

Corporate Liquidity Management and Financial Distress of Deposit Money Banks in Nigeria

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Abstract

The study examined the relationship between corporate liquidity management and the financial distress of deposit money banks in Nigeria. The specific objectives of the study were to ascertain the relationship between Loan-to-Deposit Ratio, Current Ratio, Cash-to-current asset ratio and Altman's Zeta Score of Deposit Money Banks in Nigeria. Times Series Data were collected from annual reports and accounts of the selected banks for 10 years (2011 - 2020). Covariance analysis was conducted to test the hypotheses. However, multiple regression analysis was conducted for robustness. The study found that the loan-to-deposit ratio has a weak (10% approx.) and negative (-0.108720) relationship with the Altman z-score. There is a weak (26% approx.) and positive (0.265612) relationship between the current ratio and financial distress of deposit money banks in Nigeria. The cash-to-current asset ratio has a weak (30% approx.) and positive (0.298359) relationship with the financial distress of deposit money banks in Nigeria. The findings imply that banks liquidity management has not been the major cause of their financial difficulties. The study, therefore, recommends that banks should maintain a moderate loan-to-deposit ratio to avoid reducing their liquidity and the ability to repay deposits on time. They should strive to improve their current ratio. They can do this by ensuring a faster conversion cycle of loans or accounts receivables. They should increase their pool of cash and cash equivalents which will increase their financial stability. The bank should maintain liquidity to operate with and should hold an amount of cash to service net withdrawals from customer activities such as drawing from their deposit (checking and savings) accounts.

Keywords: Liquidity Management, Financial Distress, Altman's Zeta Score, Loan-to-Deposit Ratio, Current Ratio, Cash-to-current asset ratio

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1. INTRODUCTION

1.1 Background of the Study

It is generally agreed that an efficient financial system is a prerequisite for an efficient and developed economy. Banks in most economies are the principal depositories of the public's financial savings, the nerve centre of the payment system, the vessel endowed with the ability of money creation and allocation of financial resources and channel through which monetary and credit policies are implemented (Okpara, 2009). The success of the monetary policy, to a large extent, depends on the health of the banking institutions through which the policies are implemented. As a result of this central role of banks in the economy, their activities have to be kept under surveillance to ensure that they operate within the law in line with safe and sound banking practices so that the economy will not be jeopardized. Hence, governments generally legislate to influence and/or directly control banks' activities to suit the developmental objectives of the economy.

The impact of deficiency in the banking sector usually has a further effect beyond the industry. In this spirit, predicting distress in the industry becomes imperative. Financial distress is a situation where an entity or a firm cannot meet its business goals or is having difficulty fulfilling its financial obligations to creditors. It could be said that, while the banking failures of the pre-90s could be attributed to inadequate regulatory frameworks, such failures grew unabated, even when regulations were set. These include the Banks and Other Financial Institutions Act (BOFIA) of 1991, prudential guidelines on asset classification, provision for loan losses (SAS 10), Failed Banks (Recovery of Debts), among others. These failures had eroded public confidence in the system and had resulted in the massive withdrawal of funds from failed banks to the healthier ones.

Banks' ability to achieve targeted results depends upon adherence to rules and regulations, while a deviation may cause a breakdown. In some prior research, the causes of unhealthy deviation from set rules have been discussed to include inadequate supervision, weak management, and ineffective government policies. Ogunleye (2002) classified the causes of bank failure into institutional, economic and political factors as well as regulatory and supervisory inadequacies. Ebhodaghe (1995) attributed bank failure to financial deficiencies, economic downturn, negative policy environment and management problems.

In Nigeria, the challenges of inefficient liquidity management in banks were brought to the fore during the

liquidation and distress era of the 1980s and 1990s. The negative cumulative effects of the banking system liquidity crisis from the 1980s and 1990s lingered up to the re-capitalization era in 2005 in which banks were mandated to increase their capital base from N2 billion to an astronomical high N25 billion. This move by the apex bank was believed would stabilize and rectify liquidity problems that were prevalent in the economy. Barely five years of what was applauded and considered as a fortified repositioning of banks against liquidity shortage, the Central Bank of Nigeria (CBN) in 2009 came on a rescue mission to save three illiquid banks (the defunct Afribank, Bank PHB, and Spring bank) (Elijah *et al*, 2017). The global financial crisis of 2008 also had its claws on the already ailing banks and to contain the crisis of confidence and ease financial conditions, CBN used both conventional and unconventional measures to inject liquidity into the system. In its rescue mission in 2009, CBN injected N620b to save the affected three banks that were operating on negative shareholder's funds (Okpara, 2013). The use of unconventional measures became necessary as the regular monetary policy transmission mechanism got seriously impaired by the liquidity crisis that warranted the setting up an agency, Asset Management Corporation of Nigeria (AMCON) in 2011 to buy out the bad debts of affected banks (Okpara, 2013).

From the foregoing, it is obvious that banks need a huge amounts of money to be able to effectively provide the required intermediary services, to improve their level of profit and also ensure that the customers have their money available for withdrawal when needed. These two functions are very contradictory, and hence needs to be given thorough attention. Hence, this study aimed to ascertain the relationship between corporate liquidity management and the financial distress of deposit money banks in Nigeria.

1.2 Statement of the Problem

More than a decade after the 2008 financial crisis, and six years since the oil crisis, Nigeria's banking sector continues to grapple with macroeconomic pressures including declining real gross domestic product (GDP) growth rates, rising inflation and unemployment rates, and fluctuating naira-to-dollar exchange rates caused by unstable oil prices. These factors are combined to dampen consumption and investment and curtail government expenditure, with implications for banking activities. At the same time, policy measures to stabilize the financial system and increase lending to stimulate the production of goods and services have increased pressures on banks. The CBN's downward fee revisions to electronic banking charges, which took effect in January 2020 and were designed to ensure the protection of consumer rights as more individuals are financially included, have had a negative effect on banks' fees and commission income.

Profitability is also being dampened by the Cash Reserve Requirement (CRR), which, at 27.5 per cent, is among the highest in the world. The CRR requires banks to deposit an increasing amount of local-currency deposits with the central bank and restricts their ability to lend as these reserves are only available for intervention funds.

COVID-19 is ratcheting up these pressures on banks. Restrictions on movement such as physical distancing and lockdowns have negatively impacted businesses, leading to salary cuts, layoffs, and high levels of uncertainty around business viability, while consumers have cut back on nonessential spending. All these economic circumstances can distress the banking industry immensely.

However, other than macroeconomic problems, some management problems can increase the bankruptcy risks in Nigeria banking industry. The most prominent of the management risks facing the banking industry is the liquidity risk. The Nigerian banking industry was overwhelmed with a significant rate of bad liquidity management, which led the Nigerian Central Bank to engage in a recapitalization process from 2 billion to 25 billion nairas that resulted in mergers and acquisitions to sustain necessary capitalization to have reasonable liquidity in 2005. In September 2018, the Central Bank of Nigeria (CBN) announced the liquidation of Skye Bank with Polaris Bank to takeover their activities. This is because Skye failed to meet their liquidity requirements. Skye's problems started after it used short-term funds to buy local lender Mainstreet Bank in 2014 but failed to raise fresh cash. It had been in talks with shareholders and investors to raise capital but suspended plans after weak oil prices hit the capital markets and drove foreign investors away. The problem of most Nigerian Deposit Money Banks is that they tend to focus more on profit maximization than taking liquidity measures to meet the demands of their customers and fulfilling their obligations to their clients as and when due and in that process, they are losing a large proportion of their clients.

This study, therefore, ascertained the relationship of banks' key liquidity ratios such as loan-to-deposit ratio, current ratio, cash-to-current asset ratio with financial distress of deposit money banks in Nigeria.

1.3 Objective of the Study

The main objective of this study was to ascertain the relationship between corporate liquidity management and the financial distress of deposit money banks in Nigeria. The following were the specific objectives of the study.

- i. To examine the relationship between loan-to-deposit ratio and bankruptcy of deposit money banks in Nigeria.
- ii. To evaluate the relationship between current ratio and bankruptcy of deposit money banks in Nigeria.
- iii. To ascertain the nature of the relationship between cash-to-current asset ratio and bankruptcy of deposit

money banks in Nigeria.

1.4 Research Questions

The following questions were asked to guide the study.

- i. What is relationship between loan-to-deposit ratio and bankruptcy of deposit money banks in Nigeria?
- ii. What is the relationship between current ratio and bankruptcy of deposit money banks in Nigeria?
- iii. What is the nature of the relationship between cash-to-current asset ratio and bankruptcy of deposit money banks in Nigeria?

1.5 Statement of Hypotheses

The following null hypotheses were formulated for the study:

- i. Loan-to-deposit ratio does not have a positive relationship with bankruptcy of deposit money banks in Nigeria.
- ii. Current ratio does not positively relate with bankruptcy of deposit money banks in Nigeria.
- iii. Cash-to-current asset ratio does not have a positive relationship with bankruptcy of deposit money banks in Nigeria.

1.6 Significance of the Study

The study will provide the shareholders of banks in Nigeria with the information on the management factors that put their banks at risk with a focus on liquidity management. It will provide them with more insight on the relationship each liquidity ratio shares with financial distress of their various banks. This will make them to strengthen the extent to which they monitor the management policies.

The study will provide the investors and proposed investors with the information on the financial health of the studied banks. It will give them a significant insight on the banks to invest in judging by their Altman Zeta scores. This will help them make an informed and profitable decisions.

Banks' managers and other financial institutions' managers will benefit immensely from the outcome of the study. The findings of the study will serve a good purpose during decision making on liquidity management. It gives them the information on the liquidity ratio that affects its financial health which increases their bankruptcy risks.

Regulatory agencies such as the Central Bank of Nigeria, Securities and Exchange Commission, Corporate Affairs Commission, Nigeria Stock Exchange, and Nigeria Deposit

Insurance Corporation will find the study useful during policy formulation and implementation which will provide a platform for promoting an efficient and effective banking practices in Nigeria.

The general public (which include the bank staff, customers, and other stakeholders) will benefit immensely from the findings of the study. It will give them an insight on the banks to deposit their funds judging by their financial health and Altman Z-score. Banks that have liquidity management problems will always be avoided.

The universities and other institutions of higher learning around the globe will find the study very useful by applying its findings in the development of literature and in further related research works as reference material.

1.7 Scope of the Study

The study which explored the relevance of liquidity management to financial distress of deposit money banks in Nigeria covered a period of ten (10) years, from 2011 to 2020.

2. REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

2.1.1 Liquidity

According to business dictionary, liquidity is a measure of the extent to which a person or organization has cash to meet immediate and short-term obligations or assets that can be quickly converted to do this. Liquidity can also be a measure of the ability and ease with which assets can be converted to cash. To remain viable, a financial institution must have enough liquid assets to meet its short-term obligations, such as withdrawals by depositors.

Graham (2013) defines liquidity as a bank's capacity to fund increase in assets and meet both expected and unexpected cash and collateral obligations at a reasonable cost and without incurring unacceptable losses. Also, liquidity is a financial term that means the amount of capital that is available for investment. Today, most of this capital is credit, not cash. Bank Liquidity simply means the ability of the bank to maintain sufficient funds to pay for its maturing obligations. It is the bank's ability to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demand while abiding by existing reserve requirements.

Nwaezeaku (2006) submits that liquidity in banking measures the availability of cash and the rate at which current assets are converted into cash to meet ordinary and extra – ordinary request. Several scholars have viewed liquidity as a measure of bank's bargaining power and strength.

2.1.1.1 Liquidity Management

Choudhry and Masek (2011) opines that liquidity management refers to the funding of deficits and investments of surpluses, managing and growing of statement of financial position as well as ensuring that the bank operates within regulatory and stipulated limits. Liquidity management in deposit money banks also reduces the incidence of bankruptcy and liquidation which are simply the result of illiquidity, and thereby, help to protect customers' deposits.

2.1.8 Financial Distress

Financial distress refers to a situation when firms are unable to meet their financial obligation as at when due. According to Ray (2011) a firm experiences corporate financial distress where there is a violation of loan contracts and when the organization incur constant losses and fails to honour obligation as at when due.

2.1.9 Altman's Zeta Score Model

One common bankruptcy prediction model is known as Altman's Z-score model. This indicator is a mathematical model that creates a Z-score by combining financial ratios. Altman's Z-score is one of the best known statistically derived predictive models used for forecasting a firm's impending bankruptcy (Moyer, 2005). The model was developed by Edward Altman, a financial economist, and professor at New York's stern school of Business in 1968. Altman's Z-score model is a multivariate model used to measure the financial health of a company and to predict the probability that a company will go bankrupt within two years (Hayes et al, 2010). The model uses various accounting ratios and market-derived price data to predict financial distress and future bankruptcy. Lower and negative Z-scores indicate a higher and likelihood that a company will go bankrupt while a higher and positive score indicates that a company will survive. The Z-score gained acceptance by auditors, management accountants, finance experts, and database administrators in the mid-1980s.

2.2 Theoretical Framework

The study employed General Regulation theory, and Shiftability theory to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The study was anchored on Shiftability theory and supported by General Regulation theory. These theories are as discussed below.

2.2.1 General Regulation Theory

Sinkey (1992) is a theorist acknowledged to be the first to have attempted to develop a general theory of regulation (Currie, 2005). The Regulation Theory combines agency theory which focuses on problems of hidden actions (otherwise called "moral hazards") and hidden information (otherwise called "adverse selection"), with a theory of the production of regulatory and financial services where output is dependent on two variables of confidence and convenience. According to Sinkey (1992) cited in Currie (2003), the role and importance of government guarantees are evident in a situation where an institution is distressed. In the light of the confidence function, a distressed institution is characterized by low and negative net worth, unstable earnings, amongst other negative performance pointers, all of which provide testament of a breakdown in an agency relationship, resulting in increased financial risk (Currie, 2003).

The general theory of regulation is driven by the need to recognize that regulation is required to prevent the price and output volatility that can lead to financial crises, resulting in declining or negative economic growth; and that regulation is multi-faceted and also involves establishing a regulatory model, the role of which is to contain and mould the risk-taking and management behaviour of both financial and non-financial institutions as well as other participants through prudential supervisory system appropriate to the strength or weaknesses of the protective measures. The adoption of this theory by this paper is justified against the background that regulatory failure is usually a precursor to the failure of banking institutions, which triggers financial crises and that, unless the regulator is alive to its responsibility, the problem gets festered and the wider economy is negatively affected.

2.2.2 Shiftability Theory

This theory was proposed by H.G. Moulton who asserted that if the commercial banks maintain a substantial amount of assets that can be shifted on to other banks for cash without any material loss in case of necessity then, there is no need to rely on maturities. This theory states that, for an asset to be perfectly shiftable, it must be immediately transferable without 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.

2.3 Empirical Review

To support the focal and explanatory variables, the study systematically reviewed literature that the researcher deem relevant in testing the research hypotheses. The reviewed literature are summarized properly to establish a gap that this present study filled.

Akpinar and Akpinar (2017) examined the determinants of financial distress of Turkish manufacturing firms. Panel data regression analysis reveal that leverage increases bankruptcy risk (decreases the Z score); the variables of profitability, liquidity, efficiency and intellectual capital decrease bankruptcy risk (increase the Z score). Significant findings were not obtained for other variables.

Madushanka and Jathurika (2018) examined the relationship between liquidity and profitability manufacturing companies in Sri Lanka. The analysis was based on 15 manufacturing companies listed on the Colombo Stock Exchange over five years from 2012 to 2016. Correlation and regression analysis, as well as the descriptive statistics, were applied in the analysis and findings suggest that Liquidity ratios (Quick ratio) have positive and significantly related to the firm profitability among the listed manufacturing companies in Sri Lanka. The study recommended that manufacturing companies in Sri Lanka should pay more attention to the liquidity ratios as they have a significant impact on the profitability of the firms.

Mburu (2018) examined the determinants of financial distress of non-financial firms listed on the Nairobi Securities Exchange. The study relied on secondary data obtained from the financial statements of sampled firms for a period of five years (2013 to 2017). The correlation and regression result revealed that return on asset and profitability ratios were significant variables that measure the financial distress of non-financial firms.

Ologbenla (2018) investigated the impact of liquidity management on the financial performance of insurance companies in Nigeria between 2003 and 2012. Return on asset ROA is used as the dependent variable and it measures the financial performance. Panel Regression analysis was adopted to estimate the model and the results showed that liquidity management has not been having a significant impact on insurance company's performance like equity management which affects long term stability. Again, both investment and working capital are shown to have a significant positive impact on the financial performance of insurance companies in Nigeria.

Onyekwelu, Chukwuani, and Onyeka (2018) appraised the effect of liquidity on the financial performance of deposit money banks in Nigeria. A sample of five (5) banks was used for the study. Secondary data were collected from the firms for ten years period, 2007 - 2016. The data were analyzed using multiple regression analysis. Results show that Liquidity has a positive and significant effect on banks' profitability ratios and that liquidity also has a positive and significant effect on Return on Capital Employed.

Ali and Jameel (2019) examined the role of liquidity management on the profitability of banks listed on the Iraq Stock Exchange for the period 2006 to 2016. The study adopted the current ratio as a proxy for liquidity management and ROA and ROE were used as measures of profitability. Secondary time-series data was collected from the annual financial statements of sampled 5 banks. They conducted unit root test, co-integration test as well as pooled effect, mixed effect and random effect regression analysis based on E-views software in evaluating their study data. They found that there was no long-run relationship among the variables and that liquidity management had a nonsignificant negative effect on profitability.

Ikpesu (2019) examined the determinants of financial distress of firms in the manufacturing sector in Nigeria. The study employed the fully modified ordinary least square (FMOLS) on annual time series data of eighteen listed manufacturing firms on the Nigeria stock exchange (NSE) which was obtained from their audited financial statement. The outcome of the study revealed that firm size, leverage, liquidity, profitability, revenue growth, and share price are the major firm-specific determinants of financial distress in the manufacturing firm in Nigeria. Mardaconsita and Soelton (2019) aimed to analyze the level of bankruptcy using the Altman Z-Score model of modifications and models Springate, the plantations company period 2014-2017. The data used for the study is secondary data, financial data of plantations company taken from the site www.idx.co.id. Based on the results of the study, plantations industries was having financial difficulties which would be potentially bankrupt. The Z-Score of less than 1.1 in the period 2014-2017 and no different from using a model that generates value Springate S-Score <0.862 means that the financial performance plantations company are experiencing financial difficulties during the 2014-2017 period and potentially going bankrupt.

Etale and Sawyerr (2020) investigated the link between liquidity management and the financial performance of GlaxoSmithKline a leading pharmaceutical manufacturing company in Nigeria with a strong multinational background. Current ratio (CUR), quick ratio (QUR) and cash ratio (CAR) were used to represent liquidity management (the independent variables), while return on assets (ROA), a proxy for financial performance was adopted as the dependent variable. Secondary data for the study was obtained from the financial statements of GlaxoSmithKline for the eight years covering 2011 to 2018. Statistical tools employed for the analysis of data include descriptive statistics and OLS multiple regression techniques applying the E-view 10 software. The results revealed that the current ratio and cash ratio had a significant positive effect on return on assets, while the quick ratio had a significant negative link with return on assets. The study concluded that liquidity management had mixed significant economic connection with financial performance in the case of GlaxoSmithKline Consumer Nigeria PLC. The study recommended that the management of the company should pay close attention to its liquidity position by putting in place policies for efficient management of its current assets, especially inventory, accounts receivable and cash to reduce the incidence of excess liquidity in the last few years.

Lojek (2020) examined the relationship between profitability and financial liquidity among the importers of

best-selling brands of new cars in Poland. The liquidity ratios studied were Operating cash flow/sales ratio, Operating cash flow/current assets ratio, Operating cash flow/current liabilities ratio, Current liquidity ratio, Quick ratio, and Immediate liquidity ratio. Return on asset and return on equity was used to measure financial performance. The study made use of Pearson correlation techniques. It was revealed there is a positive and strong relationship between profitability and financial liquidity in the automotive industry in Poland.

Arini, Samrotun, and Masitoh (2021) examined the effects of liquidity ratios, activity ratios, profitability ratios, leverage ratios on the financial difficulties of textile and garment companies listed on the Indonesia Stock Exchange in the period 2018-2019. The object in this study used samples of 40 samples on textile and garment companies listed on the Indonesia Stock Exchange in the period 2018-2019 using sampling techniques purposive. The methods used in this study are some of the processed linear regression analyses using SPSS

Based on this study shows that liquidity is influential but not significant to financial distress. The activity has a significant effect on financial distress. Profitability has a significant effect on financial distress. Leverage is influential but not significant to financial distress.

2.4 Gap in Empirical Literature

As shown in the summary of empirical review, most of the reviewed work relates liquidity management to performance and profitability. The few studies that attempted to relate liquidity management to financial distress were conducted outside Nigeria and considered other sectors.

The inability of prior studies to examine the relationship between liquidity management and financial distress of deposit money banks in Nigeria created a gap in literature which the current study filled.

3. METHODOLOGY

3.1 Research Design

The study adopted the *ex-post-facto* researcher design (after the fact). This research design was adopted because firstly, it helped to establish the relationship between liquidity management and financial distress. Secondly, the study focuses on financial distress over a prescribed ten-year period, from December 2011 to December 2020. Thirdly, it was appropriate for achieving the research objectives of the study because the data and the study depend grossly on secondary data collected from the annual report and account of deposit money banks listed on Nigeria Stock Exchange.

3.2 Area of the Study

The research was carried out in banking sector of Nigeria. The study used evidence from deposit money banks to make a conclusion. The sector was considered because of its relevance to the economic growth and development in Nigeria especially during this period of acute recession and severe hardship.

3.3 Sources of Data

The study made use of data collected from secondary sources. Data were collected from annual report and accounts of selected banks listed on the Nigerian Stock Exchange for the period 2011 to 2020.

3.4 Population of the Study

The population of the study consist of the 24 listed deposit money banks on the Nigeria Stock Exchange within the period 2011 to 2020. This period was suitable because it witnessed series of economic recession and financial constraints within the banking industry and Nigeria at large. During this period, the federal government implemented the treasury single account policy that hugely affected bank deposit and impacted greatly their liquidity. Also, the period witnessed a significant fall in the global price of crude oil which also directly or indirectly affected these banks.

The population include Access Bank Plc, Citibank Nigeria Limited, Diamond Bank Plc, Ecobank Nigeria Plc, Fidelity Bank Plc, First Bank Nigeria Limited, First City Monument Bank Plc, Globus Bank Limited, Guaranty Trust Bank Plc, Heritage Banking Company Ltd,

KeyStone Bank, Polaris Bank, Providus Bank, Stanbic IBTC Bank Ltd., Standard Chartered Bank Nigeria Ltd., Sterling Bank Plc, SunTrust Bank Nigeria Limited, Titan Trust Bank Ltd, Union Bank of Nigeria Plc, United Bank For Africa Plc, Unity Bank Plc, Wema Bank Plc, and Zenith Bank Plc.

3.5 Determination of Sample Size

The study sampled eight (8) deposit money banks listed on the Nigeria stock exchange, and whose annual report and accounts are submitted to the Nigerian Stock Exchange from 2011 to 2020. The selection was based on CAMEL (Capital Adequacy, Asset Quality, Management Quality, Earning Ability and Liquidity Quality) as adopted by Yussuf and Tijani (2019) in evaluating the financial health of Deposit Money Banks in Nigeria.

3.6 Model Specification

The study employed correlation model because it has the capacity to ascertain the relationship between liquidity management and financial distress of deposit money banks in Nigeria. Correlation analysis measures the relationship between two and more variables. Since the study is a relationship study, correlation technique was the most appropriate technique for analysis and test of hypotheses. The correlation model was specified as follows:

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

Where:

r_{xy} is the correlation coefficient of the linear relationship between the variables x and y x_i is the values of the x -variable in the sample \bar{x} is the mean of the values of the x -variable

y_i is the values of the y -variable in the sample

\bar{y} is the mean of the values of the y -variable x

represents Financial Distress

y represents other variables (Loan-to-Deposit Ratio, Current Ratio, Cash-to-Current Asset Ratio) taken separately in each case.

3.7 Description of Variables in the Model

The research variables were structured into dependent and independent variables for the analysis. The dependent variable of the study is bankruptcy proxy by Altman Zeta Score while the independent variables are Loan-to-Deposit Ratio, Current Ratio, Cash-to-Current Asset Ratio. The measurement of these variables are stated in the description of model variables.

Table 3.7.1: Model Variables Description

Short Form	Details	Source of Data
Z-Score	Altman Zeta Score	Annual Report and Accounts
LTD	Loan to Deposit Ratio	Annual Report and Accounts
CR	Current Ratio	Annual Report and Accounts
CCAR	Cash to Current Asset Ratio	Annual Report and Accounts

Source: Author's Compilation.

Altman Zeta Score

The Altman's Zeta score model will be specified as follows:

$$Z\text{-Score} = 1.2(Z1) + 1.4(Z2) + 3.3(Z3) + 0.6(Z4) + 0.999(Z5)$$

Where:

Z_1 = working capital / total assets

Z_2 = retained earnings / total assets

Z_3 = earnings before interest and tax / total assets

Z_4 = market value of equity / total liabilities

Z_5 = sales / total assets

3.8 Method of Data Analysis

The descriptive statistics include simple mean, median, mode and standard deviation. Since the data were collected for a period of ten years, trend analysis was also carried out with the use of Eviews 10.0 and presented in graphs. The study used correlation analysis for quantifying the influence of various simultaneous influences upon a single dependent variable. A correlation model was used to test the significance of the relationship between the explanatory variables and the focal variable. T-test and F-Statistic at 5% level of significance was used to examine the significance of coefficients of variables in the model. Also, Multiple regression test was performed on data set. The explanatory power of liquidity management on financial distress for the period of the observation, adjusted coefficient of determination (R^2) was performed. In addition, the study also employed Fixed and Random Effects Models for the purpose of addressing the heterogeneity of the sample data (Omokhudu & Ibadin, 2015). In order to determine the efficiency of either random or fixed effect, Hausman's (1978) specification test was performed to ascertain the effects model that was more appropriate.

Serial correlation or Autocorrelation was tested with the use of Durbin Watson (DW) test which is considered appropriate for this study because the samples are Panel data. DW test findings show serial correlation when the test result is different from 2 and no autocorrelation when the result is around 2.

4.2.9 INDUSTRY PANEL DATA ANALYSIS

Table 4.2.9a: Descriptive Statistic of the Industry Level Panel Data

	Z SCORE	LTD	CR	CCAR
Mean	1.454408	0.644074	1.179387	0.176851
Median	1.274176	0.617608	1.197115	0.172070
Maximum	3.418694	1.026467	1.912698	0.406086
Minimum	0.730180	0.288349	0.879569	0.053678
Std. Dev.	0.565036	0.159137	0.146297	0.067050
Skewness	1.458687	0.228876	1.260014	0.445905
Kurtosis	5.248530	2.577469	9.444405	3.327869
Jarque-Bera	45.22321	1.293564	159.6030	3.009415
Probability	0.000000	0.523729	0.000000	0.222082
Sum	116.3526	51.52596	94.35099	14.14806
Sum Sq. Dev.	25.22197	2.000637	1.690820	0.355162
Observations	80	80	80	80

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

Table 4.2.9a above reveals the variable description of the 80 observations of the panel data for sampled deposit money banks in Nigeria. From the table, the industry minimum values are Z-score: 0.730180, loan-to-deposit ratio: 0.288349, current ratio; 0.879569, Cash-to-current asset ratio: 0.053678. However, the banks' maximum are

Z-score: 3.418694, loan-to-deposit ratio: 1.026467, current ratio: 1.912698, Cash-to-current asset ratio: 0.406086. The industry mean values for the variables studied are Z-score: 1.454408, loan-to-deposit ratio: 0.644074, current ratio:

1.179387, Cash-to-current asset ratio: 0.176851.

Table 4.2.9b: Result of Panel Unit Root Tests

Variable	ADF P-value at levels	Decision	ADF P-value at 1 st difference	Decision	ADF P-value at 2 nd Diff.	Decision	Order of Integration
Z-SCORE	0.3310	Do not Reject Ho	0.0006	Reject Ho	—	—	I (I)
LTD	0.1485	Do not reject Ho	0.5186	Do not Reject Ho	0.0010	Reject Ho	I (II)
CR	0.3137	Do not reject Ho	0.0178	Reject Ho	—	—	I (I)
CCAR	0.0271	Reject Ho	—	—	—	—	I (0)

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

Table 4.2.9b above is a representation of the stationarity test of the variables used in this study. This test is necessary to determine if a variable has a unit root, i.e. if the variable is non-stationary.

Subsequently, from the table, the probability value of ADF for Zeta score, denoted as Z-score after the first differencing, is 0.0006 which is less than 0.05. This means that the null hypothesis is rejected, thereby concluding that the variable has no unit root. However, this probability value was achieved at first differencing, which is to say that the variable Z-score is stationary after first difference. Loan-to-deposit ratio, represented by LTD has an ADF probability value of 0.0010 after the 2nd difference, meaning that the variable LTD is

integrated of order two (2), or that it is stationary at 2nd difference. Current ratio, represent with CR, achieved a probability value of 0.0178 after the first difference, indicating that the variable is integrated of order one (I). Furthermore, Cash-to-current asset ratio, denoted by CCAR, showed an ADF probability value of 0.0271 at levels, which means that the variable is stationary at levels. This shows that the variable is integrated at first difference. Summarily, Cash-to-current asset ratio and cash-to-deposit ratio were integrated at levels, Z-score, and current ratio were integrated after the first difference, while loan-to-deposit ratio was integrated after the second difference.

Table 4.2.9c: Results of Kao (Engle-Granger based) Co-Integration Test

Residual Variance	HAC Variance	ADF	Probability
2.014507	1.186166	t-statistic -3.300914	0.0005

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

H0: There is no co-integration

Decision Rule: Reject the null hypothesis if the p-value of ADF is less than 0.05.

Decision: The result of the Kao (Engle-Granger based) Co-integration test shows that there is a stable long-run relationship between the variables under study. This is because the probability value of the ADF is less than 0.05. In other words, the variables are co-integrated. This means that the dependent variable, Z-score, measure of financial distress, and the independent variables; loan-to-deposit ratio, current ratio, Cash-to-current asset ratio, share a long-run relationship, and as such, a regression analysis can be conducted on them.

Table 4.2.9d: Covariance Analysis Result of the Industry Level Panel Data

Covariance Analysis: Spearman rank-order

Date: 08/12/21 Time: 07:37

Sample: 2011 2020

Included observations: 80

Covariance				
Correlation				
t-Statistic				
Probability	Z_SCORE	LTD	CR	CCAR
Z_SCORE	533.2500			
	1.000000			
LTD	-57.97500	533.2500		
	-0.108720	1.000000		
	-0.965916	-----		
	0.3371	-----		
CR	141.6375	236.6500	533.2500	
	0.265612	0.443788	1.000000	
	2.433221	4.373721	-----	
	0.0173	0.0000	-----	
CCAR	159.1000	-199.0500	-108.8875	533.2500
	0.298359	-0.373277	-0.204196	1.000000
	2.760780	-3.553544	-1.842226	-----
	0.0072	0.0006	0.0692	-----

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

Table 4.2.9d suggests that there is a weak (10.8% apprx) and negative relationship between financial distress, measured by z-score, and loan-to-deposit ratio, with t-Statistic: -0.965916 and probability: 0.3371. Z-score and current ratio share a positive and weak relationship (26% approx.) with t-Statistic: 2.433221 and Probability: 0.0173. Also, Cash-to-current asset ratio have positive and weak relationship at approximately (30%) with t-Statistic: 2.760780 and probability: 0.0072. On the relationship between financial distress, measured by z-score, there is positive but weak association at 14.7% with t-Statistic: 1.319798 and probability: 0.1908. Financial distress and cash-to-deposit ratio have a weak (38%) positive relationship, with t-statistics 3.668408 and probability value 0.0004.

Table 4.2.9e: Regression Analysis Result of the Industry Level Panel Data

Dependent Variable: Z_SCORE

Method: Panel Least Squares

Date: 08/12/21 Time: 07:33

Sample: 2011 2020

Periods included: 10

Cross-sections included: 8

Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTD	-1.247628	0.528368	-2.361288	0.0211
CR	0.993883	0.884434	1.123750	0.2651
CCAR	-0.358456	6.475747	-0.055354	0.9560

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.540770	Mean dependent var	1.454408
Adjusted R-squared	0.458519	S.D. dependent var	0.565036
S.E. of regression	0.415784	Akaike info criterion	1.230363
Sum squared resid	11.58269	Schwarz criterion	1.617442
Log likelihood	-36.21450	Hannan-Quinn criter.	1.385554
F-statistic	6.574690	Durbin-Watson stat	0.720614
Prob(F-statistic)	0.000000		

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

Table 4.2.9e reveals that loan-to-deposit ratio has a significant and negative effect on financial distress, measured with z-score, with a probability value that is lesser than 0.05 (0.0211) and t-Statistic that is lesser than 2 (-2.361288). Cash-to-current asset ratio and cash deposit ratio also have negative but nonsignificant effect on financial distress of banks in

Nigeria with probability values that is greater than 0.05 (Cash-to-current asset ratio - 0.9560 & Cash deposit ratio - 0.9874) and t-Statistic that is lesser than 2 (Cash-to-current asset ratio - -0.055354 & Cash deposit ratio - -0.015876). However, current ratio have positive and a nonsignificant effects on the financial distress of banks in Nigeria with probability values that is greater than 0.05 (Current ratio - 0.2651) and t-Statistic that is lesser than 2 (Current ratio -1.123750).

The table further depicts that a one percent increase in loan-to-deposit ratio will decrease Z-score by 124%. This indicates that loan-to-deposit ratio increases the financial distress in the banking industry. While a one percent increase in current ratio, results in 99% and 0.05% increase in Z-score respectively. This means that the variables reduced the level of financial distress in these banks. Furthermore, one percent increase in Cash-to-current asset ratio and cash deposit ratio will decrease the Z-score by 35% and 8% respectively. This means that the variables increased the financial distress in the banking industry. The adjusted R-squared (R^2) indicated that about 45% of the changes in financial distress, measured by Z-score, is accounted for by the explanatory variables. The remaining 55% could be explained by other factors capable of influencing the financial distress of banks in Nigeria. The probability of the F-statistic is significant which shows the statistical fitness of the multiple regression results.

There is a presence of negative serial autocorrelation in the panel data extracted from annual reports and accounts of deposit money banks in Nigeria as suggested by Durbin-Watson stat of 0.72.

4.3 Test of Hypotheses

This subsection presents results of the test of three null hypotheses formulated in the study and their interpretations. These hypotheses were tested in line with the specific objectives of the study. Covariance analysis was the underlying statistical tool used in the test of hypotheses because of the appropriateness of the tool to ascertain the relationship between liquidity management and financial distress. The decision rule is based on the coefficients of the correlation in the covariance.

Statement of Decision Rule: Reject H_0 if the P-value tabulated is less than the α -value calculated (0.05) and if the t-statistic is ≥ 2 . However, in the measures of association, reject H_0 if the coefficient of the correlation is > 0.50 , and accept the null hypotheses if reverse becomes the case.

Table 4.2.9d: Covariance Analysis Result of the Industry Level Panel Data

Covariance Analysis: Spearman rank-order

Date: 08/12/21 Time: 07:37

Sample: 2011 2020

Included observations: 80

	Z_SCORE	LTD	CR	CCAR
Probability	533.2500			
Z_SCORE	1.000000			

LTD	-57.97500	533.2500		
	-0.108720	1.000000		
	-0.965916	-----		
	0.3371	-----		
CR	141.6375	236.6500	533.2500	
	0.265612	0.443788	1.000000	
	2.433221	4.373721	-----	
	0.0173	0.0000	-----	
CCAR	159.1000	-199.0500	-108.8875	533.2500
	0.298359	-0.373277	-0.204196	1.000000
	2.760780	-3.553544	-1.842226	-----
	0.0072	0.0006	0.0692	-----

Source: Computed by Researcher Using Eviews 10.0 Statistical Software

4.3.1 Hypothesis One: Loan-to-deposit ratio does not have a significant relationship with Altman Zeta score of deposit money banks in Nigeria.

4.3.2 Hypothesis Two: Current ratio does not have a significant association with Altman Zeta score of deposit money banks in Nigeria.

4.3.3 Hypothesis Three: Cash-to-current asset ratio does not have a significant relationship with Altman Zeta score of deposit money banks in Nigeria.

4.4 Discussion of Findings

4.4.1 Loan-to-deposit ratio and financial distress

In the test of hypotheses one, the covariance analysis result reveals that loan-to-deposit ratio has a weak and negative relationship with financial distress. This result indicates that the increases or decreases in the loan-to-deposit ratio of the bank will not lead to financial distress of banks in Nigeria judging by the test statistics and its probability.

4.4.2 Current Ratio and Financial Distress

In the test of hypothesis two, the covariance analysis result reveals that current ratio has a weak and positive relationship with Altman Zeta score which measures financial distress of banks in Nigeria. The value of the t-statistics (2.433221) indicates that this relationship though it is weak can lead a distressed bank to safety on the long-run. This is because an increase in current ratio shows deposit money banks ability to settle its short-term liabilities.

4.4.3 Cash-to-Current Asset Ratio and Financial Distress

In the test of hypotheses three, covariance analysis result reveals that cash-to-current asset ratio has a weak and positive relationship with Altman Zeta score of deposit money banks in Nigeria. The value of the t-statistics (2.760780) indicate that this relationship though is weak can lead a distressed bank to safety on the long-run. This is in tandem with the result obtained from Zenith Bank and Union Bank when considered individually. However, the result is contrary to the individual findings for Access Bank, GT Bank, Sterling Bank, First Bank, UBA and First City Monument Bank.

5. SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of Findings

The results from the data analysis are summarized as follows:

- i. Loan-to-deposit ratio has a weak (10% approx.) and negative (-0.108720) relationship with the Altman z-score, measuring the financial distress of deposit money banks in Nigeria.
- ii. There is a weak (26% approx.) and positive (0.265612) relationship between current ratio and financial distress of deposit money banks in Nigeria.
- iii. Cash-to-current asset ratio weakly (30% approx.) and positively (0.298359) relates with the financial distress of deposit money banks in Nigeria.

5.2 Conclusion

The objective of the study was to ascertain the relationship of liquidity management to financial distress of deposit money banks in Nigeria. Using Panel Covariance analysis, the result shows that all the liquidity ratios studied (loan-to-deposit ratio, current ratio, cash-to-current asset ratio) share a weak relationship with Altman Zeta Score which measured financial distress. This shows that the financial difficulties faced by some of these banks were not due to inefficiency in managing their liquidity. However, the result shows that on the long run, current ratio, cash-to-current asset ratio, and cash-to-deposit ratio will help improve the financial position of these banks, judging by the significance of the test statistic and the probability of the t-statistic.

From the multiple regression analysis, loan to deposit ratio is the only liquidity ratio that has a significant effect on Altman's zeta score. The direction of the effect is negative. The result implies that deposit money banks in Nigeria must pay close attention to this ratio because it has the capacity to make them suffer financial distress. The R-squared suggest that about 54% of changes in financial distress measured by Altman's zeta score could be explained by the liquidity ratios studied. The remaining 46% could be explained by other factors that can cause financial distress of banks in Nigeria such as monetary policies and other macroeconomic variables.

5.3 Recommendations

Based on the result from the analysis and research hypotheses, the following recommendations were made and should be given consideration by the regulatory authorities and management of deposit money banks in Nigeria in order to improve financial performance:

- i. They should strive to keep their loan-to-deposit ratio high to avoid reducing their liquidity and give them the ability to repay deposits on request.
- ii. Deposit money banks in Nigeria should strive to improve their current ratio. They can do this by ensuring a faster conversion cycle of loans or accounts receivables, ensure that current liabilities are paid off at request, and sell-off unproductive assets and so on.
- iii. The findings of the current result indicate the ability of a bank to fulfill its liquidity obligations to its customers is very important for financial stability. A bank being a unique form of business, that deals majorly on liabilities to generate profit, has to be able to manage its level of liquidity, and increase its pool of cash and cash equivalents will increase the financial stability, as established by the findings of the study.

5.4 Contribution to Knowledge

As shown in the summary of empirical review, most of the reviewed works relate liquidity management to performance and profitability. The inability of prior studies to examine the relationship between liquidity management and financial distress of deposit money banks in Nigeria created a gap in literature which the current study filled. The findings that none of the liquidity management ratios has a strong relationship with financial distress of banks in Nigeria has also added to knowledge.

5.5 Suggested Areas for Further Studies

The following areas are suggested for further research:

- i. The effect of corporate governance on financial distress of deposit money banks in Nigeria.
- ii. Effect of macroeconomic variables on financial distress of Deposit Money Banks in Nigeria.

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