Altman Bankruptcy Prediction Model and Corporate Governance: An Empirical Study of Nigerian Banks

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ABSTRACT

The implications of the Altman bankruptcy prediction model on deposit money banks' corporate governance in Nigeria are the subject of this research. The majority of these studies were undertaken in both Nigeria and other nations, and just a few of the Nigerian studies conducted their research in corporate firms other than the banking sector, and only a few of these banking sector studies ended in 2013. Furthermore, there is a scarcity of research on bankruptcy and corporate governance in Nigeria. Meanwhile, considering the dynamic nature of Nigerian deposit money banks, all previous research relate to a specific time span. As a result, the impact of the Altman bankruptcy prediction model on the corporate governance of Nigerian deposit money institutions was investigated in this study. The study aims to determine the impact of the Altman bankruptcy forecasting model on board independence in Nigerian deposit money banks, as well as if the model has an impact on board size in Nigerian deposit money banks. It was decided to use an ex post facto study design. From a population of 22 banks in Nigeria, a sample size of 9 deposit money banks was chosen. Data was gathered from the sampled banks' annual reports and accounts for the years 2009 to 2019. With the help of E-View 9.0, the study used regression analysis to examine the hypotheses. The Altman bankruptcy forecasting model has a beneficial influence on board independence; however this effect is not significantly significant on deposit money institutions in Nigeria, according to the data reviewed. It was also discovered that while the Altman bankruptcy predicting model has a positive effect on board size, this effect is not statistically significant in Nigerian deposit money banks.

KEYWORDS: *Altman bankruptcy prediction model, Corporate governance, Board independence and Board size*

1. INTRODUCTION

In recent years, bankruptcy has been widely debated and investigated. While the accounting and finance literature has focused on corporate bankruptcy, the focus has primarily been on anticipating insolvency based on financial data (Altman, 1986). Despite the fact that this tendency has been noticed in recent high-profile bankruptcy cases, few scholars have examined the impact of corporate governance on bankruptcy risk (Fich & Slezak, 2008). As a result, the relationship between corporate governance and the likelihood of bankruptcy remains an unresolved empirical subject. According to Fich and Slezak (2008), corporate governance has two potential implications on the probability of bankruptcy. The first reason is that, following the Enron and WorldCom scandals, it is evident that financial and accounting data may be modified to conceal poor performance. Second, because a firm's governance structure is a nexus of incentive contracts, the efficacy of management's response to distress will be determined by the governance structure's characteristics. As a result, while it may be more difficult to avoid bankruptcy as the amount of distress rises, the possibility of avoiding bankruptcy will also be determined by management's response to that level of distress, which could be influenced by the firm's governance structure.

Distress in the financial sector always has a significant negative impact on the entire economy. Only functional banks can provide economic stability and confidence among all stakeholders. Meanwhile, research have been conducted to anticipate bank stability in order to prevent bank failure before it occurs. The majority of studies on bankruptcy prediction, on the other hand, were conducted in foreign nations utilizing the Altman Z score model. Mwawughanga and Ochiri (2017); Ahmadpour and Shahsavari (2014); Suzanne, Kay, and Larry (2010); Gnyana (2015); Shilo and Arie (2010); Ncube (2014); Odipo and Sitati (2008) Wurim (2013) in their research concluded that, Z score is one of the popular and effective model and all investors should analyze the Z score of company before investment decision to avoid financial loss due to financial failure. Also studies carried out in Nigeria such like; Ezejiofor, Nzewi and Okoye (2014); Oforegbunam, (2011); Adeyeye, Fajembola Olopete and Adedeji (2012) who assessed the extent of the reliance on Altman Model to predict possibility of corporate bankruptcy/failure in Nigerian banking sector show that the Model was capable of measuring accurately the failure potential of banks.

Meanwhile, a lot of studies support the existence of independent directors. For example, Nguyen and Nielsen (2010) look at how stock prices react to sudden fatalities and find that independent directors are generally perceived as advantageous to the firm. According to Byrd and Hickman (1992), independent directors are more inclined to fire a CEO who performs poorly. Fich and Slezak (2008) looked into the link between independent directors and bankruptcy filings. They lead to the conclusion that having an independent director has a negative correlation with bankruptcy, implying that having an independent director reduces the risk of a company going bankrupt. They claim that organizations with more independent directors adjust their businesses more effectively in times of crisis than companies with more inside directors.

On the contrary, there is evidence of ineffectiveness of independent directors. Independent directors, according to Perry (1995), may have a negative impact on board cohesiveness since they serve as both decision makers and monitors at the same time, thus creating a conflict of interest. Abdullah (2006) also discovered that there is no link between the board independence and the likelihood of bankruptcy. Chaganti and Sharma (1985) believe their study's findings are due to the fact that they only deal with one sort of industry. They argue that in the retailing industry, the proportion of independent directors is not a significant indicator of bankruptcy. As a result, universal recommendations for boards with a majority of independent directors ignore industry distinctions and their implications for board composition and performance.

After reviewing the relevant studies, it was discovered that the majority of these studies of this nature were conducted in both Nigeria and other countries, and that the majority of these Nigerian studies conducted their research in corporate firms other than the banking sector, with a few exceptions studies in the banking sector stopped in 2013. As a result, there have been a slew of banking changes in Nigeria as a result of a lack of corporate governance that led to bankruptcy. In order to foresee effectively the direction of the national economy, it is sufficient to predict statistically and futuristically likely distress or insolvency in Nigerian deposit money banks in relation to their corporate governance.

The study's major goal is to see how much corporate governance influences the Altman Model's ability to predict deposit money bank failure in Nigeria.

Specifically, the study intends to achieve the following:
1. To ascertain the effect of Altman bankruptcy predicting model on board independence of deposit money banks in Nigeria.
2. To evaluate whether Altman bankruptcy predicting model affect board size of deposit money banks in Nigeria.

2. Review of Related Literature
2.1. Bankruptcy Prediction
Bankruptcy allows an individual or organization to start over by forgiving debts that are simply unpayable and allowing creditors the opportunity to get some kind of payback depending on the assets available for liquidation. In theory, the opportunity to file for bankruptcy benefits the whole economy by allowing individuals and businesses a second chance to get consumer credit while also providing creditors with a measure of debt recovery. The debtor gets released of the debt obligations incurred previous to filing for bankruptcy when the bankruptcy processes are successfully completed.

In the United States, all bankruptcy matters are handled by federal courts. A bankruptcy judge makes all decisions in federal bankruptcy cases, including whether a debtor is eligible to file and whether he should be discharged of his debts. A trustee, an officer appointed by the Department of Justice's United States Trustee Program to represent the debtor's estate in bankruptcy proceedings, is often in charge of the administration of the case. Unless a

creditor raises an issue in the case, there is usually very little direct contact between the debtor and the court (2019, Alicia).

Regression analysis and its several subcategories, such as linear regression, generalized linear models (logistic regression, Poisson regression, Probit regression), and others, are statistical techniques used to predict bankruptcy. Autoregressive moving average models and vector auto regression models can be used for forecasting. Predictive analytics is the term for when these and/or similar, generalized regression or machine learning approaches are used in business settings (Siegel, 2013). Data on the variable to be predicted, termed the dependent variable or response variable, and one or more variables whose values are anticipated to influence it, called independent variables or explanatory factors, are collected to utilize regression analysis for prediction. For the supposed causal link, a functional form, generally linear, is theorized, and the parameters of the function are estimated from the data—that is, they are chosen to optimize in some way the fit of the function, so parameterized, to the data. This concludes the estimating phase. Explanatory variable values that are deemed important to future (or current but not yet observed) values are used in the prediction values of the dependent variable are input to the parameterized function to generate predictions for the dependent variable (Fox, 2016).

Meanwhile, since Fitz Patrick's work in the 1930s, bankruptcy prediction has been one of the most difficult challenges in accounting, and over the last 60 years, an outstanding corpus of theoretical and empirical research on the subject has emerged (Zavgren, 1983; Altman, 1968). Back, Laitinen, and Sere (1996) point out that in bankruptcy prediction research, there are two primary approaches: the first, and most commonly employed, is the empirical search for predictors (financial ratios) that lead to the lowest misclassification rates. The second strategy has focused on the development of statistical approaches that will increase prediction accuracy.

2.2. Corporate Governance
Corporate governance, according to Cochran and Wartick (1998), is a broad word that encompasses many aspects of the theories and practices of boards of directors and their executive and non-executive directors. Corporate governance, they explain, is a web of agreements involving boards of directors, stockholders, top management, regulators, auditors, and other stakeholders (Maassen, 1999). According to Maassen (1999), boards of directors are required under most definitions of corporate governance. Given the importance of boards of directors, there is a large body of previous literature that uses them as proxies in its investigations (Sharma, 2004; Elloumi and Gueyie, 2001). Hillman and Dalziel (2003) state that boards of directors have two roles, monitoring role and provision of resource role. First, monitoring role refers to the responsibility of directors to monitor managers on behalf of shareholders, such as monitoring the CEO (Daily, 1996), monitoring strategy implementation (Pitcher, Chreim & Kisfalvi, 2000).

2.3. Proportion of Board Independence and Bankruptcy
The ratio of independent directors on the board is referred to as the proportion of independent directors. According to Clarke (2007), an independent director is "one who has no need or inclination to remain in management's good graces, and who will be able to speak up, both inside and outside the boardroom, in the face of management's transgressions in order to preserve the interests of shareholders." Within the board of directors, independent directors have two roles: monitoring and provision of resources. Their roles are to improve monitoring efficacy and provide advice to the company (Hillman & Dalziel, 2003). The level of the board of directors' independence is usually measured in one of two ways: through the number of directors and simultaneous occupation/non occupation of two organizational positions by the CEO, that is, whether both positions of chairperson and CEO are simultaneously occupied by the same person or not.

2.4. Board size and Bankruptcy
The number of members on the board of directors is referred to as board size. Board size is a feature of board construction that has been studied extensively in the literature. It is thought to have a significant impact on the board's performance. According to previous studies, having a large board of directors is good to their companies. For starters, the more board members a company has, the more connected it is to crucial resources (Pfeffer & Salancik, 1978). Second, a larger board is more likely to prevent a company from going bankrupt. They feel that a larger board of directors will provide the organization with more knowledge and competence (Darrat, Gray, Park &Wu, 2014). Other scholars suggest that the size of a board may have implications for the level of board independence as a smaller group of directors may be more easily influenced by the CEO as a result of social cohesion. By contrast, a larger board is less easily dominated by the CEO as it may require more time and effort on the part of the CEO to build consensus.

2.5. Edward Altman's Z – Score Model

Traditional ratio analysis is used by the majority of credit managers to predict future company failure. The most important ratios, according to Altman (1968), are those evaluating profitability, liquidity, and solvency. However, determining which is more significant is challenging because different research use different ratios as markers of potential problems. A corporation, for example, may have poor liquidity ratios and be on the verge of liquidation. The good profitability of the same company may overshadow the possible risk revealed by the inadequate liquidity ratios. As a result, traditional ratio analyses may yield inaccurate results (Odipo & Sitati, 2008). Altman went out to aggregate a number of ratios and created the Z–Score model, which predicts insolvency. This method was created for public manufacturing companies, and it eliminated any companies with less than $1 million in assets. Although the original Z score was not designed for small, non-manufacturing, or non-public firms, many credit grantors nevertheless utilize it for all types of customers today. To the initial Z score, Altman developed two additional prediction models (often referred to as model 'A' and model 'B') (Altman, 1968).

The z-score model 'A' was created with private manufacturing enterprises in mind. For this model, the weighting of the individual ratios, as well as the overall predictability scoring, are different. Furthermore, while the original score calculated the equity to debt calculation using the market value of equity, model 'A' used shareholder's equity on the balance sheet. Model 'B,' which covered the service sector, was created for private general enterprises. The sales-to-total-assets ratio is not employed in this statistical model, the weighting is different, and the score is different as well. Although automated statistical modeling could help determine the weighting of each ratio, common sense is still the best guide (Odipo & Sitati, 2008).

From about 1985 onwards, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman, 2007). The formula's approach has been used in a variety of contexts and countries, although it was designed originally for publicly held manufacturing companies with assets of more than $1 million. Later variations by Altman were designed to be applicable to privately held companies (the Altman Z'-Score) and non-manufacturing companies (the Altman Z"-Score). Altman's 1968 model took the following form-:

$$Z = 1.2A + 1.4B + 3.3C + 0.6D + .999E$$

$Z < 2.675$; then the firm is classified as "failed"

Where:
A = Working Capital/Total Assets
B = Retained Earnings/Total Assets
C = Earnings before Interest and Taxes/Total Assets
D = Market Value of Equity/Book Value of Total Debt
E = Sales/Total Assets

2.6. Theoretical Framework

2.6.1. Value-based Theory

Korobkin (1991) offered the value-based theory, which explains the evolution of bankruptcy law as a system with a wide range of forms, proportions, and magnitudes. The value-based perspective does not view the debtor's assets as a pool of static or dead property that can only be shared. The theory considers life, as well as the potential for growth and loss in such resources. Resources available for distribution, like human debtors, are endowed with social, political, and moral aspects. They shift with the passage of time and the demands of life. Indeed, the idea equates such resources to human life, which increases and shrinks at varying rates over time. Because every financial crisis is unique in its historical context, it is difficult to give the same solution for challenges that arise at different periods of the debtor's inheritance. Such flaws have the ability to proliferate and, in some cases, mutate over time. According to Korobkin (1991), bankruptcy law aims to handle concerns originating from financial difficulty. The difficulties that need to be addressed are multifaceted, spanning social, political, economic, and even moral dimensions. The intricacy of problems arising from financial distress is better delegated to a diverse group of people. Because of their awareness of the historical antecedents and dynamic mutation of the issues at stake, these claimants represent opposing interests and are better positioned. In order for parties to reap maximum value from a bankruptcy case, it should be handled in a complete manner.

This research is based on value-based theory, which states that bankruptcy law aims to handle concerns stemming from financial distress as well as the lack of a clear solution to the debtor's financial misery. While theoretical knowledge is sufficient for business survival, the capacity to foresee the likelihood of business failure is required, and this is the study's goal.

2.7. Review of Related Literature

A large number of researches on bankruptcy have been conducted in Nigeria and other countries. Ezejiofor (2021) investigated the impact of the Altman bankruptcy prediction model on deposit money bank corporate governance in Nigeria. It was

decided to use an ex post facto study design. From a population of 22 banks in Nigeria, a sample size of 9 deposit money banks was chosen. Data was gathered from the sampled banks' annual reports and accounts for the years 2009 to 2019. With the help of E-View 9.0, the study used regression analysis to test the hypothesis. The Altman bankruptcy forecasting model has a beneficial effect on frequency of board meeting and this effect is significantly significant on deposit money banks in Nigeria, according to the data reviewed Hapsari (2018) looked into the dispute over how corporate governance structures affect the likelihood of bankruptcy. The particular aims are to examine the impact of board size, female board member proportion, and independent board member proportion on bankruptcy risk. Between 2000 and 2014, a sample of 190 bankrupt and healthy companies was used in this study. The findings demonstrate that smaller boards minimize the likelihood of insolvency. The findings of this study support the notion that certain sorts of corporate governance structures result in better monitoring. Mwawughanga and Ochiri (2017) used the Altman Z score model from 2005 to analyze the financial health of banks listed and unlisted on the Nairobi Stock Exchange in Kenya. As a result, this study uses the Altman Z score, a multivariant financial analysis model, to assess the financial health of Kenyan banks from 2010 to 2015. Multivariate Discriminant Statistical approaches, as described by Altman 2005, were employed in the analysis. According to the findings, a large majority of Kenyan banks were in the grey zone during the study period. The Altman model was shown to be an average tool that should only be used in conjunction with other measures. Jalan, Kale, and Meneghetti (2016) examined the effect of leverage and bankruptcy risk on corporate incentives to shelter income from taxes. Their empirical tests provide evidence that is consistent with these theoretical predictions. They use two changes to the bankruptcy law to show that our findings are robust to endogeneity concerns. Findings show that leverage and bankruptcy risk relate negatively to sheltering and that the negative effects of bankruptcy risk and debt on sheltering are stronger for riskier firms; and weaker for larger, better governed, more profitable firms, and for firms that are in the "public eye". From 2007 to 2012, Masoumeh (2016) researched the association between earnings management and earnings quality for bankrupt and non-bankrupt enterprises registered on the Tehran Stock Exchange. The study examined the relationship between discretionary accruals as a measure of earnings management, being opportunistic or efficient earnings management, and testing the relationship

between discretionary accruals as a measure of earnings management, being opportunistic or efficient earnings management, using Pearson correlation to measure earnings quality by four separate accounting-based earnings attributes: accruals quality, earnings persistence, and earnings predictability; earnings and examined by testing the relationship between discretionary accruals as a measure of earnings management, being opportun The findings of estimating the imbalanced panel data technique for 55 enterprises that were exposed to Altman's model bankruptcy and 198 non-bankrupt firms demonstrate that the bankrupt firms tend to use opportunistic earnings management, and the non-bankrupt choose efficient earnings management. From 1990 to 2014, Inaya and Isoto (2016) researched the societal impact of fraud on the Nigerian banking industry. The study's findings revealed that fraud had a negative societal impact on the Nigerian banking industry, using ordinary least squares regression techniques. Offiong, Udoka, and Ibor (2016) used regression analysis to examine Nigerian banking sector frauds from 1994 to 2013. To achieve long-term success, the study discovered that the difficulties of Nigerian banking sector frauds necessitate robust inter-agency collaboration, public education, and cross-border cooperation. Gnyana (2015) concluded that Z score is one of the most popular and effective models for predicting financial distress for selected companies in India, and that all investors should analyze the Z score of a company before making an investment decision to avoid financial loss due to financial failure. Using the Altman model, Ahmadpour and Shahsavari (2014) evaluated the impact of earnings quality management on the profitability of future profits of Tehran stock exchange insolvent companies. The results of the technique panel data for 55 enterprises on the verge of bankruptcy, according to Altman's model, show that these companies have a disproportionate composition and proceeded to increased profit management. The results of opportunistic theory of earnings management support and show that the future profitability of earnings quality worked. Campa, Del Mar, and Miano (2014) performed research on the response to the question of whether, in comparison to their counterparts, Spanish companies that go bankrupt tend to control earnings or not during the years leading up to the bankruptcy procedure. The research of a sample of matched bankrupt companies revealed that bankrupt companies have better earnings management than non-bankrupt enterprises. The findings revealed that management tools profit is affected by the industry in which the company operates and the years prior to bankruptcy. Ezejiofor, Nzewi, and Okoye (2014)

investigated the extent to which the Altman Model may be used to forecast the likelihood of corporate bankruptcy or failure in Nigerian banking sector. The information was gathered from the banks' annual reports and accounts. The Altman prediction method was used. The Model was found to be capable of accurately estimating the failure potential of sound and healthy banks. The findings also reveal that the Altman bankruptcy prediction model might have correctly anticipated the failure of the Nigerian banks that actually failed. The implication of this discovery is that regulatory authorities' conventional grading method for predicting the level of failure in Nigerian banks is still low; as a result, Nigeria has had numerous bank failures in the past, which could have been avoided if they had used a model like Altman prediction Model In Zimbabwe, Ncube (2014) investigated the utility of Altman's Z score for non-manufacturing enterprises in predicting corporate failure in the financial services and banking sector on the Zimbabwe stock exchange, and advised that the model be used. Despite the fact that Altman's model is ancient and has flaws, the study found that it is still the most widely utilized model in the world. Different equations may exist now, however they all follow the notions of the original one developed by professor Altman in 1968. In Nigeria, Olaoye and Dada (2014) investigated the nature, causes, effects, detection, and prevention of bank fraud. Only primary sources were used for data gathering, which included the use of questionnaires. A total of 100 questionnaires were distributed to chosen bank employees, with only 92 being completed and returned. The article states that, in order to combat fraud, banks should have sound/effective internal control mechanisms/checks and balances in place, as well as suitable remuneration and rewards for excellence and good behavior, whereas repetitive and periodic shrinking of bank staff should be opposed. From 2001 to 2011, Chiezey and Onu (2013) investigated the influence of fraud and fraudulent behaviors on bank performance in Nigeria. Multiple regression analysis was performed in this investigation. Between 2001 and 2005, the percentage of mobilized funds lost to fraud was highest, while between 2006 and 2011, it was significantly lower. The study found that fraud and fraudulent actions put banks and their clients in serious financial trouble. Wurim (2013) looked on the effectiveness of the Multiple Discriminant Analysis Model (Altman, 1968) in determining the health of various financial institutions. The study's sample includes two "failed" and two "non-failed" institutions within a five year period (1999-2003). The Z Scores of the two non-failed banks were found to be below 1.80, suggesting ill-health, contrary to

regulatory agencies' expectations. The analysis also verifies a bank's poor health (whose license has since been revoked), while the Z Scores of a second bank – previously labeled as a "failing bank" – are found to be higher than 3.00. The MDA model was found to be a useful tool in predicting the likelihood of failure; the major factors in Altman's model are positive indicators in the analysis; and regulatory bodies have not been diligent in adopting the study' findings. Ijeoma and Ezejiofor (2013) investigated whether corporate governance plays a significant role in ensuring accountability and transparency in order to improve an enterprise's performance, as well as the extent to which corporate governance can help organizations meet their social responsibilities to the environment. The study's data was gathered from both primary and secondary sources. Using the Statistical Package for Social Sciences (SPSS) version 17.0 software package, data were processed and tested for opinion differences using the Two Way ANOVA. The study concludes that corporate governance aids in providing structure through which SMEs' aims and means of achieving those objectives are determined, as well as monitoring performance, all in order to ensure operational effectiveness and efficiency in their services. Mokarami and Motefares (2013) investigated the impact of internal corporate governance (CG) procedures on the firm's insolvency. A sample of 76 companies listed on the Tehran Stock Exchange (TSE) over a nine-year period (2001-2009) was chosen and evaluated for this purpose. The hypotheses were tested using Cox regression. The following factors were used to develop the CG system mechanisms: board size, CEO replacement, and CEO tenure, there are two positions available. Firm size, profitability, interest coverage ratio, liquidity, financial risk, and operating risk are all control variables. The findings show that there is a strong relationship between CEO replacement and insolvency, but no such relationship exists between board size and CEO dual positions and bankruptcy. Farinde (2013) investigated the susceptibility of Nigerian banks to collapse in order to find ratios and financial data that are related to the bank's solvency. Thirty publicly traded banks with Annual Reports for the year before to the consolidation, i.e. 2004, were chosen. The study looked for signs of distress utilizing the Multilayer Perceptron Neural Network Analysis. The model was used to analyze further reforms by the Central Bank of Nigeria using published Annual Reports of twenty quoted banks for the year 2008 and 2011. It was found that the model can thus be used for future prediction of failure in the Nigerian banking system. To forecast the likelihood of bank failure in Nigeria, Adeyeye, Fajembola,

Olopete, and Adedeji (2012) used principal component analysis with a discriminant model. Profitability, liquidity, credit risk, and capital sufficiency are the important predicted financial ratios, according to the regression model's research. In other words, the key distinguishing factors of non-failed (healthy) and failed banks are determined to be disparities in profitability, liquidity, credit risk (asset quality), and capital adequacy (sustenance). However, it demonstrates that the variables for management quality, as well as other bank features such as economic conditions and employee productivity, have a significant impact are potentially not important predictors of financial problems in Nigerian banks but might make a difference for the group of banks that are facing difficulties. Li (2011) examined the impact of earnings management and earnings quality, the level needed money and Chinese companies went bankrupt. Using Altman model, their findings showed that administration of bankrupt companies' profits is opportunistic and healthy corporate earnings management, more than companies with financial hardship tends towards the performance. They also found that interest management better than the quality of earnings, anticipated future profitability and earnings quality is high in healthy companies and is low in bankrupt companies. In a related study by Gormleyel et al (2010), in their study: Bank Entry and Bankruptcy, found that on average, more firms file for bankruptcy to avoid heightened creditor scrutiny following bank entry, rather than due to financial distress. The results show that bank entry is associated with a shift from liquidations to restructuring, suggesting that one channel by which banks may affect the bankruptcy process is to make more concessions in order to more quickly reach a restructuring agreement.

The Altman Z score model was used in studies on bankruptcy prediction both locally and globally. Mwawughanga and Ochiri (2017) used the Altman Z score model from 2005 to analyze the financial health of banks listed and unlisted on the Nairobi Stock Exchange in Kenya. According to the findings, a large majority of Kenyan banks were in the grey zone during the study period. The Altman model was shown to be an average tool that should only be used in conjunction with other measures. Ahmadpour and Shahsavari (2014) looked into the management of earnings quality and its impact on future profits of Tehran stock exchange insolvent enterprises. The results of the technique panel data for 55 enterprises on the verge of bankruptcy, according to Altman's model, show that these organizations have a disproportionate composition and have enhanced profit management. Suzanne, Kay, and Larry (2010)

indicated that more research into Altman's Z score and alternative models is needed to predict bankruptcy of speciality retail enterprises doing business today. Gnyana (2015) concluded that Z score is one of the most popular and effective models for predicting financial distress for selected companies in India, and that all investors should analyze the Z score of a company before making an investment decision to avoid financial loss due to financial failure.

Shilo and Arie (2007) found that the model's most important advantage over more complex ones is its simplicity and low cost of application in their work Predicting Bankruptcy: Evidence from Israel Using the Altman Model. Odipo and Sitati (2008) investigated the applicability of Altman's revised model in predicting financial distress: a case study of companies quoted in the Nairobi stock exchange. According to the study, Edward Altman's financial distress prediction model was shown to be applicable in 8 of the 10 failed businesses studied, indicating that the model is 80 percent accurate in predicting financial hardship. Ncube (2014) advised using Altman's Z score for non-manufacturing enterprises and financial institutions listed on the Zimbabwe stock exchange in predicting corporate failure in the financial services and banking sectors in Zimbabwe. Despite the fact that Altman's model is ancient and has flaws, it is still the most widely used model in the world. In order to test the model's utility in predicting business failure in Kenya, Odipo and Sitati (2008) conducted a study on financial distress prediction using Z score. From the above perspective, the Z score model by Altman is the most widely used model for estimating the likelihood of financial failure and thus financial/strength by corporate managers, financial analysts, and auditors. Wurim (2013) looked on the effectiveness of the Multiple Discriminant Analysis Model (Altman, 1968) in determining the health of various financial institutions. The MDA model was found to be a useful tool for predicting the future of the potential of failure; the key variables in the Altman's model are positive indicators in the analysis and regulatory agencies have not been upright in implementing results of analysis. Ezejiofor, Nzewi and Okoye (2014); Oforegbunam, (2011); Olopete, and Adedeji (2012); Pam (2013); Alexia (2008) assessed the extent of the reliance on Altman Model to predict possibility of corporate bankruptcy/ failure in Nigerian banking sector. Show that the Model was capable of measuring accurately the failure potential of sound and healthy banks. The limited investigations undertaken in Nigeria, as well as the analysis of these studies, came to an end in 2012.

After reviewing the relevant studies, it was discovered that the majority of these studies were conducted in both Nigeria and other countries, and that the majority of these Nigerian studies conducted their research in corporate firms other than the banking sector, with only a few studies in the banking sector ending in 2013. As a result, there have been a series of reforms in Nigeria's banking industry in response to a lack of corporate governance that resulted in bankruptcy, and these reforms are the focus of this study.

3. Methodology
3.1. Research Methodology
Ex post facto research was used in this study. The study looked at the companies' audited financial statements. This is appropriate because the study's goal is to determine the effect of one variable on another without the researcher manipulating the variables.

3.2. The Study's Population
The 22 deposit money banks listed on the Nigerian Stock Exchange make up the study's population. From 2009 to 2019, the study looked at ten years of annual reports and accounts from these banks. The following banks are listed in the table:

Table 3.1: List of Deposit Money Banks Operating in Nigeria as at September 30, 2018.

S/N	Banks Licence with International Authorization
1	Access bank plc
2	Diamond bank plc
3	Fidelity bank plc
4	FCMB plc
5	First bank plc
6	GTB plc
7	Union bank plc
8	UBA plc (M)
9	Zenith bank plc
	Banks Licence with National Authorization
10	Citibank Nigerian limited
11	ECO bank Nigeria
12	Heritage bank limited
13	Key stone bank limited
14	Polaris bank plc
15	Stanbic IBTC bank plc
16	Standard chartered bank limited
17	Sterling bank plc
18	Unity bank plc
19	Wema bank plc
	Banks Licence with Regional Authorization
20	Suntrust bank Nigerian limited
21	Providus bank plc
	Non- interest Banks Licence with National Authorization
22	Jaiz bank plc

3.3. Sample Size Determination
The sample size was determined using the purposeful sampling technique. The sample is chosen in this approach depending on the researcher's opinion of what is appropriate for the study. During the data gathering process, nine (9) of the twenty-two (22) deposit money institutions with international authorization were picked. Due to insufficient data for the study's time span, the other banks were eliminated.

3.4. Data Sources
Working capital, retained earnings, earnings before interest and tax, equity value, total assets, and total book debts were among the metrics required by Altman predicting.

3.5. Model Specification
The study used Altman Model given as Zeta "Z"
$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$, Where:

X_1 = Working capital to total assets
X_2 = Retained earnings to total assets
X_3 = Earnings before interest and taxes to total asset
X_4 = Value of equity to total book debt
X_5 = Gross earnings to total assets

The decision rule is that:
1. For Z<1.81 Bankruptcy region
2. For 1.81<Z>2.675 High bankruptcy potential
3. For 2.675<Z<2.99 Low bankruptcy potential
4. For Z>2.99 Strong (No sign of bankruptcy at all).

The researcher modified the model to incorporate corporate governance:

$$BDIND_{it} = a_0 + \mu_i + \beta_1 CZVAL_{t+t} \sum_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(i)$$

$$BODSZ_{it} = a_0 + \mu_i + \beta_3 CZVAL_{t+t} \sum_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(iii)$$

Where;
CZVAL: Altman calculated Z-Value (independent variable)
BDIND = Board independence (dependent variable)
$BODSIZ_{it}$ = Board size (dependent variable).

3.6. Data Analysis Techniques
To meet the study's goals, the researcher extracted data using Altman's original model for public firms, and the hypotheses were tested using regression analysis with the help of E-View 9.0.

Decision Rule
Accepting the alternative hypothesis if the P-value of the test statistic is positive and significant at the 5% significant level is the decision for the hypotheses. If the P-value is less than 5%, reject it; if it is larger than 5%, do not reject it.

4. Data Presentation and Analysis
4.1. Data Analysis

Table 1: Descriptive analysis

	CZVAL	BDIND	BODSZ
Mean	2.720545	1.727273	14.27273
Median	1.781000	2.000000	15.00000
Maximum	6.577000	2.000000	16.00000
Minimum	0.399000	1.000000	10.00000
Std. Dev.	2.340547	0.467099	2.148996
Skewness	0.431382	-1.020621	-1.511301
Kurtosis	1.545168	2.041667	3.539882
Jarque-Bera	1.311244	2.330657	4.320980
Probability	0.519119	0.311820	0.115269
Sum	29.92600	19.00000	157.0000
Sum Sq. Dev.	54.78158	2.181818	46.18182
Observations	11	11	11

Source: E-view 9.0

Table 1 provides the mean (average) for each variable, as well as the maximum and minimum values, standard deviation, and Jarque-Bera (JB) statistics for each variable (normality test). The table 1 results gave some insight into the nature of the selected Nigerian quoted banks employed in this study.

To begin, it was discovered that, on average, the sampled quoted deposit money institutions in Nigeria were characterized by positive Altman model throughout a ten-year period (2009-2019). (2.721). Furthermore, the substantial disparity between the highest and minimum value of corporate governance; board independence (BDIND) and board size (BODSZ) in this study's sampled quoted banks shows that banks do not dominate the sampled quoted banks with large bankruptcy.

Secondly, it was observed that during the period under study, that the board size was approximately 14%.

4.2. Test of hypotheses

Hypothesis One

Ho_1: Altman bankruptcy predicting model does not significantly affect Board Independence of deposit money banks in Nigeria.

HI_1: Altman bankruptcy predicting model significantly affect Board Independence of deposit money banks in Nigeria.

Table 2: BDIND Regression Results

Dependent Variable: BIND				
Method: Least Squares				
Date: 03/26/21 Time: 22:17				
Sample: 2009 2019				
Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.422616	0.193752	7.342470	0.0000
CZVAL	0.111984	0.055063	2.033740	0.0725
R-squared	0.314865	Mean dependent var		1.727273
Adjusted R-squared	0.238739	S.D. dependent var		0.467099
S.E. of regression	0.407545	Akaike info criterion		1.205637
Sum squared resid	1.494840	Schwarz criterion		1.277982
Log likelihood	-4.631005	Hannan-Quinn criter.		1.160034
F-statistic	4.136099	Durbin-Watson stat		1.524925
Prob(F-statistic)	0.072495			

R-squared and adjusted Squared values in Table 2 were (0.315) and (0.239), respectively. The independent variable and the dependent variable together account for around 3% of the systematic fluctuations in (BDIND) of our sample banks over the eleven-year period (2009-2019). The board independence regression model is properly described, as evidenced by the F-statistics (4.136) and P-value (0.073).

Test of Autocorrelation: DW statistics, which we acquired from our regression result in table 2, are 1.525, and Akika Info Criterion and Schwarz Criterion, which are 1.206 and 1.278 respectively, further proved that our model is properly described. Furthermore, the specific finding from the explanatory variable is provided below.

Based on a t-value of 2.033740 and a p-value of 0.073, it was discovered to have a positive influence on our sampled quoted banks, however this effect is not statistically significant because the p-value is more than 0.05. As a result of this finding, we should accept our null hypothesis, which indicates that the Altman bankruptcy forecasting model has no substantial impact on deposit money bank board independence in Nigeria.

Hypothesis Two

Ho_2. Altman bankruptcy predicting model has no significant effect on Board size of deposit money banks in Nigeria.

H_{I2}. Altman bankruptcy predicting model has significant effect on Board size of deposit money banks in Nigeria.

Table 3: BODSZ Regression Results

Dependent Variable: BODSZ				
Method: Least Squares				
Date: 03/26/21 Time: 21:57				
Sample: 2009 2019				
Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.64712	1.042598	13.08953	0.0000
CZVAL	0.229956	0.296299	0.776095	0.4576
R-squared	0.062727	Mean dependent var		14.27273
Adjusted R-squared	-0.041415	S.D. dependent var		2.148996
S.E. of regression	2.193044	Akaike info criterion		4.571424
Sum squared resid	43.28498	Schwarz criterion		4.643768

Log likelihood	-23.14283	Hannan-Quinn criter.	4.525821
F-statistic	0.602324	Durbin-Watson stat	0.685751
Prob(F-statistic)	0.457602		

R-squared and adjusted Squared values in Table 3 were (0.063) and (-0.041), respectively. The independent variable and the dependent variable together account for around 6% of the systematic fluctuations in (BODSZ) of our sample banks across the eleven-year period (2009-2019). The board size regression model is properly described, as evidenced by the F-statistics (0.602) and P-value (0.458).

The Durbin-Waston (DW) statistics, which we obtained from our regression result in table 4, show that DW statistics is 0.686 and an Akika Info Criterion of 0.686 and Schwarz Criterion which are 4.571 and 4.644 respectively also further confirmed that our model is well specified. In addition to the above, the specific finding from the explanatory variable is provided below.

Based on the t-value of 0.776095 and p-value of 0.458, was found to have a positive effect on our sampled quoted banks and this effect is not statistically significant as its p-value is lower than 0.05 values. This result, therefore suggests that we should accept our null hypothesis three which states that Board size has no significant effect on Altman bankruptcy predicting model of deposit money banks in Nigeria.

4.3. Discussion of Finding
Although the Altman bankruptcy forecasting model has a beneficial influence on board independence, this effect is not statistically significant in Nigerian deposit money institutions. As a result, our finding confirms Chang (2009); Jalan, Kale, and Meneghetti (2016) and contradicts our aprori anticipation as well as Hapsari (2018); Fich and Slezak's viewpoint (2008).

Although the Altman bankruptcy forecasting model has a beneficial influence on board size, this effect is not statistically significant in Nigerian deposit money institutions. Female directors have a beneficial impact on the Altman bankruptcy forecasting model, and this effect is especially noticeable in Nigerian deposit money institutions. As a result, this research backs up the finding of Chang (2009) and negates our aprori expectation and the view of Jalan, Kale, and Meneghetti (2016); Mokarami, and Motefares (2013).

5. Conclusion and Recommendations
5.1. Conclusion
The purpose of this study is to show how the Altman bankruptcy forecasting model has affected board independent directors and board size. Corporate governance indicators include board independence, board meeting frequency, and board size. The research is based on nine deposit money banks and spans the years 2009 to 2019.

The findings demonstrate that the Altman bankruptcy forecasting model independent director has a favorable influence on board independence and board size, but not on deposit money banks in Nigeria. These findings show that the board director serves as an internal control mechanism in corporate governance, and that governance structures play a role in corporate governance partially contribute to the probability of bankruptcy.

5.2. Recommendations
The following recommendations were made based on the findings and conclusion:

1. The independent director must be strengthened in order for the board to be more successful in preventing and avoiding bankruptcy once the company is in crisis.

2. Because the board of directors serves as an internal control mechanism in corporate governance, bank policymakers should provide adequate regulations on the specific number of board members to be working with; as a result, a larger board is more likely to reduce the risk of bankruptcy because it brings a broader range of knowledge and expertise to the bank.

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