Bank Specific Factors and the Liquidity of Commercial Banks: Evidence from Nigeria

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Bank Specific Factors and the Liquidity of Commercial Banks: Evidence from Nigeria

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Abstract

The study investigates the effect of bank specific factors on the solvency of deposit money banks from 2001 to 2015. The ordinary least squares statistical technique was used to run the regression after confirming the normality and stationarity of the time-series data through the unit root, cointegration, kurtosis and other relevant diagnostic tests. The bank-specific factors studied include total capital ratio, impaired loans on total loans, interest expense over deposits, return on equity, return on assets and total banking assets over total banking sector assets. The results show that total capital ratio, impaired loans on total loans, return on equity and total banking assets over total banking sector assets have negative and statistically insignificant effect on banks liquidity at five percent significance level. On the other hand, return on assets and interest expenses over deposits have positive and statistically insignificant impact on bank liquidity.

Keywords: Bank liquidity, banking sector, bank-specific factors, commercial banks, multiple regression, nigeria.

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Introduction

The modern theory of financial intermediation presents the major reason for the creation and existence of banks as the performance of two central functions in the economy. Those roles include the creation of liquidity and the transformation of risk. Ndukwe (2013) asserts that by liquidity creation, banks impact on the larger economy by quickening growth in the real sector. Liquidity is created on the balance sheet by banks when they finance less liquid assets with funds from some relatively liquid liabilities. According to Diamond & Rajan, (1999), the asset side of a balance sheet includes loans given to borrowers, while the liabilities side, among other things, discloses the deposits made by customers. Horvath *et al*, (2014) posit that, in addition to assisting in transactions carried out by economic agents, banks transform illiquid assets into liquid assets through demand deposits. However, when there is an unexpected increase in liquidity demand, banks are compelled to sell their illiquid assets at lower prices. For Allen & Gale (2004) and Allen & Santomero (2001) this would result in losses and increased risk. The study of the relationship between capital level and risk by Bhattacharya and Thakor (1993) reveals that bank capital acts as a buffer against the risk faced by banks. On the other hand, Diamond & Rajan (2001) believe that greater capital buffer in banks leads to less liquidity. Horvath *et al.,* (2014) investigated the relationship between capital and liquidity creation by banks. The study found that small banks possessing high level of capital created less liquidity while large banks with excessive capital consistently created more liquidity. According to Ogbuabor *et al.* (2013), the sufficiency of liquidity plays very important roles in the successful functioning of all business enterprises but it is most paramount to banking institutions. Liquidity shortage, no matter how small, is capable of causing great damage to a bank's operations. In the same vein, liquidity crisis, as small as it may be, can without delay destroy some good customer relationships built over the years. Consequently, Ogbuabor *et al.*, (2013) maintain that managing liquidity is a core daily process which requires bank managers to monitor and project cash flows so as to be sure that adequate liquidity is maintained always. On regular basis, commercial banks mobilize deposits from the public and create deposit money by granting loans, advances and overdrafts to their customers. In that process, deposit money banks earn profits on their investors' funds. Hence, according to theoretical literature, it is generally agreed that profitability and liquidity are the most prominent issues in corporate finance (Agbada & Osuji, 2013). According to Niresh (2012), banks endeavour to strike a balance between profitability and liquidity. It is an essential characteristic of banks to ensure that sufficient liquidity is provided to their customers at all times. This goal is achieved by ensuring that adequate cash and other near-cash securities are made available to meet withdrawal obligations as well as new loan demands by customers. Taking cognizance of the serious implication for the overall macroeconomic and financial stability, the topic regarding bank liquidity risk management has continued to be significant in the academic literature. This topic has been significantly addressed in the studies like Roman & Sargu (2015), Diamond & Dybvig (1983), Mohyneux & Thornton (1992), Bangia *et al.,* (1999), Diamond & Rajan (2001), Allen & Gate (2004), Kosmidou (2008), Drehmann & Nikolaou (2009), Bissoondoyal Bheenick & Treepongkaruna (2011). In Nigeria, the problem of inefficient liquidity management in banks became manifest during the liquidation and distress era of 1980s and 1990s. This situation lingered up to the recapitalization era in 2005 during which banks were given the directive to increase their capital base from N2 million to N25 billion. Until then, Nigerian banks were challenged with issues of persistent illiquidity, poor asset quality and undercapitalization. According to Anaeto (2015), banks depended mostly on public sector deposits. The recapitalization exercise was expected to stabilize and resolve the liquidity challenges which prevailed in the Nigerian banking sector. Notwithstanding that arrangement aimed at fortifying and repositioning banks against liquidity inadequacy, the Central Bank of Nigeria (CBN) had to come on a rescue mission in 2009 to save five illiquid banks. The CBN injected N622 billion to redeem the affected five banks that were operating on negative shareholders' capital, while the Asset Management Corporation of Nigeria (AMCON) was set up to buy the bad debts of affected banks (Agbada & Osuji, 2013). Ebhodaghe (2015) argues that adequate liquidity planning was still lacking in many Nigerian banks, few banks were capable to plan for short, medium and long-term liquidity needs. Nigerian banks held portfolio of short term financial securities that could be easily sold or rediscounted for cash. They also engaged in interbank borrowings which constituted a major source of their liquidity. The liquidity on the interbank market vanished after commercial banks were directed by Nigerian government to transfer all government revenue to a single account at the CBN as part of government's transparency drive. To ameliorate the situation, the CBN decided in September, 2015 to reduce the cash reserve ratio to 25 percent from 31 percent and by injecting 300 billion naira ($1.51 billion) into the financial system (Ayemoba, 2015). According to Ajibike and Aremu (2015), Nigerian banks experienced a tremendous growth in the early 2000s. However, these recorded growths were eroded by the financial crisis in 2008. As stated in Ahamika & Sharma (2016), literature immediately after the global financial crisis suggests that the crisis mainly affected developed economies. However, developing economies like Nigeria were not left out. Nigerian banking system experienced tight liquidity. According to Oladapo and Daisi (2012) the liquidity problems were attributable to net foreign exchange outflows which arose from divestment and repatriation of

capital and dividends by foreign investors as well as the lower moralization of oil earnings as a result of the crash of oil prices in the international market. Foreign credit lines enjoyed by Nigerian banks were recalled. At the same time, some underwriting to various issuers and institutions' loans created by banks with equities became clear and definite. The combined effects of the illiquidity in the Nigerian banking system were the depression of the capital market and drop in the quality of the credit extended by banks for trading in the capital market (Oladapo and Daisis, 2012, Ujunwa *et al*., 2011). Hence, to re-echo Roman and Sargu, (2013), the global financial and economic crisis aggravated the importance of liquidity risk management. According to Fadare (2011), the relationship between banking sector liquidity and banking sector prudential regulations in Nigeria were largely ignored. The study provides deep insights into the relationships that liquidity shares with some bank specific factors. Imala (2005) postulates that the main objectives of the banking sector in Nigeria are to ensure price stability, rapid economic development through their role of mobilizing savings and inculcating banking habit at the household and micro business level. However, these objectives remained largely unattained because of some deficiencies. Ogbuabor *et al*. (2013) identify some of those deficiencies as low capital base, a large number of small banks with relatively few branches, the dominance of a few banks, poor rating of some banks, weak corporate governance, eroded shareholders fund caused by operating losses, overdependence on public sector deposits, foreign exchange trading, the neglect of medium scale private savers and insolvency. Insolvency was evidenced by negative capital adequacy ratios of some banks. Imala (2005) asserts that the Nigerian banking sector plays marginal role in the development of the real sector. A large body of literature exists on the factors that determine bank liquidity. Some of the important studies include Agenor *et al.,* (2004), Aspachs *et al* (2005), Winston (2009), Ogbuabor *et al.,* (2013). Diamond and Dybvig (1983), Molyneux and Thornton (1992), Bangi *et al.,* (1999), Diamond and Rajan (2011), Allen and Gale (2004), Kosimodou (2008), Arehmann and Nikolaou (2009), as well as Bissoondoyal Bheenick and Treepong Karuna (2011). According to Roman and Sargu (2013), the topic regarding bank liquidity management has always been significant in the academic literature because of its serious implications for the overall macroeconomic and financial stability. As a subject of study, liquidity has received considerable attention of both researchers and policy makers in recent times. According to Arif & Nauman Anees (2012), liquidity problems arise when deposits in banks are withdrawn unexpectedly. To avert such situation, banks ought to hold adequate liquidity levels. One can therefore maintain that if deposits increase, the liquidity held by banks should also increase. Conceptually, liquidity could be viewed as a measure of the relative amount of asset in cash or which can be quickly converted into cash without any loss in value

available to meet short term liabilities (Olagunju *et al.*, 2011). According to Agbada and Osuji (2013, bank liquidity is the ability of a bank to keep sufficient funds to pay for its obligations as they mature. Ogbulafor *et al*, (2013) understand bank liquidity as referring to the bank's disposition to immediately meet cash, cheques and other withdrawal obligations as well as new legitimate loan demands while keeping to existing reserve requirements. Bhattacharyya (2011) posits that liquidity management by central banks typically is about the framework, set of instruments and the rules which the monetary authority follows while managing systemic liquidity in consonance with the ultimate goals of monetary policy. According to Ebhodghe (2015) liquidity management refers to a bank's programs or strategies in order to be able to meet deposit and loan demands. Such strategies, according to Ebhodghe, include holding short term financial assets (Treasury bill and certificates) which are highly marketable, maintaining avenues for short term accommodation from the lender of last resort or other banks and by bidding for greater volume of deposits. For Ndukwe (2013), managing banking system liquidity involves monitoring and projecting the cash flows needs of banks to ensure that adequate liquidity is maintained. Ndukwe (2013) classifies liquidity into three categories, namely central bank liquidity, market liquidity and funding liquidity. Ndukwe (2013) views central bank liquidity as constituting deposits of financial institutions held at the central bank. These deposits are required by the central bank. They are often known as reserve balances. Market liquidity has to do with buying and selling of assets without unduly affecting the asset price. It is the ease at which an asset can be sold quickly without incurring unacceptable losses. Funding liquidity refers to the ability to rave cash or its equivalent quickly either through collateralized loans, asset sales or borrowing. If a bank fails to be liquid, there will be a liquidity mismatch. Such a situation can lead to a crisis or a run on the bank. Bassey *et al.,* (2016) describes liquidity as the financial institution's capacity to meet its cash and collateral obligations without incurring unacceptable losses. They view adequate liquidity as being dependent upon the institution's ability to efficiently meet both expected and unexpected cash flows and collateral need without adversely affecting either daily operations of the financial state of the institution. It is the lifeblood of a banking system. Levine (1999) considers liquidity risk as one of the key factors determining the operating and financial performance of a bank. Subramanyam and Wild (2009) accuse bank managers for blaming a decrease in their bank profitability on the high liquidity risk they face. Bank liquidity is defined by Reserve Bank of India (2012) as a bank's capacity to finance increase in assets and meet both expected and unexpected cash and collateral obligations as they mature. It can be defined as the ability of banks to meet maturing financial obligations without incurring unacceptable losses. (Ogbuabor *et al*, 2013, Ebhodaghe, 2015, Basel Committee on Banking

Supervision, 2000). Ndukwe (2013) refers to liquidity as a measure of the ability and ease with which assets can be converted to cash on short notice, or "by having access to credit in response to meeting cash and collateral obligations at a reasonable cost" Olagunju, et al., (2011) refers to liquidity as a measure of the relative amount of asset. This asset is either cash or can be quickly converted into cash without any loss in value and is available to meet short term liabilities. Liquid assets are made up of cash and bank balances, debtors and marketable securities. Olagunju et al., (2011) goes further to define liquidity as the ability of a firm to meet all obligations without endangering its financial situation. Agbada and Osuji (2013) consider bank liquidity as the ability of the bank to immediately meet cash, cheque and other withdrawal obligations and legitimate fresh loan demands while, at the same time, abiding by the existing reserve requirements. Bhattacharyya and Sahoo (2011) regard liquidity management by central banks as typically referring to the framework, set of instruments and the rules which the monetary authority follows while managing systemic liquidity and as consistent with the ultimate monetary policy goals. Ebhodaghe (1997), Biety (2003), Adekanye (1986) and Anyanwu (1993) consider the objective of liquidity management as t gearing banks towards a financial position which enables them meet their financial obligations as they arise. According to Bassey et al., (2006), banks derive their liquidity from the following sources: vault cash, balances-held with CBN, balances held with offices and branches outside Nigeria, money at call in Nigeria, inter-bank placement, placement with discount houses, treasury bills, treasury certificates, investment in stabilizations securities, bills discounted payable in Nigeria, negotiable certificates of deposits, bankers acceptances and commercial papers. On the other hand, the total deposit liabilities are made up of demand, saving and time deposit liabilities. Liquidity ratio is used as a measure of the liquidity of a bank. It is prescribed by the CBN. Another measure of bank liquidity is loan-to-deposit, ratio. This measure is based on the fact that loans and advances are the most liquid of a bank's earning assets. Hence, a high loan-to-deposit ratio implies low liquidity position, and conversely (Ebhodaghe, 2013). Its limitation arises from its inability to say anything about either the quality of the loans and advances and of their maturities. Liquidity ratios have been generally criticized for their inadequacy to serve as a metric of the true liquidity position of a bank because ratios are computed at a point in time and hence, are based on a 'stock' concept. According to Moore (2009), it is necessary that a bank holds liquid assets to enable it meet the cash requirements of its customers. If a bank does not possess the resources to satisfy its customers' demand, it will have to borrow on the interbank market or from the central bank. This implies that a bank that is not capable of meeting its customer's demands takes the risk of being exposed to a run, it equally faces a systemic lack of confidence in the banking system. The causes of liquidity runs on commercial banks have been suggested by Bordo et al., (2001) as follows. Firstly, runs of banks have a relationship with mob psychology or panic such that when people anticipate financial crisis and take panic actions based on what they expect, the financial crisis becomes unavoidable. Secondly, crisis constitutes an intrinsic part of the business cycle and results from strong emotional disturbance to economic principles. Furthermore, as an economy goes into recession or depression, asset returns are likely to reduce. It will be difficult for borrowers to repay loans while depositors who expect increase in defaults or non-performing loans will strive to protect their wealth by withdrawing their bank deposits. When the situation highlighted above arises, banks are "caught between the illiquidity of their assets (loans) and the liquidity of their liabilities (deposits) and may become insolvent", (Bordo et al., 2001: 58). However, banks are aware that they can draw funds from either the interbank market or the central bank when there are unexpected contingencies, (Agenor et al, 2004). Liquidity management occupies a central position in working capital management which refers to the management of short-term investment and financing of a company. Liquidity management requires addressing the drags and pulls on liquidity. While drags on liquidity refer to those forces which delay the collection of cash, such as slow payments by customers and obsolete inventory, pulls on liquidity are the decisions which result in paying cash too soon, such as paying trade credit earlier than previously arranged or a bank reducing a line of credit. CFA Institute indicates the primary sources of liquidity as including ready cash balances (cash and cash equivalents) short term funds (short term finance such as trade credit and bank loans) cash flow management (for example, getting customers' payments deposited quickly. On the other hand, secondary sources of liquidity include renegotiating debt contracts, selling assets, filing for bankruptcy protection and reorganizing. Liquidity ratios are of two types, namely current ratio which measures an entity's ability to satisfy its current liabilities using its current assets, and quick ratio used to ascertain the ability of a concern to satisfy its current liabilities using its most liquid assets. Some theories have been propounded with regard to liquidity management. Examples are as follows.

The Liquid Asset Theory

This theory posits that banks ought to maintain large pool of short term asset. According to Anyanwu (1993), the proponents of this theory pre-suppose the existence of efficient primary and secondary (money) markets. The theory emphasizes the need to have short term (liquid) assets that will enable the bank meet its short term obligations as they mature.

Commercial Loan Theory or Real Bill Doctrine

This theory proposes that lending should be on short term since most deposits are also in the short term form. It is the oldest theory of liquidity management and seeks to make short term profit motive with short term obligation of making depositors' funds available to them on demand. This doctrine is supported by Onoh (2002). Onoh opines that for management and application of funds (liquidity) to be effective the tenor of funds (sourced from depositors and other sources) must be matched with the tenor of assets (i.e. loans and advances to customers, etc.).

Anticipated Loan Theory

This theory was propounded in the 1940s. It focuses on the earning power and credit worthiness of the borrower as a major source of bank liquidity. It urges banks to examine the reputation of the borrower and his ability and willingness to pay. Those who originated this theory agree on granting long term and non-business loans by banks since they will be repaid out of the future earnings of the borrower. Beck *et al.,* (2005) investigated the effect of privatization on the performance of Nigerian banks for the period 1990-2001. The results indicate some evidence of improvement in the performance of nine banks that were privatized. The results also suggest negative effects of the continuing minority government ownership on the performance of some Nigerian banks. Adegbaja & Olokoyo (2008) examined the impact of previous recapitalization in the banking system on the performance of the banks in Nigeria. They intended to find out if recapitalization is of any benefit. Secondary data obtained from NDIC annual reports were employed by the study. The results show that the mean of prominent profitability ratios like Yield on Earning Asset, Return on Equity and Return on Asset were significant. This means that there is statistical difference between the mean of the banks before 2001 recapitalization and after 2001 capitalization Uremadu (2009) used an economic model of the Nigerian financial system in order to determine its liquidity profile using a group of money market instruments comprising treasury bills, treasury certificates eligible development stocks, certificate of deposits, commercial papers and bankers' acceptance. The model estimates were based on a time series data of financial system aggregates stretching from 1980 to 2005. The estimates were used to evaluate the impact multipliers and the liquidity rating of the Nigerian financial system using those money market instruments. The regression results indicate that while treasury certificates, eligible development stocks and treasury bills have significant positive impact on bank liquidity (proxy for financial system liquidity) commercial papers, certificate of deposits and bankers' acceptance have negative impact on banking system liquidity ratio. Also, treasury bills and eligible development stocks are identified to be having positive effect on bank liquidity ratio. Fadare (2011) employed a linear least square model and time series data from 1980 to 2009 to study the determinants of banking sector liquidity in Nigeria and

assess the extent to which the previous financial crisis affected liquidity in deposit money banks in Nigeria. Out of the five explanatory variables used for the study, only three regressors were found significant for predicting banking sector liquidity. They include loan-to-deposit ratio lagged one year, liquidity ratio, and monetary policy rate at $p = .002 < 0.05$ in each case. The remaining regressors are volatility of natural log of ratio of currency in circulation to total banking sector deposits and the volatility of the natural log of output to trend output as proxy for changes in the demand for cash for manufacturing and transactional purpose. The study finds that getting liquidity monetary policies right is crucial in ensuring the survival of commercial banks. It also discovers that lagged loan-to-deposit ratio, liquidity ratio and monetary policy rate are key monetary policy instruments for determining the extent of Nigerian banking sector credit. According to Fadare (2011), the relationship between banking sector liquidity and banking sector prudential regulations in Nigeria market variables (treasury bills, treasury certificates, eligible development stock, certificate of deposit, commercial papers. The research of Bonfim and Kim (2012). Highlights how a sample of European and North American banks managed liquidity risk during the period from 2002 to 2009. It investigated whether banks tend to take more risks in a crisis period and whether they followed similar procedures. The results provide important information for regulators, they suggest that banks have a collective behavior in the pre-crisis period. Horvat, *et al.,* (2012) conducted a study on Czech banks to find out the relationship between capital and liquidity creation. The authors carried out a series of Granger-Causality tests over the period 2000-2010. The results of the study create the impression that the requirements of Basel II can lead to the decrease of liquidity creation, while opining that greater liquidity creation can reduce banks' solvency. This exposes the trade-off between the benefits of financial stability generated by stronger capital requirements and the benefits of greater liquidity creation. Fadare identifies the work of Uremadu (2009) as the only relevant study which used several money and bankers' acceptance) in modeling a liquidity demand function for the Nigerian economy. Kolapo, *et al* (2012) performed some empirical inquiry into the quantitative effect of credit risk on the performance of commercial banks in Nigeria over the period 2000 to 2010. Five commercial banks constituted the sample size. Panel model analysis was employed to estimate the determinants of the profit function. The results reveal that the effect of credit risk on bank performance (proxied by Return on Assets) is cross-sectional invariant. In other words, the effect is similar across deposit money banks in Nigeria. Olokoyo (2012) studied the effect of bank deregulation on bank performance in Nigeria. The outcome of the investigation carried out by employing the OLS technique on secondary data collected from CBN statistical bulletin is that

deregulation of the banking sector has positive and significant effect on bank performance. Barros and Caporale (2012) examined the Nigerian banking consolidation. The authors used a dynamic panel for carrying out the study for the period 2000-2010 using the Arellano & Bond (1991) dynamic GMM approach to estimate a cost function in due consideration of possible endogeneity of the covariates. The major findings of the study are that the Nigerian banking sector benefited from the consolidation process and that foreign ownership, mergers and acquisition and bank size reduced costs. Exiting literature suggests that there are some micro and macro factors that impact on liquidity. Micro factors refer to the bank-specific determinants of liquidity. On the other hand, macro factors are exogenous factors which influence bank liquidity but are not under the control of bank management (Haron, 2004. Cucinelli (2013) is a more recent research undertaken on the banking sector from the Euro area communities. It investigated the interconnection between liquidity risk and a series of bank structure variables in order to ascertain the variables that impact liquidity coverage ratio and the net stable funding ratio. The results show that the selected variables can have an impact on liquidity risk management. With regard to the central and eastern European Union member countries, the literature is yet to be developed (Roman & Sargu, 2013). However, recent studies tried to address this issue in various ways. For existence, Vadova (2012), using a panel data regression analysis, tried to find out the liquidity determinants of commercial banks in Poland. The results indicate that liquidity tends to decrease with the size of the bank, large banks tend to hold less liquid assets because they rely on a liquidity assistance of the lender of last resort in case of distress. On the contrary, small and medium sized banks hold more liquid assets. The work of Vadova (2012) also demonstrates that inflation increases in capital adequacy and share of non-performing loans have positive effect on bank liquidity. Roman and Sargu (2013) investigated the impact of bank-specific factors on the commercial bank liquidity of the Central Eastern European (CEE) countries which include Bulgaria, the Czech Republic, Hundary, Larvia, Lithuana, Poland and Romance. This study had the aim of analyzing the determinants of the liquidity risk of a sample of banks operating in the CEE countries. It also reviewed the progress made in some key areas as well as the remaining challenges. It examined the following effect of bank-specific factors (capital adequacy, assets quality, management quality and profitability) on the liquidity risk of the sampled banks over the period 2004-2011, employing an OLS regression analysis. The results of the study highlight that the depression of the loan portfolio had a negative effect on the overall liquidity of the banks investigated. The study concludes that the economic and financial crisis has had a serious impact on the banking system. According to the authors, the management of liquidity risk is of paramount importance and ought to receive serious attention from policymakers,

researchers and practitioners, since a liquidity shortage at a single "too big to fail" financial institution is capable of leading to systemic contagion and instability). Roman & Sargu identifies the specific bank structure variables as: size, capitalization, asset quality and specialization. According to Roman & Sargu (2013), the literature on the determinants of liquidity risk is relatively scarce. Generally, the empirical studies focused mainly on the case of advanced economies. Ogbuabor, et al., (2013) examined the impact of informality on the liquidity of deposit money banks in Nigeria. The results disclose that informality impacts negatively on the liquidity of commercial banks in Nigeria. The study used panel data regression model to capture both the cross sectional and time series data of six sampled bank, loan to deposit ratio was used as proxy for bank liquidity while the explanatory variables included informality, GDP growth rate, total banking sector credit to GDP ratio, ratio of MI to total banking sector deposits, profit after tax, asset quality (measured as a ratio of total non-performing loans to total loans), and capital adequacy ratio. Osamor, et al., (2013) studied the impact of globalization on performance of Nigerian commercial banks between 2005 and 2010. They made use of panel data econometrics in a pooled regression where time series and cross-sectional observations were combined and estimated. The results confirmed that globalization (represented by foreign private investment, foreign trade and exchange rate) have positive impact on the profit after tax of Nigerian banks. Agbada & Osuji (2013) carried out a study aimed at examining empirically the effect of efficient liquidity management on banking performance in Nigeria particularly after several banking reforms, rescue mission by the CBN and the attendant merger and acquisition. Using survey design, they observe a significant relationship between them. Anamike and Sharma (2016) conducted a study on bank specific and macroeconomic factors that determine the liquidity of Indian banks. They used OLS fixed effect and random effect estimates on a data set of 59 banks from 2000 to 2013 in order to explore the association. The bank-specific factors used include bank size, profitability, cost of funding, capital adequacy and deposits while the macroeconomic factors considered are GDP, inflation and unemployment. Their findings reveal that bank ownership has impact on bank liquidity. Based on panel data analysis, they suggest that bank specific (except cost of funding) and macroeconomic (except unemployment) factors affect bank liquidity significantly. On the contrary, the study reveals that deposits, profitability, capital adequacy and inflation exhibit a positive effect on bank liquidity while cost of funding and unemployment show insignificant effect on bank liquidity. Bassey et al., (2016) carried out a study examining the relationship between the variables of bank performance and those of liquidity management of banks in Nigeria between 2000 and 2010. They collected secondary data from the CBN statistical bulletin. The data

were analyzed employing simple percentages and simple regression model. The findings re-emphasize the fact that successful operations and survival of banks rely on efficient and effective liquidity management. The not too distant financial crisis and the ongoing recession have had tremendous effect on the financial system in Nigeria. The situation raises important questions about liquidity risk of the commercial banks. Its management is considered as being of utmost importance and receives serious attention from policy makers, researchers and practitioners considering that liquidity shortage at a strategic financial institution can lead to systematic contagion and instability in the entire banking sector. While reviewing previous works, the researchers observed that the literature on the determinants of bank liquidity was relatively scarce and yet to be developed (Roman & Sargu). The results of the studies centering on the effect of some bank-specific factors on bank liquidity appear to be both contradictory and inconclusive. In addition, just as Fadare (2011) remarks, notwithstanding, the importance of efficient management, the topic regarding the relationship between banking sector liquidity and banking sector prudential regulations are largely ignored. The cardinal objective of this research, therefore, is to determine the impact of a number of financial indicators like capital adequacy, asset quality, management quality and profitability on the liquidity of a sample of the commercial banks operating in Nigeria. This study is expected to contribute to the literature on the topic. The study addresses a topic which is of interest to regulators, researchers and practitioners, given its serious level of importance in a crisis environment. The remaining part of this paper is organized as follows. Section 2 contains materials and methods. Section 3 presents the results. Section 4 discusses the results, while section 5 concludes the study.

Materials and Methods

The aim of this study is to explore the bank specific factors that influence the liquidity of Nigerian commercial banks. It uses the ex post facto research design. The bank-specific factors whose relationship with bank liquidity is investigated include loan to deposit ratio, total capital ratio, ratio of impaired loans to total loans, ratio of interest expenses to total deposits, return on assets, return on equity and ratio of banking assets to total banking sector assets.

Data and Sample

The study investigates the secondary data of seven commercial banks listed on the Nigerian Stock Exchange pertaining to the period 2001-2015. The banks include Access Bank Plc, United Bank for Africa Plc, First Bank of Nigeria Plc, GT Bank Plc, and Union Bank of Nigeria Plc, Zenith Bank Plc and Wema Bank Plc. They are selected to represent twenty-four licensed commercial banks operating in Nigeria based on judgmental sampling technique. Coincidentally, five of the sampled banks were among the ten largest banks in Nigeria according to the report of Financial Times Group of London, (Sherif, 2016). The banks are considered to be adequately representing the commercial banking sector for the purpose of this study. The data have been extracted from various audited annual reports of the sampled banks as well as the relevant CBN statistical bulletins. Based on literature, some significance variables expected to have major impact on bank liquidity have been selected for the study. These bank- specific factors are used for the study since they can be influenced through the business strategy employed by the banks. Unlike the macroeconomic factors, these variables are under the direct control of the management team of their respective banks. In this way, the researchers are in a position to comprehend and underline how business decisions influence the overall liquidity of a Nigerian commercial bank. The summary of the variables has been provided in Table 1. The details of proxy of measurement, notation and expected relationships with liquidity are also exhibited in this table. The dependent variable considered in this work is liquidity (total loans over total banking assets). Independent variables investigated here include bank specific-variables, namely total capital ratio, total impaired loans over total loans, interest expenses over deposits, return on equity, return on assets, and total banking assets over total banking sector assets. The Ordinary Least Squares statistical technique is used to run the regression after confirming the normality and stationarity of the time-series data through the unit root, cointegration and other relevant diagnostic tests.

Table 1: Summary of variables and expected relationship of independent variables with dependent variable

Variables	Measurements	Notation	Expected effect
Dependent Variables			
Liquidity	Total loans/Total asset	Liquid	-
Independent variables			
total capital ratio	Equity capital over total assets	TCR	Positive
Impaired loan over total loans	Total impaired loan over total loans of bank	ILTL	Negative
Interest expenses over deposits	Total interest expenses over total deposits of bank	IED	Positive
Return on equity	Total return over total equity capital of bank	ROE	Positive
Return on assets	Total return over total assets of bank	ROA	Negative/Positive
Total banking assets on total banking sector assets	Total banks assets over total banking sector Assets	TATSA	Negative

Variables Description

These variables are described based on the past literature on bank liquidity.

Dependent Variable
Liquidity

Some researchers like Delechat *et al*, (2012) and Vodora (2012) calculate bank liquidity as the ratio of liquid assets over total assets. Vodora (2012) considers this ratio as the most popular indicator for bank liquidity. However, to calculate the liquidity of banks analyzed, this study employs a very common liquidity indicator earlier used in the study by Roman and Sargu (2013), namely total loans over total banking assets. The advantage of the ratio of loans to total assets is that it is easy to calculate. Liquidity is required by all commercial banks for carrying out their daily operations. It ensures the availability of funds when there is expected or unexpected demand for cash by customers. In this study, liquidity was treated as the dependent variable.

Independent Variables
Total Capital Ratio

According to Anamika & Sharma (2016), capital ratio is the ratio of the capital which a bank must maintain for the purpose of absorbing the loss which arises from statutory capital requirements. It is considered by Munteanu (2012) as a buffer against losses which arise in business. It assists banks to stabilize and recover from uncertain shocks. A bank with high capital ratio is considered to be less risky when compared with others with low capital ratios. Capital adequacy ratio (Tier 1) has a positive relationship with bank liquidity. On the contrary, researchers like Roman and Sargu observed a negative link between bank liquidity indicator and total capital ratio. For the purpose of this study, capital ratio was proxied by the ratio of owners' equity capital to total assets.

Ratio of Impaired Loans to Total Loans (ILTL)

An increase of impaired loans to total loans is expected to have a negative link with bank liquidity because when bank loan becomes impaired, liquid assets turn illiquid. Hence, an increase in the total impaired loans to total loans will tend to translate to a decrease in bank liquidity. A bank whose impaired loans are on the increase will be inclined to reducing its lending operations until it is able to reverse the negative trend.

Return on Equity (ROE)

A positive relationship is expected to exist between a bank's return on equity and its liquidity indicator. The explanation for this is that, as bank shareholders contribute more capital as a result of new prudential requirements, they would also expect an increase in their returns. ROE is calculated as Profit after tax divided by total owners' equity.

Return on Assets (ROA)

When a bank becomes increasingly profitable, the liquidity requirements become less stringent. Consequently, there emanates a negative connection between return on assets and a bank's liquidity (Bonfim and Kim, 2012). On the other hand, there are situations when profitability, proxied by return on assets, can have a positive relationship with bank liquidity (Anamike and Sharma, 2013). ROA is calculated as Profit after tax divided by Total assets.

Ratio of Total Banking Assets to Total Banking Sector Assets (TATSA)

This ratio refers to a bank's share of the total banking sector assets. It has to do with a bank's size as compared with the size of the entire banking sector. The size of a bank may have some specific risks. According to Dele chat *et al* (2012), size affects bank liquidity negatively. Large sized banks are capable of arranging for funds from external sources while small banks would require maintaining adequate liquidity each moment. The implication is that an increase in bank size (assets) brings about a decrease in its liquidity buffer.

Interest Expenses over Deposits

As banks attract additional deposits in order to comply with new regulatory guidelines regarding liquidity, they may be faced with paying higher interest charges for the extra deposits compulsorily. The implication is that there is a positive effect of interest expenses to deposit ratio on bank liquidity.

Techniques of Analysis

This study analyzed the cross sectional and time series data of the sampled Nigerian deposit money banks for the period 2001 to 2015. The summary statistics of the bank specific variables employed are presented in Table 2. After carrying out the necessary diagnostic tests, unit root and cointegration tests, we observed that the data were stationary. With stationarity being in place, any possible shocks were expected to have died down over the period of the time series. Consequently, we were enabled to employ the Ordinary Least Squares (OLS) technique to analyze the time-series data so as to estimate the impact of the explanatory variables on the dependent variable. The OLS technique was adopted to run the regression because it is generally considered as the best linear unbiased estimator (Koutsoyianis, 1973).

Research Hypotheses

The null hypotheses of the study are as follows:
H1: A unit increase in total capital ratio will lead to a decrease in bank liquidity.
H2: An increase in the ratio of impaired loans to total bank loans will increase bank liquidity.
H3: An increase in the ratio of interest expenses to deposits will occasion a decrease in bank liquidity.

H4: A unit increase in return on equity will bring about a decrease in bank liquidity.

H5: A unit increase in return on assets will lead to a decrease in bank liquidity.

H6: A unit increase in the ratio of total banking assets to total banking sector assets leads to an increase to bank liquidity.

Model Specification

The specification of the determinants of liquidity which we estimated was formulated as follows:

Liquidit = Xit + βI TCRit + β2 ILTLit + β3 IEDit + β4 ROEit + βit + β5 ROAit + β6 TATSAit + ∑it

(1)

Where Xit is the intercept, β_1, β_2, β_3, β_5 and β_6 are the coefficients of the explanatory variables and Σ is the stochastic error term. We converted the variables to their natural logarithm forms, after producing the statistical summary from the nominal data. The reason for the transformation of the data is partly to make the data concise, convenient and be of the same form. Converting the data to their natural logarithms would also make for easier interpretation of the parameters' ellasticity. E-views 9 statistical package was employed for estimating the model above where

Liquid=Bank liquidity (loan to banking asset)

TCR = Total capital Ratio (Owner's equity capital to total assets)

ILTL = Impaired loans to total assets

IED = Interest Expenses over total loans

ROE = Return on Equity (Profit after tax over Owner's equity)

ROA = Return on Assets (Profit after tax over total assets)

TATSA=Bank share of the total banking sector assets (Total Banking Assets over Total Banking Sector Assets)

Results

The empirical results are presented in two sections: descriptive analysis and empirical analysis.

Descriptive

This section was initiated by first analyzing the normality of the data distribution. We considered it worthwhile carrying out some normality test as it is a necessary prerequisite for engaging in any parametric tests. The validity of some parametric tests will depend on the normality of the distribution of the related data (Asghar & Saleh, 2012). In the absence of normality using the ordinary least squares to carry out the data analysis will produce spurious and misleading results. Table 2 displays the descriptive statistics. With 15 observations, the mean-median ratio of the variables was each approximately 1. The mean and standard deviation of the dependent variable (Liquid) was 3.767 ± 0.730, while the mean values and standard deviations of the explanatory variables were 0.310 ± 0.135, 1.124 ± 0.759, 0.093 ± 0.159, 0.436 ± 1.389, 0.427 ± 0.094, 0.427 ± 0.094, and 90.554 ± 22.904 for IED, ILTL, ROA, ROE, TATSA and TCR respectively. The standard deviations of most of the variables were low. The coefficients of variation were small. The Kurtosis of each of the variables was positive. On the average, the distribution was positively skewed as the skewness was greater than zero.

Table 2: Descriptive Statistics

	IED	ILTL	LIQUID	ROA	ROE	TATSA	TCR	YEAR
Mean	0.310733	1.124400	3.767667	0.093933	0.436200	0.427467	90.85400	2008.000
Median	0.313000	1.008000	3.644000	0.144000	0.845000	0.426000	93.92000	2008.000
Maximum	0.492000	2.742000	5.051000	0.340000	2.069000	0.535000	127.2600	2015.000
Minimum	0.041000	0.292000	2.588000	0.299000	-2.325000	0.160000	53.10000	2001.000
Std. Dev.	0.135241	0.759869	0.730909	0.159896	1.389044	0.094253	22.90498	4.472136
Skewness	-0.554129	0.755452	0.141260	-1.158002	-0.639001	-1.370304	-0.005200	-4.03E-17
Kurtosis	2.685579	2.485262	1.913363	3.813789	2.121386	5.381975	1.823122	1.789286
Jarque Bera	0.829435	1.592367	0.787874	3.766330	1.503282	8.240458	0.865718	0.916143
Probability	0.660527	0.451047	0.674397	0.152108	0.471592	0.016241	0.648652	0.632502
Sum	4.661000	16.86600	56.51500	1.409000	6.543000	6.412000	1362.810	30120.00
Sum Sq. Dev.	0.256063	8.083614	7.479191	0.357935	27.01219	0.124370	7344.932	280.0000
Observations	15	15	15	15	15	15	15	15

Regression Results

The results obtained from the regression analysis are displayed in table 3. The regression results suggest an estimated negative link between TCR, ILTL, ROE and TATSA and bank liquidity. On the other hand, both IED and ROA were estimated to be having a positive impact on bank liquidity, given that other explanatory variables remained constant. At 5 percent level of significance, ($p < 0.05$), none of the explanatory variables had a statistically significant impact on bank liquidity. However, at 10 percent level of significance, both ROE and ROA had some estimated statistically significant effect on liquidity, should all other exogenous variables remain constant.

Table 3: Regression results (logged)

Dependent Variable (Liquidity)

Method: Least Squares
Date: 11/23/16 Time: 17: 21
Sample: 2001 2015
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.

LOG (TCR)	-0.084864	0.077888	-1.089561	0.3556
LOG (ILTL)	-0.008877	0.093051	-0.095399	0.9300
LOG (IED)	0.036122	0.040515	0.891591	0.4383
LOG (ROE)	-0.924137	0.325728	-2.837140	0.0658
LOG (ROA)	0.921356	0.353185	2.608709	0.0798
LOG (TATSA)	-0.037638	0.184521	-0.203978	0.8514
C	3.609747	0.745432	4.842491	0.0168
R-squared	0.977180	Mean dependent var		1.261685
Adjusted R-squared	0.931540	S.D. dependent var		0.219597
S.E. of regression	0.057457	Akaike info criterion		-2.679523
Sum squared resid	0.009904	Schwarz criterion		-2.467714
Log likelihood	20.39762	Hannan Quinn criter		-2.911878
F-statistic	21.41065	Durbin Watson stat		1.516999
Prob (F-statistic)	0.014672			

The model was as follows:

Liquid= 3.609 - 0.085TCR - 0.009 ILTL + 0.036 IED -0.924 ROE + 0.921 ROA − 0.038 TATSA

(0.745) (0.078) (0.093) (0.041) (0.325) (0.353) (0.185)

(Standard error in parenthesis)

$R^2 = 0.977$ Ser. = 0.057

On the average, the standard errors in parenthesis, which measured the degree of uncertainties about the true values of the estimated regression coefficient, was low. The standard error of the regression, which represented the standard deviation of the error term, was 0.057. The R-squared was 0.97. The F-statistic was 21.41 while its related probability was 0.01. The Durbin- Watson statistic was 1.52.

Discussion

The mean-median ratio of the variables was each approximately 1. This implies that the distribution had some normality characteristics and, hence, amenable to the use of the Ordinary Least Squares statistical technique. The standard deviations of most of the variables were low, hence, the variables were not widely dispersed from their mean values. The fact that the kurtosis of the variable s were positive implies that their distribution was more peaked than that of a Gaussian distribution. Researchers suggest that this kind of leptokurtosis arises from a pattern of volatility in financial markets where periods of high volatility are succeeded by those of relative stability. Furthermore, the distribution was positively skewed (skewnesss>0). This means that it was concentrated on the left side of the histogram. The implication of the F- statistic of the regression standing at 2.41 with a related probability of 0.01 is that there was no chance at all that the coefficients of all the explanatory variables were equal to zero. The R-squared of the regression was 0.97, implying that approximately 97 per cent of the variations in the liquidity levels of Nigerian commercial banks during the period of study were explained by the regression. As the standard deviations of most of the variables were low, the variables were not widely dispersed from their mean values. The closeness of the Durbin-Watson statistic to 2 has the implication that there was almost a complete absence of serial correlation among the variables of this study. In this study, an attempt has been made to estimate the impact of bank-specific (TCR, ILTL, IED, ROE, ROA, TATSA) factors on bank liquidity. Various studies have investigated the relationship between bank liquidity and bank-specific factors. They provided the basis for developing the hypotheses of this paper. The empirical findings of this work highlight that at 5 percent significance level, total capital ratio, impaired loans to total loans, return on equity and total banking assets over total banking sector assets have statistically insignificant negative effect on bank liquidity. On the contrary, interest expenses on deposits and return on assets have been estimated as having statistically insignificant and positive effect at 5 percent significance level. At 10 percent significance level, both return on equity and return on assets have significant links with bank liquidity. The total capital ratio has an estimated coefficient of -0.078 and a p-value of 0.356, exhibiting a negative impact on banking liquidity. This is in agreement with the finding of Roman and Sargu (2013). This negative impact can, perhaps, be explained by the pressure which shareholders mount on the management of banks to increase their profitability if the former are to increase their equity holdings. In a bid to meet the demands of the shareholders, the bank management are forced to convert some of their liquid assets, which generate low to zero returns, to illiquid assets. The illiquid assets include long-term loans and other long-term investments which have higher returns. This finding is also in agreement with the works of Choon *et al.,* (2013), Munteanu (2012) and Bhati *et al.,* (2015). On the contrary, capital ratio was found to be having a positive effect on banking liquidity by Tseganesh (2012), Vodova (2013), Vodora (2011), and Alger and Alger (1999). The recommendation of Basel III speaks in favor of enhancing the size of bank's equity capital. The discrepancy between the two sets of results probably arose from the fact that while some studies considered only private sector banks, others investigated the banks from both private, public and foreign banks. Nationalized banks, like those of India, for example, where government is the major or only shareholder will have less pressure from shareholders for return than the private banks which are under the pressure of private shareholders. On the whole, higher capital ratio is expected to generate safety and higher liquidity. Banks should maintain adequate capital ratios to be able to absorb the losses that arise from statutory capital requirements. According to Munteanu (2012), capital ratio is a buffer against losses, which arise in business, and helps banks to stabilize and recover from

uncertain shocks. According to the findings of this study, the impaired loans ratio has a negative effect on bank liquidity. This result contradicts the discovery of Roman and Sargu (2013). In Nigeria, the CBN took a series of bank reform measures during the period of this study aimed at improving the liquidity conditions of the commercial banks and minimizing the negative effects of impaired loans. As banks recorded and reported some increase in their impaired loans, the CBN intensified efforts in clearing these 'toxic' assets. The efforts made by the monetary authorities to buy the toxic assets failed to yield the targeted results partly because the banks did not fully comply with the prudential guidelines (Ebhodaghe, 2015). This study's finding agrees with that of Roman and Sargu (2013) with respect to the effect of interest expenses over deposits on bank liquidity. Both of them discovered positive link between interest expenses over deposits and bank liquidity. Roman and Sargu made this discovery when they studied Bulgarian and Hungarian banks. Banks had to attract additional deposits in order to comply with new regulations regarding liquidity standards. This resulted to an increase in interest expenses for deposits, which consequently had some positive effect on bank liquidity. Return on equity was found by this study as having a negative effect on bank liquidity. The result aligns with the discovery made by Roman and Sargu (2013) when they investigated the liquidity determinants of Hungarian banks. Banks registering losses had to beef up their liquidity under new prudential guidelines. However, the loan market was almost filled up such that banks were unable to enhance their revenue by granting more loans. They were incapacitated to meet shareholders' demand. Consequently, there was a negative link between return on equity and the liquidity indicator. With a p-value of 0.079, the return on assets of Nigerian commercial banks had a positive impact on liquidity. Similar results were observed in Vodora (2013) and Lartey *et al.,* (2013). On the contrary, Bonfim and Kim (2012) found a negative link between probability (ROA) and liquidity. When a bank becomes more and more profitable, the liquidity required becomes less demanding. The implication is that there may arise a negative relationship between bank profitability and bank liquidity. Anamika and Sharma posited that banks tend to get involved in riskier projects in order to boost their profitability. We suggest that banks should strive to strike a balance between the need to make profit and the necessity for maintaining adequate liquidity at all times.

Conclusion

The aim of this study was to determine the impact of bank-specific factors on the liquidity of listed banks in Nigeria. This work found a negative relationship between banking assets to total banking sector assets ratio and bank liquidity. It is in agreement with the findings of Dinger (2009), Bonnerat *et al.,* (2013) and Delechat *et al.,* (2012). They all observed that a bank's size affects its

liquidity level negatively. They rationalized this finding by arguing that large-sized banks are capable of arranging funds from external sources when the need arises while small banks need to maintain sufficient liquidity. The implication is that with an increase in bank size, liquid reserve of banks tends to decrease. Aspachs, Nier and Tiesset (2005) agreed with this study that bank size has a statistically insignificant effect on bank liquidity. We suggest that smaller banks should always maintain adequate levels of liquidity to avoid negative consequences. In summary, these researchers view this work as a modest contribution to the literature on this subject. The study completely relied on the available annual secondary data which the researchers were able to extract from the audited financial reports of the sampled commercial banks. However, owing to its level of importance, engaging in a more detailed analysis as a further research direction is considered appropriate. We also recommend the usage of more liquidity indicators, quarterly data and larger samples to enhance the precision of the findings. When such extensive analysis is carried out, the link between the efficiency of the investigated banks and their liquidity will be evident. Hopefully, such information will assist commercial banks and the regulatory authorities in developing their monetary policies.

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