Cash Flow Ratios and Business Failure of Healthcare Firms in Nigeria

Salome Ogochukwu Okeke, Prof. Chike E. Nwoha, & Dr. Anastasia N. Duru
Department of Accountancy, Enugu State University of Science and Technology, Enugu

ABSTRACT: *The study examined cash flow ratios as predictors of business failure of healthcare firms in Nigeria. The objectives of the study were to ascertain the effect of operating cash flow ratio, cash flow to debt ratio, and price to cash flow ratio on Altman's zeta score of healthcare firms in Nigeria. The study adopted ex-post-facto research design, covering a period of 10 years (from 2013 to 2022). Secondary data used for the study were extracted from annual reports and accounts of selected healthcare firms listed on the Nigeria Exchange Group (NGX) from 2013 to 2022. Multiple regression technique was used to test the hypotheses. The result of the test of hypotheses revealed that the operating cash flow ratio has a statistically non-significant negative effect on the Altman z-score of healthcare firms in Nigeria (p-value = 0.3397). The finding also indicates that the cash flow to debt ratio has a statistically non-significant negative effect on the Altman z-score of healthcare firms in Nigeria (p-value = 0.2937). Lastly, the finding reveals that the price to cash flow ratio has a non-significant positive effect on the Altman z-score of healthcare firms in Nigeria (p-value = 0.5281). The policy implications of these findings suggest that when assessing the financial health and bankruptcy risk of healthcare firms in Nigeria, policymakers and regulators should consider factors beyond cash flow ratios. It was recommended therefore that healthcare firms in Nigeria should diversify their sources of cash flow beyond operating cash flow to improve financial stability and mitigate bankruptcy risk. Healthcare firms should have a careful evaluation of debt management practices is necessary to maintain a healthy balance between cash flow generation and debt obligations in healthcare firms. Market sentiment reflected in the price to cash flow ratio should not be relied upon as the sole indicator of financial stability. Healthcare firms should prioritize fundamental financial and operational indicators to assess their financial health and mitigate bankruptcy risk.*

KEYWORDS: cash flow ratios, business failure, healthcare firms, Nigeria, Altman's zeta score, operating cash flow ratio, cash flow to debt ratio, price to cash flow ratio

INTRODUCTION

Background of the Study

The healthcare industry holds a vital role in Nigeria's economic development and healthcare sector, necessitating the financial stability and viability of healthcare firms for sustainable growth and success. Consequently, the significance of identifying reliable predictors of business failure cannot be overstated, as it has substantial financial implications for investors, creditors, and poses risks to public health and the overall economy. In light of this, the present study aims to analyze the effectiveness of cash flow ratios as predictors of business failure specifically within Nigeria's healthcare sector.

Cash flow ratios are widely recognized as crucial financial indicators that offer insights into a company's financial health and performance. These ratios enable the assessment of a firm's liquidity, solvency, and profitability by scrutinizing the flow of cash from its operational activities, investments, and financing undertakings (Amran et al., 2017). When it comes to predicting business failure, cash flow ratios serve as valuable tools for early detection and risk assessment.

The prediction of business failure holds immense importance for investors, creditors, and other stakeholders, empowering them to make informed decisions and mitigate potential risks. Numerous financial ratios and models have been developed with the objective of assessing the likelihood of business failure, aiming to identify warning signs before an actual failure occurs. One widely employed model is the Altman Zeta Score, which amalgamates multiple financial ratios to evaluate a firm's bankruptcy risk (Altman, 1968). In the present study, the Altman Zeta Score is adopted as the dependent variable, signifying the business failure indicator.

As independent variables, the study selects the operating cash flow ratio, cash flow to debt ratio, and price to cash flow ratio. These ratios have been recognized as critical indicators of a firm's financial stability and performance, particularly in assessing its cash flow generation and management (Pereira & Vanalle, 2016). The operating cash flow ratio measures a company's capability to generate cash from its core operations, while the cash flow to debt ratio evaluates its ability to fulfill debt obligations. Furthermore, the price to cash flow ratio compares the market price of a company's stock to its cash flow per share.

The healthcare industry in Nigeria is characterized by stringent regulatory requirements, intense competition, evolving market dynamics, and a reliance on research and development investments (Amran et al., 2017). Business failure within this sector can stem from factors such as inadequate cash flow management, burdensome debt loads, declining sales, non-compliance with regulations, and economic uncertainties (Pereira & Vanalle, 2016). Given these unique challenges and opportunities, the identification of reliable predictors of business failure is of utmost significance for healthcare firms in Nigeria to enhance financial stability and ensure sustainable growth (Amran et al., 2017). Consequently, this study aims to provide valuable insights to investors, creditors, and policymakers by examining the effectiveness of cash flow ratios as predictors of business failure in healthcare firms in Nigeria.

Statement of the Problem

The healthcare industry in Nigeria holds a crucial position in the country's economic development and healthcare sector. The financial stability and viability of healthcare firms are vital for sustainable growth and success in this industry. However, business failure within this sector not only has significant financial implications for investors and creditors but also poses risks to public health and the overall economy. Recent closures of healthcare firms, such as Afrik Healthcare Plc, Evans Medical Plc, and Nigeria-Germany Chemical Plc, due to prolonged losses and poor financial performance, highlight the challenges faced by firms in this sector (Nigeria Exchange Group, 2022). These closures demonstrate the urgent need to identify reliable predictors of business failure. In many cases, the management of these firms was unable to detect the potential for business failure until it was too late. Consequently, there is a pressing need to proactively identify warning signs and risk factors to prevent such financial difficulties. Cash flow ratios are widely recognized as important financial indicators that can serve as valuable tools for early detection and risk assessment in various industries.

However, the effectiveness of cash flow ratios as predictors of business failure (measured by Altman's Zeta Score) specifically within Nigeria's healthcare sector has not been extensively studied. Therefore, there is a significant knowledge gap regarding the application of cash flow ratios as predictive indicators in this particular industry. Understanding the effectiveness of cash flow ratios in predicting business failure in healthcare firms in Nigeria can provide valuable insights to investors, creditors, and policymakers. Consequently, the study ascertained the effectiveness of cash flow ratios as predictor of business failure of healthcare firms in Nigeria. The specific objectives included the analysis of the impact of operating cash flow ratio on Altman z-score for healthcare firms in Nigeria, an examination of the effect of cash flow to debt ratio on Altman z-score, and the ascertainment of the effect of price to cash flow ratio on Altman z-score for healthcare firms in Nigeria.

REVIEW OF RELATED LITERATURE

Cash Flow Ratios

Cash flow ratios are widely recognized financial metrics that play a crucial role in evaluating a company's ability to generate and effectively manage cash flow (Brigham & Houston, 2019). Cash flow ratios can play a vital role in evaluating the financial health of healthcare firms, which can be crucial in mitigating the risk of business failure. Investors in the healthcare industry rely on these ratios to assess a company's cash-generating potential beyond mere profitability, providing a comprehensive view of its financial performance (Brigham & Houston, 2019). By analyzing cash flow ratios, investors can determine if a healthcare firm can generate sufficient cash to cover operating expenses, fund research and development initiatives, and distribute dividends (Gibson, 2019). This assessment helps investors make informed decisions about investing in a particular firm and reduces the risk of investing in companies with weak cash flow positions.

Similarly, creditors, such as banks and other financial institutions, utilize cash flow ratios to evaluate the credit worthiness of healthcare firms. Consistent cash flow generation is a critical factor in determining a company's ability to meet its debt obligations and interest payments (Brigham & Houston, 2019). Cash flow ratios enable creditors to assess a healthcare firm's ability to generate enough cash to service its debts, reducing the risk of potential defaults and business failure.

Operating Cash Flow Ratio

The operating cash flow ratio also plays a significant role in predicting the potential failure of a business. A low operating cash flow ratio indicates a company's inability to generate sufficient cash flow from its core operations to cover short-term liabilities (Brigham & Houston, 2019). This can be an early warning sign of business failure and an increased risk of business failure. A consistently low operating cash flow ratio suggests that a company may struggle to meet its financial obligations and may be reliant on external financing or borrowing to sustain its operations Brigham & Houston, 2019). This dependency on external sources can lead to increased debt levels and interest expenses, further straining the financial position of the business.

By monitoring the trend of the operating cash flow ratio over time, investors, creditors, and managers can identify deteriorating financial health and take necessary measures to address the underlying issues. It provides insight into the company's ability to generate sufficient cash flow to support its operations, repay debts, and fund future growth initiatives.

Cash Flow to Debt Ratio

The Cash Flow to Debt Ratio is a financial metric used to assess a company's ability to repay its debts using its cash flow from operations. It is calculated by dividing cash flow from operations by total debt (Brigham & Houston, 2019). This ratio provides insights into a company's capacity to generate sufficient cash flow to meet its debt obligations. The Cash Flow to Debt Ratio is an important indicator of a company's financial health and its ability to manage its debt burden. A higher ratio signifies a stronger ability to generate cash flow from operations to cover the outstanding debt, indicating a healthier financial position and reduced risk of default. On the other hand, a lower ratio suggests potential difficulties in generating enough cash flow to service the debt, indicating a higher risk of business failure.

Price to cash flow ratio

According to financial analysis, the price to cash flow ratio is a useful metric for evaluating a company's stock valuation (Hayes, 2022). By comparing the market price to the cash flow per share, the ratio provides insights into the relative pricing of the stock. A low price to cash flow ratio indicates potential undervaluation, suggesting an attractive purchase opportunity for investors (Hayes, 2022). Conversely, a high price to cash flow ratio suggests overvaluation, where investors may need to pay a premium for each unit of cash flow generated by the company.

Business failure

Business failure refers to a situation where firms are unable to meet their financial obligations within the designated timeframe. It is characterized by the violation of loan contracts, continuous losses, and failure to honor financial obligations promptly (Ray, 2011). Financially distressed firms face challenges related to leverage and cash flow, resulting in poor performance and a decline in market value (Chan & Chen, 1991). These firms often encounter issues such as cash shortages and overdue obligations (Wesa & Otinga, 2018).

To assess business failure, researchers in this study employed several indicators. Altman's Zeta Score Model, which incorporates multiple financial ratios, was used to evaluate the likelihood of

bankruptcy. Operational cash flow, indicating a firm's ability to generate cash from its core operations, was utilized to assess financial liquidity. The debt to equity ratio was employed to analyze a firm's capital structure and financial leverage (Kazemian et al., 2017).

Altman Zeta Score

Altman's Z-score model, developed by Edward Altman in 1968, is a well-known and widely used bankruptcy prediction model in finance (Moyer, 2005). This multivariate model incorporates accounting ratios and market-derived price data to assess a company's financial health and predict the likelihood of bankruptcy within a two-year period (Hayes et al., 2010). The model gained acceptance among auditors, management accountants, and finance experts in the mid-1980s and has since been applied beyond the manufacturing sector, with modifications for other industries such as healthcare (Al-Sulaiti & Almwajeh, 2007).

The Altman Z-score model evaluates a company's financial health by considering multiple financial ratios, including profitability, liquidity, solvency, and market value ratios. These ratios are weighted based on their significance in predicting business failure. The resulting Z-score provides an overall assessment of a company's financial health, with lower scores indicating a higher probability of bankruptcy or business failure. Altman himself made amendments to the model to expand its applicability in certain situations not covered in the initial sample set (Altman, 2006). The Altman Z-score model has become a popular tool for auditors, financial analysts, investors, and researchers across industries and regions due to its robustness and wide-ranging applicability.

Theoretical Framework

The study was anchored on Agency Theory and Theory of Business failure.

Agency Theory

Agency Theory, developed by Jensen and Meckling (1976), examines the relationship between the principal (shareholders/owners) and the agent (management) in a corporation. It recognizes that conflicts of interest may arise between these two parties due to differing goals and objectives. In analyzing the effectiveness of cash flow ratios as predictors of business failure of healthcare firms in Nigeria, the Agency Theory is relevant. The theory suggests that management may have incentives to manipulate financial information to present a more favorable picture of the company's financial health. This can be done to maintain control, secure personal benefits, or protect their reputation. It implies that management may have an incentive to misrepresent or manipulate cash flow ratios to mask potential business failure. This behavior can occur if they believe that the disclosure of business failure could jeopardize their positions or affect their personal interests. Consequently, it becomes crucial to examine the effectiveness of cash flow ratios as predictors of business failure in healthcare firms in Nigeria, considering the potential agency problems that may hinder their reliability.

Theory of Financial Distress

The Theory of Financial Distress, also known as the Bankruptcy Theory or the Insolvency Theory proposed by Edward I. Altman in 1968, provides insights into the causes, consequences, and dynamics of business failure. This theory focuses on understanding the factors that lead to financial distress and ultimately bankruptcy. It recognizes that firms can face various challenges and vulnerabilities that affect their ability to meet financial obligations and sustain operations. According

to the Theory of Financial Distress, firms experience financial distress when they face difficulties in meeting their financial obligations, such as debt repayments or contractual commitments. This distress can arise due to a range of factors, including inadequate cash flow, high levels of debt, declining sales, economic downturns, and industry-specific challenges

In the study, the Theory of Financial Distress provides a conceptual framework for understanding the phenomenon of business failure in healthcare firms. It helps identify the key drivers and risk factors that may contribute to financial distress in this specific industry, such as cash flow management issues, debt burden, regulatory challenges, and market dynamics. The theory also emphasizes the importance of early detection and prediction of financial distress to enable proactive measures and interventions.

By integrating the Agency Theory and the Theory of Financial Distress, a deeper understanding of the interplay between agency conflicts, managerial decisions, and financial distress in healthcare firms can be achieved. The Agency Theory provides insights into the motivations and actions of key stakeholders, while the Theory of Financial Distress illuminates the broader context of business failure. This combined theoretical framework facilitates an examination of how cash flow ratios can serve as predictors of financial distress, considering the agency relationships within the firm and the external factors that contribute to financial vulnerability.

Empirical Review
Operating Cash Flow Ratio and Altman Zeta Score Model
Ibraheem, Saleem, and Hussain (2020) examined the effects of operating cash flow, profitability, financial leverage, trading activities, and liquidity on financial distress in the banking industry of ASEAN countries. The study used data from the central banks of ASEAN countries for the period 2009-2018. The results of generalized method of moment (GMM) revealed that all the predictors (operating cash flow, profitability, financial leverage, trading activities, and liquidity) were positively associated with financial distress in the banking industry of ASEAN countries.

Meryana and Setiany (2021) tested the effects of investments, free cash flow, earnings management, and interest coverage ratio on the risk of financial distress in healthy enterprises. The study collected data from 33 healthy companies and used the Altman Z-score method to measure financial difficulties. The results of the regression analysis indicated that free cash flows had a significant effect on the financial difficulties of healthy companies.

Phan, Hoang, and Tran (2022) evaluated the influence of cash flow on the financial distress of private listed enterprises on the Vietnamese stock market from 2010 to 2020. The study analyzed data from 263 private non-financial enterprises listed on the Ho Chi Minh and Hanoi stock exchanges. Using the quantile regression method, the study found that cash flow from operating activities and cash flow from financial activities had negative relationships with financial distress, while cash flow from investing activities had a positive relationship.

Suryani and Mariani (2022) aimed to analyze the effect of profitability, leverage, liquidity, activity, and cash flow ratio on financial distress. The study focused on the property and real estate service sector and used a purposive sampling technique. The sample consisted of 180 samples from 45

companies, and multiple linear regression analysis was used for data analysis. The results showed that cash flow ratio had no effect on financial distress.

Agustina and Nariman (2022) examined the role of financial ratios such as profitability, leverage, liquidity, cash flow ratio, and corporate governance on financial distress in the manufacturing industry listed on the Indonesia Stock Exchange from 2017 to 2019. The sample was selected using purposive sampling, and logistic regression analysis with the assistance of Eviews 11 was used for data processing. The results showed cash flow ratio had a significant effect.

Purwaningsih and Safitri (2022) aimed to identify the factors that influence financial distress conditions in retail trading sub-sector companies listed on the Indonesia Stock Exchange from 2015 to 2019. The study used a causal comparative research design and selected a sample of 10 companies using purposive sampling. Multiple regression analysis was used to test the hypotheses. The results showed that cash flow ratio had a negative effect, and firm size had no effect on financial distress.Sembiring (2022) examined the effect of corporate governance mechanisms and operating cash flows on financial distress. The study used data from manufacturing companies with negative EBIT values for two years from 2017-2019. Using partial least squares structural equation modeling, the research findings indicated operating cash flow had a negative and significant effect on financial distress.

Mahendra and Mahendra (2023) analyzed the impact of operating cash flow and book value on financial distress in state-owned companies listed on the IDX from 2009-2019. Using multiple regression technique, the study concluded that operating cash flow had a significant impact on financial distress.

Suranta, Satrio, and Midiastuty (2023) examined the effects of investment, free cash flow, earnings management, interest coverage ratio, liquidity, and leverage on financial distress of manufacturing companies listed on the Indonesia Stock Exchange from 2016 to 2020. The study used the Altman Z-score as the measure of financial distress. The results of the ordinal logistic regression analysis showed that free cash flow had a significant effect on financial distress.

Ramadani and Ratmono (2023) tested financial ratios in predicting financial distress moderated by firm size using a sample of 128 manufacturing companies listed on the Indonesia Stock Exchange from 2018 to 2020. The study employed the Structural Equation Model based on Partial Least Square (SEM-PLS) analysis with SmartPLS 3.0. The results indicated that operating cash flow had the opposite effect.

Gap in Empirical Review
The empirical review reveals a lack of specific studies that directly analyze the effectiveness of cash flow ratios as predictors of business failure in healthcare firms in Nigeria. While there exist studies examining the influence of financial ratios on financial distress across different industries and countries, the literature gap remains when focusing on the Nigerian healthcare sector. Furthermore, the reviewed studies have limited period coverage, ending in 2020, leaving a knowledge gap for more recent data.

To address these gaps, it is crucial to conduct a study specifically examining the relationship between cash flow ratios and business failure in healthcare firms operating in Nigeria. This study would provide valuable contributions to the existing literature by shedding light on the unique dynamics and challenges faced by healthcare companies within the Nigerian context. Moreover, by extending the period of analysis to 2022, this study would offer the most up-to-date insights compared to the reviewed studies, ensuring a comprehensive understanding of how cash flow ratios can effectively predict business failure in this particular industry.

METHODOLOGY

Research Design
The study utilized an ex-post facto research design, examining historical data to validate results. To ensure the reliability and accuracy of the findings, financial data were sourced from the annual reports and accounts of selected healthcare firms operating in Nigeria. The research focused specifically on the healthcare sector within the Nigerian economy, utilizing secondary data from published audited financial statements of seven healthcare firms listed on the Nigeria Exchange Group (NGX). The data covered a 10-year period, spanning from 2013 to 2022. The population of the study comprised the initially identified seven healthcare firms listed on the NGX, with the sample size determination excluding Ekocorp Plc due to its inability to provide complete data. The final sample included Glaxo Smithkline Nigeria Plc, Fidson Healthcare Plc, May and Baker Nigeria Plc, Pharma-Deko Nigeria Plc, Neimeth International Healthcares Plc, and Morison Industries Plc, chosen for their ability to provide comprehensive and verifiable data for the entire study period.

Model Specification
In line with Inyiama and Ezeugwu (2016), the regression model was adopted as follows:

$$\text{Z-SCORE}_t = \beta_o + \beta_1 \text{OCFR}_t + \beta_2 \text{Log CFDR}_t + \beta_3 \text{PCFR}_t + \mathcal{E}_t \quad - \quad [\text{Equation (1)}]$$

Where,

Z-SCORE	Altman's Zeta Score
OCFR	Operating Cash Flow
CFDR	Cash Flow to Debt Ratio
PCFR	Price to Cash Flow Ratio
$\mathcal{E}$	Stochastic Disturbance (Error) Term
β_o	Coefficient (constant) to be estimated
$\beta_i - \beta_3$	Parameters of the independent variables to be estimated
t	Current period

Description of Variables
The variables used in the study were categorized into dependent and independent variables for data analysis. The dependent variable in this study is the Altman's Zeta Score, which represents the value of the company's stock in the market. On the other hand, the independent variables include operating cash flow ratio, cash flow to debt ratio, and price to cash flow ratio.

Altman's Zeta Score: Z-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

Here's a general interpretation guide for the Altman Z-Score:

i. Z-Score value above 3.0: A Z-Score above 3.0 indicates a low risk of bankruptcy. It suggests that the company is financially stable and has a healthy financial position.

ii. Z-Score value between 2.7 and 3.0: A Z-Score in this range suggests a moderate risk of bankruptcy. It indicates a company that may be facing some financial challenges, but not necessarily on the brink of bankruptcy.

iii. Z-Score value between 1.8 and 2.7: A Z-Score in this range implies a higher risk of bankruptcy. It indicates a company that may be facing significant business failure and should be closely monitored.

Z-Score value below 1.8: A Z-Score below 1.8 signifies a high risk of bankruptcy. It suggests that the company is in severe business failure and may be at risk of defaulting on its financial obligations.

Operating Cash Flow Ratio = Operating Cash Flow / Current Liabilities
Cash Flow to Debt Ratio = Operating Cash Flow / Total Debt
Price to Cash Flow Ratio = Market Price per Share / Cash Flow per Share
Cash Flow per Share: This is calculated by dividing the company's cash flow from operations by the total number of outstanding shares.

DATA PRESENTATION AND ANALYSIS

Data Presentation
The data for the study are contained in appendix A

Panel Data Analysis

Table 4.2.1: Descriptive Statistic for the Variables Under Study

	Z-SCORE	OCFR	CFDR	PCFR
Skewness	0.197760	-2.556376	7.544829	6.304364
Kurtosis	3.069782	11.95312	57.95631	48.40905
Jarque-Bera	3.252175	265.7466	8119.734	5552.405
Probability	0.196698	0.000000	0.000000	0.000000
Observations	60	60	60	60

Source: Author's Computation from Eviews 10.0 Statistical Software

Table 4.2.1 provides a comprehensive overview of the panel data, which includes 60 observations for the selected healthcare firms. The coefficients of Skewness, Kurtosis, and Jarque-Bera Probability offer insights into the normality of the distribution of the data series.

A close examination of Table 4.2.1 reveals that the Jarque-Bera Probability values indicate a non-normal distribution for the operating cash flow ratio (0.000000), cash flow to debt ratio (0.000000),

and price to cash flow ratio (0.000000). These probabilities are all below 5%, suggesting significant deviations from normality. However, the distribution of the zeta score (0.196698) appears to be normal, as its JB probability is greater than 0.05.

The skewness coefficients further support the non-normal distribution of the operating cash flow ratio (-2.556376), cash flow to debt ratio (7.544829), and price to cash flow ratio (6.304364). In contrast, the skewness coefficient for the zeta score is 0.197760, indicating a normal distribution. Furthermore, the kurtosis coefficients for the operating cash flow ratio (11.95312), cash flow to debt ratio (57.95631), and price to cash flow ratio (48.40905) suggest a non-normal distribution, as they exceed the range of 3. However, the kurtosis coefficient for the zeta score is 3.069782, indicating a normal distribution.

In summary, the findings presented in Table 4.2.1 indicate that the operating cash flow ratio, cash flow to debt ratio, and price to cash flow ratio exhibit a non-normal distribution, while the zeta score demonstrates a normal distribution. These results provide valuable insights into the statistical properties of the variables under investigation.

Table 4.2.2: Multiple Regression Result (Dependent Variable: Z-SCORE)

Variable	Coefficient	Standard Error	t-Stat	p-Value
OCFR	-0.505347	0.524307	-0.963838	0.3397
CFDR	-0.001110	0.001046	-1.060930	0.2937
PCFR	0.000134	0.000210	0.635271	0.5281
C	1.483671	0.111406	13.31767	0.0000
R^2 = 0.605, Adjusted R^2 = 0.543, F-Stat = 9.760311, Prob(F-stat) = 0.000000, D.W. Stat. = 2.26				

Source: Author's Computation, 2023 (Eviews 10.0 Statistical Software)

Operating Cash Flow Ratio: The value of the t-statistics (-0.963838 < 2) and the probability of the t-Statistic (0.3397 > 0.05) shows that operating cash flow ratio has a statistically non-significant effect on z-score of healthcare firms in Nigeria.

Cash Flow to Debt Ratio: The value of the t-statistics (-1.060930 < 2) and the probability of the t-Statistic (0.2937 > 0.05) shows that cash flow to debt ratio has a statistically non-significant effect on z-score of healthcare firms in Nigeria.

Price to Cash Flow Ratio: The value of the t-statistics (0.635271 < 2) and the probability of the t-Statistic (0.5281 > 0.05) shows that price to cash flow ratio has a statistically non-significant effect on z-score of healthcare firms in Nigeria.

Statistical Criteria (First Order Tests)
The Adjusted R2 value of 0.543 indicates that approximately 54% of the variations in z-score of healthcare firms in Nigerian can be explained by the independent variables considered in the model. The remaining 36.7% can be attributed to other factors that influence z-score within the industry, as well as factors captured within the error term.

The significance of the model as a whole is evaluated using the f-statistic. In this case, the p-value (0.000000) is less than the 5% critical value, indicating that the model is statistically significant and well-fitted. This implies that the independent variables collectively have a substantial effect on the business failure in the ICT industry.

The Durbin Watson Statistic, with a value of 2.26, provides insights into the presence of autocorrelation within the time series data. A value of 2.26 suggests that there is absence of positive autocorrelation, indicating that the observations in the data are not significantly correlated with each other over time.

Test of Hypotheses
The hypotheses were tested using the following decision rule:

Statement of Decision Criteria
According to Gujarati and Porter (2009), the decision rule for hypothesis testing involves considering multiple criteria. In order to accept the alternate hypothesis (H1), the following conditions need to be satisfied:

  i. The sign of the coefficient should be either positive or negative, indicating a clear direction of the relationship between the variables.
  ii. The p-value associated with the t-statistic should be less than 0.05. A p-value below 0.05 indicates that the observed results are statistically significant and unlikely to occur by chance.

If any of these conditions are not met, the null hypothesis (H0) is accepted, and the alternate hypothesis (H1) is rejected. These criteria provide a framework for evaluating the statistical significance of the coefficients and determining the validity of the alternative hypothesis in hypothesis testing.

Hypothesis One

Step 1: Restatement of the Hypothesis in Null and Alternate Forms
H_0: Operating cash flow ratio has a non-significant effect on Altman z-score of healthcare firms in Nigeria.
H_1: Operating cash flow ratio has a significant effect on Altman z-score of healthcare firms in Nigeria.

Step 2: Presentation of Test Results
Table 4.2.2: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision
From the regression analysis result in Table 4.2.2, the p-value for operating cash flow ratio is 0.3397 which is greater than the alpha value of 0.05. It falls in the acceptance region, hence, we accept the first null hypothesis (H_0). The conclusion here is that operating cash flow ratio has a statistically non-significant negative effect on Altman z-score of healthcare firms in Nigeria.

Hypothesis Two
Step 1: Restatement of the Hypothesis in Null and Alternate Forms

H_0: Cash flow to debt ratio has a non-significant effect on Altman z-score of healthcare firms in Nigeria.

H_1: Cash flow to debt ratio has a significant effect on Altman z-score of healthcare firms in Nigeria.

Step 2: Presentation of Test Results

Table 4.2.2: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision

From the regression analysis result in Table 4.2.2, the p-value for cash flow to debt ratio is 0.2937 which is greater than the alpha value of 0.05. It falls in the acceptance region, hence, we accept the first null hypothesis (H_0). The conclusion here is that cash flow to debt ratio has a statistically non-significant negative effect on Altman z-score of healthcare firms in Nigeria.

Hypothesis Three

Step 1: Restatement of the Hypothesis in Null and Alternate Forms

H_0: Price to cash flow ratio has a non-significant effect on Altman z-score of healthcare firms in Nigeria.

H_1: Price to cash flow ratio has a significant effect on Altman z-score of healthcare firms in Nigeria.

Step 2: Presentation of Test Results

Table 4.2.2: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision

From the regression analysis result in Table 4.2.2, the p-value for price to cash flow ratio is 0.5281 which is greater than the alpha value of 0.05. It falls in the acceptance region, hence, we accept the first null hypothesis (H_0). The conclusion here is that price to cash flow ratio has a statistically non-significant positive effect on Altman z-score of healthcare firms in Nigeria.

DISCUSSION OF FINDINGS

Effect of Operating Cash Flow Ratio on Altman z-score

The test of hypothesis one revealed that the operating cash flow ratio has a statistically nonsignificant negative effect on Altman z-score of healthcare firms in Nigeria. The table also depicts that a unit increase in the operating cash flow ratio results in a 0.51% decrease in Altman z-score of Healthcare firms in Nigeria. The non-significant negative effect of operating cash flow ratio on Altman z-score in Nigeria contradicts the *a priori* expectation of the researcher. However, the result is not scary because the financial dynamics of the healthcare industry in Nigeria could contribute to the observed result. Factors such as regulatory requirements, market competition, pricing pressures, or R&D investments may outweigh the influence of the operating cash flow ratio on the Altman Z-score. Also, a negative effect would suggest that a lower operating cash flow relative to other variables does not significantly affect the Altman Z-score. This may indicate that, in the context of healthcare firms in Nigeria, other factors or financial indicators have a stronger influence on the Altman Z-score than the operating cash flow ratio. The finding aligns with the findings of Suryani and Mariani (2022) and Purwaningsih and Safitri (2022). They found a non-significant or negative relationship between cash flow ratio and business failure.

Effect of Cash Flow to Debt Ratio on Altman z-score

The test of hypothesis two revealed that the cash flow to debt ratio has a statistically non-significant negative effect on Altman z-score of healthcare firms in Nigeria. The table also depicts that a unit

increase in the cash flow to debt ratio results in a 0.001% decrease in Altman z-score of healthcare firms in Nigeria. The non-significant negative effect of cash flow to debt ratio on Altman z-score in Nigeria contradicts the *a priori* expectation of the researcher. However, the result is not scary because the level of debt and its relationship with cash flow may not be a crucial determinant of the bankruptcy risk as measured by the Altman Z-score in this specific context. The specific characteristics of the healthcare industry in Nigeria may contribute to the observed result. Factors such as regulatory environments, pricing dynamics, government policies, or market competition can influence the financial performance and risk profile of healthcare firms. These industry-specific factors may interact with the cash flow to debt ratio and alter its impact on the Altman Z-score. The finding aligns with the findings of Suryani and Mariani (2022) and Purwaningsih and Safitri (2022). They found a non-significant or negative relationship between cash flow ratio and business failure.

Effect of Price to Cash Flow Ratio on Altman z-score
The test of hypothesis three revealed that the price to cash flow ratio has a statistically non-significant positive effect on Altman z-score of healthcare firms in Nigeria. The table also depicts that a unit increase in the price to cash flow ratio results in a 0.0001% increase in Altman z-score of healthcare firms in Nigeria. Similarly, Suryani and Mariani (2022) found a non-significant relationship between cash flow ratio and business failure. The non-significant positive effect of price to cash flow ratio on Altman z-score in Nigeria aligns with the *a priori* expectation of the researcher. A non-significant positive effect suggests that fluctuations in the price to cash flow ratio do not significantly influence the financial stability and bankruptcy risk of healthcare firms in Nigeria. It implies that market sentiment, as represented by the price to cash flow ratio, may not strongly influence the perceived bankruptcy risk of healthcare firms in Nigeria. Other financial and non-financial factors, such as profitability, debt levels, operational efficiency, and regulatory compliance, may have a more substantial impact on investors' perception of bankruptcy risk in this industry. Also, the healthcare industry in Nigeria is subject to unique dynamics and challenges, including regulatory requirements, market competition, pricing pressures, and research and development investments. These industry-specific factors may outweigh the influence of the price to cash flow ratio on the Altman Z-score.

CONCLUSION AND RECOMMENDATIONS

Conclusion
This study examined the effectiveness of cash flow ratios as predictors of business failure in healthcare firms in Nigeria. The results regarding the operating cash flow ratio indicated that variations in this ratio did not significantly impact the bankruptcy risk of healthcare firms. Similarly, the cash flow to debt ratio was found to have a statistically non-significant effect on the Altman Z-score. This suggests that the level of debt and its relationship with cash flow may not be a crucial determinant of bankruptcy risk in this specific context. Regarding the price to cash flow ratio, the results indicated a statistically non-significant positive effect on the Altman Z-score. Fluctuations in this ratio did not significantly influence the financial stability and bankruptcy risk of healthcare firms in Nigeria. Other financial and non-financial factors, such as profitability, debt levels, operational efficiency, and regulatory compliance, may have a more substantial impact on investors' perception of bankruptcy risk in this industry. The unique dynamics of the healthcare industry, including regulatory requirements and market competition, may outweigh the influence of the price to cash flow ratio on the Altman Z-score. The policy implications of these findings suggest that when

assessing the financial health and bankruptcy risk of healthcare firms in Nigeria, policymakers and regulators should consider factors beyond cash flow ratios.

Recommendations
The study made the following recommendations:

i. Given the non-significant negative effect of the operating cash flow ratio on the Altman Z-score, it is recommended that healthcare firms in Nigeria focus on diversifying their sources of cash flow. Relying solely on operating cash flow may not be sufficient to assess financial health and mitigate bankruptcy risk. Firms should explore alternative means of generating cash flow, such as improving profitability, optimizing working capital management, and seeking external financing options. This diversification can enhance financial stability and reduce vulnerability to potential business failure.

ii. Considering the non-significant negative effect of the cash flow to debt ratio on the Altman Z-score, healthcare firms should carefully evaluate their debt management practices. While debt can be an important source of financing, excessive reliance on debt may increase bankruptcy risk. Firms should focus on maintaining a healthy balance between cash flow generation and debt obligations. This can be achieved by closely monitoring debt levels, optimizing debt repayment schedules, and exploring opportunities to refinance or restructure debt. A balanced approach to debt management can help enhance financial stability and mitigate bankruptcy risk.

iii. With the non-significant positive effect of the price to cash flow ratio on the Altman Z-score, healthcare firms should not solely rely on market sentiment reflected in the price to cash flow ratio as an indicator of financial stability. Instead, firms should prioritize fundamental financial and operational indicators, such as profitability, efficiency, and compliance, in assessing their financial health. This includes implementing effective financial management practices, improving operational efficiency, diversifying revenue streams, and ensuring compliance with regulatory requirements. By focusing on these fundamental aspects, firms can enhance their long-term financial viability and reduce the impact of market sentiment on perceived bankruptcy risk.

Overall, the recommendations aim to promote a comprehensive and balanced approach to financial management, risk assessment, and decision-making in healthcare firms in Nigeria. By considering multiple factors and diversifying strategies, firms can enhance their ability to withstand financial challenges, mitigate bankruptcy risk, and ensure sustainable growth within the healthcare industry.

Contribution to Knowledge
This study significantly contributes to the existing knowledge by bridging the research gap and analyzing the effectiveness of cash flow ratios as predictors of business failure, particularly in healthcare firms in Nigeria. While prior studies have explored the influence of financial ratios on business failure in diverse industries and countries, a specific focus on the Nigerian healthcare sector has been lacking. By conducting this study within the Nigerian context, the unique dynamics and challenges faced by healthcare companies in Nigeria are brought to light, thereby enhancing our comprehensive understanding.

Furthermore, this study surpasses the limitations of previous research by extending the period of analysis up to 2022, providing the most recent insights compared to studies that had limited coverage ending in 2020. The incorporation of up-to-date data enables a more accurate and current understanding of how cash flow ratios can effectively predict business failure in the Nigerian healthcare industry.

The empirical findings of this study yield valuable insights that enhance the existing literature. Specifically, the study reveals statistically non-significant negative effects of both the operating cash flow ratio and the cash flow to debt ratio on the Altman Z-score of healthcare firms in Nigeria. Additionally, a statistically non-significant positive effect of the price to cash flow ratio on the Altman Z-score is observed. These findings contribute to our understanding of the specific relationships between these cash flow ratios and the Altman Z-score within the Nigerian healthcare context.

REFERENCES

Agustina, C., & Nariman, A. (2022). Analysis of financial ratios and corporate governance in predicting financial distress. *Paradigma Akuntansi Journal, 4(3),* 69-80. https://doi.org/10.24912/jpa.v4i3.19823

Al-Sulaiti, K. I., & Almwajeh, S. M. (2007). Testing Altman's bankruptcy prediction model: Evidence from Saudi Arabia. *Journal of Economic and Administrative Sciences, 23(1),* 1-18.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance, 23(4),* 589-609.

Altman, E. I. (1968). Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy. *The Journal of Finance, 23(4),* 589-609.

Altman, E. I. (2006). Corporate financial distress and bankruptcy: Predict and avoid bankruptcy, analyze and invest in distressed debt. *Wiley Finance*.

Amran, A., Ahmad, N. H., & Zainuddin, Y. H. (2017). The impact of cash flow ratios on predicting financial distress condition in Malaysia. *Journal of Business and Retail Management Research, 11(1),* 82-90.

Brigham, E. F., & Houston, J. F. (2019). *Fundamentals of financial management.* Cengage Learning.

Chan, Y. C., & Chen, A. S. (1991). Financial distress and corporate acquisitions: Further empirical evidence. *Journal of Financial Economics, 29(2),* 323-344.

Gibson, C. H. (2019). *Financial reporting & analysis.* Cengage Learning.

Gibson, C. H. (2019). *Financial reporting and analysis: Using financial accounting information.* Cengage Learning.

Hayes, R. (2022). *Financial analysis and valuation: A practical guide.* Wiley.

Hayes, R., Bose, S., & Kumar, V. (2010). The impact of recessionary times on corporate bankruptcy prediction models. *Managerial Finance, 36(12),* 1032-1049.

Ibraheem, R., Saleem, R., & Hussain, A. (2020). Impact of operating cash flow, profitability, financial leverage, trading activities and liquidity on financial distress of banking industry of ASEAN countries. *iRASD Journal of Economics*, *2(2),* 113-123. DOI:10.52131/joe.2020.0202.0020

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3(4),* 305-360.

Kazemian, S., Kazemian, M., & Abdar, Y. (2017). Prediction of financial distress using a hybrid method based on support vector machines and genetic algorithm. *Journal of Computational Science, 20,* 225-234.

Mahendra, R.I., & Mahendra, P. (2023). The effect of operating cash flow and book value on financial distress. Journal of Economy, Accounting and Management Science (JEAMS)., 4(2), 105-115. DOI:10.55173/jeams.v4i2.39

Meryana, & Setiany, E. (2021). The effect of investment, free cash flow, earnings management, and interest coverage ratio on financial distress. *Journal of Social Sciences, 2,* 67-73.

Moyer, C. R. (2005). Altman's bankruptcy z-score: A 30-year update. *The Journal of Business Finance & Accounting, 32(1-2),* 55-82.

Pereira, A., & Vanalle, R. M. (2016). Cash flow, accrual, and hybrid anomalies. *Revista Contabilidade & Finanças, 27(70),* 134-151.

Phan, T. D., Hoang, T. T., & Tran, N. M. (2022). Cash flow and financial distress of private listed enterprises on the Vietnam stock market: A quantile regression approach. Cogent Business & Management, 9. DOI: 10.1080/23311975.2022.2121237

Purwaningsih, E., & Safitri, I. (2022). The influence of profitability, liquidity, leverage, cash flow ratios, and company size on financial distress. *Journal of Accounting and Economics, 7(2),* 147-156. https://doi.org/10.29407/jae.v7i2.17707

Rahmawati, I.Y., Pandansari, T., & Khasanah, F.L. (2020). Liquidity ratio analysis, profitability ratio, leverage ratio, and cash flow operations to predict the financial distress in manufacturing companies listed in Indonesia stock exchange (2015-2018). *Proceedings of the 2nd International Conference of Business, Accounting and Economics, ICBAE 2020, 5 - 6 August 2020, Purwokerto, Indonesia.* DOI:10.4108/eai.5-8-2020.2301126

Ramadani, A.W., & Ratmono, D. (2023). Financial distress prediction: The role of financial ratio and firm size. *Journal of Contemporary Accounting Research, 15(1),* 19-27. DOI: https://doi.org/10.23969/jrak.v15i1.6428

Ray, A. (2011). Financial distress and corporate restructuring: A study of Indian Corporate sector. *Paradigm, 15(2),* 155-164.

Sembiring, E.E. (2022). Effect of corporate governance mechanism and operating cash flow on financial distress. *Journal of Business and Accounting, 24(2),* 205-214. DOI:10.34208/jba.v24i2.1133.

Setyawati, I., & Amelia, R. (2018). The role of current ratio, operating cash flow and inflation rate in predicting financial distress: Indonesia stock exchange. Journal of Management Dynamics

Suranta, E., Satrio, M.A., & Midiastuty, P.P. (2023). Effect of investment, free cash flow, earnings management, interest coverage ratio, liquidity, and leverage on financial distress. *Ilomata International Journal of Tax and Accounting, 4(2),* 283-295. DOI:10.52728/ijtc.v4i2.714

Suryani, S.M., & Mariani, D. (2022). Predicting financial distress through internal factors in property and real estate service companies. *Journal of Accounting Research and Unity*, 8(13), 344-361.

Wesa, J. O., & Otinga, F. N. (2018). Financial distress and firm value: A study of companies quoted on the Nairobi securities exchange. *European Journal of Business and Management, 10(3),* 11-20.