by the Central Bank- to reduce the quantity of money in their portfolios, thus stimulating activities in the real sector. (Uruakpa, 2019). The Monetarist Economist recognize that money is not just a close surrogate for a small class of financial assets but rather a substitute for a large spectrum of the financial and real asset (Chukwu & Ogbonnaya-Udo, 2020).

Keynesian Schools of Thought

The Keynesians posit that change in money stock facilitates activities in the financial market affecting interest rate, investment, output and employment (Keynes, 1930, p.90). Modigliani (1963) supports this view but introduced the concept of capital rationing and said the willingness of banks to lend affects monetary policy transmission. In their analysis of the use of bank and non-bank funds in response to tight monetary policy (Uruakpa, 2019).

Monetary theory provides insight into achieving optimal monetary policy. Monetary policy rests on the relationship between the rates of interest in an economy, that is the price at which money can be borrowed and the total supply of money. Monetary policy uses a variety of tools for economic growth, inflation, exchange rates with other currencies and unemployment. (Enahoro et al., 2013). The Keynesian theory of money and prices (1930); which viewed monetary policy instruments as a reward for parting with liquidity (money). This provides interest rate as a determinant of demand and supply of money, hence, the theory indicated that money supply is usually determined by the monetary authority which is the central bank; while, the demand for money is a function of income and interest rate. The theory further explains that transactional and precautionary motives of liquidity preference depend on income, whereas, speculative motive depends on the interest rate. Thus, the Keynesian theory implies that a low interest rate as a component of cost administered is detrimental to increasing savings; and, hence investment demand (Nadabai & Eze, 2019).

The Modigliani-Miller Bank Lending Channel Theorem

According to Modigliani-Miller, (1958) monetary policy has a direct impact on the supply of bank loans and advances. He states that in financing loans, these financial intermediaries also shoulder reserve requirements. For instance, where contractionary monetary policy control is being operated like in Nigeria, the Central Bank reduces the intake of reserve deposits by banks. This reduction in reserve liabilities inversely affects bank lending. For a bank lending channel to be operative, the market for non-reserve bank liabilities must be frictionless so that banks can access profitable lending opportunities. The lending channel of banks has nothing to do with banks capital regulation or level of banks capital except in instances where a binding capital requirement exists. In this case, monetary authority's placement of policies like minimum or maximum level of capital for financial intermediaries will affect bank lending. This is because a change in a bank's capital level will have a strong effect on its lending abilities. Therefore, the bank lending channel thesis by Modigliani-Miller hinges its existence on the availability of liquidity constraints in the banking system. This simply means that in the event a bank suffers cash insufficiency, illiquidity of assets or is unable to gain entrance to a frictionless market for managed liability, the need for a bank lending channel will arise. The theorem further states that monetary policy actions can affect the profitability of a bank as a result of the fluctuations in open market interest rates (Omankhanlen et al., 2015).

2.3 Empirical Review

Bangura et al (2021) investigated whether banks' loan supply during monetary policy shocks depends on different banks characteristics, namely size, liquidity, capitalization and ownership structure. It also examines

the extent to which bank-level characteristics-size, liquidity and capital-affect the effectiveness of the monetary policy. This is done by utilizing a dynamic panel data method namely generalized method of moments (GMM) procedure, employing quarterly bank-level data of 11 licensed commercial banks in Sierra Leone spanning the period 2014-2018. Findings reveal that monetary policy rates significantly and negatively influence banks' loan supply. This lends support for the existence of the bank lending channel of monetary policy transmission in Sierra Leone and that banks do play a role in Sierra Leone's monetary transmission mechanism. Commercial banks' loan supply in Sierra Leone is also explained by past loan supply, economic activity (Real GDP), inflation and the interaction term between bank size and monetary policy rate.

Demehin (2021) examined the effect of monetary policy on deposit money banks' lending rates in Nigeria, 1987-2018 within the ARDL model framework. The monetary management variables used are lending rate, monetary policy rate, cash reserve ratio, and money supply. The study shows that money supply had a positive and insignificant effects on lending rates in the short-run but a negative and significant effects in the long run. Cash reserve ratios exerted positive and significant effects in the short run and negative and insignificant in the long run. Monetary policy rates influence was positive and significant both in the short run and long run. It was concluded that, with monetary policy rates showing the potency to influence the direction of lending rates, monetary policies would go a long way in producing monetary management capable of generating increased growth with stability in Nigeria.

Using OLS regression, Abere et al (2020)'s investigation of the effect of monetary policy on allocation of loans and advances to small and medium scale enterprises in Nigeria from the period of 1992 to 2017 confirms that monetary policy rate and exchange rate were found to be positively related with commercial bank loans and advances to small and medium scale enterprises (SMEs). However, money supply, liquidity ratio and inflation rate were found to negatively affect commercial banks loans and advances to SMEs in Nigeria in the study period. In another study, Omankhanlen et al (2015) examined the effects of monetary policy on loan risk exposure in Nigeria's commercial banks. From the VECM analysis, the study indicates that lending rate does not play a significant role in support of loans and advances but banks liquidity has a significant positive relationship with their level of risk exposure. However, the monetary policy rate exerts the most significant effect on commercial banks loans and advance in Nigeria.

Ademokoya et al (2020) evaluated the impact of the monetary policy rate, money supply, liquidity ratio, and change in maximum lending rate on bank credit in Nigeria based on monthly time series data from 2007-2019. From the fully modified ordinary least square regression, the study reveals that money supply has a positive and significant effect on bank credit in Nigeria, unlike liquidity ratio which has a negative and significant effect on bank credit in Nigeria. Further empirical evidence from the study indicates that monetary policy rate and maximum lending rate do not exert a significant effect on bank credit in the case of Nigeria.

From 1988-2018, Chukwu and Ogbonnaya-Udo (2020) are VECM and Pairwise Granger causality analysis of the effect of monetary policy on financial intermediation in Nigeria (total domestic bank credit). The variables examined in the study include monetary policy rate, cash reserve ratio, loan to deposit ratio and liquidity ratio. The study found among others that monetary policy has an insignificant effect on intermediation in Nigeria with a unidirectional causality between monetary policy and intermediation. The results suggest that in the long run, monetary policy rate, loan to deposit ratio and liquidity ratio have a positive and significant effects on intermediation in Nigeria. In the short run, the study confirms that monetary policy rate and loan to deposit ratio exerts a positive and insignificant effects on total domestic bank credit in Nigeria. Furthermore, in the short run, the liquidity ratio is positive and statistically significant to total domestic bank credit in Nigeria. Also, cash reserve ratio has a negative and significant effect on total domestic bank credit in Nigeria in the short run.

Oyebowale (2020) analysed the impact of growth in loan-to-deposit ratio, growth in inflation, growth in broad money, and growth in bank capital on growth in bank lending from 1961 to 2016. ARDL and granger confirm that growth in broad money Granger causes growth in bank lending. Also, this study shows that growth in bank lending Granger-causes growth in loan-to-deposit ratio and growth in inflation in Nigeria. Thus, this paper argues that commercial banks in Nigeria exhibit stern concern for their liquidity and capital adequacy positions while acting as financial intermediaries. This study reveals that growth in loan-to-deposit ratio, growth in inflation, and growth in broad money are determinants of bank lending in Nigeria. However, growth in bank capital is not a determinant of bank lending in Nigeria.

Yunusa et al (2020) examined monetary policy and lending in Nigeria between 1980-2018, based on the ARDL model. The study shows that inflation rate and interest rate have a significant negative effect on loans and advances; the exchange rate has a positive significant effect on loans and advances while liquidity ratio and money supply have a negative insignificant effect on loans and advances. More so, the Granger causality test further revealed that the inflation rate does cause the lending rate in Nigeria while the interest rate doesn't cause the inflation rate in Nigeria.

Abuka et al., (2019) investigated the bank lending channel of monetary policy in Uganda from 2010 to 2014 using a linear probability model based entirely on microdata from a credit register. The study employed the loan-level data with bank balance sheet variables and macroeconomic time series. The study confirms that a monetary contraction reduces bank credit supply—increasing loan application rejections and tightening loan volume and rates—especially for banks with more leverage and sovereign debt exposure. The result is a strong bank lending channel of monetary policy and better-capitalized banks transmit changes in monetary policy significantly less than lower-capitalized banks. The study confirms that a tightening of monetary policy reduces the supply of bank credit to firms and dampens economic activity.

Uruakpa (2019) evaluated the impact of monetary policy (monetary policy rate, cash reserve ratio, money supply and liquidity ratio) on credit to the private sector by deposit money banks in Nigeria from 1986-2015. From the OLS regression analysis, and granger causality test, the study found that cash reserve ratio and money supply have a positive and significant relationships with credit to the private sector. Furthermore, the study found that liquidity ratio has a negative and insignificant relationship with credit to the private sector while monetary policy rate has a positive and insignificant relationship with credit to the private sector with a unidirectional causality running from credit to the private sector to cash reserve ratio and money supply while there is no causality relationship between credit to the private sector, liquidity ratio and monetary policy rate. The study argues therefore that the strength of monetary policy lies in the combination of the various instruments and not a single instrument.

Ebire and Ogunyinka (2018) investigated the existence of a bank lending channel in monetary policy transmission in Nigeria from 2002:1 to 2017:1. VECM analysis carried out by the study reveals that loan supply was significant and positively associated with borrowing rate but negatively significant with lending rate equation which supports the existence of a lending channel for monetary transmission process.

Omorokunwa and Adegboye (2011) examined the role of bank lending in the transmission of monetary policy in Nigeria from 1980 to 2009 in line with ARDL and error correction techniques. The study finds a significant response of bank lending to monetary policy, especially in the short run. The pattern of loan to deposits ratio of banks significantly changes with shifts in the monetary policy rate. Thus, the lending channel is shown to be operational in Nigeria, the policy effects on banks following a distributed lags pattern. It is also shown that banks in Nigeria take a long-run perspective of monetary policy effect in modifying their lending behaviour. However, larger bank assets seem to mitigate the response of banks' lending to monetary policy changes.

Udoka et al (2015) in their examination of the relationship between interest rate and bank loans in Nigeria from 1981 to 2013. The OLS regression indicates that an increase in monetary policy rate reduces the capacity of banks to lend; while the lending rate had a positive and significant relationship with the bank loans and advances in Nigeria. The study also shows that deposit rates and treasury bill rates have a negative but significant relationship with bank loans and advances. It was also argued that an increase in monetary policy rate does not deter bank loans and advances but it only reduces the capacity of banks to lend to the public. Ndughu et al (2015) applied OLS and Granger causality techniques to investigate the impact of monetary policy on the performance of deposit money banks in Nigeria from 1993 to 2013. Out of the monetary policy variables examined (bank deposit rate, bank lending rate, cash reserve ratio and liquidity ratio) in the study, only bank deposit rate has a significant relationship though inverse relationship.

Jegede (2014) applied the Vector Error Correction Mechanism of Ordinary Least Square econometric technique to determine the effect of monetary policy on commercial bank lending in Nigeria between 1988 and 2008. Variables considered in the study are exchange rate, interest rate, liquidity ratio, money supply, and commercial bank loan and advances. The study shows that exchange rate and interest rate significantly influenced commercial banks' lending, while liquidity ratio and money supply exert a negative effect on commercial banks' loans and advances. The major conclusion drawn in the study is 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 the cash reserve ratio.

In another study Enahoro et al., (2013) assessed statutory functions of financial institutions as affected by fiscal and monetary policies in Nigeria based on a survey approach, the authors applied ANOVA to the study and established that fiscal and monetary policies had enhanced operational efficiency in the Nigerian financial institutions, by reducing financial indiscipline in the financial and fiscal systems.

Agbonkhese and Azekome (2013) investigated the impact of monetary policy on bank credit creation in Nigeria, 1980-2010. They employed OLS and found that there was 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.

From the review of empirical literature, it is discovered that there still exist divergent findings on the effect of monetary policy on bank lending, ranging from positive effect (Abere et al (2020), Demehin (2021)); negative effect (Abuka et al., (2019), Ndughu et al (2015)); and non-significant effect (Ademokoya et al (2020), Chukwu and Ogonnaya-Udo (2020)) of the former on the latter. This current study contributes to the debate of monetary policy nexus with bank lending in a developing country like Nigeria by showing that monetary policy rate has short and long-runs negative and significant impact on bank lending in Nigeria unlike liquidity ratio which exerts significant positive impact in the long-run and negative in the short-run in Nigeria. The study also provides that lending rate exerts a positive and significant impact on bank lending in Nigeria for period 1987 to 2020. Methodologically speaking, this study addition to providing both short-run and long-run estimates of the link between monetary policy and bank lending in Nigeria using ARDL technique; also determined the direction of causality between the variables of interest using granger causality technique. Furthermore, while the latest past studies on the subject provided empirical evidence up to year 2019 (Ademokoya et al (2020)); this current study extends the study duration to 2020 being the relatively latest empirical evidence on the study matter due to availability of dataset. Therefore, this current study provides a much more up-to-date evidence on the subject of monetary policy influence bank lending in a developing country like Nigeria.

3. Research Methods

3.1 Data and Research Design

This study aims to assess the effect of monetary policy (monetary policy rate, liquidity ratio, and lending rate) on bank lending in Nigeria for the period of 1987 through 2020. The period of choice is the Structural Adjustment Programme (SAP) of 1986 to the currently available time data. However, to allow for the full effect of a year of the SAP policy, this study begins from 1987 and ends in 2020, making total annual observations of 34 years. Ex-post facto research design constitutes the adopted research design for this study whereby past data on an annualized basis were obtained from documentary evidence from the Central Bank of Nigeria [CBN] Statistical Bulletin, 2020 and World Development Indicators. Furthermore, variables of interest were listed in Table 1, with their descriptions.

Table 1. Description of Variables of Study

Variables/ Notation	Operationalization	Justification
Bank Lending (LTDR)	Loan to deposit ratio; the ratio of total loans to the total deposit liabilities of deposit money banks in Nigeria (Per Cent). This represents the dependent variable	Chukwu and Ogbonnaya-Udo (2020), Omorokunwa and Adegboye (2011)
Monetary policy (MPR)	Monetary policy rate as given by the Central Bank of Nigeria (Per Cent). This represents the independent variable.	Abere et al (2020), Ademokoya et al (2020), Chukwu and Ogbonnaya-Udo (2020), Demehin (2021), Omorokunwa and Adegboye (2011), Uruakpa (2019), Yunusa et al (2020)
Liquidity ratio (LQDR)	Liquidity is the ability of the bank to meet up with its financial obligations to the customers. Statutory actual liquidity ratio (Per Cent). This represents the independent variable.	Abere et al (2020), Ademokoya et al (2020), Omankhanlen et al (2015), Ndughu et al (2015), Uruakpa (2019), Yunusa (2020).
Lending rate (LDR)	Interest rate is the proportion of the principal, which compensated the owner of funds for time and risk taken (Yunusa, 2020). The maximum interest rate on lending by deposit money banks in Nigeria. Maximum weighted average lending rates of deposit money banks (per cent). This represents the independent variable.	Abere et al (2020), Abuka et al (2019), Ademokoya et al (2020), Demehin (2021), Ndughu et al (2015), Omorokunwa and Adegboye (2011), Yunusa (2020).
Inflation (INFR)	Inflation is the persistent increase in the general price level in an economy. Consumer price index, percentage annual changes (Per Cent). This represents a control variable.	Abere et al (2020), Abuka et al (2019), Bangura et al (2021), Oyebowale (2020), Yunusa et al (2020).

Source: Authors' compilation from literature review (2021)

Estimation Techniques

The Pesaran et al., (2001)'s Autoregressive Distributed Lag (ARDL) Model and Pairwise Granger Causality techniques were applied to the secondary data after the necessary pre-estimation diagnostic tests.

The pre-estimation diagnostic tests include descriptive statistical test, correlation test, unit root test and cointegration test. Descriptive statistical test provides tips as to the statistical behavior of the variables of study particularly on the average, standard deviation, degree of peakedness or otherwise, nature of asymmetry, normality of the series, among others. Correlation test based on Pearson test was also applied to the time series to ascertain the nature of relationship between variables of interest (that is, monetary policy and bank lending in Nigeria).

Time series are assumed to be stationary but this assumption may not always stand. Stationarity is key in time series econometrics. A stationary time series data is a series whose mean, variance and auto covariance at various lags remain unchanged irrespective of the point of measurement. Woodridge (2009) describes a stationary time series process as that whose probability distribution are stable over time. According to Gujarati (2004), a variable is said to be stationary if its mean, covariance, and variance do not vary systematically over time. ARDL technique requires that none of the variables is integrated of order greater than one, hence the need for unit testing for determining the integration order of the variables. Furthermore, to avoid spurious regression results and also as a key test that should precede Granger causality test (Gujarati & Porter, 2009), this study applied the Augmented Dickey-Fuller (ADF) test in evaluating the stationarity property of each of the variables of study.

Augmented Dickey-Fuller (ADF) test equation is generally stated as in equation (1) thus:

$$\Delta y_t = \alpha_t + \phi y_{t-1} + \sum_{i=1}^n \beta_i \Delta y_{t-i} + \epsilon_t \quad (1)$$

The null (H_0) and alternative (H_1) hypotheses of the ADF unit root test are stated thus:

$H_0: \phi = 0$ non – stationary, that is, there is unit root

$H_1: \phi < 0$ stationary, that is, there is no unit root

Where y in the equation represent each of the variables in the specified model, ϵ is the error term, ϕ is the stationarity coefficient; α_t and β_i are the parameters to be estimated.

The test of stationarity employed is the Augmented Dickey-Fuller (ADF) unit root test based on the null hypothesis of the presence of unit root. The hypothesis of the ADF test is rejected when the probability value (p-value) is less than 10 per cent significance level threshold at maximum and hence the conclusion that the said variable does not contain unit root but stationary. However, when the p-value of the ADF test exceeds the stated maximum threshold of 10 per cent significance level, the null hypothesis of the presence of unit root is not rejected and hence the conclusion that the said variable is said to contain unit root or non-stationary.

Following after stationary testing is the test of cointegration among variables of study. Cointegration means that despite being individually non-stationary, a linear combination of two or more time series can be stationary and as such cointegration of two or more time series suggests that there is a long-run or equilibrium relationship between them (Gujarati, 2004). In other words, cointegrating variables are said to have long run equilibrium relationship, meaning they will not drift apart if there is disturbance (Ashraf, 2021). Therefore, the cointegration test was performed using the F-Bounds test of cointegration considered suitable for the I (1) and I (0) times series. The decision rule of the F-Bounds test is summarized in Table 2.

Table 2. The Decision Rule of the F-Bounds Test

Basis	Decision Rule	Remarks
F < I (0)	Do not reject the null hypothesis of no levels relationship between the variables	There is no cointegration between the variables, estimate only short-run model
F > I (1)	Reject the null hypothesis of no levels relationship between the variables of the study	There is cointegration between the variables, estimate long run as well as short-run model
F lies between I (0) and I (1)		Inclusive

Source: Pesaran *et al.*, (2001).

In this study, bank lending is expressed as a function of monetary policy variables (monetary policy rate, liquidity ratio and lending rate) as well as a control variable (inflation) to account for the effect of macroeconomic (in)stability.

After cointegration test, the Autoregressive Distributed Lag (ARDL) model was estimated. ARDL is a standard least squares regression that include lags of both the dependent variable and explanatory variables as regressors (Greene, 2008). While ARDL provides both long-run and short-run estimates that helps to determine the effect of explanatory variables on the dependent variable, the techniques however fail to provides the direction of impact or causality between variables of interest. Thus, in order to ascertain the direction of impact, Granger (1969) proposed a causality technique.

Granger causality test relates to how a time series can predict the variability in another time series (Granger, 1969). The technique is premised on the assumption that past and present information determines the future better; such that variable y causes variable x if past values of y and x predict x better rather than previous values of x alone, and vice versa (Kiminyei, 2018). Three types of causalities have been identified in literature, namely, unidirectional causality (one-way causality), bi-directional causality (two-way causality or feedback causality), and zero causality (Gujarati & Porter, 2009; Babarinde, 2022). For instance, if there is a causality running from monetary policy to bank lending, then the past values of monetary policy predict the present value of bank lending. Thus, if monetary policy granger-cause bank lending or bank lending granger-cause monetary policy, then there is a unidirectional causality in each case. A bi-directional causality is said to exist, if monetary policy granger-cause bank lending and simultaneously, bank lending granger cause monetary policy. Thirdly, a case of zero causality or independence exists, when there is no causality (whether unidirectional or bi-directional) between monetary policy and bank lending.

Models Specification

Mathematically, the relationship among these variables is expressed in equation (1) below:

$$LTDR = f(MPR, LQDR, LDR, INFR) \quad (1)$$

The ARDL equation for the model in equation (2) is specified thus:

$$\begin{aligned} \Delta LTDR_t = & \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta LTDR_{t-i} + \sum_{i=0}^q \beta_{2i} \Delta MPR_{t-i} + \sum_{i=0}^r \beta_{3i} \Delta LQDR_{t-i} + \sum_{i=0}^s \beta_{4i} \Delta LDR_{t-i} + \sum_{i=0}^w \beta_{5i} \Delta INFR_{t-i} \\ & + \alpha_1 LTDR_{t-1} + \alpha_2 MPR_{t-1} + \alpha_3 LQDR_{t-1} + \alpha_4 LDR_{t-1} + \alpha_5 INFR_{t-1} \\ & + e_t \end{aligned} \quad (2)$$

Furthermore, the Granger causality test equations for this study are specified in equations (3) to (8):

$$\begin{aligned} LTDR_t = & \sum_{i=1}^n \beta_{1i} LTDR_{t-i} + \sum_{j=1}^n \beta_{2j} MPR_{t-j} + \sum_{k=1}^n \beta_{3k} LQDR_{t-k} + \sum_{l=0}^n \beta_{4l} LDR_{t-l} + \sum_{m=0}^n \beta_{5m} INFR_{t-m} \\ & + U_{1t} \end{aligned} \quad (3)$$

$$\begin{aligned} MPR_t = & \sum_{i=1}^n \alpha_{1i} LTDR_{t-i} + \sum_{j=1}^n \alpha_{2j} MPR_{t-j} + \sum_{k=1}^n \alpha_{3k} LQDR_{t-k} + \sum_{l=0}^n \alpha_{4l} LDR_{t-l} + \sum_{m=0}^n \alpha_{5m} INFR_{t-m} \\ & + U_{2t} \end{aligned} \quad (4)$$

$$\begin{aligned} LQDR_t = & \sum_{i=1}^n \psi_{1i} LTDR_{t-i} + \sum_{j=1}^n \psi_{2j} MPR_{t-j} + \sum_{k=1}^n \psi_{3k} LQDR_{t-k} + \sum_{l=0}^n \psi_{4l} LDR_{t-l} + \sum_{m=0}^n \psi_{5m} INFR_{t-m} \\ & + U_{3t} \end{aligned} \quad (5)$$

$$LDR_t = \sum_{i=1}^n \gamma_{1i} LTDR_{t-i} + \sum_{j=1}^n \gamma_{2j} MPR_{t-j} + \sum_{k=1}^n \gamma_{3k} LQDR_{t-k} + \sum_{l=0}^n \gamma_{4l} LDR_{t-l} + \sum_{m=0}^n \gamma_{5m} INFR_{t-m} + U_{4t} \quad (6)$$

$$INFR_t = \sum_{i=1}^n \phi_{1i} LTDR_{t-i} + \sum_{j=1}^n \phi_{2j} MPR_{t-j} + \sum_{k=1}^n \phi_{3k} LQDR_{t-k} + \sum_{l=0}^n \phi_{4l} LDR_{t-l} + \sum_{m=0}^n \phi_{5m} INFR_{t-m} + U_{5t} \quad (7)$$

$$\Delta LTDR_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta LTDR_{t-i} + \sum_{i=0}^q \beta_{2i} \Delta MPR_{t-i} + \sum_{i=0}^r \beta_{3i} \Delta LQDR_{t-i} + \sum_{i=0}^s \beta_{4i} \Delta LDR_{t-i} + \sum_{i=0}^w \beta_{5i} \Delta INFR_{t-i} + U_{6t} \quad (8)$$

where it is assumed that the disturbances U_{1t} to U_{6t} are uncorrelated.

4. Results

Descriptive Statistics

A preliminary insight in the data is necessary for understanding the statistical behaviour of the data used in the study, a descriptive statistical test was performed and the results are presented in Table 3. According to the descriptive statistics presented in Table 3, the average loan-to-deposit ratio (LTDR) of deposit money banks between 1987 and 2020 was about 76 per cent while the mean values for monetary policy rate (MPR), liquidity ratio (LQDR), lending rate (LDR) and inflation rate (INFR) stood at about 14, 48, 24 and 20 per cent respectively. The all the variables of study (LTDR, MPR, LQDR, LDR and INFR) could be considered to be relatively stable around its average value since their mean exceed their standard deviation. However, except inflation rate and loan-to-deposit ratio which are not normally distributed, other variables (MPR, LQDR, and LDR) pass the normality test.

Table 3. Descriptive Statistics

	LTD	MPR	LQDR	LDR	INFR
Mean	75.9866	13.8333	47.6350	24.1809	19.9818
Maximum	283.0300	26.0000	81.4200	36.0900	72.8355
Minimum	37.5600	6.0000	26.3900	17.6000	5.3880
Std. Dev.	44.5329	3.8561	12.7261	4.4607	18.2035
Jarque-Bera	308.5328	7.5342	3.6947	2.4555	16.9259
Probability	0.0000	0.0231	0.1576	0.2929	0.0002

Source: Authors' computation (2021)

Correlation Analysis

In order to examine the relationship between monetary policy and bank lending in Nigeria, the Pearson correlation test was conducted and the results of the test are presented in form of a matrix in Table 4. In addition, having a correlation coefficient among the variables reasonably below 0.8 (80 per cent) implies less tendency of multicollinearity in the combination of variables specified in the model.

Table 4. Correlation Matrix

Probability	LTDR	MPR	LDR	INFR	LQDR
LTDR	1.0000				
MPR	-0.1594	1.0000			
LDR	0.1851	0.5122	1.0000		
INFR	-0.1184	0.3654	0.0560	1.0000	
LQDR	0.4819	0.1047	0.1338	-0.3051	1.0000

Source: Authors' computation (2021)

As presented in Table 4, the correlation coefficients of -0.1594 and -0.1184 for monetary policy rate and inflation rate respectively, it can be asserted that there is a negative, though the weak relationship between loan-to-deposit ratio, and each of inflation rate and monetary policy rate. This study also shows via the correlation analysis that the lending rate of deposit money banks and statutory liquidity ratio have a positive correlation of 0.1594 and 0.4819 respectively with a loan-to-deposit ratio of deposit money banks in Nigeria.

Furthermore, the Correlation Matrix in Table 3 indicates the Correlation coefficients among the ranges of the explanatory variables between a minimum of -0.3051 and a maximum of 0.5122. This suggests that the explanatory variables are not highly collinear and do not possess a multicollinearity problem.

Unit Root Test

The assumption of stationarity of time series data used in this study was tested using Augmented Dickey-Fuller (ADF) unit root test. This is necessary to avoid spurious regression results occasioned by the employment of non-stationary data in regression modelling. The ADF test was conducted on each variable both in level and first difference and results are summarized in Table 5.

Table 5. Augmented Dickey-Fuller Unit Root Test

Variables	ADF at Level	Remarks	ADF at first diff	Remarks	I(d)
MPR	-3.0536**	Stationary	-	-	I(0)
LQDR	-2.9395***	Stationary	-	-	I(0)
LDR	-3.1076**	Stationary	-	-	I(0)
INFR	-1.4740	Not Stationary	-4.9519*	Stationary	I(1)
LTDR	-2.5563	Not Stationary	-8.2712*	Stationary	I(1)

Source: Authors' computation (2021)

Note: *, ** and *** stationary at 1%, 5% and 10% respectively.

The results of the Augmented Dickey-Fuller Unit Root Test (Table 5) suggest that the variables are of mixed order of integration because while some variables, loan-to-deposit ratio (LTDR) and inflation rate (INFR) attain stationarity only after the first difference; other variables (monetary policy rate (MPR), liquidity ratio (LQDR), and lending rate (LDR)) are stationary in level.

Cointegration Test

Is there a long-run (cointegrating) relationship between monetary policy and bank lending in Nigeria? This question was answered by conducting a cointegration test. This study applied the F-Bounds test of cointegration as proposed by Pesaran et al. (2001) considered suitable for determining the extent of cointegration between variables that of the combination of I(0) and I(1) level of integration, such as found in this current study. Moreso, having a regressand with an induced stationary at first difference further reinforced the adoption of the analytical method used in this study.

Table 6. F-Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Sig.	I(0)	I(1)
F-statistic	5.347332	10%	2.2	3.09
K	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Authors' computation (2021)

The F-Bounds result in Table 6 suggests the existence of cointegration between monetary policy and bank lending in Nigeria. This is because the null hypothesis of no levels relationship between monetary policy and bank lending in Nigeria could be rejected because the F-statistic (5.3473) exceeds the critical values at the upper bound (I[1]) of the test at 1%, (4.37), 5% (3.49) and 10% (3.09) respectively.

Models Estimation

In line with the results of the VAR lag order selection criteria which used different model selection criteria such as sequentially modified likelihood ratio (LR) test statistic (each test at 5% level), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ). Except for SC which suggests lag length one, all other four criteria (LR, FPE, HQ, AIC) prescribe lag

length two, hence the estimation of both Autoregressive Distributed Lag (ARDL) and Granger causality test at lag length two formations.

ARDL Model Estimation

Table 7 contains the ARDL Long-Run, Short Run and Error Correction Regression Results. The ARDL long-run model results in Panel A of Table 7 shows that the monetary policy rate is negatively signed with coefficients of -5.6589 and -3.7249 at a level and lag one but it is only at a level that the variable is statistically significantly impactful on bank lending in Nigeria. The liquidity ratio, in level, lags one and two, exhibits a positive association with bank lending in Nigeria with their respective coefficient of 2.2408, 0.6089 and 1.5219. The level and lagged-two form of liquidity ratio exert a positive and significant impact on bank lending behaviour in Nigeria, which is expected.

Furthermore, the lending rate of deposit money banks is also positively signed (5.2899) with bank lending in Nigeria in the long run and the relationship is statistically significant at 5 per cent. In the long-run, the inflation rate, in level, lags one and two, has a coefficient of 1.0624, -0.43300 and 1.2149 respectively. However, it is only the lag-2 value of the inflation rate that was found to be statistically related to bank lending in Nigeria. Moreover, the short-run and error correction model (ECM) estimates in Table 6 (Panel B) show that monetary policy has a negative ($t = -5.6589$) and significant ($p < 0.01$) impact on bank lending in Nigeria in the short-run. With coefficients of 2.240801 and -1.521979 for liquidity ratio in level and lag-1 and the latter (lag-1) is statistically significant in explaining the short-run lending behaviour of deposit money banks in Nigeria. The inflation rate and its one-year lagged value of 1.0624 and -1.2149 are statistically significant in explaining the short-run lending behaviour of deposit money banks in Nigeria. The net effect of the inflation rate (1.0624 minus 1.2149) on the short-run lending behaviour of deposit money banks in Nigeria is still negative and statistically significant. The error correction term (ECT) which is negative (-1.0421) is also found to be statistically significant at 1 per cent, though, close to be an explosive correction term.

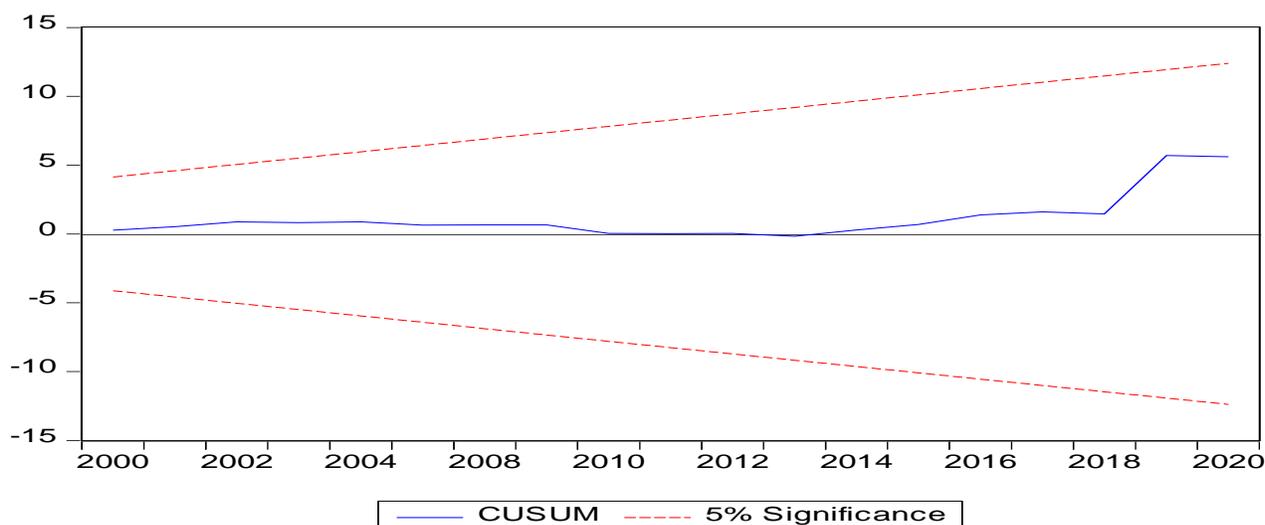
Table 7. ARDL Long-Run, Short Run and Error Correction Regression Results

	A		B
	Long-Run Estimates		Short-Run and ECM Estimates
DV: LTDR		DV:D (LTDR)	
LTDR(-1)	-0.0421	D(MPR)	-5.6589*
MPR	-5.6589**	D(LQDR)	2.2408*
MPR(-1)	-3.7249	D(LQDR(-1))	-1.5219**
LQDR	2.2408**	D(INFR)	1.0624**
LQDR(-1)	0.6089	D(INFR(-1))	-1.2149*
LQDR(-2)	1.5219**	ECT	-1.0421*
LDR	5.2899**		
INFR	1.0624		
INFR(-1)	-0.4330		
INFR(-2)	1.2149**		
R-squared	0.6409	R-squared	0.6443
Adjusted R-squared	0.4519	Adjusted R-squared	0.5702
F-statistic	3.3915*		
Durbin-Watson stat		2.4391	
Breusch-Godfrey Serial Correlation LM Test		[0.1488]	
Heteroskedasticity Test: Harvey		[0.3017]	

Source: Authors' computation (2021)

Note: *, ** and *** significant at 1%, 5% and 10% respectively.

The CUSUM Stability Test as exhibited in Figure 1 shows that the residual of the estimated model is stable within 5 per cent significance level, that is the estimates of the model could be relied on.

Fig. 1: CUSUM Stability Test

Source: Authors' computation (2021)

Causality Tests

To determine the direction of causality between monetary policy and bank lending in Nigeria, this study applied Pairwise Granger Causality Tests and contained in Table 8 is the result of the pairwise Granger causality tests conducted on the variables of the study.

Table 8. Pairwise Granger Causality Tests

Null Hypothesis	Prob.	Causality?	Null Hypothesis	Prob.	Causality?
$MPR \rightarrow LQDR$	0.9155	No	$LDR \rightarrow MPR$	0.5481	No
$LQDR \rightarrow MPR$	0.6701	No	$MPR \rightarrow LDR$	0.7750	No
$LQDR \rightarrow LTDR$	0.0963	Yes	$INFR \rightarrow MPR$	0.2176	No
$LTDR \rightarrow LQDR$	0.9490	No	$MPR \rightarrow INFR$	0.0008	Yes
$LDR \rightarrow LTDR$	0.1332	No	$LDR \rightarrow LQDR$	0.1919	No
$LTDR \rightarrow LDR$	0.6379	No	$LQDR \rightarrow LDR$	0.6589	No
$INFR \rightarrow LTDR$	0.9727	No	$INFR \rightarrow LQDR$	0.7103	No
$LTDR \rightarrow INFR$	0.6539	No	$LQDR \rightarrow INFR$	0.7874	No
$LQDR \rightarrow MPR$	0.8637	No	$INFR \rightarrow LDR$	0.0958	Yes
$MPR \rightarrow LQDR$	0.0285	Yes	$LDR \rightarrow INFR$	0.0038	Yes

Source: Authors' computation (2021)

Note: \rightarrow denotes "does not Granger-cause"

The results of the Granger causality analysis of monetary policy and bank lending in Nigeria summarized in Table 8 shows that monetary policy rate Granger-caused liquidity ratio but not vice versa. Similarly, liquidity ratio Granger-caused loan to deposit ratio but not vice versa. Furthermore, there is a unidirectional causality flow from monetary policy rate to the inflation rate. inflation rate and lending rate Granger-cause each other.

5. Discussion

From the time series econometric analysis of monetary policy and bank lending in Nigeria between 1987 and 2020, this study found that the monetary policy rate has a negative and significant impact on bank lending in Nigeria in both the short and long runs. This implies that the tighter the monetary policy, the lower the ability of deposit money banks to extend credit facilities to the customers. This suggests there is an inverse relationship between the CBN's monetary policy and bank lending in Nigeria. This finding agrees with the theoretical knowledge of the relationship between the two concepts and is in line with the submission of some past empirics like Agbonkhese and Azekome (2013), Ndughu et al (2015), Ebire and Ogunyinka (2018), and

Bangura et al (2021). However, this finding does not align with the result of the positive impact of monetary policy on bank lending reported by Ademokoya et al (2020), Abere et al (2020), Udoka et al (2015) as well the finding of Demehin (2021) and Yunusa et al (2020) which reported the non-significant impact of monetary policy on bank lending.

Furthermore, this study also established that liquidity ratio has a long-run positive but short-run negative significant impact on bank lending in Nigeria. The study also found that the lending rate exerts a positive and significant impact on bank lending in Nigeria. In the same vein, the inflation rate has a long-run positive and short-run negative significant impact on bank lending in Nigeria.

Monetary policy rate Granger-caused liquidity ratio but not vice versa. Similarly, liquidity ratio Granger-caused loan to deposit ratio but not vice versa. Furthermore, there is a unidirectional causality flow from monetary policy rate to the inflation rate. Inflation rate and lending rate Granger-cause each other. It is factual that empirical findings from this kind of investigation will ever be mixed depending on the most prevailing Monetary policy direction targeted by the apex bank within the period of consideration. If contractionary policy happened to be the order within the period of investigation, it is expected that monetary policy rate would contrast the bank lending because that is the target, and it is an implication that the policy is somehow effective. In a study like this, it is ideal to segregate data as much as possible for the effective outcomes of the finding.

6. Conclusion

Considering the time series econometric analysis of the monetary policy and lending behaviour of deposit money banks in Nigeria between 1987 and 2020 using the ARDL approach, this study has empirically established that monetary policy rate has a negative and significant impact on bank lending in Nigeria in both short and long runs. Furthermore, the liquidity ratio has a long-run positive and short-run negative significant impact on bank lending in Nigeria. In the same vein, the inflation rate has a long-run positive and short-run negative significant impact on bank lending in Nigeria. The lending rate exerts a positive and significant impact on bank lending in Nigeria. Monetary policy rate Granger-caused liquidity ratio but not vice versa. Similarly, liquidity ratio Granger-caused loan-to-deposit ratio but not vice versa. Furthermore, there is a unidirectional causality flow from monetary policy rate to the inflation rate. Inflation rate and lending rate Granger-causes each other. This study, therefore, posits that monetary policy is a significant predictor of bank lending in Nigeria such that the tighter the policy, the lower the lending ability of deposit money banks and vice versa, the cheaper the monetary policy, the higher the lending ability of deposit money banks in Nigeria. Also, a contractionary monetary policy seems to be the prevailing policies within the period of investigation.

The results of this study have policy implications to economy of Nigeria. The negative and significant impact of monetary policy rate on bank lending in Nigeria implies that the rise in the monetary policy rate will produce a contraction of bank credit in the economy in both short and long runs. That is to say, the higher the monetary policy rate, the lower the bank ability to lend in Nigeria. Thus, the role of bank credit in the economy will be adversely affected. The long-run positive significant impact of liquidity ratio on bank lending in Nigeria which turns negative but still statistically significant in the short-run implies that the higher the liquidity ratio the lower the bank credit in the short-run but the bank lending ability in the long-run despite the increase in the liquidity ratio stipulated by the monetary authority. This suggests, the positive role of liquidity ratio in regulating bank liquidity and by extension the amount of credit extendable by banks is only effective in the short-run, such that when the ratio is raised, bank lending is reduced. This is in line with the adverse relationship between liquidity ratio and bank credit available for lending. It therefore, imply that the monetary authority, particularly, the Central Bank of Nigeria should be cautious in the employment of liquidity ratio, as an instrument of monetary policy, in curtailing liquidity in the Nigerian economy because the long-run impact may shield unexpected results. Furthermore, the positive and significant impact of lending rate on bank lending in Nigeria established in this study implies that the higher the lending rate, the higher the amount of credit facilities that the banking sector can extend to borrowers in the economy. Banks should employ lending rate in improving their bottom line while at the same time considering the effect of credit in the economy.

It is therefore recommended that a similar study with data segregation based on the monetary policy implemented, either expansionary or contractionary should be conducted, since the effect of monetary policy is ambivalence and the empirics is expected to be ever mixed. Also, the apex bank should be conscious that the monetary policy rate is actually effective with respect to the bank lending rate. Then considering its implication on the inflation, combining the two together will hurt the lending rate. Therefore, it is equally recommended that the apex bank should continue to put inflation rate into consideration in setting the monetary policy rate.

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