COMMERCIAL BANKS' LIQUIDITY AND ECONOMIC GROWTH NEXUS IN NIGERIA

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ABSTRACT

This study investigated the role of the Central Bank of Nigeria (CBN) liquidity reforms from the perspective of the relationship between commercial banks' liquidity and economic growth over the study period of 1988-2024 in Nigeria. The estimation methods employed were linear and interactive autoregressive distributed lag (ARDL). Findings from the linear ARDL revealed that loan-to-deposit and liquidity ratio are positive but insignificant while the interaction of loan-to-deposit and liquidity ratio is found to be positive and has significant impact on economic growth in the short run. Additionally, the interactive ARDL results for Models II and III found that both commercial bank recapitalization and lending rate reforms matter, spurring economic growth in the long run through loan-to-deposit (Basel I) and liquidity ratio (Basel II) in Nigeria. More so, commercial bank recapitalization reform matters in Nigeria over the CBN lending rate reform in the short run. Going forward, the study recommends that commercial banks should support the implementation of Basel III while the CBN should enforce the implementation of bank recapitalization and lending rate reforms. The study hence concludes that fiscal policymakers should consciously manage inflation and unemployment rates targeted towards increasing commercial banks liquidity level which will ultimately stimulate economic growth both in the short run and in the long run in Nigeria.

Keywords: Commercial banks liquidity, CBN liquidity reform, Economic growth, Basel Accord, ARDL

1. INTRODUCTION

Economic growth is one of the main macroeconomic objectives that is pursued by both developed and developing economies. The finance-growth theory of Schumpeter in 1912 postulates that finance is the main driver of real economy in any economies. Importantly, Schumpeter's finance-growth theory emphasizes on aggregate finances from the entire financial sector, such as total liquid liabilities, broad money supply (M_2) and total credit to private sector, to attain country's economic growth (Almeshan, Yahya, Kamarudin & Hamid, 2023). This finance-growth nexus from Schumpeter's theory has motivated many countries, especially Nigeria to adopt several finance policies over the years. Notably, the Nigerian governments have implemented a number of national finance policies through the Central Bank of Nigeria (CBN) liquidity policies. For instance, the value of broad money supply has significantly increased from 43.8 billion in 1990 to 124.4 trillion in 2025 and it is surprisingly that the current annual money supply growth rate of 12.8% in 2025 is far above the annual GDP growth rate of 3.87%. Also, the total domestic credit .to private sector in Nigeria has increased significantly from 76.1 million in 1992 to 75.8 trillion in 2025, yet the unemployment and inflation rates as of February stood at 4.9% and 13.53% (NBS, 2025). This implies that both broad money supply and total domestic credit to private sector growth rates have weakly drive economic growth in Nigeria.

The commercial banks liquid assets are important not only to adequately finance illiquid assets with liquid liabilities of the depositors but also to constantly fund investments and expand real projects in the economy (Bouwman, 2018). In view of the importance of commercial banks liquidity to drives financial stability and economic growth across the globe, many commercial banks align to the BASEL principles of 1 and II that are aimed to continually meet increasing demand for funds from customers, corporate entity, small and medium scale enterprises, and even the country's government through the increasing capital adequacy ratio (Vuong et al., 2023). It is noted that the prevalence of global financial meltdown in 2008 and associated financial instability issues like high liquidity risk, financial losses, financial distress and low capital requirement has led to the introduction of BASEL III in December 2010 to improve the commercial banks liquidity. The BASEL III acknowledges the need for commercial banks to accommodate more commercial banks liquidity instruments in their operations such as capital adequacy ratio, loan-to-deposit, liquidity coverage ratio, among others and also to regularize the shadow banks operations into the commercial banks sector (McNamara & Metrick, 2014; Mishin, 2021) and thus, creates more commercial banks liquidity for financial inclusion (Fisera, Harvalth, & Melecky, 2025), financial stability (Rubio, 2025) and above all promote economic growth in any economy (Fidrmuc & Lind, 2020).

The linkage between Basel I-III and commercial bank liquidity has been well documented in the literature. While many studies such as (McNamara & Metrick, 2014; Ozulu, 2021; Fidrmuc & Lind, 2020; Mishin, 2024; Fisera, Harualth, & Melecky, 2025) have explored the relationship between Basel III and commercial banks liquidity, there are few studies on the nexus between commercial banks liquidity and economic growth in finance literature. The advent of post-global financial crisis and the recent COVID-19 have undermined the potency of commercial bank liquidity induced by the Basel principles I-III to resist bank instability, financial exclusion, and widening economic growth differences within and across nations globally (Garcia & Suarez, 2025). The consequences of low commercial banks liquidity level and the non-alignment between

commercial banks liquidity performance and CBN liquidity indicators have continued to raises concern among researchers and governments in the 21st century.

Therefore, the need for monetary authority commercial banks liquidity reforms (off-balance sheets) has becomes an impetus to indirectly helps commercial banks to meet the core finance function of funding requirement. It is noted the interaction between the funding liquidity through the monetary authority reforms (off-balance sheet funding items) and the existing Basel principles I-III of commercial banks liquidity (on-balance sheet financing items) becomes imperative to achieve financial stability and financial inclusion, amid the uprising global economic, political and other shocks worldwide, with reference to Nigeria, a developing country. Therefore, this new discourse surprisingly has received less attention in the liquidity finance-growth literature and thus, motivated this study to empirically investigate the role of monetary authority commercial banks liquidity on the nexus between commercial banks and economic growth in Nigeria.

This study differs from previous studies and contributes to the existing literature on the following reasons. First, this study extends the Basel principles by investigating the three Basel principles I-III that induces commercial banks liquidity effect on economic growth in Nigeria, and thus, helps to test Basel principles in the existing literature. Second, this study pioneers the empirical interaction effect of CBN commercial banks liquidity reforms-bank recapitalization and lending rate reforms and commercial banks liquidity on economic growth in Nigeria. This new knowledge will help to show the benefits of the alignment between CBN commercial banks liquidity reforms and commercial banks liquidity, thus, provide a new direction for policymakers. Third, this study introduces a dynamic time series econometric technique to capture both short and long run relationships of the CBN bank recapitalization and lending rate reforms respectively to provide more insights to the time dynamics for policymakers.

2. THEORETICAL REVIEW OF LITERATURE

The nexus between banks liquidity and economic growth is also rooted in the theoretical philosophy of the Schumpeter's finance-growth theory of 1912. The finance-growth theory views finance as the supply of money (liquid assets) while economic growth is the demand-side that converts the liquid assets into productive activities. Another strand of finance-growth ideology shifts the financing role from the central banks (monetary authorities) to the commercial banks in the financial system. Unlike the central bank liquidity that is just a statutory function, the commercial bank liquidity is an anticipated income and profit functions by all commercial banks and thus, enhances the motivations to meet the obligations for all categories in a presumed competitive market. Additionally, the CBN liquidity funds are often distort and limited by several shocks such as frequent bank distress interventions, country's currency depreciation savage at the international market, and local borrowings from the governments, all adversely affect the CBN reserves, and thus creates supply funds deficits leading to under economic growth performance (Berger and Bouwman, 2012). In this study, the commercial banks liquidity theories discussed are anticipated income theory and theory of delegated monitoring.

First, the anticipated income theory developed by Prachanow in 1944, postulates that potential earnings from the expected credit worthiness of a borrower solely motivates the commercial banks on–balance sheet activities (Ukeje, 2021). As a result of the anticipated earnings from the liquidity function, commercial banks encourage increases in deposits to guarantee a higher liquidity levels.

The anticipated income theory of commercial banks liquidity is associated to high banks profitability performance, increases in bank depth (size), as well as high banks liquidity risk. However, the anticipated income theory is largely associated with high banks liquidity risk through excessive commercial banks on-balance sheet activities, and thus resulting to high non-performing loans (NPLs), high commercial banks distress, and the root cause of the recent global financial crisis in the United States in 2008 (Mairafi, Hassan, & Mohamed–Arshad, 2018). The second theory of commercial banks liquidity is the delegated monitoring theory. This theory is synonymous to the agency theory (Diamond, 1984). Commercial banks liquidity behaviour is a statutory function to meet the capital providers or shareholders' objective at the expense of liquidity risk-taking actions always Jensen and Mecking (1976). The actions of commercial banks allocating more funds to finance customers' obligations need is based on profit maximization and customer maximization objectives which are yardsticks of performance from the stakeholders of the delegated monitors (Mairafi, Hassan, & Mohamed-Arshad, 2018).

In summary, these two commercial banks liquidity theories are associated to liquidity risks, yet, commercial bank liquidity theories is superior over the Schumpeter's finance-growth theories, with less distortions and uncertainties to meet demand funding and also the income-oriented objectives to supply funds for all and sundry to promote economic growth in any economy. Nonetheless, the needs for the CBN commercial banks liquidity as a complementary tool is inevitable for any economy that is predominantly associated with financial instability, constant internal and external shocks, as well as dwindling economic growth, like Nigeria.

2.1 Empirical Review of Literature

The study of the role of CBN commercial banks liquidity in the nexus between commercial banks liquidity and economic growth is drawn from three empirical strands. The first strand focuses on the nexus between commercial banks liquidity and economic growth, the second strand discusses the role of monetary authority banks liquidity reforms on economic growth and the third strand underscores the role of CBN commercial banks liquidity on the nexus between commercial banks liquidity and economic growth. The first strand has extensively examined the nexus between commercial banks and economic growth. Beck et al., (2023) examined the relationship between bank liquidity creation by banks is positively associated with economic growth. Similarly, Ismail et al., (2024) investigated the impact of liquidity creation on real economy output, using a sample of 10 countries. Evidence from two banks, Full-fledged Islamic banks (FIBs) and Hybrid Conventional Banks (HCBs) over the period 2012-2022. their findings were that FIBs and HCBs liquidity creation per capital income have positive impact on real economy output. In Pakistan, Ali and Ahmed (2023), evaluated the moderating role of firm size on the effect of liquidity creation on economic growth. Their findings revealed that firm size does not moderate the relationship between liquidity creation and gross domestic product. In another study, Bhatta, Pokharel, Subedi, Kunwar, & Sah (2025), examined the impact of economic growth on bank liquidity in Nepal, using regression for 10 selected commercial banks from 2013 to 2023. their study found that GDP growth rate has a positive impact on cash reserve ratio and return on assets.

Unlike earlier studies, Fidrmuc et al. (2015) examined the effect of liquidity on economic growth in a large panel dataset of Russian banks from 1999 to 2009, using the Berger and Bouwman's bank liquidity measurements of CATFAI method. Their study found a positive effect of bank liquidity on economic growth and also established that state–controlled banks and Russians largest

banks have the greatest liquidity creations. Similarly, Berger and Sedunov (2017) evaluated the role of US banks liquidity creation on economic growth between 1984 and 2010 and found a positive relationship between US banks liquidity creation and economic growth. On a contrary, Umar et al (2021) in their study of effect of liquidity creation on China's economic output using 377 banks that spanned between 2016 and 2017. Their study showed a negative relationship between liquidity creation and Chinese economic output. Fidrmuc et al. (2015) also investigated the effects of banks liquidity creation on economic growth in Russia between 2004 and 2012. Their result showed that bank liquidity creation strengthens economic growth.

Previous studies all focused on banks liquidity on economic growth without a specific measures/indicators of banks liquidity, Syedi and Ringin (2018) examined the influence of bank liquidity on economic growth in Nigeria from 1981 to 2014. Using the OLS regression technique, their findings showed that Deposit Money Banks (DMBs) reserves ratio has a positive significant effect on economic growth, whereas, both DMBs loan–to–deposit ratios and liquidity ratios have insignificant negative impact on economic growth in Nigeria. In same vein, Ojiegbe, Oladele, and Makwe (2016), employed OLS regression and Granger causality, to investigate effect of bank liquidity on economic growth in Nigeria from 1980 and 2013. They found that both total bank credit ratio and total bank deposits have positive and significant impact on long–run economic growth respectively, whereas, deposit credit ratio has a negative and insignificant impact on long run economic growth in Nigeria. Nevertheless, none of these studies has considered measuring commercial banks liquidity from the Basel principle III, thus, this study fills the existing empirical gap in the nexus between commercial banks liquidity and economic growth.

The second strand discusses the effects of monetary authority banks liquidity reforms on economic growth, however, this strand of literature is scantly researched. Adeyeye and Migiro (2015), in their study described the stylized facts of bank reforms in the under-banked sector in Nigeria. Their study found that banks reforms have progressed but there is high evidence of under-banking with only 24 banks to serve over 170 million people in Nigeria. Nkemakolan (2018), pioneered the empirical study of the impact of liquidity reforms on economic growth in Nigeria from 1986 to 2013. Using OLS regression technique, his findings revealed that the liquidity ratio as a proxy for liquidity reform has a negative and significant impact on economic growth. Also, both loan-to deposit ratio and saving rate have significantly declined economic growth in Nigeria. Yet, none of these studies have sufficiently measured monetary authority banks liquidity reforms and also their bank liquidity reforms have been limited to on–balance sheet items in the existing literature. This study considers the use of on-balance and off-balance sheet items to proxy CBN commercial banks reforms. Further, the study uses CBN lending rate to proxy the on-balance sheet item while the CBN commercial bank recapitalization represents the off-balance sheet item.

The third strand is a new insight that examines both the linear relationship between commercial banks liquidity and economic growth, as well as the interaction effects of CBN commercial banks liquidity reforms and commercial banks liquidity on economic growth with motive to estimate both short-run and long run effects in literature. Almeshari, Yahya, Kamarudin and Hamid (2023) in their study examined liquidity creation and economic growth in the MENA countries from 2000 to 2019. Unlike existing study's methodology, they employed a non-linear panel autoregressive distributed lags (PARDL), and pooled mean group (PMG) and found that bank liquidity creation has a positive influence on economic growth in the long run, whereas, no influence exists in the short-run. Additionally, this result revealed that an inverted U-shaped existed between bank

liquidity and economic growth in both short run and long run. Similarly, the study of Almeshari, Yahya, Kamarudi, and Hamid (2023) investigated the relationship among liquidity creation, oil term of trade shocks and growth volatility in the Middle Eastern and North African Countries (MENA) from 2000 to 2019. They employed panel autoregressive distributed legs and pooled mean group (PMG) techniques. Their findings revealed that bank liquidity creation has a negative impact of real and monetary shocks on economic growth volatility in MENA countries over the long-run and short run. Additionally, both real and monetary shocks significantly, increase economic growth volatility in the short run than in the long run. Yet none of these studies has employed interaction econometric methodology, except Almeshari, Yahya, Kamarudi, and Hamid (2023). However, their interaction estimation method was limited to bank liquidity creation and real and monetary shocks, and not the interaction between monetary authority bank liquidity and commercial banks liquidity, which is the empirical gap to be filled in this study.

3. DATA AND METHODOLOGY

This study uses annual time series datatset that spans from 1988 to 2024. The choice of 1988 for this study earmarks the commencement of the Basel accords standard to increases commercial banks liquidity level globally and by extension, the CBN commercial banks liquidity reforms of commercial bank recapitalization and lending rate respectively in Nigeria. Data used in the study were sourced from the Central Bank of Nigeria Statistical Bulletin (2025). This study uses eight variables, namely are loan-to-deposit ratio, liquidity ratio, interaction of loan-to-deposit and liquidity ratio, inflation rate, unemployment rate, bank recapitalization, lending rate, and real GDP. In this study, the dependent variable is the real GDP used as proxy for the real economic growth whereas the main independent variable that measures commercial banks liquidity are loan-to-deposit ratio, liquidity ratio, and the interaction term such as loan-to-deposit and liquidity ratio in accordance to the Basel principles I-III respectively. Also, the interaction variables are bank recapitalization and lending rate representing the CBN commercial banks liquidity reforms. The bank recapitalization reform is the CBN banks liquidity regulatory reform, commonly known as off-balance sheet item and proxy as annual minimum capital base for commercial banks whereas, lending rate is the CBN bank liquidity instrument reform also known as on-balance sheet item and used as a proxy for annual minimum lending rate of commercial banks. Lastly, the inflation and unemployment rates were used as the control variables in this study. The summary of the variables used for this study is shown in Table 1.

Table 1. Summary of Variables Description

Variables	Description	Symbol	Data Source
Real Gross Domestic Product	The real domestic product measures real productive in an economy. The economic growth is proxy as real GDP in this study.	RGDP	CBN
Loan-to-Deposit Ratio	The loan-to-deposit is the proportion of deposits granted as loans to create banks liquidity. The higher the deposits, the more liquidity creation by the commercial banks and vice-versa.	LTD	CBN
Liquidity ratio	This measures the ability of the commercial banks to maintain enough cash to meet immediate obligations and day to day operations. The more cash held, the more liquidity creation by commercial banks and vice-versa.	LR	CBN
Loan-to-deposit and liquidity ratio	The interaction term, loan-to-deposit and liquidity ratio measures the joint capital and funding requirements in line with the Basel III.	LTD*LR	CBN
Inflation rate	Inflation rate is the purchasing power in any economy that determines market price and cost levels. A macroeconomic factor that directly affect economic growth and indirectly influences banks liquidity.	INF	CBN
Unemployment rate	Unemployment rate is the rate of joblessness in the supply labour market. A macroeconomic factor that directly affect economic growth and indirectly influences banks liquidity	UNEM	CBN
Bank Recapitalization reform	This is the minimum capital base for commercial banks as pronounced by the CBN over times. The bank recapitalization reform proxy as annual minimum capital base for commercial banks as pronounced by the CBN, and not a dummy variable.	BRR	CBN
Lending Rate reform	This is the minimum lending rate for commercial banks as pronounced by the CBN over times. Lending rate reform is the annual minimum rate for commercial banks by the CBN, and not a dummy variable.	LRR	CBN

Source: CBN, 2025.

3.1 *Model Specification*

This study adapts the works of Almeshani, Yahya, Kamarudin& Hamid (2023) to model the linear and interaction relationship of CBN commercial banks liquidity reforms on the nexus between commercial banks liquidity and economic growth in Nigeria. The functional models are in line with the objectives specified in equations (1)-(3).

RGDP= f (LTD, LR, LTD*LR, INF, UNEM) ……(1)

RGDP = f (LTD*BRR, LR*BRR, LTD*LR*BRR, INF, UNEM) ……(2)

RGDP= f (LTD*LRR, LR*LRR, LTD*LR*LRR, INF, UNEM)…….(3)

Where RGDP is real gross domestic product, LTD is loan-to-deposit ratio, LR is liquidity ratio, LTD*LR is interaction term, loan-to-deposit ratio and liquidity ratio which proxy Basel III, INF is inflation rate, and UNEM is unemployment rate.

Equations (1)-(3) is specified in the baseline regression equations (4)–(6) as follows:

$$In(RGDP)_t = \beta_0 + \beta_1 In(LTDR)_t + \beta_2 In(LR)_t + \beta_3 In(LTDR * LR)_t - \beta_4 In(INFR)_t - \beta_5 InUNER_t + e_t \text{----------(4)}$$

$$In(RGDP)_t = \propto_0 + \propto_1 In(LTDR * BR)_t + \propto_2 In(LR * BR)_t + \propto_3 In(LTDR * LR * BR)_t + \propto_4 In(INFR)_t + \propto_5 In(UNEMR)_t + e_t \text{----------(5)}$$

$$In(RGDP_t) = \emptyset_0 + \emptyset_1 In(LTDR * LDR)_t + \emptyset_2 In(LR * LDR)_t + \emptyset_3 In(LTDR * LR * LDR)_t + \emptyset_4 In(INFR) + \emptyset_5 In(UNEM)_t + e_t \text{---------- (6)}$$

Where RGDP is the dependent variable, LTD, LR, LTD*LR, INF, UNEM, LTD*BRR, LR*BRR, LTD*LR*BRR, LTD*LRR, LR*LRR, LTD*LR*LRR are independent variables, β_0-β_5, α_0 -α_5 andϕ_0 - ϕ_5 are parameters of the baseline regression equations and e_{1t} and e_{3t} are error terms for estimated regression equation.

3.2 Equation Model

To capture the dynamics in the main variables due to changes in the CBN commercial banks liquidity reforms as well as the possibility of endogeneity problems among the control variables, interaction variables and the main explanatory variables, this study employs an autoregressive distributed lags (ARDL) model. The ARDL estimation method is preferred over the ordinary least squares (OLS) regression, because it estimates both short-run and long-run effects. Additionally, the ARDL method is employed when all variables exhibit stationarity at both level I(0) and first

difference I(1) (Ogunyomi-Oluyomi, Ogbuji, & Adewunmi-Lipede, 2025). Furthermore, ARDL model uses the unrestricted error correction model (UECM) to estimate the speed of adjustment to a long run equilibrium and also estimate the dynamic interactions cause and effect (Almeshari et al., 2023). Therefore, the ARDL-UECM regression model developed by Pesaran, Shin and Smith (2001) is expressed in equation (7) as:

$$\Delta\gamma_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\, \Delta\gamma_{t-i} + \sum_{i=0}^{q} \beta_{2i}\, \Delta X_{t-i} + \emptyset ECM_{t-1} + \sum_{i=1} \propto_{1i} Y_{t-1} + \sum_{i=0} \propto_{2i} X_{t-i} + e_t \; 7$$

Where Y stands for dependent variable, X is a vector of independent variables including main independent, interaction and control variables, β stands for short–run coefficients of lagged one dependent and initial and lagged independent variables respectively. Φ and α are the speed for the adjustment to the long run equilibrium and long run coefficient respectively. The upper script and subscripts, p and i represent maximum and minimum number of lags, while the t represents time periods. Following equation (7), the functional models in equations (1) - (3) are expressed in ARDL models and shown in equations (8) - (10) as follows:

$$\Delta RDGP_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\, \Delta RGDP_{t-i} + \sum_{i=0}^{q_1} \beta_{2i}\, \Delta In(\Delta^1 TDR)_t + \sum_{i=0}^{q_2} \beta_{6i}\, \Delta In(LR_t) + \sum_{i=0}^{q_3} \beta_{4i}\, \Delta In(LTDR * LR)_t + \sum_{i=0}^{q_4} \beta_{5i}\, \Delta In(INFR) + \sum_{i=0}^{q_5} \beta_{6i}\, \Delta In(UNEM)_t + \emptyset ECT_{t-1} + \alpha_1 RGDP_{t-1} + \alpha_2 In(tTDR_t) + \alpha_3 In(LR_t) + \alpha_4 In(LTDR * LR)_t + \alpha_5 In(INFR_t) + \alpha_5 In(UNEM_t) + e_t \text{ ----------(8)}$$

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\, \Delta RGDP_{t-i} + \sum_{i=0}^{q_1} \beta_{2i}\, In(LTDR * BR)_t + \sum_{i=0}^{q_2} \beta_{3i}\, In(LR * BR)_t + \sum_{i=0}^{q_3} \beta_{4i}\, In(LTDR * LR * BR)_t + \sum_{i=0}^{q_4} \beta_{5i}\, In(INF) + \sum_{i=0}^{q_5} \beta_{6i}\, In(UNEM)_t + \emptyset ECT_{t-1} + \alpha_1 RGDP\_GR_{t-1} + \alpha_2 In(LTDR * BR)_{t-1} + \alpha_3 In(LR * BR)_{t-1} + \alpha_4 In(LTDR * LR * BR)_{t-1} + \alpha_5 In\ (INF)_{t-1} + \alpha_6 In(UNEM)_{t-1} + E_t \text{ ---------- (9)}$$

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\, \Delta RGDP_{t-i} + \sum_{i=1}^{q_1} \beta_{2i}\, \Delta In(LTDR * LDR)_t + \sum_{i=0}^{q_2} \beta_{3i}\, \Delta In(LR * LDR)_{t-i} + \sum_{i=0}^{q_3} \beta_{4i}\, \Delta In(LTDR * LR * LDR)_{t-1} + \sum_{i=0}^{q_4} \beta_{5i}\, \Delta In(INF)_{t-1} + \sum_{i=0}^{q_5} \beta_{6i}\, \Delta In(UNEM)_{t-1} + \emptyset ECM_{t-1} + \alpha_1 (RGDP\_GR)_t + \alpha_2 In(LTDR * LDR)_{t-1} + \propto_3 In(LR * LDR)_{t-1} + \propto_4 In(LTDR * LR * LDR)_{t-1} + \propto_5 In(INF)_{t-1} + \propto_6 In(UNEM)_{t-1} + e_t \text{ ---------- (10)}$$

4. RESULTS AND DISCUSSION

This section presents the empirical results of linear and interactive ARDL estimates. Before reporting the ARDL estimates, descriptive statistic and correlation matrix as well as unit root and co-integration tests, are essential to determine the appropriate estimation method.

4.1 Descriptive and Correlation Analyses

Table 2. Descriptive Statistics

Variable	Mean	Standard deviation	Jarque-Berq	Observation
RGDP	45739.89	22288.96	4.089 [0.129]	37
LTD	64.18	13.33	0.304 [0.859]	37
LR	48.71	14.41	51.82 [0.00]	37
LTD*LR	3118.58	1165.98	94.75 [0.00]	37
INF	22.41	17.25	12.17 [0.00]	37
UNEM	4.24	1.31	403.17 [0.00]	37
BRR	23995.41	44283	270.58 [0.000]	37
LRR	24.70	4.48	1.56 [0.458]	37

Source: Author's computation from EViews 13, 2026

Table 2 presents descriptive statistics for the relevant variables. The mean result shows that the average real GDP is twice higher than the average commercial bank recapitalization, indicating that the real GDP outperforms the commercial banks recapitalization in monetary terms throughout the study periods. Also, the mean for the ratio variables show that average LTD*LR of 3118.58 exceeds other related variables, indicating that the commercial banks liquidity induce by Basel III outperforms other commercial banks liquidity and the control variables during 1988-2024 in Nigeria. Furthermore, the standard deviation result shows that variability exist in the variables because their standard deviation coefficients are all greater than zero. Additionally, the Jarque-Bera tests result shows that all variables are not normally distributed except economic growth (RGDP), loan-to-deposit (LTD) and lending rate reform. This suggests that only economic growth, loan-to-deposit and lending rate reform exhibit stable distributions during the 37 annual study periods in Nigeria.

Table 3. Pearson Correlation Matrix and Variance Inflation Factor (VIF) test

variable	RGDP	LTD	LR	LTD*LR	INF	UNEM	BRR	LRR	VIF
RGDP	1.00								N/A
LTD	-0.183	1.00							1.03
LR	0.248	-0.041	1.00						1.07
LTD*LR	0.093	0.535	0.801	1.00					1.01
INF	-0.325	-0.090	-0.240	-0.254	1.00				1.12
UNEM	0.167	0.048	0.566	0.428	-0.025	1.00			1.03
BRR	0.886	-0.078	0.278	0.184	-0.521	0.031	1.00		4.65
LRR	0.333	-0.491	0.174	-0.150	0.172	0.201	0.120	1.00	1.12

Note: VIF indicates variance inflated factor

Source: Author's computation EViews 13, 2026

Table 3 shows degree of associations and variance inflated factors (VIF) between the variables. The direct correlations results show the highest positive associations between bank recapitalization and economic growth (0.886), whereas the highest inverse associations exist between inflation and economic growth (-0/325). Also, there are low positive associations between interaction of loan-to-deposit and liquidity ratio and economic growth (0.093) as well as between liquidity ratio and economic growth (0.248) respectively. This indicates the possibility of low commercial banks liquidity and the need for bank recapitalization and lending rate reforms to spurs economic growth. Further, the concern for collineraity or multicollineraity issue among these variables were tested using the variance inflation factor(VIF) in this study. Results of the VIF coefficients results are relatively low and less than the standard value of 10 and thus confirms no collinerity between two variables nor multicollinerity among all the variables in this study.

4.2 Unit Root and Co-integration Tests

4.2.1 Augmented Dickey-Fuller (ADF) Unit Root

Table 4: Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	Model I (without CBN Bank liquidity Reforms)			Model II (with CBN Banks liquidity Reforms)		
	Coefficient Level	1st Difference	Order of Integration	Coefficient Level	1st Difference	Order of Integration
RGDP	0.399	-4.781***	I(1)	0.399	-4.781***	I(1)
LTD	-2.896	-5.729***	I(1)			
LR	-3.748***	-	I(0)			
LTD*LR	-4.085***	-	I(0)			
INF	-2.993**	-5.373***	I(0)			
UNEM	-5.235***	-	I(0)			
LTD*BRR				-3.12**	-4.355***	I(0)
LR*BRR				0.3044	-7.311***	I(1)
LTD*LR*BRR				-2.656*	-5.533***	I(0)
LTD*LRR				-4.317***	-	I(0)
LR*LRR				-3.308	-8.10***	I(1)
LTD*LR*LRR				-3..889***	-	I(0)

*Notes: *, **, and *** represent 10%, 5%, and 1% level of significance..*
Source: Author's computation EViews 13, 2026

Table 4 presents the ADF unit root tests for models I and II. Results from models I and II reveal that all variables exhibit a mixed order of integration of zero, I(0) and one I(1). Additionally, the mixed order of integration confirms the use of autoregressive distributed log (ARDL) method and bounds3cointegration test.

Table 5. Bounds Co-integration test for Models I-III

Models	Lag ARDL Model	Variable	F-statistic and DOF values	1%	5%	10%
Model I (Without CBN Commercial Banks liquidity reforms)	1.2.3.2.3.2	ALL	F=5.515** K=5	I(0)=5.10 I(1)=6.77	I(0)=3.67 I(1)=5.00	I(0)=3.08 I(1)=4.28
Model II (With Bank Recapitalization reform)	1,0,2,0,3,0	ALL	F=5.471*** K=5	I(0)=3.93 I(1)=5.23	I(0)=3.12 I(1)=4.25	I(0)=2.75 I(1)=3.79
Model III (With CBN lending rate reform)	1,0,3,0,1,3	ALL	F=5.22*** K=5	I(0)=3.90 I(1)=5.20	I(0)=3.12 I(1)=4.25	I(0)=2.79 I(1)=3.79

*Notes: *, **, and *** represent 10%, 5%, and 1% level of significance; F and K represent F-Bounds statistic and degree of freedom*
Source: Author's computation EViews 13, 2026

Table 5 displays the Bounds co-integration tests for the three models. All the bounds statistics values for the three models exceed both the upper and lower Bounds critical values at 1%, 5% and 10% levels of significance. These results confirm a long-run relationship in the three models at different significance levels, except model 1.

4.3 ARDL Estimation

4.3.1 Linear ARDL Estimate

Table 6. Estimated ARDL result without interaction

Dependent Variable : Economic Growth	Model I
Independent variables:	**Short run Estimates**
ECT(-1)	0.016*** [6.70]
Constant	-0.367*** [-5.91]
Δloan-to-deposit	0.002 [1.64]
Δloan-to-deposit (-1)	-0.004*** [-2.98]
Δliquidity ratio	0.002 [0.98]
Δliquidity ratio (-1)	-0.006*** [-3.72]
Δliquidity ratio (-2)	0.001*** [3.16]
Δloan-to-deposit X liquidity ratio	-2.64E-05 [-1.33]
Δloan-to-deposit X liquidity ratio (-1)	7.89E-05*** (3.89)
Δinflation rate	-0.0003 [-0.66]
Δinflation rate (-1)	0.0007* [1.85]
Δinflation rate (-2)	0.001** [2.55]
Δunemployment rate	-0.037*** [5.82]
Δunemployment rate (-1)	0.009** [2.14]
@trend	-0.001 [-1.23]
Diagnostic tests:	
R^2	0.83
DW	2.09
F-Statistic	

Notes: Model 1 represents commercial banks liquidity and economic growth nexus without CBN banks liquidity reforms; *, **, and *** represent 10%, 5%, and 1% level of significance; Δ is change; (-1) and (-2) represent one-year lag and two-years lag respectively; R^2 is coefficient of determination; DW is Durbin-Watson.

Source: Author's computations from EViews 13, 2026

Table 6 shows the linear ARDL estimate of the nexus between commercial banks liquidity and economic growth in Nigeria during the period 1988-2024. The ARDL short run estimates shows that the coefficient for the error correction term is statistically significant at 1% significant level but not negative, as, theoretically expected. This violation of the expected negative sign implies no long run relationship exists between commercial banks liquidity and economic growth in Nigeria. This finding is in contrast to the study of Ojiegbe, Oladele, and Makwe (2016), Almeshani, Yahya, Kamarudin, and Hamid (2023) whose studies found a positive and long run relationship between commercial banks liquidity creation and economic growth in Nigeria and MENA countries respectively. Besides the non-long run relationship between commercial banks liquidity and economic growth in this study, the ARDL short run results in Table 1 shows that the coefficients for changes in the current loan-to-deposit and liquidity ratio cause a positive and insignificant changes in economic growth by 0.2 percent respectively. In contrast, the coefficients for a change in the interaction of loan-to-deposit and liquidity ratio causes an insignificant decrease changes in economic growth by 0.0026 percent. These infer that the Basel III which theoretically intends to increases commercial banks liquidity and thus spurs economic growth in a country is a contradiction in Nigeria. This finding validates the works of Ozili (2021) who found that the effect of Basel III performance is unknown among Nigerian banks. Similarly, this study's finding does not align with Sayedi & Ringim (2018) of a negative effect of loan-to-deposit and liquidity ratio on economic growth respectively.

Furthermore, Table 6 result shows that a one-year lag changes in loan-to-deposit and liquidity ratio cause a significant decrease in economic growth respectively, whereas, a one-year lag change in the interactions of loan-to-deposit and liquidity ratio spurs economic growth significantly in the short run in Nigeria. This result reinforces the reliable benefits of the Basel III, proxy as interactions of loan-to-deposit and liquidity ratio on economic growth in the aftermaths of years of implementation in Nigeria. Results from the control variables in Table 6 shows that current changes in unemployment rates significantly retards economic growth whereas the one-year past changes in unemployment rate increases economic growth significantly in the short run. In same vein, a one-year and two-years past changes in inflation cause significant increases in economic growth by 0.07 and 0.1 percent respectively in Nigeria. This results uphold the theoretical underpinning of Okun's law and the empirical finding of Musa & Hussaini (2021). Furthermore, the coefficient for trend has a negative and insignificant impact on economic growth, implying that the commercial banks liquidity during the study periods cause a decline in economic growth in the short run. This suggests that commercial banks liquidity periods without CBN commercial banks liquidity reforms are counterproductive to Nigeria's economic growth.

4.3.2 ARDL results for models with interactions

Table 7. Estimated ARDL with interaction effects for models result

Dependent variable: Economic growth	**Model II** (Commercial bank recapitalization reform)	**Model III** (Lending rate reform)
Short run Estimates		
ECT (-1)	-0.069*** [-6.375]	-0.070*** [-6.29]

Constant	0.797*** [6.71]	0.822*** [6.60]
Δliquidity ratio x bank recapitalization reform	-2.14E-08*** [-4.827]	
Δliquidity ratio x bank recapitalization reform(-1)	1.81E-08*** [3.419]	
Δunemployment rate	-0.028*** [-5.772]	
Δunemployment rate(-1)	0.0117** [2.30]	
Δunemployment rate (-2)	0.0116*** [2.99]	
@trend	0.0048*** [5.236]	
Δliquidity ratio x lending rate reform		-4.15E-06 [-0.306]
Δliquidity ratio x lending rate reform (-1)		-1.12E-05 [-0.88]
Δliquidity ratio x lending rate reform (-2)		1.74E-05 (1.448)
Δunemployment rate		-0.022*** [-6.09]
Δinflation rate		-0.0008* [-1.77]
Δinflation rate (-1)		0.0007* [-1.91]
Δinflation rate (-2)		0.001** [2.43]
Δliquidity ratio x lending rate reform		-4.15E-06 [-0.306]
Long run Estimates		
Loan-to-deposit x bank recapitalization reform	3.10E-0 [1.061]	
Liquidity ratio x bank recapitalization reform	-4.23E-0 [-1.045]	
Loan-to-deposit x liquidity ratio x bank recapitalization reform	-4.24E-10 [-0.088]	
Unemployment rate(-1)	-0.364 [-1.163]	
Inflation rate	-0.0076 [-0.916]	
Loan-to-deposit x lending rate reform		0.0004 [0.63]
Liquidity ratio x lending rate reform (-1)		-0.0004 [-0.78]

Loan-to-deposit x lending rate reform		-1.73E-06 [-0.22]
Unemployment rate (-1)		-0.219 [-0.712]
inflation rate (-1)		-0.025 [-0.933]
Diagnostic tests:		
R^2	0.759	0.769
Durbin-Waston (DW)	1.88	2.04
Normality (Jarque-Bera BG)		0.324 (-0.850)
Serial Correlation (Breusch-Godfrey test)	0.06 (0.94)	0.014 (0.986)
Heteroskedasticity (Breusch-Pagan-Godfrey)	0.33 (0.973)	2.21 (0.25)
Functional form (Ramsey)	4.25 (0.14)	2.85(0.11)
CUSUM	Stable	Stable
CUSUM SQ	Stable	Stable

Notes: *Models 1I and III represent commercial banks liquidity and economic growth nexus with bank recapitalization reform and lending rate reform respectively; *, **, and *** represent 10%, 5%, and 1% level of significance; Δ is change; (-1) and (-2) represent one-year lag and two-years lag respectively; R^2 is coefficient of determination; DW is Durbin-Watson.*
Source: *Author's computations from EViews 13, 2026*

Results in Table 7 displays the ARDL interaction effect of commercial banks recapitalization and commercial banks liquidity on economic growth as well as the interaction effect of CBN lending rate and commercial banks liquidity on economic growth respectively in Nigeria for models II and III. The short-run estimated results show that the coefficients for error correction term (ECT) in models II and III are negative and statistically significant at 1 percent level, indicating the presence of a long run relationship between commercial banks liquidity and economic growth when there is CBN commercial bank recapitalization and lending rate reforms.

Besides the comparison, the model II short-run results show that the coefficients for the changes in the interaction of the current liquidity ratio and CBN bank recapitalization reform (LR*BRR) will cause a significant decrease in economic growth whereas a change in the interaction of one-year lag of liquidity ratio and CBN bank recapitalization will significantly increases economic growth in the short run in Nigeria. This suggests that CBN bank recapitalization reform matters to influence commercial banks liquidity but require some time to take effect and not automatic. This finding is in line with Bouwman (2018) that acknowledges the role of monetary authority banks regulatory reforms only on commercial banks liquidity creation in MENA countries. On the control variable result, Table 7 shows that the coefficient for change in current unemployment rate has significantly decreases economic growth by 2.8 percent whereas the coefficients for one-year and two-years pasts have significantly induced changes in economic growth by 1.2 percent respectively. This suggests that the increasing commercial banks liquidity through the CBN commercial bank recapitalization reform will indirectly enhance job creations and spur economic growth in the short run. Also, the coefficient for trend is positive and statistically significant. Furthermore, the ARDL long run results reveal that all coefficients are negatively insignificant in

the long run in Nigeria, except the coefficient for the interaction of loan-to-deposit and bank recapitalization reform (LTD * BRR).

On the other hand, the model III reports the ARDL short-run and long-run estimates of the interaction effect of the CBN lending rate reform and commercial banks liquidity on economic growth in Nigeria. Results from Table 7 shows the coefficients for the current and past changes in the interactions of liquidity ratio and lending rate reform are negative and insignificantly impact on economic growth in the short run, except the change in the interaction of a two-year past of liquidity ratio and CBN lending rate in this study. This results infer that CBN banks recapitalization reform causes a faster economic growth in the short run than the CBN lending rate reform, and thus, the CBN bank recapitalization reform matters most to economic growth recovery in Nigeria. This result lends credence to the new 2024 CBN bank recapitalization exercise to increase commercial banks capital base from N25 billion to N200 billion and N500 billion for national and international banking operation license in Nigeria. Furthermore, the negative and positive significant effects of changes in unemployment and inflation rates on economic growth in the short run confirms the importance of these control variables to significantly drive or distort economic growth in the short run in Nigeria.

While both current changes in unemployment and inflation rates cause a significant decrease in economic growth by 2.2 percent and 0.08 percent respectively, the coefficients for one-year and two-year pasts inflation rate are consistent and significantly induce short run economic growth by 0.07 percent and 0.1 percent respectively in Nigeria. This finding is consistent with Adabor (2022) and Almeshni et al., (2023), that current changes in inflation rate retards economic growth in the short run. Also, the coefficient for trend is positive and significantly affects short run economic growth implying that the periods for changes in the CBN lending rate reform induces commercial banks liquidity and ultimately increases economic growth by 0.3 percent in the short run. In comparison, the periods of CBN bank recapitalization reform affects short run economic growth by 0.5 percent, which is higher than the periods of CBN lending rate reform and thus, the CBN bank recapitalization reform matters most for economic growth in the short run in Nigeria. Also, the long run estimates of Model III result reveal that the coefficients for all regressors are negative and insignificantly impact long run economic growth in Nigeria, except the coefficient for the interaction of loan-to-deposit and lending rate reform is contrary. Importantly, the results in models II and III underscore the consistent alignment of loan-to-deposit (Basel I) with bank recapitalization reform and lending rate reform to drive long run economic growth in Nigeria respectively. Comparing these results, it is noted that lending rate reform outperforms the bank recapitalization reform, and thus lending rate reform matters most for a long run economic growth in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

This study investigated the role of CBN commercial banks liquidity reforms on the nexus between commercial banks liquidity and economic growth in Nigeria during the study period of 1988-2024. Furthermore, the study examined the respective interaction effects of commercial banks recapitalization reform on economic growth as well as the lending rate reform and commercial banks liquidity on economic growth in Nigeria. The findings from the linear ARDL technique reveals that loan-to-deposit and liquidity ratio are positive and insignificantly impact on economic growth in the short run whereas only the interaction of loan-to-deposit and liquidity ratio has a

positive and significant impact on economic growth in Nigeria in the short run. Furthermore, the results from the interaction ARDL method in Models II and III infer that both commercial bank recapitalization and lending rate reforms matter to enhance economic growth in the long run through loan-to-deposit (Basel I) and liquidity ratio (Basel II) in Nigeria. More so, it is evident that commercial bank recapitalization reform matters over the CBN lending rate reform in the short run because commercial bank recapitalization reform induces economic growth significantly. the findings lend credence to the ongoing commercial bank recapitalization exercise aimed at increasing commercial banks' capital base from N25 billion to N200 billion. The study thus recommends that the regulatory bodies of commercial banks in Nigeria should enforce the implementation of Basel III accord which requires the simultaneous use of loan-to-deposit and liquidity rate to increases the Nigerian commercial banks liquidity level. The CBN should also evaluate the commercial banks liquidity deficits and regularly augment them through the implementations of bank recapitalization and lending rate reforms in Nigeria. Though this study is limited to linear and interaction regression, the future research should test for the decomposition regression analysis of the different phases of bank recapitalization and lending rate reforms and other reforms to provide more insights to what phase(s) of these reforms really inhibits or promotes commercial banks liquidity and thus, ultimately impact economic growth in the existing literature.

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