
MONEY MARKET INSTRUMENTS AND LIQUIDITY OF COMMERCIAL BANKS: A TIME VARIANT STUDY FROM NIGERIA

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ABSTRACT

This study examined the effect of money market instruments on the liquidity of commercial banks in Nigeria using time series data sourced from Central bank of Nigeria Statistical Bulletin from 1987-2020. Liquidity of commercial banks was modeled as the function of treasury bills, treasury certificates, commercial papers, bankers acceptance, certificate of deposits and government bonds. Ordinary least square methods were used as data analysis methods. The study found that 37.9 percent variation in liquidity of commercial banks was traced to the money market instruments. The estimated model found that government bonds, banker acceptance and treasury certificate have negative effect on liquidity of the commercial banks within the periods of the study, the negative effect of the variables contradicts our a-priori expectation and justifies reforms in the Nigeria money market. The coefficient indicates that a unit increase in the variables reduces commercial banks liquidity by 0.001, 0.29 and 0.39 percent. Commercial paper, certificate of deposits and treasury bills have positive effect on the liquidity of commercial banks such that a unit increase in the variables increases commercial banks liquidity by 0.05, 0.03 and 0.001 percent. The study concludes that money market does not really determine the liquidity of commercial banks in Nigeria. It recommends that regulatory authorities and the money market institutions should formulate policies that enhance operational efficiency of the money market for better liquidity management of the commercial banks.

Keywords: Money Market Instruments, Liquidity, Commercial Banks, Treasury Bills, Treasury Certificates, Commercial Paper.

INTRODUCTION

The financial stability of a bank can be tested in many ways. One of the quickest ways to see how well a bank is performing is to use liquidity ratios. A bank is considered to be liquid when it has sufficient cash and other liquid assets together with the ability to raise funds quickly from other sources, to enable it to meet its payment obligations and financial commitments in a timely manner. Liquidity ratios are the ratios that measure the ability of a bank to meet its short term debt obligations. These ratios measure the ability of a bank to pay off its short term liabilities when they fall due. Liquidity ratios basically allow banks a way to gauge their paying capacity on a short-term basis (Fecht, Nyborg & Rocholl. 2011).

Banks create liquidity on the balance sheet by financing less liquid assets with funds from relatively liquid liabilities. Banking system liquidity is vital to the sustainability of the financial system. Indeed a quick look into the global financial market crises between 2007 and 2009 stresses this point. Tensions appeared in global markets and even in Nigeria as liquidity in money markets declined significantly, following credit rationing in the interbank markets. The tightening of liquidity in the market and increasing default risk culminated in the intervention of central banks in the financial system.

A banking system with a very high loan to deposit ratio may be exposed to significant liquidity risk. For instance, during an economic downturn followed by significant loss in business and revenue of firms, the rate of non-performing loans will rise significantly, when this happens, the banking system faces a liquidity risk and may require intervention from the central bank to prevent a systemic crises. Banking system liquidity is imperative for macroeconomic sustainability given the role that the banking system plays in financial intermediation. Banks use liquid assets from deposits and other sources to fund illiquid assets that boost economic activities. However, the process of creating the needed liquidity is associated with some level of funding risk and hence systemic liquidity risk. Such liquidity risk are often triggered when there are perceived concerns of insolvency caused by poor asset quality.

The history of money market in Nigeria dates back to the April 1960 when Central Bank of Nigeria issued the first treasury bills. Commodities traded in the market vary from a maturity of 1 day to 12 months. The values of instruments traded in the market have continued to increase from as low as N11.75billion in 1981 to N48, 578.51billion in 2018 with an average value of N4332.828billion. Given its standard deviation of N10907.58billion, which exceeds the average value, there is a wide dispersion in the values of money market instruments traded over the study period of 38years (1981 to 2018) (CBN, 2018). Participants in the Nigerian money market include the CBN, the Nigerian Deposit Insurance Corporation and Debt Management Office, Federal Ministry of Finance, Deposit Money Banks, Microfinance Banks, Discount Houses and the private individuals. These participants deal in instruments such treasury bills, treasury certificates, certificates of deposits, commercial papers, bankers' acceptances(BAS) and other short term/medium term investments. Afiemo (2013) noted that treasury bills (TBS) are short-term money-market securities issued by government at a discount and mature within 3 to 12 months from the date of issue. Treasury certificates are similar to TBS but are issued at par and pay fixed interest rates. TCS serve to bridge the gap between the TBS and long term government securities, which mature after a period of one to two years.

The money market is an important component of liquidity management framework as it is the first avenue to place or borrow short-term funds, in Nigeria; the money market instrument is a

means of managing liquidity. Investment in treasury bills, commercial papers, banker's acceptance and inter-bank placement are short-term liquidity management instrument (Okereke, 2003). Liquidity has been found to be one of the reasons for the Nigerian banking crisis of 1980s and 1990s (Onoh, 2002). Recognizing this fact and the importance of liquidity management in achieving objectives and enhance deposit money banks profitability performance, government has over the years formulated policies of leveraging Nigerian banks the challenge of illiquidity in the banking sector. For instance the money market instrument has been deepened to meet commercial banks investment of excess liquidity and source of liquidity shortage.

The effect of money market instrument has well been studied, however the studies focused on money market instrument and economic growth. Gbenga, Olorunleke, Tajudeen and Hamzat (2021) investigated the relationship between money market and economic growth using annual time series data, Krokeme and Eze (2021) examined the effect of money market instruments on capital market performance in Nigeria using time series spanned data over a period while Umasom (2018) used multivariate model to study money market instruments and Nigeria inflation rate.

LITERATURE REVIEW

Money Market

The money market is a market for short-term funds, and as the name suggests, it is a market in which money is bought and sold. The market is used by business enterprises to raise funds for the purchase of inventories, by banks to finance temporary reserve loss, by companies to finance consumer credit and by government to bridge the gap between its receipts and expenditure. Unlike the market for textiles, for example, there is no place that one can call a money market. The activities in the money market can be concentrated in a particular street. Thus, it is a market for the collection of financial institutions set up for the granting of short-term loans and dealing in short-term securities, gold, and foreign exchange (Anyanwu, 1993).

No money market existed in Nigeria prior to the establishment of the Central Bank of Nigeria. This is however not to say that a market for short-term funds did not exist before then. Before the advent of commercial banking, there existed some elements of short-term lending and borrowing based on commercial papers. The market was an integral part of the London Money Market. It worked by moving funds from London to Nigeria during the season in order to finance the export of produce. At the end of the season, the funds were moved back to London, when there was all-season money-market activity. The establishment of the Nigerian money market involved, on the part of the Central Bank of Nigeria, repatriating these roving funds to Nigeria for the country's economic development. The development of the Nigerian money market is not unconnected with the systematic introduction of the various instruments used in the market. The instruments traded in the Nigerian Money Market are treasury bills, treasury certificate, call money, bankers' acceptance (bill of exchange), commercial papers or commercial bills and certificate of deposits.

Money Market Instruments

Money market instruments are issued by obligor or obligee of the highest credit rating, and are characterized by a high degree of safety of principal (Uremadu, 2005). Maturities of money market instruments may be as long as one year, but normally they are of three months (90 days) or less. As a practical matter these instruments can be arranged to span only a few days or even one day. Accordingly, these instruments involve small risk of loss due to change in interest rates (Ogunleye, 2001). Probably the best way to obtain a clear impression of the

money market is to understand the mechanics of the various debt instruments traded on it. The discussion that follows explain the operation of these debt instruments (Uremadu, 2005).

Treasury Bills

A treasury bill is one of the most important money market instruments used in Nigeria (Ezema, 1993). Treasury bills are issued by the Federal Government through the Central Bank. When the government wants to borrow to meet its budgetary needs, treasury bills are then issued. Treasury bills are particularly important to, and are also popular with commercial banks (Ezema, 1993).

Moreover, treasury bills count as liquid assets of commercial banks while at the same time earning handsome interest rate for the holders. Above all, it is easily marketable. Banks that are faced with liquidity problems (needs) can easily sell treasury bills for cash in the money market. A treasury bill is a much secured means of holding short-term assets; it also has a stable price (Ezema, 1993).

Treasury Certificates

Treasury certificates are usually issued for a period of one to three years, like treasury bills which have a life span of about 90 days. Treasury certificates yield a much higher interests than treasury bills. They can equally count for liquidity requirements of commercial banks like treasury bills (Ezeama, 1993). Treasury certificates are other avenues through which commercial banks invest their surplus funds without defaulting in liquidity requirements stipulated by the Central Bank. They are a secure investment with no risks of default.

Long-Term Government Stocks

These are usually known as Federal Republic of Nigeria Development Stocks (Ezema, 1993). In most cases, they are issued at par and redeemed at par. Interest thereon is payable half-yearly at fixed rates. The advantage of EDS is that the Central Bank is always ready to buy them back at any time, at market value. Besides, commercial banks are allowed to hold some of their assets in development stocks.

Certificate of Deposit

Certificate of Deposit were introduced in Nigeria in 1975 as interbank debit instruments at a time where there was a shortage of government short-term debt instruments and the banking system was also experiencing excess liquidity (Falegan, 1987 and Uremadu, 2005). It was introduced to mop up excess liquidity. The main advantage of CDs are that they can be discounted in the event of urgent needs for cash, the commercial banks invest their excess funds to earn interest returns on them; and they can be purchased by banks, in preference to making interbank loans for fixed terms (Ezema, 1993; Beecham, 1994 and Uremadu, 2005).

Commercial Papers

Commercial papers are the means by which commercial houses, through their bankers (mostly merchant or investment banks) raise short-term funds of three to six months (Ezema, 1993). This is only possible if such funds attract interest rates less than bank overdrafts. For instance, if the interest on an overdraft is 18%, and the commercial paper rate is between 16% and 17%, the company may opt for commercial paper. It is the standing of the company that matters and not that of the agent bank, since the paper does not carry the guarantee of the agent bank. This observation will compel companies that want to issue CPs to strive to raise their market value through better performance and other indices of performance rating (Uremadu, 2004). The main attraction to an investor is that interest is paid up front. It means that the investor only pays the discounted value, while at maturity he receives the face value

of the commercial papers. The risk therefore is that if the borrower should go bankrupt suddenly the investor may lose his investment (Ezema, 1993). It is usually for investors in commercial papers to just seek the advice of their bankers and credit rating agencies, before investing in CPs.

Bankers Acceptance

When a banker accepts a promissory note or bill of exchange drawn on its customer, the instrument becomes a banker's acceptance. Bankers' acceptances are borrowings by banks on behalf of their customers for which the borrowing bank is liable (Luckett, 1984 and Ezeama, 1993). They are therefore considered generally less risky than commercial papers. They have maturities of three to six months (90 – 180 days) as commercial papers. Bankers' acceptance can be issued by individuals, companies or another bank and accepted by a bank on behalf of its customers (Ezema, 1993).

Money Market and Liquidity Management in Commercial Banks

A money market is a mechanism which makes it possible for borrowers and lenders to come together. In particular, it refers to a market for short-term funds. It meets the short-term requirements of the borrowers and provides liquidity of cash to the lenders. In other words, money market is the name given to the various firms and institutions which deal in various grades of near-moneys (Shekhar and Shekhar, 1999). According to them, a money market is a mechanism through which short-term loans are loaned and borrowed and through which a large part of the financial transactions of particular country or of the world are cleared. A money market is distinct from but supplementary to the commercial banking system. As such the importance of the money market does not solely lie on its size. It has rather on its liquidity, in its capacity for furnishing cash to any part of the country at a few hours' notice. Shekhar and Shekhar (1999) argued that what a bank balance is to the individual, the money market is to the country's credit system. Therefore the term money market does not refer to any specific place where money is lent or borrowed. Although money market does not refer to any specific place, it may be located in or associated with a particular place or geographical locality where short-term funds from an entire region or country or countries are attracted (Uremadu, 2007).

Looking at the issues of the concept of money market from another way, the money market is a market for short-term instruments that are close substitutes for money (Jhingan, 2001). The short-term instruments are highly liquid, easily marketable, with little chance and dependable transfer of short-term debt instruments maturing in one year or less, which are used to finance the needs of consumers, business, agriculture and the government. The money market is not one market but it is a collective name given to the various forms and institutions that deal with the various grades of near-moneys. Culbertson (1972) described money market as a network of markets that are grouped together because they deal in financial instruments that have a similar function in the economy and are, to some degree, substitutes from the point of view of holder. In general the money market consists of call and notice market, treasury bills market, commercial paper market, interbank market. All these markets are closely interrelated so as to make the money market, and it is a wholesale market where large number of financial assets or instruments is daily traded nationwide (or worldwide if nationally considered).

Bank Liquidity

Bank for International Settlements (2008) defined liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Liquidity risk arises from the fundamental role of banks in the maturity transformation

of short-term deposits into long-term loans. The term liquidity risk includes two types of risk: funding liquidity risk and market liquidity risk. Funding liquidity risk is the risk that the bank will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm. Market liquidity risk is the risk that a bank cannot easily offset or eliminate a position at the market price because of inadequate market depth or market disruption. Liquidity risk can be measured by two main methods: liquidity gap and liquidity ratios. The liquidity gap is the difference between assets and liabilities at both present and future dates.

Loan to Deposit Ratio

The loan-to-deposit ratio regulation was introduced for the purposes of curbing the incentives for excessive competition among domestic banks dependent upon wholesale funding to increase their business sizes before the global financial crisis, and improving liquidity conditions during crises (Lopez-Espinosa, Moreno, Rubia and Valderrama, 2012). According to Dhanuskodi (2014), loan to deposit ratio is a useful instrument to determine bank liquidity, and by extension, it influences the profitability of banks. The regulation of loan to deposit ratio is basically an instrument for effective management of banks liquidity by limiting their loan size within the certain ratio of their deposits. During a period of economic expansion, however, this regulation is used to curb any expansion in lending (CGFS 2012). As part of its monetary policy effort towards ensuring that DMBs increase its financial intermediation function, stem financial inclusion and increase lending to the real sector of the Nigerian economy, the CBN increase the loan to deposit ratio to 60 percent. The apex bank in a bid to ensure compliance opine that banks that fail to meet the deadline of March ending 2019 will attract 50 percent levy of additional CRR of the lending shortfall of the target LTDR. The LTDR was further increase to 65 percent in the last quarter of 2019 to facilitate robust investment and disbursement of credit to the real sector of the Nigerian economy that will bring about a sound and resilient financial intermediation system.

The loan-to-deposit ratio regulation is a macro prudential policy instrument designed to curb systemic risks. The regulation is not only useful but also actually brings about ring-fencing between retail and wholesale financing by encouraging banks to extend loans within the limits of their deposits. Given however that this regulation is a powerful policy tool, that puts direct constraints on banks' core businesses of deposits and loans, some unintended consequences could be created. Loan-to-deposit ratio regulation could affect banks' function of financial intermediation by hindering their flexible use of wholesale funding as assets for bank lending. Facing restraints on their assets for lending, banks generally tend to first reduce their lending to SMEs whose credit ratings are relatively low. Bank lending to large corporations and households has continued to rise since introduction of the loan-to-deposit ratio regulation, whereas their lending to SMEs has stagnated or declined (Jeong, 2009)

Theoretical Review

Fry's Theory on Money Market

According to Fry (1997) finance and financial institutions have become relevant in a world of positive information, transaction and monitoring costs and if monitoring costs are high, a simple debt instrument would dominate a more complicated state that resembles equity. His stand is that positive real interest rates act as inducement to savers and also enable banks to give credit to the most efficient firms which can make profits to pay the high rate of borrowing. Over the years, policies regarding financial development of emerging market economies have shifted towards market-based financial systems and lessons learnt from

financial crises. The approach to financial policy in developing countries has shifted from mainly direct controls to more market oriented systems.

Fry (1988) stressed the role of money markets; he points out that the real rate of interest can be reduced by financial repression as liquidity preference pushes the real interest rate above its equilibrium level. He emphasizes that money markets in which interest rates are freely determined by interaction of supply and demand are few and far in between the developing world. Fry (1988) asserts that a measure of financial intermediation often used is the real interest rate. When this rate hovers below its competitive levels it indicates the extent of financial repression. A positive money market rate encourages financial savings and financial intermediation leading to an increase in the supply of credit to the private sector and hence investment. According to Fry (1997), a key aspect of financial liberalization is the development of the money market in which the independent central bank will implement indirect monetary policy. In his view, the absence of progress in the areas concerning the effect of financial development on growth follows directly from the fact that no attention is paid to the nature of banking or financial markets.

Commercial Loan Theory

The essence of the theory is that short term loans are preferred by commercial banks as they will be repaid from the proceeds of transactions they facilitate and finance. A proposition that has been immensely subjected to criticism Dodds (1982) and Nwankwo (1992). Its antagonists argue that the theory is a deterrent to economic development especially for developing countries like Nigeria that require huge long term funds to provide a big push for development. The commercial loan or the real bills doctrine theory states that a commercial bank should forward only short-term self-liquidating productive loans to business organizations. Loans meant to finance the production, and evolution of goods through the successive phases of production, storage, transportation, and distribution are considered as self-liquidating loans.

This theory also states that whenever commercial banks make short term self-liquidating productive loans, the central bank should lend to the banks on the security of such short-term loans. This principle assures that the appropriate degree of liquidity for each bank and appropriate money supply for the whole economy.

The central bank was expected to increase or erase bank reserves by rediscounting approved loans. When business started growing and the requirements of trade increased, banks were able to capture additional reserves by rediscounting bills with the central banks. When business went down and the requirements of trade declined, the volume of rediscounting of bills would fall, the supply of bank reserves and the amount of bank credit and money would also contract.

Shift ability Theory

The shift ability theory is premised on the argument that banks' liquidity is a function of their capacity to acquire assets that are convertible or marketable to other lenders or investors should there be imminent need for cash, noting that the banks' assets should be marketable to the Central Bank and other financial institutions at discounted values. Thus this theory recognizes marketability or transferability of a bank's assets is a basis for ensuring liquidity. This theory was proposed by H.G. Moulton who insisted that if the commercial banks continue a substantial amount of assets that can be moved to other banks for cash without any loss of material. In case of requirement, there is no need to depend on maturities. This theory

states that, for an asset to be perfectly shiftable, it must be directly transferable without any loss of capital loss when there is a need for liquidity. This is specifically used for short term market investments, like treasury bills and bills of exchange which can be directly sold whenever there is a need to raise funds by banks. But in general circumstances when all banks require liquidity, the shiftability theory need all banks to acquire such assets which can be shifted on to the central bank which is the lender of the last resort.

Anticipated Income Theory

This theory holds that banks' management of liquidity can be enhanced by adequate phasing and structuring of the loan commitments to the customers. According to Nzotta (1997) the theory focuses on the earning capacity and borrowers' credit worthiness as the ultimate guarantee for liquidity adequacy. It drives banks' transactions in self-liquidating commitments (Nwankwo, 1991); and encourages the adoption of ladder effects in investment portfolio of commercial banks (Ibe, 2013).

This theory was proposed by H.V. Prochanow in 1944 on the basis of the practice of extending term loans by the US commercial banks. This theory states that irrespective of the nature and feature of a borrower's business, the bank plans the liquidation of the term-loan from the expected income of the borrower. A term-loan is for a period exceeding one year and extending to a period less than five years.

It is admitted against the hypothecation (pledge as security) of machinery, stock and even immovable property. The bank puts limitations on the financial activities of the borrower while lending this loan. While lending a loan, the bank considers security along Bank Management with the anticipated earnings of the borrower. So a loan by the bank gets repaid by the future earnings of the borrower in installments, rather giving a lump sum at the maturity of the loan.

Empirical Review

Gbenga, Olorunleke, Tajudeen and Hamzat (2021) investigated the relationship between money market and economic growth using annual time series data for the period 1981-2018 based on Fully Modified Ordinary Least Squares (FMOLS) and Granger causality analysis. Other econometric techniques applied include ADF unit root test, Pearson correlation, impulse response and variance decomposition techniques. Empirical findings reveal the existence of a positive, strong and significant correlation between money market and economic growth. The study also found that money market has positive and significant impact on economic growth in Nigeria. Causality flows from money market to economic growth but not vice versa. The study concludes that money market constitutes a veritable vehicle for achieving economic growth in Nigeria. It is imperative for Nigerian government to strengthen the money market by encouraging participants in the market through its various policies like tax incentives, extension of interest-free short term investment loans to investing public.

Krokeme and Eze (2021) examined the effect of money market instruments on capital market performance in Nigeria using time series spanned data over a period, 1981-2018. Secondary data were sourced from the central bank of Nigeria statistical bulletin 2018. Descriptive statistics, covariance Analysis, Johansen cointegration and vector error correction model were used in the study; the study is to determine how the trading of commercial paper, Bankers' acceptance and Treasury Bills affects capital market performance in Nigeria for the period under review. The result of the study indicates that treasury bills (TB) is negative at lags 1 and 2; the implication is that an increase in purchase of treasury bills in the money market

would result to a fall in the annual market capitalization of the Nigerian capital market. Similarly, a negative relationship was also noticed between commercial paper (CP) trading and annual market capitalization which implies that an increase in trading on commercial paper will lead to a decrease in the trading of annual capital market. However, a positive relationship was observed between bankers' acceptance (BA) and annual market capitalization. The study recommended that; there should be adequate market information to investor in stocks to enable them transform their stock from money market to capital market depending on the market outlook. Both markets (money and capital market) should ensure that they work harmoniously because investors holding one stock can cause adverse negative effect on the other.

Pavtar (2016) carried out a time series analysis of the nexus between money market instruments and Nigeria's economic growth (1985-2014). From the results of the OLS, the study concluded that except CDS which is negatively related to GDP, all other money market instruments (TBS, CPS and TCS) have no significant effect on GDP of Nigeria. Using OLS, cointegration test, and variance impulse and variance decomposition, Uruakpa (2019) investigated the impact of money market reforms on economic growth of Nigeria (1990-2017). The study established evidence of co-integration between money market value and GDP, with the former having positive and significant effect on the latter. TBS outstanding has positive but insignificant effect on GDP (Uruakpa, 2019). Igbinosa and Aigbovo (2015) studied the impact of money market development on Nigerian economic development between 1986-2013. From the empirical findings, based on OLS, co-integration analysis, ECM and Granger causality test, the authors found that BAS significantly influence economic development in both in the short run and long-run respectively, while value of TBS and CPS have significant impact on economic development only in the long run. Furthermore, causality flows from BAS to economic development in Nigeria.

Etale and Ayunku (2017) assessed the relationship between money market and economic growth in Nigeria for the period 1989-2014. From the OLS, the study found that TBS and CPS had positive and significant influence on GDP, while BAS had positive but insignificant influence on GDP in Nigeria. Furthermore, the granger causality test result indicates a unidirectional causality running from GDP to TBS, but not vice-versa. However, there was no causality between CPs and GDP. Similarly, BAS does not granger-cause GDP and vice versa. Agbada and Odejimi (2015) explored developments in money market operations and economic viability in Nigeria (1981-2011). The results from Pearson correlation coefficient matrix attest to strong linear relationship between money market (TBS, TCS, CDS, CPS and BAS) and GDP. OLS results show the evidence of a long run relationship between money market operations and economic growth in Nigeria.

Iwedi and Igbani (2015) via vector autoregressions (VAR), Johansen co-integration, and Granger causality tests examined the nexus of money market operations and economic growth in Nigeria (1980-2013). The study found a positive significant short-run and long-run relationship between money market operations and economic growth in Nigeria. Also, causality flows from economic growth to money market operations but not vice versa. However, based on the Autoregressive Distributive Lag (ARDL) and Bound Testing, Akarara and Eniekezimene (2018) investigated the effect of selected money market instruments on the growth of the Nigerian economy. Result showed no form of convergence among the variables in the long-run. According to the authors, money market variables are positively related with economic growth rate both in the short and long-run, except for CDS and CPS that have inverse relationship with economic growth in the long-run. The study also found that TCS

has a significant positive impact on GDP in the short-run but an insignificant impact on GDP in the long-run.

Isiwu, Okoh, Ojiya and Mamman (2015) focused on the effect of deregulation of money market operations on the performance of the Nigerian economy. It examined the relationship between GDP vis-à-vis money market instruments namely, Treasury bills (TB), Treasury Certificate (TC), Certificates of Deposit (CD), Commercial papers (CP) and Bankers' Acceptances (BA) in the Nigerian economy for the period 1986 to 2015. Data for the study were analyzed using the OLS multiple regression techniques and empirical estimation was carried out using E-views econometric software version 8.0. The findings show robust evidence of linear relationship. Results derived from empirical analysis are thought-provoking and a wakeup call for policy makers to get more committed to revitalizing the Nigerian money market for efficiency, effectiveness and more robust activities in the sector. The study holds that there exists a unique long run equilibrium relationship between money market instruments and economic growth in Nigeria. Similarly, the result show that money market deregulation have significant impact on the performance of the Nigerian economy within the period under reference. The study thus recommended that the Nigerian monetary authorities should initiate policies that would encourage money market operations and also be proactive in CBN surveillance role in order to check practices that could undermine or sabotage market integrity and soundness. Finally, there is the need for the creation of an enabling (investment friendly) environment by concerned authorities (both government and monetary policy regulators), as it will further deepen the popularity of the instruments and subsequently create market for those instrument(s).

Ehigiamusoe (2013) examined the impact of money market on economic growth in Nigeria using data for the period 1980-2012. Econometrics techniques such as Ordinary Least Squares Method, Johanson Co-integration Test and Vector Error Correction Model were used to examine both the long-run and short-run relationship. Evidence from the study suggests that though a long-run relationship exists between money market and economic growth, but the present state of the Nigerian money market is significantly and negatively related to economic growth. The link between the money market and the real sector of the economy remains very weak. This implies that the market is not yet developed enough to produce the needed growth that will propel the Nigerian economy because of several challenges. It was therefore recommended that government should create the appropriate macroeconomic policies, legal framework and sustain the present reforms with a view to developing the market so as to promote productive activities, investments, and ultimately economic growth.

Mohammad (2014) observed that money market instruments such as treasury bills, commercial papers, bankers' acceptance, certificate of deposit are very liquid and considered extraordinarily safe. Most money market instruments are traded in high denominations. This limits the access of individual investors. Thus, Timothy and Robert (1993) noted that these financial instruments enable borrowing and lending for periods of a year or less and also facilitates the transfer of large sums of money quickly at a low cost from one economic unit (business, government bank) to another for relatively short periods of time. They are characterized by high degree of safety of principal and are most commonly issued in units of millions of currencies or more. Some of them (market instruments), yielded interest at maturity and are generally exempted from government income taxes, which makes them particularly attractive to investors in high income tax brackets, for instance treasury bills.

Umasom (2018) used multivariate model to study money market instruments and Nigeria inflation rate. Inflation Rate (INFR) was used as function of Percentage of Treasury Bills to Gross Domestic Product (TB/GDP), Percentage of Stabilization Securities to Gross Domestic Product (STS/GDP), Percentage of Treasury Certificate to Gross Domestic Product (TC/GDP), Percentage of Eligible Development Stock to Gross Domestic Product (EDS/GDP), Percentage of Central Bank of Nigeria Short Term Fund to Gross Domestic Product (CBNSF/GDP) and Percentage of Call Money Scheme to Gross Domestic Product (CMS/GDP). The integration, Augmented Dickey Fuller Unit Root, Granger Causality Test and Vector Error Correction Model (VECM) were employed to determine the relationship between the money market instruments and Nigerian inflation rate. The results revealed that money market instruments are statistically significant in explaining variation in Nigerian inflation rate. The study recommends that the money market should well be structured, properly managed and its operational efficiency enhanced to achieve the monetary policy objective of price stability.

Eze & Mansi (2017) conducted a causality analysis on money market and economic growth in Nigeria from 1990 to 2014 using. Four money market instruments (treasury bills, treasury certificates, certificates of deposits, and bankers' acceptances) were regressed against the gross domestic product (representing economic growth), the unit root tests, co-integration tests, and parsimonious error correction results shows that money market has significant impact on the growth of the Nigerian economy, the impact was specifically significant with respect to bankers' acceptances and certificates of deposits. Based on the findings, it was recommended among others, that, more instruments and innovations should be introduced into the money market to enlarge the scope of the market, and that the money market should be fragmented for expansion.

Igbinosa & Aigbovo (2015) examined the Nigerian Money Market and National Economic Development from 1986 to 2013. The study uses money market indicators (values of treasury bills, commercial papers and bankers acceptances) as measures of money market development and real GDP per capita for economic development, while monetary policy rate was the only control variable. It adopts a multivariate OLS analysis for the estimation process, co-integration analysis for long-run equilibrium relationship and the associated error correction model to determine the short-run impact of the variables. The Granger causality test is used to determine the direction of causality among the variables. The findings of the study are that banker acceptances (LVBA) significantly influences economic development in both the short run and long-run respectively, while value of treasury bills and commercial papers as well as the monetary policy rate have significant impact on economic development only in the long run. Also, a unidirectional causality is found running from value of bankers' acceptances and monetary policy rate to economic development. It was recommended that measures to improve and strengthen the money market instruments in order to improve the level of development in Nigerian economy. Also, policies measures by the monetary authority (CBN) to promote market integrity and soundness which will enable the money market to continue to stimulate economic development in Nigeria.

Pavtar (2016) conducted a time series analysis on the Nexus between Money Market Instruments and Nigeria's Economic Growth from 1985 to 2014. Ex-post-facto research design was adopted. Data sourced from CBN annual statistical bulletin for the years under review were Descriptive statistics and the ordinary least square (OLS) multiple regression techniques were used to analysed. The T-test statistics was used to test the null hypotheses of the study at 5% level of significance for a two tailed test. The study found that Treasury bill,

Treasury certificate, Commercial paper does not have any significant effect on the gross domestic product (GDP) of Nigeria while Certificate of deposits was found to significantly impact on the gross domestic product (GDP) of Nigeria.

Etali and Ayunku (2017) investigated if money market spurs economic growth in Nigeria using a granger causality approach. The study adopted money market instruments such as treasury bills (TBs), commercial papers (CPs) and bankers' acceptances (BAs) as proxy for money market (independent variables), and gross domestic product (GDP) as proxy for economic growth (the dependent variable). Secondary time series data for the variables were collected from CBN Statistical Bulletin and the National Bureau of Statistics for the period 1989-2014. The study employed econometric techniques such as ADF, Unit Root Test, OLS, multiple regression and Granger Causality Test to analysed the study data; strong evidence that TBs, and CPs had positive and significant influence on GDP, while BAs had positive but insignificant influence on GDP in Nigeria. The granger causality test result revealed no directional causality relationship between TBs and GDP, meaning that TBs does not granger cause GDP and vice-versa. There was also no directional causality relationship between CPs and GDP, BAs and GDP. However, there exists bi-directional relationship running from CPs to TBs and BAs as it was established at 5 per cent level of significance. The study recommended among others that for the money market to influence meaningful economic growth and development in Nigeria, appropriate policies should be employed to strengthen and deepen the market.

Akarara and Eniekezimene (2018) employed empirical analysis to study Money Market Instruments and Growth of the Nigerian Economy. Using data obtained from Central Bank of Nigeria Statistical Bulletin 2017. Autoregressive Distributive Lag (ARDL) Bound Testing approach to co-integration were conducted. Results showed no form of convergence among the variables in the long-run. It also revealed that money market variables are positively related with economic growth rate both in the short and long-run, except for Certificate of Deposit (COD) and Commercial Paper (CPR) that has an inverse relationship with economic growth in the long run. Broad Money Supply (M2G) which does not seem to have a significant relationship with GDP both in the short and long-run, while Treasury Certificate (TRC) has a significant positive impact on GDP in the short-run but an insignificant impact on GDP in the long-run. It was advised that Central Bank of Nigeria in the use of Treasury Certificate as a means of managing liquidity in the short-run, as its prolonged use would amount to no significant effect in the economy. Also, Certificate of Deposit and Commercial Paper should be used on short term basis, if otherwise; their impact on the economy would be negative. It is evident from the review that ordinary least square methods constitutes the commonest method employed and annual time series data employed by previous studies. The studies mainly focused on money market instrument and economic performance while the present study focused on money market instrument and liquidity of commercial banks in Nigeria.

METHODOLOGY

This applied the error correction methodology to a regression model based on the relationship between money market instruments and liquidity of commercial banks in Nigeria. The idea is to subject the variables to stationary lest and subsequently remove the non- stationary trends by differencing before regressing. This removes the possibility of the so-called spurious regression not have considered the problem of unit roots. As a result, the econometric methodology used in those studies did not account for non-stationarity in the data. The analysis here is primarily based on Engle and Granger (1987), and Engle and Yoo (1987).

The idea is to determine the order of integration of the variables, that is, we test whether they are stationary in their levels or whether they have to be differenced once or more before they become stationary. Testing for unit roots is earned out by using an Augmented Dickey-Fuller (ADF) test. In order to examine the relationship between the dependent and the independent variables, the model for the study is hereby specified as follows:

Model specification

The purpose of the study a multivariate econometric model is specified and estimated. The model examined the relationship between the money market instrument and the liquidity of commercial banks in Nigeria.

$$LTDR = f(TB, TC, CD, CP, BA, GB)$$

$$LTDR = \alpha_0 + \beta_1 TB + \beta_2 TC + \beta_3 CD + \beta_4 CP + \beta_5 BA + \beta_5 GB + \mu$$

Where:

LTDR	=	Loan to deposit ratio as measure of liquidity
TB	=	Treasury bills
TC	=	Treasury certificates
CD	=	Certificates of Deposits
CP	=	Commercial paper
BA	=	Bankers Acceptance
GB	=	Government bonds
μ	=	Error Term

The theory of co-integration development in Granger (1981) and elaborated in Engle and Granger (1987) addressed this issue of integrating short-run dynamics with long-run equilibrium. It is important to note that the usual starting point of ECM modeling is to assess the order of integration of both the dependent and independent variables in the model. The order of integration ascertains the number of time a variable will be differentiated to arrive at stationary. Dickey- fuller (DF), Augmented Dickey-Fuller (ADF) and Sargan -Rhargava Durban-Watson (SRDW) are the widely used lest for stationary for both individual time series and residual from OLS regressions. Co-integration is based on the properties of the residuals from regression analysis when the series are individually non-stationary. The original co integration regression is specified as follows:

$$A_t = \alpha_0 + \alpha_1 \beta_1 + \ell_1 \tag{3}$$

Where A represents the dependent variables, β stands for the independent variable, and $I e$ is the random error term. a_n and a_j are intercept and slope coefficients respectively. To include the possibility of bi-directional causality, the reverse specification of equation 1 is considered. To provide a more defensive answer to the non-stationarity in each time series, the Dickey-Fuller (1979) regression is estimated as follows for a unit root:

$$\Delta e_t = -\lambda e_{t-1} + W_t \tag{4}$$

If X Equals zero e is non-stationary. As a result, A and B are not co-integrated. In other words, if X is significantly different from zero A and B is found integrated individually. Given the inherent weakness of the root test to distinguish between the null and the alternative hypothesis, it is desirable that the Augmented Dickey-Fuller (ADF) (1981) test be applied. The desirability is warranted because it corrects for any serial correlation by incorporating logged changes of the residuals. To be co-integrated, both A and B must have the same order of integration (Eagle and Granger, 1987 and Granger, 1986).The ADF regression is specified as follows:

$$\Delta e_t = \beta_0 e_{t-1} + \sum_{j=1}^m \beta_j \Delta e_{t-j} + \mu_t$$

5

Where Δ the first different operator and μ_t is the new random error term. M is the optimum number of lags needed to obtain "white noise". This is approximated when the DW value approaches 2.0 numerically. The null hypothesis of non-co-integration is rejected, if the estimated ADF statistics is found to be larger than its critical value at 1 or 5 or 10 per cent level of significance. If A, and B, are found to be co-integrated, then there must exist an associated error-correlation Model (ECM), according to Engle and Granger (1987). The usual ECM may take the following form:

$$\Delta G_t = \sigma_0 e_{t-1} + \sum_{j=1}^T \sigma_1 \Delta A_{t-j} + \sum_{j=1}^T \theta_j \Delta B_{t-j} + V_t$$

6

Where Δ denotes the different operator CM is the error correction term, T is the number of lags necessary to obtain white noise and V_t is another random disturbance term. If σ_0 is significantly different from zero, then A and B have long-Run relationship, the error-correction term (e_{t-1}) depicts the extent of disequilibrium between A and B The HCM, reveals further that the change in A, not only depends on lagged changes in B, but also on its own lagged changes.

A-priori Expectation

This specifically has to do with sign expectation set by economic theory and it is expected that parameters in this model have the correct signs and sizes that conform to economic theory. From the model, the expected theoretical relationship between the explanatory and independent variables are all expected to be positive as the various money market instruments (treasury bills, treasury certificates, commercial papers, certificate of deposits and bankers acceptance) are all expected to contribute positively and collectively to the liquidity of commercial banks.

Empirical Results and Discussion of Findings

Table 1: Unit Root Test Results

Variable	ADF Statistic	MacKinnon @ 1%	MacKinnon @ 5%	MacKinnon @ 10%	Prob.	Order of Int	Summary	Conclusion
ADF @ Level								
LTDR	-1.939068	-3.670170	-2.963972	-2.621007	0.2624	1(0)	Not stationary	Accept H_0
TB	-1.061128	-3.724070	-2.986225	-2.632604	0.9959	1(0)	Not stationary	Accept H_0
TC	-2.551881	-3.646342	-2.954021	-2.615817	0.1130	1(0)	Not stationary	Accept H_0
GB	-2.082398	-3.737853	-2.991878	-2.635542	0.9998	1(0)	Not stationary	Accept H_0
CP	-2.123540	-3.646342	-2.954021	-2.615817	0.2372	1(0)	Not stationary	Accept H_0
CD	-1.428872	-3.699871	-2.976263	-2.627420	0.5533	1(0)	Not stationary	Accept H_0
BA	-1.988460	-3.646342	-2.954021	-2.615817	0.2902	1(0)	Not stationary	Accept H_0
ADF @ Difference								
LTDR	-9.216266	-3.661661	-2.960411	-2.619160	0.0000	1(I)	Stationary	Reject H_0
TB	-8.070463	-3.752946	-2.998064	-2.638752	0.0000	1(I)	Stationary	Reject H_0
TC	-5.727009	-3.679322	-2.967767	-2.622989	0.0001	1(I)	Stationary	Reject H_0
GB	-5.656991	-3.679322	-2.967767	-2.622989	0.0001	1(I)	Stationary	Reject H_0
CP	-7.822094	-3.670170	-2.963972	-2.621007	0.0000	1(I)	Stationary	Reject H_0
CD	-9.404568	-3.699871	-2.976263	-2.627420	0.0000	1(I)	Stationary	Reject H_0
BA	-10.28834	-3.661661	-2.960411	-2.619160	0.0000	1(I)	Stationary	Reject H_0

Source: Extract from E-view 9.0

The time series properties of the variables were carefully analyzed using the ADF tests and the results are shown in table 1. The results in Table 1 indicate that all the variables are non-stationary at level series. At first differences the results of the ADF shows that all the

variables are stationary and the variables are integrated in the order of 1(I). Having established the order of integration of the variables the next step is to test the existence a cointegration relationship among the variables series using the Johansen-Juselius approach described in the methodology.

Table 2: Johansen Cointegration Test

Hypothesized		Trace	0.05			
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**		
None *	0.930792	243.9591	125.6154	0.0000		
At most 1 *	0.821442	158.4988	95.75366	0.0000		
At most 2 *	0.760038	103.3679	69.81889	0.0000		
At most 3 *	0.597258	57.69509	47.85613	0.0046		
At most 4	0.496517	28.59239	29.79707	0.0683		
At most 5	0.165695	6.633828	15.49471	0.6206		
At most 6	0.025812	0.836838	3.841466	0.3603		
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)						
Hypothesized		Max-Eigen	0.05			
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**		
None *	0.930792	85.46032	46.23142	0.0000		
At most 1 *	0.821442	55.13090	40.07757	0.0005		
At most 2 *	0.760038	45.67277	33.87687	0.0013		
At most 3 *	0.597258	29.10270	27.58434	0.0317		
At most 4 *	0.496517	21.95856	21.13162	0.0382		
At most 5	0.165695	5.796990	14.26460	0.6394		
At most 6	0.025812	0.836838	3.841466	0.3603		
1 Cointegrating Equation(s):		Log likelihood	-1045.785			
Normalized cointegrating coefficients (standard error in parentheses)						
LTDR	GB	CP	CD	BA	TB	TC
1.000000	0.011050	-0.127225	-1.200074	0.707525	0.000534	0.716676
	(0.00135)	(0.01581)	(0.16280)	(0.12385)	(0.00378)	(0.09443)

Source: Extract from E-view 9.0

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

From Table 2, the outcome of the cointegration test indicates the presence three cointegrating equation as suggested by the trace and max-eigen statistic. We therefore reject the null hypothesis of no cointegration. It is therefore evident that a long-run relationship exists. From the normalized cointegration results, the study found that government bonds, bankers' acceptance, treasury bills and treasury certificate have positive long run effect on commercial banks liquidity while commercial paper and certificate of deposits have negative long run effect on the liquidity of Nigeria commercial banks.

Table 3: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	Summary	Conclusion
GB does not Granger Cause LTDR	32	0.30237	0.7415	No causality	Accept HO
LTDR does not Granger Cause GB		1.40516	0.2627	No causality	Accept HO
CP does not Granger Cause LTDR	32	5.57289	0.0094	Causality	Reject HO
LTDR does not Granger Cause CP		2.02124	0.1521	No causality	Accept HO
CD does not Granger Cause LTDR	32	0.56474	0.5751	No causality	Accept HO
LTDR does not Granger Cause CD		0.91349	0.4132	No causality	Accept HO
BA does not Granger Cause LTDR	32	5.03862	0.0138	Causality	Reject HO
LTDR does not Granger Cause BA		4.02078	0.0296	Causality	Reject HO
TB does not Granger Cause LTDR	32	1.00596	0.3790	No causality	Accept HO
LTDR does not Granger Cause TB		0.32522	0.7252	No causality	Accept HO
TC does not Granger Cause LTDR	32	0.82171	0.4504	No causality	Accept HO
LTDR does not Granger Cause TC		0.82216	0.4502	No causality	Accept HO

Source: Extract from E-view 9.0

Table 4 summarizes the results of the Pairwise granger causality test.

Table 4. Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72.15594	4.884229	14.77325	0.0000
GB	-0.001607	0.001599	-1.005164	0.3244
CP	0.058601	0.021347	2.745123	0.0110
CD	0.038399	0.144551	0.265641	0.7927
BA	-0.291688	0.166277	-1.754227	0.0916
TB	0.001451	0.004704	0.308464	0.7603
TC	-0.394868	0.187934	-2.101099	0.0459
ECM(-1)	-0.612150	0.180188	3.397280	0.0023
R-squared	0.514900	Mean dependent var		65.34939
Adjusted R-squared	0.379073	S.D. dependent var		13.73822
S.E. of regression	10.82557	Akaike info criterion		7.808916
Sum squared resid	2929.826	Schwarz criterion		8.171706
Log likelihood	-120.8471	Hannan-Quinn criter.		7.930984
F-statistic	3.790831	Durbin-Watson stat		1.807851
Prob(F-statistic)	0.006170			

Source: Extract from E-view 9.0

The estimates of the short-run dynamics suggest that the coefficient of the lagged error correction term (ECT) is negative and significant at 1%. The coefficient of the error term, 0.612150, suggests that only about 61.2 percent of the discrepancy in commercial banks liquidity between the long and short-run is corrected within a year. This suggests a suitable speed of adjustment in the model.

Furthermore, the adjusted R² value suggests that 37.9 percent of the variation in the dependent variable; liquidity of commercial banks is explained by the independent variables (the money market instruments) while 62.1 percent variance in commercial banks liquidity is explained by other factors not captured in this research. Also, the F statistic of 3.790831 and probability of 0.006170 suggests that the model is significant at a 5% level. While the Durbin- Watson statistic of 1.807851 indicates the absence of autocorrelation in the model.

The estimated model found that government bonds, banker acceptance and treasury certificate have negative effect on liquidity of the commercial banks within the periods of the study, the negative effect of the variables contradict our a-priori expectation and justifies

reforms in the Nigeria money market. The coefficient indicates that a unit increase in the variables reduces commercial banks liquidity by 0.001, 0.29 and 0.39 percent. However, the study found that commercial paper, certificate of deposits and treasury bills have positive effect on the liquidity of commercial banks such that a unit increase in the variables increases commercial banks liquidity by 0.05, 0.03 and 0.001 percent. The positive effect of the variables confirm our a-priori expectations validity the reforms in the financial market such as the deregulation of the industry in the last quarter of 1986.

CONCLUSION AND RECOMMENDATIONS

This study examined the effect of money market instruments on the liquidity of commercial banks using time series data from 1987-2020. From the findings, the study concludes that government bonds and banker acceptance have negative but no significant effect on liquidity while treasury certificate have negative and significant effect on liquidity of commercial banks. Treasury certificate and treasury bills have positive but no significant effect on liquidity while commercial paper have positive and significant effect on the liquidity of Nigeria commercial banks. From the findings, the study makes the following recommendations:

1. There is need for the regulatory institutions and money market institutions to formulate policies that enhance the operational efficiency of the money market for better liquidity management of the commercial banks.
2. The development of current and other interbank market instruments in the money market, like commercial papers, certificates of deposits, bankers' acceptances should be encouraged by the government through proper surveillance of its operations and rolling of incentives aimed at encouraging investments in the sub-market.
3. Excessive use of government bonds and treasury certificate by the government through the Central Bank of Nigeria as a liquidity management strategy should be de-emphasized as its prolong use could endanger the economic growth of the country.
4. The short term investments component of the money market should be strengthened with policy framework and application that will ensure trading and investments in the instruments (such as treasury bills, treasury certificates, and short term securities) in the sub-market do not retard the growth of the Nigerian economy.

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