Cash Flow and Bank Failure Predictions: Evidence From Nigerian Deposit Money Banks

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Abstract

This study examined the influence of cash flow on bank failure prediction in deposit money banks in Nigeria. The study exploited all listed deposit money banks in the Nigerian stock exchange market that have adequate financial reports for a period of ten years, from 2011 to 2020. Data collected were analyzed using descriptive statistics, correlation matrix, and random effect regression model. The study's findings of the study divulged that net cash flows from investing and financing activities have a positive and considerable influence on bank failure predictions while operating activities such as cash flow have an adverse effect on the likelihood of bank distress prediction. It was also observed that investing and financing activities' net cash flows are significant cash flow components that predict the likelihood of bank failure and the cash flow model is an effective predictor of bank failure in the Nigerian banking sector. The study recommended that the management of Nigeria's deposit money banks should monitor the banks' cash flows and continue to sustain or further increase the current net cash flow from investing and financing activities since these cash flow components have a significant impact on their survival.

Keywords: Cash flow, deposit money banks, bank failure predictions

INTRODUCTION

Cash is a crucial necessity not only for the survival and continuity of business organizations but also for the success of their operations. It is the most liquid and highest current asset in many companies. It is one of the variables that can be used to measure the liquidity of a corporate organization. It can also be used to determine a firm's earnings and financial flexibility of a firm (Adebayo et al., 2022). Cash flow statement assists users of financial reports to make vital financial decisions. The statement also helps users of financial statements to obtain relevant information pertaining to sources and uses of financial resources of the organization in a given period of time (Davies, 2013). Ozcan (2020) explained that information furnished by cash flow documents would reflect the financial attainment of the firm adequately more than the income statement.

A cash flow statement unlike an income statement and financial position is on a cash basis rather than an accrual basis. The statement complements the information provided by the income statement and financial position. Also, identify possible liquidity problems that might lead to liquidation. The statement will reveal net cash flows (inflows and outflows) over time for operating, investing, and financing activities. Statement of cash flow placed the cash inflows and outflows in line with the activities of the organization

and gave rise to them, under the heading of operating, investing, and financing activities. An important statement of cash flow to predict corporate organization discontinuity argued by numerous researchers (Eraghbe & Aderin, 2017; Nanayakkara & Azeez, 2016; Onyeiwu & Aliemeke, 2014; Titshabona, 2014; and Urhoghide, 2018). They asserted that cash flow statement plays an important function in predicting the probability of corporate failure better than financial ratios.

Corporate failure is a worldwide problem and not a new phenomenon. This problem is a situation whereby a corporatorganizationon is unable to meet its obligations to suppliers, lenders, employees, and shareholders. Aleksanyan and Huiban (2015) explained that corporate failure occurs when the organization failed to accomplish its financial obligations or has obstacles to settling its bills as a result of having a problem with cash. Bank failure takes place when a bank is incompetent to meet its duties to customers and other stakeholders of the bank as a result of having problems with cash to meet its liabilities. A bank failure is a general problem common to almost all countries in the world, both advanced countries and developing economy countries. This problem does not only affect the depositors and shareholders of the bank but also affects employees and the public at large.

In Nigeria, the causes of bank failure have been traced to capital inadequacy, huge non-performing loans, bad management, poor transparency and disclosure, ineffective internal control, and illiquidity among others. According to the Central Bank of Nigeria Economic Review (2016) major causes of bank failure in Nigeria are liquidity problems, excessive borrowing from regulatory authorities, as well as technical insolvency among the banks. Bank failure problems as undermined depositors' confidence in the banking sector and lead to holding more cash by hand. Other effects of bank failure include: loss of depositors' money, loss of confidence in bank shares by investors, which affects investment in the banking sector, loss of jobs, possess a threat to the development of an efficient payment system, retard economy's rate of capital formulation and reduce the pace of economic growth.

Despite the impact of bank failure on depositors, investors, workers, other stakeholders, and society at large, the bank failure problem has not received the necessary attention it deserved. Models that can forecast organization discontinuation need to be in place, banks included, since the results of organizational distress will cause both financial and non-financial losses not to the owners of the company only but also to other stakeholders and society at large (Eragbhe & Aderin, 2017). If the models can predict corporate failure, it would assist the management of the corporate organization to take necessary actions to prevent the occurrence of failure. Several financial ratios have been developed to predict corporate failure in the literature the prominent among them are: Beaver's model, Robert's model, Kane's model, Toffler's model, and Altman's model. Altman's model has been used by a lot of researchers and has been demonstrated to be the best organization's failure predictor model. Altman introduced three types of corporate failure prediction, one for public companies, one for private companies, and one for service providers companies (banks inclusive).

The importance of cash flow statements to predict corporate failure has been established by many studies (Adesola, 2018; Rodgers, 2013; Uyar & Kuzey, 2014; Urhoghide, 2018). They concluded that the success or failure of corpororganizationsions has been fundamentally related to the cash flows of corporate activities. Several studies have linked cash flow statements with bank failure (Baimwera & Muriuki, 2014; Bello, Kofarmata & Falola, 2016; Rafique, 2018; Titshabona, 2014; Wasiuzzaaman, 2014; Ozcan, 2020). The majority of these research works were done in advanced economy nations, while few studies focused on developing economy countries like Nigeria. The few previous studies on Nigeria use financial ratios, while few studies used cash flows to foretell bank failure. Also, few studies on cash flow focus solely on cash flow from operating activities and unheeded other cash flow variables. In addition, most of the past studies on Nigeria focused on the non-financial sector of the economy, especially manufacturing companies. It is against this backdrop that this research work wants to contribute a to few existing studies on cash flows and bank failure prediction in Nigerian deposit money banks. Hence, the objective of this research work is to examine the impact of cash flow statement variables in predicting bank failure in Nigerian deposit money banks. Following this introduction section, the remaining of this research work is presented in this manner: section two examines the conceptual, theoretical 'and relevant literature; section

three outlines the methodology used in executing the study. Section four provides the study's findings and discussion, while the section concludes the work.

LITERATURE REVIEW

Cash has been described as the lifeblood of any organization, either business enterprise, non-profit making enterprise, or public enterprise. Organizations cannot survive without cash and in most enterprises, it is the highest current asset. Therefore, analysis of cash generation (inflows) and cash utilization (outflows) is important for decision-making by the management, shareholders, and other stakeholders of the organization. According to Shamsudin and Kamaluddin (2015), cash flow is the movement of cash inside and outside the organization. The cash statement will furnish information on cash received and cash paid by the organization during the accounting period. The Companies and Allied Matters Act (CAMA) 2020 makes the publication of cash flow statements compulsory for all public liability companies.

The cash flow statement will be part of the financial statement components produced by corporate organizations at the end of the accounting year. Other financial statement components that will be in the company financial statement are: financial position, income statement, notes to the accounts, statement of value added, and five years financial summary (Hasan et al., 2021). The statement of cash flow is closely associated with the analysis of the firm's liquidity and will show the cash movement of the firm during the accounting period.

Bank failure can be referred to as a state of non-performance of what is expected from a bank. It is discontinued activities of the bank that will have a negative impact on the company's stakeholders. Bank failure occurs when the bank could not meet its duties to depositors, creditors, owners, and society at large (Makinde, 2016). Bank failure usually has an adverse effect on the economy than the failure of other corporate organizations due to the importance of the sub-sector in the economy of the country. Also, the effect of failfailureed of one bank will spread throughout the economy of the country and may result in the failure of other banks. This is referred to as the spillover effect, whereby depositors of other banks try to withdraw their savings from the bank in order to avoid losses that may lead to the failure of other banks. Fragile of this sub-sector is the main reason why banks are more monitored and regulated than any other sub-sector of the economy. The pedigree of bank failure in Nigeria can be traced back to 1954 when 21 out of 103 banks failed. This problem is attributed to the absence of regulations and control. The economic growth and increase in government revenue as a result of the oil boom in the 1970s made the banking business thrive and by the end of 1989 number of banks increase to 107 from 42 in 1968. The period from 1991 to 2003 witnessed bank failure, in 1992 nine were distressed and another 22 banks were distressed in 2003. An increase in the capital base of commercial banks from ₦2 billion to ₦25 billion in 2005 led to decreasing in banks from 89 in 2003 to 15 in 2006. (NDIC, 2015).

Many factors have been identified as major causes of bank failure. Eragbhe and Aderin (2017) explained that the causes of bank failure can be grouped into two intra-industry factors and extra-industry factors. The intra-industry factors include bad management, the inadequacy of capital, huge non-performing loans, bad internal control, frauds and forgeries, and illiquidity among others. The extra-industry factors are political instability, economic recession, and government policies, among others. According to Adesola (2018) causes of bank failure are capital inadequacy, huge non-performing loans, low liquidity ratio, and poor transparency and disclosure.

The bank failure phenomenon has been a concern not only to bank depositors and shareholders but also to government regulatory authorities and other stakeholders including researchers. The results of bank discontinuity will lead to both financial and non-financial losses to all the stakeholders of the bank. This led to questioning on how bank failure can be predicted or detected ahead in order to protect depositors; shareholders and other stakeholders of the bank. It has been argued in many quarters that reliable models that can predict bank failure in the nearest future are needed so that stakeholders can take necessary preventive actions before the failure occur. One of the models that can show early signs of bank failure in the nearest future is the CAMEL model. This model was introduced in the United States of America by the

United States Controller of Currency after various research studies. The CAMEL implies the evaluation of the Organisation's Capital Adequacy, Assets Quality, Management Competence, Earnings Strength, and Liquidity Sufficiency. The CAMEL model parameters can be used as a standard rating system to assess the likelihood of future bank failure. The model will indicate characteristics of unsound banks, which may include: capital inadequacy, poor asset quality, management incompetence, lower earnings, and inadequate liquidity.

Many financial experts also carried out research studies on how to predict corporate failure. The prominent among them include the study of Beavers in 1966. Beaver used univariate analysis (individual financial ratios) to forecast organizational failure. He used a sample of 79 failed and non-failed companies. Results of the study revealed that ratios of cash flow to total debt, net income to total assets, and total debt to total assets have a strong ability to predict corporate failure. Other researchers like Fitzpatrick, Winkar, Ramser, Smith, Foster, and Marwin used ratios to predict corporate distress. In 1968 Altman developed a model called the Z-score by combining a set of financial ratios to foresee the possibility of organization bankruptcy and corporate discontinuation, Altman developed three different Z-score models, one for public companies, one for private companies, and one for service providers and non-manufacturing companies. The Z-score for service provider companies is used to predict bank failure. The model is expressed as Z-score $= 6.56_{X1} + 3.26_{X2} + 6.72_{X3} + 1.05_{X4}$. The Altman Z-score model was tested by many researchers (Ahmad, Azhar & Abu-Bakar, 2015; Akande, 2019; Nanayakkara & Azeez, 2016; Uchenna & Okelue, 2012; Ozcan 2020) and they found that it is up to 95% accurate in predicting bank failure.

Deposit money banks are financial institutions that perform the functions of funds security, lending management, and financial advisory, among others. They ensure that adequate funds are serviced to deficit sectors of the economy of a nation and also ensure the movement of funds amongst economic units. This sub-sector of the economy plays important functions in the development and growth of Nigeria. As of 31st of December, 2020, twelve deposit money banks were listed on the Nigeria stock exchange.

Theoretical Framework

In the literature, different theories have been used to link cash flow with corporate failure researchers, among them are the balance sheet decomposition theory, credit risk theory, pecking order theory, and free cash flow theory. Free cash flow theory was found to be the most suitable and is the underpinning theory for this study free cash flow theory was propounded by Jensen in 1986. The theory explained that a firm's management would like to hold more cash within the organization in order to meet their day-to-day activities. In addition, firm managers that prefer holding high cash levels believed that high cash levels would rise up the quantity of the firm's total assets.

According to supporters of this theory (Al-Najjar, 2015; Wasiuzzaman, 2014; Uyar and Kuzey, 2014) management of firms that hold high cash believed that payment of dividends to shareholders are not important and dividend payments would have a negative impact on the firm's cash holding. Management would like to have high cash reserves by paying a lower percentage of earnings after interest and taxes or not paying the dividend to shareholders. Supporters of free cash flow theory (Baimwera & Muriuki, 2014; Eragbhe & Aderin, 2017; Khaliq, et.al. 2014; Urhoghide, 2018) stressed that cash flow from operating activities can be the most important foretelling variable of corporate failure, other net cash flows (net cash flow from financial activities and net cash flow from investing activities) also use variables to predict corporate failure. They concluded that corporate failure would be a result of cash flow instability and in the ability of a corporate organization to meet its cash obligations when due.

Review of Related Literature

Many past research studies have examined the influence of cash flows on corporate failure prediction using different variables. Among them is the study of Ozcan (2020) that examined the use of cash flows to predict business failure in Turkey. Author used a sample of 66 quoted companies on the Borsa stock exchange from 2010 to 2018. The author used a ratio of cash flow from operations to current liabilities, the ratio of

cash flow from operations to total assets, and the ratio of cash flow from financing to interest expenses to measure cash flows (independent variables). Business failure (dependent variable) captures by Z-score. Data collected were analyzed using a logistic regression model. The study's results showed that collectively all the independent variables are strong predictors of business failure.

Urhoghide (2018) studied the influence of cash flows on the corporate failure prediction of non-financial firms in Nigeria. A sample of 30 quoted companies in the Nigeria stock exchange was used in the study, from 2010 to 2016. The author used Altman Z-score to capture corporate failure prediction, while cash flow from operating activities, cash flow from investment activities, and cash flow from financing activities were used to measure cash flow. The researcher employed a logistic regression model to analyze the data collected. The study's results revealed that both operating and investing cash flow have for favorable effect on corporate failure prediction but there positive effect not significant. The cash flow from financing activities a has positive and significant effect on corporate failure prediction of sampled companies.

In a study carried out by Rafique (2018), the study examined impinges of operating cash flow on firms' financial distress in Pakistan. The author used 67 firms listed on Karachi stock exchange as a sample size from2007 to 2016. Author employed modified Altman Z-score as a variable to measure financial distress, while operating activities cash flow used as explanatory variable. The study employed descriptive statistics and logistic regression to analyse data collected. The study's results indicated that operating activities cash flow has a strong and important influence on financial distress of sampled firms.

Another study in this area is the study of Lawal and Ogunleke (2018) that examined the relationship between corporate failure and cash flow component in selected manufacturing firms in Nigeria. Authors employed sample of thirty-five manufacturing firms quoted in Nigeria stock exchange from 2011 to 2016. Altman Z-score used to determined health companies, while operating, financing and investing cash flows were used to capture cash flow. Descriptive statistics and a multiple regression model were used to analyse data collected. Results of multiple regression model showed that operating and investing cash flows have negative and substantial influence on corporate failure. Financing cash flow has a favourable and important influence on corporate failure.

In a large longitudinal study,Limanta and Malelak (2017) examined variables that influencing corporate cash holding of financial sector companies listed in Indonesian stock exchange for the period of six years, 2010 to 2015. The study used corporate cash holdings as dependent variable, while leverage, volatility of cash flow, profitability, firm size and dividend used as independent variables. The researchers employed descriptive statistics and fixed effect regression model to analyse the data obtained from annual report and accounts of sampled firms. The study's results showed that divided, profitability and firm size have strong and fundamental influence on corporate cash holdings. Leverage and volatility of cash flow have negative and significant effect on corporate cash holdings.

To investigate the ability of cash flow deficiency to forecast the insolvency certainty of selected listed firms in Nigeria, Eragbhe and Aderin (2017) used a sample of 50 non-financial firms quoted in the Nigeria stock exchange over a period of five years, 2010-2014. The study used operating cash flow, investing cash flow, and cash holdings to total assets to measure cash flow, while Altman Z-score was used to measure corporate failure prediction. Descriptive statistics, correlation matrix, and pool regression model were employed to analyze the data collected. The study results revealed that operating cash flow and cash holding have a powerful influence on the foretelling failure or survival of companies. The cash flow from investing is not significant in predicting the failure or survival of the companies. In their own contribution, Shamsudin and Kamaluddin (2015) conducted a study on cash flow patterns and prediction firms' financial distress. The study used a sample of 124 Malaysian quoted firms on the Bara stock exchange. Data for a period of seven years from, 2007 to 2013 were used. Operating activities cash flow and investing activities cash were used as independent variables, while financial distress (dependent variables) was captured by Z-score. The study used a random effect model to analyze the data. Results showed that when the company used cash inflows from operating activities to financing long-term investments and long-term debt, it is likely for such a company to experience financial distress. Also, firms have a greater chance of experiencing

financial distress when they are unable to settle their current obligations, as a result of inadequate cash inflows from operating activities.

The study of Titshabona (2014) focused on corporate failure prediction in Zimbabwe financial institutions using a sample of six commercial banks. Financial data from 2009 to 2013 was used. Altman's Z-score was used to capture the possibility of corporate failure in the financial sector of Zimbabwe. The Z-score results showed that more than 83% of banks are in distress, only more than 16% are in the grey zone and non of sampled financial institutions isaren the safe zone. In analyzing the role of cash flow in predicting the financial distress of banks, Davies (2013) carried out a study on cash flow information and predicting financial distress among banks in Kenya for the period of 2007 to 2011. The author used a sample of twelve commercial banks listed on the Nairobi stock exchange. The study used cash flow from operating activities, dividend payout, and cash dividend coverage as the independent variable, whereas, financial distress, is the dependent variable captured by Z-score. Data were analyzed using a panel data regression model. The study's findings indicated that cash flow from operating activities has a negative and substantial influence on financial distress. Dividend payments and cash dividends coverahasave a positive but insignificant impact on the financial distress of sampled banks.

METHODOLOGY

This study employed a correlational research design to examine the influence of cash flow on bank failure prediction. The study population comprised all the twelve deposit money banks quoted on the Nigeria stock exchange as of 31st December 2020. Eleven banks were selected as the sample size due to the availability of adequate financial reports. The study used secondary data gathered from financial statements of sampled deposit money banks from 2011 to 2020. Based on previous studies (Baimwera & Muriuki, 2014; Danilov, 2014; Eragbhe & Aderin, 2017; Rodgers, 2013; and Urhoghide, 2018). Bank failure prediction (dependent variable) captured by Z-Score. Cash flow (independent variable) is captured by net cash flow from operating activities, net cash flow from investing activit,ies and net cash from financing activities. Furthermore, profitability, liquidity, and leverage were used as control variables. Descriptive statistics, correlation matrix, and random effect regression model were employed to analyze the data collected. Moreover, in other to achieve reliable results, robustness tests like multicollinearity, heteroscedasticity, and Hausman tests were conducted.

Model Specification

This study used modified econometric models of Arlov, et.al. (2013); Onyeiwu and Aliemeke (2014); Rodger (2013), and Urhoghide (2018) to examine the influence of cash flow on bank failure prediction of listed deposit money banks in Nigeria. Thus, the study model is expressed as:
Z-Score=f(NCFOA, NCFIA, NCFFA, PROFT, LIQTY, LEVGE)

Model stated in econometric form would be:
Z-Score = β_0 +β_1 NCFOAit + β_2NCFIAit + β_3 NCFFAit + β_4 PROFTit + β_5 LIQTYit
 + β_6 LEVGEit + ϵt…………………………………………………………………..(i)
Z-Score = Altman failure prediction score for non-trading and service provider company is:
Z-Score= 6.56_{X1} + 3.26_{X2} + 6.72_{X3} + 1.05_{X4}
$_{X1}$ = Working Capital ÷ Total Assets.
$_{X2}$ = Retained Earnings ÷ Total Assets.
$_{X3}$ = Earnings Before Interest and Taxes ÷ Total Assets.
$_{X4}$ = Book Value of Equity ÷ Total Liabilities.

Decision Rule:
(i)   When Z-Score computed is less than 1.1 (Weak performance and operating in distress zone).
(ii) When Z-Score computed is more than 1.1 and less than 2.6 (Better performance but operating at gray zone and moving towards failure).
(iii) When Z-Score computed is more than 2.6 (Healthy and sound performance, no sign of failure).

NCFOA= Net Cash Flow From Operating Activities.
NCFFA = Net Cash Flow From Investing Activities.
NCFFA= Net Cash Flow From Financing Activities.
PROFT = Profitability.
LIQTY = Liquidity.
LEVGE= Leverage.
β_0= Intercept of relationship in the model/constant.
β_1- β_6 = coefficient of each independent and control variable.
$\mathcal{E}t$= Error term.
i = Number of sampled banks
t= Number of years covered by the study.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents descriptive statistics of the dependent, explanatory, and control variables. The table reported the mean or average, minimum and maximum values of the variables used in the study. As well as standard deviation, skewness and kurtosis values of the variables.

Table 1. Descriptive Statistics

Variables	Z-Score	NCFOA	NCFIA	NCFFA	PROFT	LIQTY	LEVGE
Mean	2.086	28,415,000,000	- 132,686,000,000	74,630,000,000	0.163	1.083	0.581
Minimum	-2.310	70,415,000,000	- 224,825,000,000	-33,134,000,000	-0.045	0.135	0.214
Maximum	6.214	47,676,000,000 ¤	35,611,000,000	103,564,000,000	0.725	1.252	0.638
Standard Deviation	1.385	15,380,000,000	49,884,000,000	18,168,000,000	0.182	1.253	0.217
Jarque-Bera	5.114	323,146.48	205,660.13	165,704.22	0.2868	2.5916	1.7302
Probability	0.001	0.003	0.001	0.000	0.000	0.000	0.002
Observation	110	110	110	110	110	110	110

Source: Authors' Computation, 2021

Table 1 showed that the Z-Score of sampled banks ranged from a minimum value of 2.310 to a maximum value of 6.214, with a mean value of 2.086. This result implied that while some sampled banks are healthy, in the safe zone with no sign of failure, some are operating in the distress zone and have a sign of future failure. The net cash flow from operating activities has a mean value of ₦28. 415billion, with a minimum value of -₦90.415 billion and a maximum value of ₦47.676 billion.Net cash flow from investing activities mean value is - ₦132,000 billion, with a minimum value of -₦224.835 billion and a maximum value of ₦35.611 billion. Like net cash flow from operating activities, net cash flow from financial activities has s

mean value is ₦74,630 billion, with a minimum value of -₦ 33.134 billion and a maximum value of 103,564 billion. This result showed that most of the sampled banks record negative net cash flow from investing activities.

The mean value of profitability is 0.163, with the lowest value of -0.045, and the highest value of 0.725. This implied that most of the sampled banks recorded profits, which lead to their survival. Liquidity has a mean value of 1.083, with the lowest and highest values of 0.135 and 1.253 respectively. It showed that some of the sampled banks keep more than 125% of their current assets in liquidity form. Leverage smallest and highest values are 0.214 and 0.638 respectively, with a mean worth of 0.581. This result showed the high leverage of some sampled banks, which is more than 63%. The standard deviation of all variables of this study is close to their mean values. This indicated that there is a moderate variation between these variables and their mean values. The Jarque-Bera values with probability values of all variables which are less than 0.05 implied that all the variables are normally distributed and there is the absence of significant outliers in the data.

Correlation Analysis Results

The correlation matrix in Table 2 showed a connection among the dependent variable, explanatory variables, and control variables. Also, the table revealed the relationship between the independent variables and control variables.

Table 2. Correlation Matrix

Variables	Z-Score	NCFOA	NCFIA	NCFFA	PROFT	LIQTY	LEVGE
Z-Score	1						
NCFOA	-0.047 (0.096)	1					
NCFIA	0.168 (0.037)	-0.337 (0.001)	1				
NCFFA	0.253 (0.002)	0.201 (0.030)	-0.043 0.013	1			
PROFT	0.263 (0.000)	0.446 (0.000)	-0.214 (0.013)	0.384 (0.001)	1		
LIQTY	0.107 (0.043)	0.087 (0.046)	0.094 (0.095)	0.124 (0.092)	0.126 (0.082)	1	
LEVGE	-0.304 (0.041)	-0.106 (0.112)	0.086 (0.103)	-0.327 (0.048)	-0.383 (0.021)	-0.321 (0.001)	1

Source*: Authors' Computation, 2021.*

The table results showed that Z-SCORE has a positive relationship with Net Cash Flow From Investing Activities (NCFIA), Net Cash Flow From Financing Activities (NCFFA), Probability (PROFT), and Liquidity (LIQTY) with a correlation coefficient (r) of 0.253, 0.168, 0.263 and 0.107 respectively, with at least 5% level of significant. These positive figures of correlation coefficient (r) revealed that an increase in the dependent variable (Z-SCORE) could be associated with an increase in these independent variables (NCFIA, NCFFA, PROFT, AND LIQTY) and vice versa. On the other hand, Z-SCORE has an adverse connection with Net Cash Flow From Operating Activities (NCFOA) and Leverage (LEVGE) with correlation coefficients (r) of - 0.047 and -0.304 respectively. The negative association between Z-SCORE and NCFOA is negligible, but a negative connection between Z-SCORE and LEVGE is substantial at 5%. Negative figures correlation coefficient (r) suggested that an increase in NCFOA and LEVGE decreases the Z-SCORE of sampled banks and vice-versa. The correlation results among independent variables revealed that NCFOA positively related with NCFFA, PROFT, and LIQTY. Likewise, NCFFA is positively related to PROFT and LIQTY. NCFIA is positively related to LEVGE and LIQTY. While NCFOA and NCFFA are negatively related to LEVGE. The correlation matrix table also revealed that the correlation

coefficient (r) of all the independent variables is very low and below 0.50. This implied the absence of a multicollinearity problem among the variables.

Robustness Tests Results

The multicollinearity and heteroskedasticity tests are done to find whether the data used by this study are reliable or not. The multicollinearity test is an important test for regression analysis. It shows the possibility of the existence or otherwise of a multicollinearity problem. Variance inflation factor and tolerance values were used to test multicollinearity. A heteroscedasticity test is necessary since the data used constitute different sizes. Heteroscedasticity was tested using Breusch-pagan's.

Table 3. Results of Multicollinearity and Heteroscedasticity Tests

Multicollinearity Tests			Heteroscedasticity Test
Independent Variables	**Variance Inflation Factor Value (VIF)**	**Tolerance Value (1/VIF)**	Breusch Pagan's Test Chi 2 (1) = 0.027 Prob. (Chi2) = 0.116
NCFOA	2.64	0.736	
NCFIA	1.87	0.883	
NCFFA	1.32	0.798	
PROFT	1.58	0.696	
LIQTY	1.95	0.640	
LEVGE	2.34	0.701	

Source*: Authors' Computation, 2021.*

Results of Table 3 showed the absence of a multicollinearity problem in the variables since values of variance inflation factor for all variables are less than 5 and values of tolerance are less than 1. Furthermore, it can be concluded that there is no problem of heteroscedasticity since the Chi-2 value is 0.027 with a probability value of 0.116, which is insignificant, this implied that there is the absence of heteroscedasticity.

Regression Analysis Results

Both the fixed effect model and random effect model were employed to analyze the influence of individual explanatory variables on dependent variables. Hausman test result was used to select a better model out of the two models (fixed effect and random effect). The Hausman test results revealed a Chi-2 of 2.194 with a p-value of 0.163, which is not statistically significant. This implied that the random effect model is the most suitable estimator for this research work. Therefore, this study interprets the results of the random effect model.

Table 4. Regression Results (Fixed and Random Effect) Models

Models:	Fixed Effect Model			**Random Effect Model**		
	Dependent Variable: Z-Score			**Dependent Variable: Z-Score**		
Independent Variables:	Coefficient	t-Statistics	Prob.	**Coefficient**	**t-Statistics**	**Prob.**
Constant	2.957	3.251	0.026	**3.022**	**1.386**	**0.013**
NCFOA	-2.316	-2.861	0.117	**-2.044**	**-3.614**	**0.126**
NCFIA	2.913	3.102	0.032	**2.671**	**3.623**	**0.027**
NCFFA	4.042	5.318	0.001	**3.805**	**4.765**	**0.001**
PROFT	3.861	4.168	0.002	**3.793**	**4.145**	**0.002**
LIQTY	1.803	1.640	0.030	**1.683**	**1.810**	**0.034**

LEVGE	-1.952	-1.535	0.039	**-2.340**	**-3.853**	**0.028**
R-Square	0.613			**0.685**		
Adjusted R-Square	0.598			**0.637**		
F-Statistic	26.839			**27.658**		
Prob. (F-Statistic)	0.0004			**0.0002**		
Durbin Watson Stat	1.864			**1.920**		
Hausman Test:						
Chi-Square..2.194						
Prob. Value..0.163						

Source: Authors' Computation, 2021.

Table 4 showed that net cash flow from operating activities has an undesirable and inconsiderable influence on the likelihood of bank failure (Z-Score), since the β-value and p-value are-2.047 and 0.126 respectively. This showed that a decrease in net cash flow from operating activities by 1% decreases the Z-Score of sampled banks by more than 2.04%. This variable; net cash flow from operating activities shows the ability of the banks to satisfy the customers' demand for withdrawal. A decrease in net cash flow from operating activities would lead to the inability of the banks to satisfy their customers' demand, a low Z-score, and a high chance of failure. It implied that as net cash flow from operating activities decreases, the likelihood of bank failure increases. This result is in agreement with the studies of Bhandar and Iyer(2013), Eragbhe and Aderin(2017), and Nyamboga et.al.(2014).

Net cash flow from investing activities has a positive and substantial influence on Z-Score, with a β-value of 2.671 and a p-value of 0.027, which is significant at 1%. This indicated that an increase in net cash flow from investing activities by 1%, increases the Z-Score of sampled banks by more than 2.67%. Also showed that an increase in net cash flow from investing activities, decreases the likelihood of bank failure and when sampled banks reduced their investments their z- score improved. This implied that most of the sampled banks have over-investment in the past by having large idle assets both non-current and current assets which may cause failure. The results, therefore, insinuate that as sampled banks de-invest or sell some of their idle assets, more cash is generated which is used for more banking activities and generates more profit that leads to the continuity of existence of the banks. This result supports the findings of Rafique (2018); Shamsudin and Kamaluddin (2015) and Wasiuzzaman (2014).

The net cash flow from financing activities has a positive and significant impact on Z-Score, with a β-value of 3.805 and a p-value of 0.001, which is significant at 1%. This implied that an increase in net cash flow from financing activities by 1% increases the Z-Score by more than 3.80%. This showed that as net cash flow from financing activities rises chance of bank failure reduces. The increase in net cash flow from financing activities of the sampled banks showed that the banks have more proceeds than payments from financing activities. This improved their liquidity (cash) which led to having more funds to satisfy their customers. The positive net cash flow from financing activities leads to a high Z-score and reduces the likelihood of bank failure. This is consonant with the results of Danilov (2014), Onyeiwu (2014) , and Urhoghide (2018).

Furthermore, profitability, one of the control variables has a positive and important influence on Z-Score, with a β-value of 3.793 and p-value of 0.002, which is significant at 1%. It implied that an increase in profitability by 1%, increasing the Z-Score of sampled banks by more than 3.79%. It indicated that an upwards in profitability enhances the possibility of bank survival and reduces the likelihood of bank distress. This result agrees with the studies of Khaliq et al. (2014), Rodgers (2013), and Uyar and Kuzey (2014). Moreover, the result exhibits evidence of the strong and fundamental influence of liquidity on Z-Score. The β-value of liquidity is 1.683 with a p-value of 0.034, at is significant at 5%. This showed that an increase in liquidity by 1% increases the Z-Score by more than 1.68%. This implied that an increase in liquidity increases the chance of bank survival and reduces the likelihood of bank failure.

The higher the bank's liquidity the higher the profit generated by the bank. Also, banks would keep most of their assets in liquid form in order to satisfy their customers. This result showed that sampled banks maintained high liquidity during the period covered by the study which improved the Z-score and increase their chance of survival. This corroborated the research works of Baimwera and Muriuki (2014); Davies (2013) and Ognjan et. al. (2014).

The β-value of leverage which is -2.340 with a p-value of 0.028 which is significant at 5% showed that leverage has adverse and essential effects on Z-Score. This implied that an increase in leverage by 1% decreases the Z-Score by more than -2.34%. It indicated that an increase in leverage (debt to equity ratio) reduces the chances of sampled bank survival and increases the likelihood of bank distress. This result also implied that as sampled banks deleverage (using more equity than debt) more profits would be realized since low interest will be paid, more retained earnings, more investment, and a high chance of survival. This adverse effect is in support by the studies of Bhandari and Iyer (2013) and Eragbhe and Aderin (2017).

In addition, the coefficient of determination (R-Square) of the random effect model which is 0.685 indicated that all the independent and control variables of this study jointly explained more than 68% of the systematic variations in the dependent variable (Z-Score). The remaining less than 32% can be traced to other variables that are not captured by this study. Durbin-Watson's value of the random effect model which is 1.920 that close to 2, indicated that there is no autocorrelation problem in the data and the model is reliably good for policy decisions. Furthermore, the constant β-value which is 3.022, with a p-value of 0.013 that significant at 5%, and the F-statistics value of 27.658 with a probability of 0.0002, indicated that collectively all the independent and control variables have a substantial influence on bank failure prediction (Z-Score). This finding is consistent with the studies of Danilov (2014), Nyamboga et al. (2014), Rafique (2018), and Urhoghide (2018).

CONCLUSION AND RECOMMENDATIONS

This research work investigated the impact of cash flow statement variables in predicting banks' failure in Nigeria's deposit money banks. By under seeking whether net cash flow from operating, investing, and financing activities could be used to predict banks' failure. The correlational research design was employed for this research work. Going by the results of the random effect regression model, the net cash flow from operating activities has an unfavorable influence on the survival of the sampled banks. This implied that decreases in net cash flow from operating activities degenerate Z-Score and increase the risk of failure. This entails that as the net cash flow from operating activities of listed DMBs in Nigeria deteriorates the chance of their failure rises.

On contrary, net cash flows from investing and financing activities have a positive influence on the survival of the sampled banks. This indicated that increases in net cash flow from investing and financing activities ameliorate Z-Score and reduce the likelihood of sampled banks' failure. This implies that as net cash flows from investing and financing activities of listed DMBs in Nigeria raise the chance of their failure declines. In addition, profitability and liquidity enhance Z-Score and reduce the likelihood of sampled banks' failure, whereas leverage worsens the Z-Score and increases the likelihood of sampled banks' failure. The study results also revealed that net cash flow from investing activities and net cash flow from financing activities are significant cash flow components that predict the likelihood of banks' failure, and also cash flow model used is a good predictor for banks' failure in Nigeria.

The findings of this study are in tandem with the free cash flow theory which stipulated that cash flow from operating activities may be the most important predictor of corporate failures, other cash flows, that is cash flows from investing and financing activities are also important variables that can be used to predict the likelihood of corporate failure.

The study, therefore, recommends that Nigeria's deposit money banks should monitor their cash flows and continue to sustain or further increase the current net cash flow from investing activities and net cash flow from financing activities since these cash flow components have a significant impact on their Z-

Score and improve their chance of surviving. Also, sampled deposit money banks should increase their net cash flow from operating activities in order to boost their Z-Score and reduce the risk of failure.

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