EPOSIT MONEY BANKS LIQUIDITY MANAGEMENT MEASURES AND CAPITAL FORMATIONS DILEMMA IN NIGERIA.

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Abstract

The study investigated liquidity management Measures of banks and capital formations in Nigeria covering the periods 1981 to 2023. Liquidity management was captured using liquidity ratio, loan-to-deposit ratio; treasury bills subscriptions by Deposit Money Banks and savings/deposit rate. Capital formations on the other hand was proxied by gross fixed capital formations (GFCF). Data on these variables were collected from the Central Bank of Nigeria (CBN) statistical bulletin. The Autoregressive Distributed Lag (ardl) approach to cointegration analysis was used to analyse the data. Results from statistical estimations revealed the existence of long run association between liquidity management measures of Deposit Money Banks and capital formations in Nigeria. The study further revealed that, short-run distortions can be significantly corrected in the long-run at the speed of 37.96 %. Based on results, it was advised that existing liquidity management measures adopted by banks should be sustained given its significant effects on capital formations in Nigeria. The said measures should further be deepened for optimum results viz-a-viz capital formations in Nigeria.

Keywords: *Deposit Money Banks, Liquidity Management, Capital Formations.*

Introduction

There is no doubt that banking business revolves around borrowing funds from different economic units and lending of same to various sectors of the economy for productive purposes. Deposit money banks borrow from customers by way of accepting various forms of deposits (savings, current and time deposits) with the understanding that these customers can always have access to their deposits under certain conditions especially in the case of time deposits, otherwise known as fixed deposits. These mobilized funds via deposits are regarded as banks deposit liabilities. More so, given that lending is an essential function of deposit taking bank with profit making motive, banks lend these deposits received to those in need of credit under strict credit administration conditions and rules. Thus, Elijah, Jaya and Jacklinne, (2017), asserted that banking is the art of borrowing on short term and lending on long term. It involves acceptance of deposits from the public and giving out loans for the purposes of consumption and investments to make a profit.

However, in the process of banks discharging their fundamental obligations of deposit taking to serve the credit needs of economic units, incurres liquidity risk. This stems from the obvious inevitable gap of maturity-mismatch that arises from the time frame involved in borrowing and lending activities. This makes adequate liquidity a necessary requirement to manage this risk. Thus, adequate liquidity is an important factor and condition precedent in banking. To be liquid relates to the ability of a bank to maintain sufficient funds to pay for its maturing obligations. It is the bank's ability to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demand while abiding by existing reserve requirements. This whole activities centres around banks' liquidity management.

Liquidity management therefore involves the strategic supply or withdrawal from the market or circulation the amount of liquidity consistent with a desired level of short-term reserve money without distorting the profit making ability and operations of the bank. It relies on the daily assessment of the liquidity conditions in the banking system, so as to determine its liquidity needs and thus the volume of liquidity to allot or withdraw from the market, (Elijah, Jaya & Jacklinne 2017). Dzapasi (2020) noted that liquidity can be managed using different approaches like holding large amounts of liquid assets as reserves, lending short term self-liquidating loans, investing in marketable securities, concentrating on the reputation and ability of the borrower to repay borrowed funds, to increasing the deposit rates offered for funds. The main essence of these measures are all geared towards having a good trade-off between bank deposits and loans. This attests to the reason why liquidity can be measured using loan-to-deposit ratio. Such loans are assets to the bank because of the recurring revenue that they create. Thus, there is no gain saying the fact that Deposit Money Banks make so much money from their lending activities which comes from banks deposit liabilities or time deposit investments. Azeez and Baruwa (2013), observed that in return for using savers funds, banks pay such savers/investors (customers) small amount of interest on their deposits, while they lend this same money out to customers at higher interest. The difference between both interests constitutes profit to banks

Bank loans are used by individuals, corporate organizations and the government for investment purposes. Such investments increase the capital stock of a country and this result to capital formation (Chirinko & Morris, 2014). Basically, capital formation is the increase in the capital stock of a country that results from investment spending. According to Dwanti (2021), it involves foregoing current consumption, and it is less than investment because of depreciation, the amount of existing capital that disappears due to normal wear and tear or due to obsolescence as technology improves. Therefore, banks in the course of managing their liquidity and carrying out their

intermediation functions make funds available for investment purposes and this in turn gives rise to and as well have effect on capital formations of a country.

The financial intermediation function of banks especially Deposit Money Banks helps them to adequately manage their liquidity needs and meet up with contractual obligations with depositors and borrowers of funds. According to Nwankwo (2004), this practice is at the center of banks management and deposit money banks all over the world, including those in Nigeria, abide by it. However, Anaele, Uzoakoli and Wambu, 2019) noted, that in spite of the wide acceptability of liquidity management as a bank management practice, it is surprising to note that the value of capital formation in Nigeria does not measure up with what is obtainable in other developing countries like South Africa, Egypt and Rwanda. Also, sufficient or adequate empirical studies on the effects of liquidity management measures on capital formation especially in the case of Nigeria seems to be lacking. Related studies were majorly on liquidity creation, investment and growth, financial performance, etc (Beck, Dottling, Lambert & Dijk, 2022; Berger & Sedunov, 2017; Bencivenga & Smith, 2021). It was on these premise that this paper sought to examine the effect of banks liquidity management measures on capital formation in Nigeria.

Review of Related Literature

Liquidity is an important factor for any business concern. Possession of adequate liquidity to meet daily operations and commitments is very essential to the health of the organization. Therefore, it is important to manage liquidity effectively and ensure that cash is in the right place at the right time. Liquidity is a financial concept that has been variously defined by scholars for different reasons. According to Adebayo, Adeyani and Olabode (2021) liquidity is a financial term which means the amount of capital that is readily available to banks for investment. Acharya and Naqvi (2022) believed that liquidity is the speed and certainty of converting an asset to cash at the discretion of the asset owner. Okanya, Efanga and

Oluseun, Paseda (2021), confirmed this view by asserting that liquid assets could be monetized at minimal cost and loss. It can be seen as the ability of companies to meet their maturing financial obligations and also connotes the amount of capital that is available for major investments. Differently put, it describes how quickly and profitably an asset can easily be converted into cash. Thus, from banking perspectives, liquidity refers to the capability of a bank to meet its financial obligations as soon as they fall due.

It is important to note that customers confidence on banks is largely dependent on the availability of funds on time. Therefore, management of liquidity is critical to the successful operations of all banking institutions. According to Lartey, Antwi and Boadi (2013), liquidity underscores the ability of banks to meet its contractual obligations on due dates and include in the normal course of business, those lending and investment commitments, deposit withdrawals as well as liability maturities. It is often seen as a pre-condition for the daily operation of banks and very significant to banks' both internal and external environments in relation to their day to day operations (Edem, 2017). Liquidity that is poorly managed can damage proper functioning of banks as they may fail to meet customer demands for funds on time. This will lead to strained relationships with bank customers and is, therefore, imperative to develop a strategy for efficient liquidity management. This could be in the form of appropriate procedures for measuring, monitoring and managing liquidity (Agbada & Osuji, 2013). There is no doubt that liquidity and its efficient management are the main components for a robust banking system in a country. Dzapasi (2020) noted that an effective liquidity management in banks should ensure a good balance between inflows and outflows of cash; and the adoption of such a practice among all banks that will lead to the creation of a stable banking sector. Efficient liquidity management will guarantee successful business operations, help increase return on assets and improve earnings and capital (Businge, 2017). Banks can achieve liquidity by shortening asset maturities; lengthen liability maturities,

issuance of more equity, reduction of contingent commitments etc. (Okanya, Efanga & Oluseun Paseda, 2021).

Liquidity management therefore refers to the planning and control of liquid assets either as an obligation to customers financial needs or as a measure to adhere to the monetary policies of the Central Bank (Bassey, Tobi, Bassey & Ekwere, 2016). For a commercial bank to plan or manage its liquidity position, it must comply firstly with the legal requirement concerning its cash position. However, it is very essential for banks to manage and maintain adequate funds for operations so as to avoid excesses or deficiencies of the required primary reserves. Where there is a decline in the market price of securities or where additional funds needed to correct the bank reserve position for a short time, it will be definitely expensive to secure securities than to borrow from another bank. Moreover, it may be more desirable to borrow for bank's liquidity needs than to call back outstanding loan or cancel outrightly or place embargo on new loans, a situation that will reduce the customer confidence in the bank. Effective liquidity management therefore involves obtaining full utilization of all reserves. The primary reserves are made of vault cash, cash balances or excess reserves with the CBN, as well as deposits with other banks, both locally and abroad (CBN, 2022). They are maintained to satisfy legal and operational requirements. While the secondary reserves are those liquid assets that can be converted into cash without impairment of the principal sum invested. Secondary reserves are characterized by short maturity, high credit quality and high marketability. The secondary reserves are held primarily to meet both anticipated and unanticipated short-term and seasonal cash needs from depositors. They contribute to that attainment of both profitability and liquidity objective of the bank (Bassey, Tobi, Bassey & Ekwere, 2016).

From the foregoing, it is evident that a bank can be considered liquid if it stores enough cash and other liquid assets together with the ability to raise funds quickly from other sources to enable it meet its payment obligations and financial commitments in a timely manner (Nwankwo, 2004).

Hence, in the literature, there are many ways the liquidity of bank can be measured. These includes: loan-deposit ratio, loan-liability ratio, liquid asset ratio, cash ratio, capital adequacy ratio, liquidity ratio and cash reserve ratio. Generally, these measures of bank liquidity assess a bank's ability to meet its short-term financial obligations, such as withdrawals, deposits, and loan repayment.

On the other hand, Capital formation or capital accumulation refers to the process of creating and accumulating capital assets. It is defined as man-made means of production. It includes machinery, plant and buildings, means of transport and communication, electricity plants, and social overheads like roads, railways, schools, colleges, hospitals, etc. (Dwivedi, 2008). According to Renston and Harry (2017), creating or acquiring man-made means of production is known as capital formation or capital accumulation. There are four major types of capital formation which are physical capital formation (creating tangible assets like buildings and machinery), financial capital (accumulating financial assets like stocks and bonds), human capital formation (relates to developing skills and knowledge like education and training) and intangible capital formation (creating intellectual property like patents and copyright).

Capital Formation enhances the availability of capital per worker. A high capital/labour ratio enhances the productivity of labour. In other words, a larger quantity of goods and services are produced per unit of time. Capital formation requires saving men and material resources from their use in consumer goods and transforming them into producer goods. Hence, in economic terms, capital formation means sacrificing current consumption and saving incomes to be invested in capital goods (machinery, plant, building, equipment etc.). In general, countries with high rate of savings and investments have a higher rate of economic growth. Also, as the rate of savings and investments increases, the rate of economic growth increases also (Lucky & Uzah, 2016). In essence, capital formation is determined by increase in the volume of real savings, mobilization of savings and investment savings. This means

capital formation is a monetary phenomenon (Jhingan, 2004).

Capital formation can be measured using Gross Domestic Product (GDP), gross fixed capital formation (GFCF), net domestic product (NDP), or capital formation ratio (Shuaib, Igbinosun & Ahmed, 2015). Gross fixed capital formation measures the total value of new fixed assets added to an economy during a specified period, typically one year (Kanu & Ozurumba, 2014). It is given as total value of new fixed assets plus net changes in inventories plus net acquisition of valuables. Invariably, it can be given as gross domestic product (GDP) less consumption of fixed capital (CFC) plus net capital exports. The components of GFCF are: building and structures; machinery and equipment; transportation equipment; intellectual property products (e.g. software, research); and other fixed assets (e.g. land improvement, geological exploration). However, the exclusions are: second hand assets, inventory changes, and intangible assets (e.g., goodwill and patents). Thus, gross fixed capital formation measures investment in physical capital, indicates economic growth potential, reflects business confidence, and influences productivity and competitiveness. GFCF is called "gross" fixed capital formation because the measure does not make any adjustments to deduct the consumption of fixed capital (depreciation of fixed assets) from investment figures. However, net fixed investment includes the depreciation of existing assets from the figures for new fixed investment, and is called net fixed capital formation (Sarkar, 2016). In essence, gross fixed capital formation is also referred to as investment because it covers the acquisition of produced assets (including purchases of second-hand assets), including the production of such assets by producers for their own use, minus disposals but not depreciation (wear and tear) (Sarkar, 2016).

Theoretical Review
The following theories are related to bank liquidity management and capital formation – commercial loan theory, shiftability theory, anticipated income theory, the neoclassical growth theory and Harrod-

Domar Growth theory. The most suitable theory for this study is the anticipated income theory, the neoclassical growth theory and Harrod-Domar Growth theory. The anticipated income theory of liquidity supports Deposit Money Banks in giving out term loans provided the borrower has the ability to repay such loan out of his anticipated or future stream of income. Thus, the theory says it is quite alright for a bank to make long-term non-business loans, provided the borrower has the ability to repay the loan out of future earnings. The theory relates with the neoclassical growth and Harrod-Domar growth theories since such borrowed funds (long term loans) are used for investment purposes, which will end up increasing the capital stock of a country.

The anticipated income theory was developed by Prochanow in 1944, and the theory holds that a bank's liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to customers (Ukeje, 2021). Here, liquidity can be planned if the scheduled loan payments by a customer are based on the future earnings of the borrower. According to Ekezie (2017) the theory emphasizes the earning potential and the credit worthiness of a borrower as the ultimate guarantee for ensuring adequate liquidity. In other words, the anticipated income theory stresses on the earning power and the credit worthiness of the borrower as the major source of bank liquidity. Thus, the doctrine urges banks to examine the reputation of the borrower and the ability and willingness to pay. The theory agreed with granting long term and non-business loans by banks since it will be repaid out of the future earnings of the borrower (Bassey, Tobi, Bassey & Ekwere, 2016).

The neo-classical theory of growth was an offshoot of the neo-classical economic school of thought. According to Dwivedi (2008), the theory is anchored on the following set of assumptions: perfect competition in commodity and factor markets; factor payments equal their marginal revenue productivity; A variable capital/output ratio; and existence of full employment. Hence, the theory has it that rate of economic growth depends on the growth rate of capital stock, labour supply,

and technological progress over time. In other words, the economic growth of a country is a function of capital formation (capital stock), labour supply and technological advancement of a country. Thus, the relationship between the national output of a country and these variables can be expressed in a linear function as:

$$Y = F (K, L, T) \quad ………………………………………….. (2.2)$$

Where:

K = Stock of capital;
L = Labour supply;
T = Scale of technological progress

It is expected that a positive relationship exists between stock of capital, labour supply, technological progress and national output.

The proponents of the Harrod-Domar growth theory are Roy Harrod and Evsey D. Domar; who in their separate writings examined and explained the conditions and requirements of steady economic growth. They consider capital accumulation (formation) as a key factor in the process of economic growth. Harrod and Domar emphasized that capital accumulation (net investment) has a double role to play in economic growth. First, it generates income and secondly, it increases the production capacity of the economy. However, it states that a necessary condition of economic growth is that the new demand (or spending) must be adequate enough to absorb the output generated by the new investment, i.e., the increase in capital stock. Otherwise, there will be excess or idle production capacity (Jhingan, 2014). According to Dwivedi (2008), this condition should be fulfilled year after year in order to maintain full employment and to achieve steady economic growth in the long term. This is the central theme of this this theory/model.

Empirical Literature Review

Igwenwanne, Ozurumba, Nwaimo, Anyanwu and Ubah (2023) examined the effect of liquidity management on banks' performance in Nigeria for the period 2012 to 2021. Liquidity ratio, cash ratio, efficiency ratio and loan-to-deposit ratios were

regressed against Tobin's Q using Fixed Panel Least Square method (FPLSM) in the model estimation. The findings of the study indicated that liquidity management and efficiency ratio have a positive and significant relationship with the performance of Deposit Money Banks in Nigeria. On the other hand, cash ratio has a negative and insignificant relationship with the performance of Deposit Money banks in the country.

Eke and Ringim (2022) studied the impact of liquidity management on the financial performance of quoted consumer goods companies domiciled in Nigeria. The population of the study consisted of all consumer goods companies whose shares were traded on the floor of the Nigeria Stock Exchange (NSE) from 2009 to 2020. The sample size was 7 consumer goods companies. The Ordinary Least Squares (OLS) regression method was employed. The results showed a positive and a weak direct relationship between cash ratio and return on assets. Also, the results showed a negative and weak inverse relationship between current ratio and return on assets. The results also showed a negative and a weak inverse relationship between quick ratio and return on assets of quoted consumer goods companies in Nigeria.

Danmulki, Agbi and Mustapha (2022), empirically investigated the effect of liquidity management on the financial performance of listed deposit money banks in Nigeria, 2010-2019. Capital adequacy ratio, liquidity ratio and loan to deposit ratio were liquidity management measures employed while financial performance was proxied with Tobin's Q. Panel multiple regression technique was adopted as the technique of data analysis, while Stata 13 was used as the tool for analysis of data. Findings revealed that capital adequacy ratio have positive and significant effect on financial performance of listed deposit money banks in Nigeria. Liquidity ratio has significant but negative effect on financial performance of banks in Nigeria which connotes that high level of liquidity ratio will lead to low level of performance strategically for banks. Loan to deposit ratio has positive but insignificant effect on financial performance.

Okanya, Efanga and Oluseun Paseda (2021) analyzed the impact of liquidity management on commercial bank performance in Nigeria. The secondary data used was obtained from the Central Bank of Nigeria Statistical Bulletin of 2019. Total Assets of Commercial Banks in Nigeria served as a proxy for Banks performance; while liquidity ratio, cash reserve ratio, and loan-to-deposit ratio were adopted as independent variables. The Auto-Regressive Distributed Lag (ARDL) Model was used for estimation and inferences were drawn from there. Findings confirmed the significant impact that Liquidity management has on Nigerian Commercial Bank performance.

Onyekwelu, Chukwuani and Onyeka (2018) examined the effect of liquidity on the financial performance of deposit money banks in Nigeria using a sample of five (5) banks. Data for the study were collected from these banks for a ten years period (2007-2016). These data were analyzed using multiple regression analysis. Results showed that liquidity has positive and significant effect on banks' profitability ratios and that liquidity also has positive and significant effect on return on capital employed.

Osuji (2018) examined the impact of liquidity management on deposit money banks' performance in Nigeria. The study spanned from 2000-2016. Time series data were used and gotten from annual reports of the banks under study. The estimation technique applied were ordinary least square (OLS). The result revealed that all the independent variables except debt ratio have significant impact on returns on equity of deposit money banks in Nigeria.

Lucky and Uzah (2018) examined the factors that determine capital formation in Nigeria with the objective to test Jhingan's propositions for sources of capital formation in Nigeria. Secondary data was sourced from Central Bank of Nigeria (CBN) Statistical Bulletin. Thus, Gross Fixed Capital Formation was modeled as a function of broad money supply, credit to private sector, gross national savings, commercial banks' lending rate, exchange rate, inflation rate, external debt, public expenditure, government revenue, terms of trade and operating surplus. Cointegration test,

Augmented Dickey Fuller unit root test, Granger causality test and Vector Error Correction Model were used to test the dynamic relationship between the variables. Findings proved that broad money supply, gross national savings, exchange rate, external debt, and terms of trade have negative and insignificant effects on capital formation while credit to private sector, lending rate, inflation rate, public expenditure, government revenue and operating surplus have positive and insignificant effects on capital formation in Nigeria.

Umerede (2016) investigated the possible determinants of capital formation in Nigeria, 1980 - 2004. Secondary data was used alongside the OLS technique which included tests for stationarity and cointegration. Empirical results showed a positive influence of cumulative foreign private investment, index of energy consumption, and total banking system credit to the domestic economy; and a negative influence of gross national savings, domestic inflation rate, maximum lending rate, foreign exchange rate and debt service ratio on capital formation. The study also discovered that foreign exchange rate leads capital formation in Nigeria, followed by index of energy consumption and then, debt service ratio.

Torbira and Ogbulu (2014) empirical investigated the relationship between fund mobilization by insurance companies and gross fixed capital formation (GFCF) in Nigeria and specifically how the latter responds to stimuli emanating from the insurance companies. A five variable-predictor multivariate regression model was estimated and analyzed. The short run results revealed those four explanatory variables namely: premium from fire, accidents, motor vehicles and employee liabilities insurance policies positively and insignificantly correlate with gross fixed capital formation while the relationship between premium from marine insurance policies and GFCF is both negative and insignificant. In the long run, the fund mobilization variables by insurance companies positively and significantly impact on the growth of gross fixed capital formation. In addition, the Granger causality test provided no evidence of causality among the variables.

A careful review of related empirical literatures showed dearth of studies in the area of bank liquidity management measures and capital formation in Nigeria. Hence, this study is novel in the sense that it ranks amongst the first on the effects of bank liquidity management measures on capital formation in Nigeria with respect to determining the extent to which liquidity ratio, savings/deposit rates, treasury bills subscription by banks and loan-deposit ratio have affected gross fixed capital formations.

Methodology
The study adopted the quasi-experimental design aimed at establishing causal relationship between banks liquidity management measures and capital formation in Nigeria. The secondary data used in this work were obtained from Central Bank of Nigeria (CBN) statistical bulletin 2023. The Autoregressive Distributed Lag (ARDL) approach to cointegration analytical technique for data analysis.

Model Specification
The model is functionally expressed as:

$gfcf = f(lqr, svr, ldr, tbs)$ ………………..……….. (1)

In econometric form, the above functional model was translated as:

$gfcf_t = b_{0c} + b_1 lqr_t + b_2 svr_t + b_3 ldr_t + b_4 tbs_t + \mu_t$ ……………… (2)

Where;

gfcf	=	gross fixed capital formation
lqr	=	liquidity ratio
svr	=	savings rate
ldr	=	loan-to-deposit ratio
tbs	=	treasury bills subscriptions by DMBs
f	=	functional relationship

b_0 =   *Constant term of the model*

$b_1…b_4$ =   *slopes of the model*

μ =   *error term*

t =   *current Year*

Data Estimation and Results
Table 1: Log of Data set used for the study.

Year	Gfc	Lqr	svr	Tbs	ldr
1981	2.095254	1.585461	0.778151	0.735471	1.872156
1982	2.107538	1.607455	0.875061	0.876339	1.92737
1983	2.080134	1.737987	0.875061	1.198814	1.923244
1984	1.990257	1.813581	0.977724	1.394818	1.913284
1985	1.940242	1.812913	0.977724	0.322116	1.825426
1986	2.036889	1.561101	0.977724	1.350543	1.920123
1987	2.088002	1.667453	1.146128	1.219425	1.862728
1988	2.140184	1.653213	1.161368	1.319706	1.825426
1989	2.337958	1.605305	1.214844	1.142633	1.905256
1990	2.419568	1.646404	1.274158	1.233418	1.822822
1991	2.455743	1.586587	1.155032	1.408404	1.776701
1992	2.598362	1.463893	1.206826	0.650677	1.741939
1993	2.747525	1.625312	1.221675	0.877463	1.632457
1994	2.871627	1.685742	1.130334	0.72781	1.784617
1995	3.062007	1.519828	1.100715	0.959018	1.865104
1996	3.174569	1.634477	1.067815	1.505542	1.862728
1997	3.229878	1.604226	0.680789	1.044892	1.884229
1998	3.289735	1.670246	0.739572	1.1094	1.871573
1999	3.321916	1.78533	0.726727	1.586232	1.737193
2000	3.381082	1.806858	0.723456	1.76535	1.70757
2001	3.393307	1.723456	0.739572	2.83644	1.817069
2002	3.488379	1.719745	0.618048	2.999529	1.797787
2003	3.585036	1.706718	0.613842	0.144263	1.79134
2004	3.674284	1.703076	0.622214	3.147074	1.836482
2005	3.761374	1.700487	0.583199	3.099403	1.850033
2006	3.900264	1.910733	0.49693	2.887375	1.985952
2007	3.84495	1.618625	0.549616	2.768871	1.920414
2008	3.877099	1.57652	0.452569	2.583957	1.939079
2009	3.962705	1.421485	0.427459	2.942692	1.925828
2010	3.962987	1.437583	0.343502	3.169886	1.718393
2011	3.995512	1.623456	0.149386	3.301301	1.651023
2012	4.012076	1.69652	0.230104	3.330817	1.626473
2013	4.059869	1.664968	0.336184	3.264052	1.574719
2014	4.13334	1.582819	0.529003	3.297769	1.803505
2015	4.149594	1.626824	0.554148	3.42918	1.84247
2016	4.179097	1.662286	0.573625	3.367186	1.902818

2017   4.228096   1.738699   0.615599   3.397228   1.862378
2018   4.390056   1.813207   0.609904   3.246368   1.779327
2019   4.554658   2.017878   0.596547   3.268524   1.768828
2020   4.615461   1.829937   0.508417   3.382648   1.780556
2021   4.765623   1.786716   0.227956   3.48282   1.781594
2022   4.814428   1.73981   0.36883   3.488328   1.790285
2023   4.918498   1.715753   0.696441   3.768555   1.802432

Source: Researcher's Computations, 2025

Table 2: Unit root test results

Variables	ADF Statistic	5% Critical Value	Probability Value	Level of Integration	Remark
gfc	-4.267089	-2.935001	0.0016	1(1)	Stationary at 1st differencing
ldr	-4.828167	-2.938987	0.0003	1(0)	Stationary at level
lqr	-7.335161	-2.935001	0.0000	1(1)	Stationary at 1st differencing
svr	-5.118541	-2.935001	0.0001	1(1)	Stationary at 1st differencing
tbs	-8.528402	-2.936942	0.0000	1(1)	Stationary at 1st differencing

Source: e-views 2025.

The Augmented Dickey fuller unit root test results on the above table revealed that except for loan-to-deposit ratio that was stationary at level, all other variables were stationary at first differencing. This informed the use of the ardl technique for data analysis.

Table 3: ARDL Bounds Test
Date: 08/29/25   Time: 03:00
Sample: 1985 2023
Included observations: 39
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	20.58316	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: e-views output, 2025.

The Ardl bounds test result showed that the f-statistic of 20.58316 is greater than the lower 1(0) and upper 1(1) bounds at 5% level of significance. This confirmed the existence of long run relationship between liquidity management measures of banks and capital formations in Nigeria.

Table 4: ARDL Cointegrating And Long Run Form
Dependent Variable: GFCF___B

Selected Model: ARDL(2, 4, 3, 3, 2)

Date: 08/29/25   Time: 02:58

Sample: 1981 2023

Included observations: 39

	Cointegrating Form			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GFCF___B(-1))	-1.115845	0.214972	-5.190648	0.0000
D(LDR)	-12.391249	28.897796	-0.428796	0.6727
D(LDR(-1))	17.644946	35.792183	0.492983	0.6274
D(LDR(-2))	-13.801383	35.284169	-0.391149	0.6998
D(LDR(-3))	-54.459585	33.914729	-1.605780	0.1240
D(LQR)	133.274980	22.643287	5.885850	0.0000
D(LQR(-1))	-34.830083	25.771847	-1.351478	0.1916
D(LQR(-2))	-72.309253	31.120308	-2.323539	0.0308
D(TBS___B)	0.026059	0.893218	0.029175	0.9770
D(TBS___B(-1))	-0.149792	0.855472	-0.175099	0.8628
D(TBS___B(-2))	-2.033507	0.745404	-2.728060	0.0130
D(SAVINGS_RTE)	-293.438068	149.046510	-1.968768	0.0630
D(SAVINGS_RTE(-1))	-598.288838	219.655401	-2.723761	0.0131
CointEq(-1)	0.379621	0.089261	4.252960	0.0004

Cointeq = GFCF___B - (-73.4109*LDR -573.5040*LQR -3.3204*TBS___B

   -748.7764*SAVINGS_RTE + 40568.3177)

	Long Run Coefficients			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDR	-73.410870	113.807742	-0.645043	0.5262
LQR	-573.503991	225.508596	-2.543158	0.0194
TBS___B	-3.320369	3.209243	-1.034627	0.3132
SAVINGS_RTE	-748.776374	364.116003	-2.056423	0.0530
C	40568.317738	17924.287184	2.263316	0.0349

Source: e-views Output, 2025

The above table showed the long run relationship of banks liquidity management measures and capital formations in Nigeria. Accordingly, All the measures adopted as proxied by t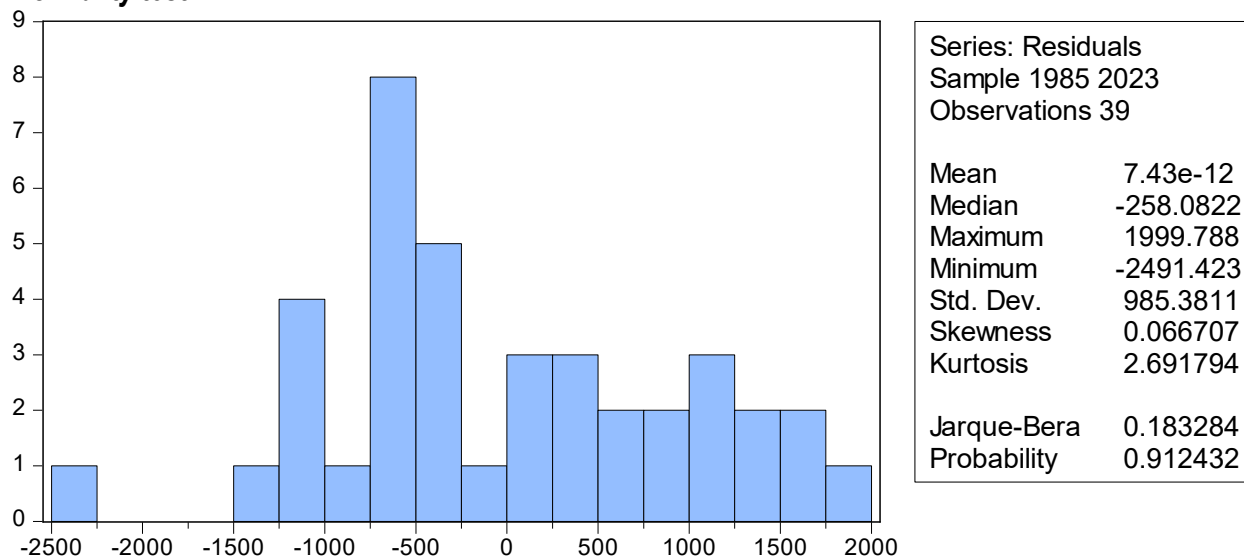he variables (except liquidity ratio – lqr) used in the study had negative and insignificant relationship with capital formations. Liquidity ratio was observed to have a negative but significant relationship with capital formations in the long run.

However and on a general note, the long run cointegration test result value of 0.379621 with significant t-statistic of 4.252960 and probability value of 0.0004 revealed that short run disequilibrium can be corrected in the long run at the speed of 37.96%.

Diagnostic tests
Normality test

Series: Residuals	
Sample 1985 2023	
Observations 39	
Mean	7.43e-12
Median	-258.0822
Maximum	1999.788
Minimum	-2491.423
Std. Dev.	985.3811
Skewness	0.066707
Kurtosis	2.691794
Jarque-Bera	0.183284
Probability	0.912432

Source. e-views output, 2025.

The Jaque-Bera probability value value of 0.912432 is greater than the 5% level of significance. Thus, it can be concluded that the model is normally distributed as expected.

Serial Correlation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.767523	Prob. F(2,18)	0.4788
Obs*R-squared	3.064583	Prob. Chi-Square(2)	0.2160

Source: e-views output, 2025.

The probability values of the Breusch-Godfrey Serial Correlation LM test are all greater than the 5% level of significance. This shows the absence of auto or serial correlation in the model estimations.

Heteroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.358178	Prob. F(18,20)	0.5331
Obs*R-squared	26.50945	Prob. Chi-Square(18)	0.0887
Scaled explained SS	5.897243	Prob. Chi-Square(18)	0.9966

Source: e-views output, 2025.

The p-values are all greater than the 5% level of significance. This shows that the errors are constant overtime.

Discussion of Results

The study set out to examine the effect of bank liquidity management measures on capital formations in Nigeria. The variables of the study included liquidity ratios, loan-to-deposit-ratios, savings/deposit rates and treasury bills subscriptions by Deposit Money Banks as liquidity

management measures, while the gross fixed capital formation was used to proxy capital formations. The unit root test results for the data used in analysis revealed a mixed order of integration (i.e 1(0) and 1(1)), which informed the use of the ardl method of analysis. It was observed that results emanating from the short-run analysis revealed that only liquidity ratio, treasury bills subscriptions and savings rate had positive and significant relationship with capital formations within the periods under study. It was also noted that given the positive coefficient value of 133.2750 and probability value of 0.0000; increases in liquidity ratios of banks also increases capital formations. On the same note, liquidity ratio lagged three periods (lqr-3) also had positive association with capital formations given the positive coefficients of 72.30925 and probability values of 0.0308 which is less than 0.05 level of significance. Furthermore, treasury bills subscriptions by deposit money banks lagged three periods was indicated to have positive and significant relationship with capital formations given the coefficient value of 2.033507 and probability value of 0.0130. Thus, confirmed that increases in treasury bills subscriptions increases capital formations. Previous years savings rate was also found to have positive and significant association with capital formations going by the coefficient values of 598.2888 and probability values of 0.0131. On a general note, the short run analysis showed that liquidity management measures of deposit money banks in Nigeria had positive and significant effect on capital formations in Nigeria. This was further confirmed by the f-statistic value of 421.5067 (0.000000) with durbin-watson statistic of 2.241566.

However, the long run effect of each of the variables used in the study showed that loan-to-deposit-ratio had negative and insignificant relationship with capital formations. This findings negates our a priori expectations. The general expectations in this regard will be as loan to deposit ratio increases, capital formations also moves in same direction but the reverse was the case. This by extension, may be as a result of the maturity structure of bank deposits. Deposit Money Banks basically specialize in the extension of short term than long term loans; whereas capital formations is a venture that requires long term funding. In addition, this depicts that banks are not good source of capital formation and where such exist, it is basically for working capital purposes.

Liquidity ratio was observed to have negative but significant relationship with capital formations. The more funds are being kept by banks for liquidity needs, it results to decrease in capital formations. High liquidity ratio amounts to low funds available for investments and vice-versa. This conforms with research expectations and shows that the policy is achieving its desired results.

On another note, treasury bills subscriptions by deposit money banks was observed to have inverse and insignificant relationship with capital formations in Nigeria within the period under study. Treasury bills are used by Central Bank of Nigeria to manage the liquidity of the economy (money supply). Depending on the policy target of the monetary authorities at a given point in time (expansionary or contractionary), when the rate on treasury bills increases, it becomes attractive; proceeds from the issuance treasury bills usually finds its way to the treasury of the regulators and sometimes not loaned out (as way of mopping excess liquidity in the economy). This means less funds will be available for loans unlike when the rate drops and banks begins to look out for market for their loans. Thus, this could be attributed to the reason of the inverse relationship.

The savings/deposit rates also had a negative and insignificant relationship with capital formations against a priori expectations of positive relationship. This may be due to the fact that increases in savings/deposit rates also increases the interest rates on money market instruments thereby making it more attractive for banks to invest. Increases in this rate also amounts to increases in lending rates making cost of funds or loans expensive and costly.

Remarkably, the ardl bounds test for long run analysis depicted the existence of long run relationship between the identified liquidity measures and capital formations in Nigeria. The f-

statistic value of 20.58316 was observed to be greater than the ardl lower 1(0) and 1(1) upper bounds test results at 5% level of significance. Specifically, it was important to note that in the long-run, all the liquidity management measures were found to have negative and insignificant association with capital formations. It was only, liquidity ratio that its negative relationship was observed to be significant. The long run cointegration test result value of 0.379621 with significant t-statistic of 4.252960 and probability value of 0.0004 revealed   that short run disequilibrium can be corrected in the long run at the speed of 37.96%.

Conclusion and Recommendations

The concern of this study was to examine the effect of bank liquidity management measures on capital formations in Nigeria between 1981 and 2023. The objective was to determine the effect of bank liquidity management measures (liquidity ratio, savings/deposit rates, loan-deposit ratios and treasury bills subscriptions by deposit money money banks) on gross fixed capital formation (GFCF) in Nigeria. As such, a regression model was specified for the study. The quasi-experimental research design and the ardl technique was adopted to analyse the secondary data collected from annual publications of the Central Bank of Nigeria (CBN). It was found that all measures of liquidity management (liquidity ratio, savings/deposit rate, loan-deposit ratio and treasury bills subscriptions) have positive effects on gross fixed capital formations in Nigeria. The following recommendations were made:

1. liquidity management measures instituted by the regulatory authorities and adopted by banks should be sustained given its significant effects on capital formations in Nigeria.

2, The monetary authorities should intensify efforts to come up with more and better liquidity management policies viz-a-viz savings/deposit rates and treasury bills subscriptions by deposit money banks, that will mop up cash in the system in favour of capital formations to achieve desired results.

3. Existing policies on liquidity ratio manipulations by the regulatory authority of banks should be sustained as it has achieved the desired positive and significant effects on capital formations in Nigeria.

4. Since the effect of loan-deposit ratio did not yield the desired result, it is imperative that measures like increasing deposit rates and reducing lending rates should further be considered in order to boost bank deposits and increase loans for capital formations.

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Appendices
ARDL MODEL ESTIMATE

Dependent Variable: GFCF___B
Method: ARDL
Date: 08/29/25   Time: 02:56
Sample (adjusted): 1985 2023
Included observations: 39 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LDR LQR TBS___B
    SAVINGS_RTE
Fixed regressors: C
Number of models evalualed: 2500
Selected Model: ARDL(2, 4, 3, 3, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GFCF___B(-1)	0.263776	0.170208	1.549727	0.1369
GFCF___B(-2)	1.115845	0.214972	5.190648	0.0000
LDR	-12.39125	28.89780	-0.428796	0.6727
LDR(-1)	-10.35643	27.90496	-0.371132	0.7144
LDR(-2)	-17.64495	35.79218	-0.492983	0.6274
LDR(-3)	13.80138	35.28417	0.391149	0.6998
LDR(-4)	54.45958	33.91473	1.605780	0.1240
LQR	133.2750	22.64329	5.885850	0.0000
LQR(-1)	-22.69990	24.90021	-0.911635	0.3728
LQR(-2)	34.83008	25.77185	1.351478	0.1916
LQR(-3)	72.30925	31.12031	2.323539	0.0308
TBS___B	0.026059	0.893218	0.029175	0.9770
TBS___B(-1)	-0.948875	0.755190	-1.256472	0.2234
TBS___B(-2)	0.149792	0.855472	0.175099	0.8628
TBS___B(-3)	2.033507	0.745404	2.728060	0.0130
SAVINGS_RTE	-293.4381	149.0465	-1.968768	0.0630
SAVINGS_RTE(-1)	-20.59920	230.4510	-0.089386	0.9297
SAVINGS_RTE(-2)	598.2888	219.6554	2.723761	0.0131
C	-15400.60	4277.378	-3.600477	0.0018

R-squared	0.997371	Mean dependent var		12151.54
Adjusted R-squared	0.995005	S.D. dependent var		19217.61
S.E. of regression	1358.254	Akaike info criterion		17.57232
Sum squared resid	36897086	Schwarz criterion		18.38277
Log likelihood	-323.6602	Hannan-Quinn criter.		17.86310
F-statistic	421.5067	Durbin-Watson stat		2.241566
Prob(F-statistic)	0.000000			

Note: p-values and any subsequent tests do not account for model selection.

Data Set on Variables of the study

Years	gfcf #'b	Lqr %	Svr %	tbs #'b	ldr %
1981	124.52	38.5	6.00	5.44	74.50
1982	128.10	40.5	7.50	7.52	84.60
1983	120.26	54.7	7.50	15.81	83.80
1984	97.78	65.1	9.50	24.82	81.90
1985	87.14	65.0	9.50	2.10	66.90
1986	108.87	36.4	9.50	22.42	83.20
1987	122.46	46.5	14.00	16.57	72.90
1988	138.10	45.0	14.50	20.88	66.90
1989	217.75	40.3	16.40	13.89	80.40
1990	262.77	44.3	18.80	17.12	66.50
1991	285.59	38.6	14.29	25.61	59.80
1992	396.61	29.1	16.10	4.47	55.20
1993	559.15	42.2	16.66	7.54	42.90
1994	744.09	48.5	13.50	5.34	60.90
1995	1,153.47	33.1	12.61	9.10	73.30
1996	1,494.75	43.1	11.69	32.03	72.90
1997	1,697.77	40.2	4.80	11.09	76.60
1998	1,948.65	46.8	5.49	12.86	74.40
1999	2,098.54	61.0	5.33	38.57	54.60
2000	2,404.82	64.1	5.29	58.26	51.00
2001	2,473.47	52.9	5.49	686.18	65.63
2002	3,078.78	52.5	4.15	998.92	62.78
2003	3,846.23	50.9	4.11	1.39	61.85
2004	4,723.72	50.5	4.19	1,403.05	68.63
2005	5,772.64	50.2	3.83	1,257.19	70.80
2006	7,948.12	81.42	3.14	771.57	96.82
2007	6,997.62	41.56	3.55	587.31	83.26
2008	7,535.27	37.72	2.84	383.67	86.91
2009	9,177.08	26.39	2.68	876.38	84.30
2010	9,183.06	27.39	2.21	1,478.72	52.29
2011	9,897.20	42.02	1.41	2,001.25	44.77
2012	10,281.95	49.72	1.70	2,141.99	42.31
2013	11,478.08	46.23	2.17	1,836.76	37.56
2014	13,593.78	38.27	3.38	1,985.04	63.61
2015	14,112.17	42.35	3.58	2,686.46	69.58
2016	15,104.18	45.95	3.75	2,329.09	79.95
2017	16,908.13	54.79	4.13	2,495.90	72.84
2018	24,550.24	65.04	4.07	1,763.47	60.16
2019	35,863.98	104.20	3.95	1,855.77	58.73

2020	41,253.55	67.60	3.22	2,413.51	60.33
2021	58,293.95	61.20	1.69	3,039.62	60.48
2022	65,227.13	54.93	2.34	3,078.42	61.70
2023	82,889.22	51.97	4.97	5,868.88	63.45

Source: CBN Statistical Bulletin, 2023