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Effects of Liquidity, Leverage, and Profitability on Financial Distress among Industrial Goods Firms in Nigeria

Efectos de la liquidez, el apalancamiento y la rentabilidad sobre la dificultad financiera en las empresas de bienes industriales en Nigeria

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ABSTRACT

Introduction: there are limited empirical studies that can be found on liquidity, leverage and profitability as indicators of financial distress in the industrial goods sector of Nigeria.
Objective: this study examines the determinants of financial distress among industrial goods firms listed on the Nigerian Exchange Group using liquidities, leverage and profitability.
Method: the study employed a fixed effect panel regression model using panel data of 11 purposively selected firms in a ten year period (2015- 2024) with Altman Z score as a proxy for financial distress.
Results: the findings indicated a negative, but statistically insignificant, effect of liquidity on financial distress suggesting that short term solvency does not fully predict financial distress in the sector. It was found that debt leverage had a considerable negative effect, meaning that managed debt can decrease the chances of financial distress. On profitability, return on equity was also highly correlated with an inverse relationship with financial distress. The model of financial distress proved very robust since the explained percentage of the variation in financial distress was 72,3 %.
Conclusions: it concludes that firm managers should give more importance to the strategies that yield profitability like cost control, revenue maximization, and optimum use of capital by maintaining the optimum debt structure so as to reduce the risk of financial solvency.

Keywords: Financial Distress; Altman Z-Score; Liquidity; Leverage; Return on Equity.

RESUMEN

Introducción: existen estudios empíricos limitados sobre la liquidez, el apalancamiento y la rentabilidad como indicadores de dificultad financiera en el sector de bienes industriales de Nigeria.
Objetivo: este estudio examina los determinantes de la dificultad financiera entre las empresas de bienes industriales que cotizan en el Nigerian Exchange Group, utilizando indicadores como la liquidez, el apalancamiento y la rentabilidad.
Método: se empleó un modelo de regresión de efectos fijos con datos de panel de 11 empresas seleccionadas intencionalmente durante un período de diez años (2015-2024), utilizando el puntaje Z de Altman como indicador de dificultad financiera.
Resultados: los resultados indicaron un efecto negativo, aunque estadísticamente no significativo, de la liquidez sobre la dificultad financiera, lo que sugiere que la solvencia a corto plazo no predice completamente la dificultad financiera en el sector. Se encontró que el apalancamiento de deuda tenía un efecto negativo

considerable, lo que significa que una deuda gestionada puede disminuir las probabilidades de dificultad financiera. En cuanto a la rentabilidad, el rendimiento sobre el patrimonio mostró una alta correlación inversa con la dificultad financiera. El modelo de dificultad financiera resultó ser muy sólido, ya que explicó el 72,3 % de la variación en la dificultad financiera.
Conclusiones: se concluye que los directivos deben dar mayor importancia a las estrategias que aumentan la rentabilidad, como el control de costos, la maximización de ingresos y el uso óptimo del capital, manteniendo una estructura de deuda adecuada para reducir el riesgo de insolvencia financiera.

Palabras clave: Dificultad Financiera; Puntaje Z de Altman; Liquidez; Apalancamiento; Rendimiento sobre el Patrimonio.

INTRODUCTION

Corporate finance places great importance on financial distress, especially when it comes to the industrial goods sector in emerging countries such as Nigeria. If a firm cannot pay its debts when they are due, it is in financial distress, which is often signal that they will go bankrupt soon.[1] Since more industrial sector corporations are failing recently, it has become more important to identify what leads to financial distress in firms. In Nigeria, the industrial goods sector is vital for improving the economy by creating jobs, gathering capital, and developing infrastructure. On the other hand, many companies in this industry have posted low financial results, written down their assets, faced credit downgrades, and been shut down for some. Because of these developments, we must closely examine the financial issues within the firm that could be responsible for facing financial distress.

Liquidity, leverage, and profitability have always been recognized as main indicators of risk in assessing financial health. The company's survival largely depends on its ability to cover short-term bills. If a business lacks liquidity, it may find it challenging to cover its expenses to workers, suppliers, and creditors, which can stop its operations and weaken the public's confidence. Results from these studies have varied. This means that for Indonesian food and beverage companies, higher liquidity reduces the risk of financial distress, whereas for real estate companies there was no significant impact from liquidity.[2]

Leverage can be seen through the debt-to-asset ratio, and it plays a vital part as well. High debt may boost returns in good years, although it also expands the company's regular expenses and increases the risk of going bankrupt if there is a drop in its revenues. It is well-documented that financial distress usually starts with leveraging the business.[1,3,4] In particular,[5] discovered that levels of financial leverage strongly affected the stress levels of consumer goods firms in Nigeria.[2], pointed out that debt loaned and managed responsibly by manufacturing firms in Nigeria actually helped them avoid financial difficulties.

One of the main signs for assessing and anticipating problems with a company is the lack of profitability, often seen by measuring the return on equity (ROE). If a firm is profitable, it can pay shareholder dividends and handle all its obligations, which cut the chances of distress. A firm's profitability indicators such as Net Profit Margin and Earnings per Share raised its company value and reduced signs of distress.[6] Similarly, [7] discovered that higher profits positively influence the worth of a firm and play an important role in preventing financial stress for non-financial companies in Nigeria. Instead, the authors of the cited paper explained that profitability alone does not prevent firms from experiencing financial problems, especially if it does not result in effective use of resources and management of finances.

There are scanty studies on liquidity, leverage, and profitability as indicators of financial distress in the industrial goods sector of Nigeria. This industry is different due to how much capital it requires, how much it is governed, and the importance of importing raw materials, which may affect the usual market patterns. Besides, the different outcomes in studies show that these financial indicators might act differently depending on the characteristics of the sector and macroeconomic conditions present in Nigeria, such as inflation, exchange rates, and interest rate instability.

In the recent past, many companies involved in industrial goods in Nigeria have struggled with losses, borrowed more money, and faced liquidity issues. Though some previous studies emphasized the effect of firm-related variables on financial distress in several industries, little research has looked at the exact role of liquidity, leverage, and profitability in causing financial distress among industrial goods firms in Nigeria. As the industry is very important for national growth and research has given conflicting results (for instance, from [1,2,3] this study explores the potential ways these aspects are related. Consequently, this study will try to discover if liquidity, leverage, and profitability relate to industrial goods firms becoming financially distressed, as this information is extant for Nigeria. The study results will assist both financial theory and also help policy makers, managers, and investors in handling distress risks and strengthening the resilience of companies. Arising from

the above, the general objective of the study was to examine the determinants of financial distress among industrial goods firms listed on the Nigerian Exchange Group using liquidities, leverage and profitability.

Hypotheses of the Study

The following null hypotheses were formulated for this study:

- $H0_1$: there is no significant effect of liquidity on financial distress in industrial goods firms listed on the Nigerian Exchange Group.
- $H0_2$: there is no significant effect of leverage (debt to asset ratio) on financial distress in industrial goods firms listed on the Nigerian Exchange Group.
- $H0_3$: there is no significant effect of profitability (return on equity) on financial distress in industrial goods firms listed on the Nigerian Exchange Group.

Financial Distress

A company faces financial distress when poor cash flows, a lot of debt, and repeated losses make it impossible to fulfill its financial commitments. If the issue is not tackled quickly, it may cause business failure and bankruptcy.[8] There is a range from slight financial trouble to severe bankruptcy in cases of financial distress.[9] In Nigeria, there have been many cases of financial challenges in the manufacturing sector because of issues such as unstable macroeconomics and weak management systems.[10]

Altman Z-Score as a Proxy for Financial Distress

The Altman Z-score is a popular tool used to determine the chances of a company from going bankrupt. It uses financial ratios to check the firm's financial condition and sort it into one of the following categories: safe, grey, or distress.[11] A number of Nigerian and global studies have established the Z-score's effectiveness in predicting financial distress of companies.[8,12]

As an example [12] used the Z-score to analyze retail companies in the COVID-19 period and was able to notice changes in their finances. Likewise [11] made use of the Z-score to analyse firms according to their various lifecycle stages.

Liquidity

Liquidity refers to the extent to which a firm can meet its short term obligations using the most liquid assets. Like other such ratios, the current ratio and quick ratio are used to measure it. Generally speaking, high liquidity is viewed as a form of financial distress buffer. Empirical findings on the relationship of liquidity and financial distress are mixed however.[2] uncovered that the liquidity had a positive but insignificant influence on the financial distress of Nigerian manufacturing firms, which suggests that being too liquid may not avert distress.

More related to liquidity [3] observed a positive and significant relationship between liquidity and financial distress, which means that firms possessing current assets that are more than what the liabilities can pay off may still face some operational inefficiency. Further [1] also confirmed a significant effect of liquidity on financial distress and noted that liquidity is a key factor for reducing solvency of firm in economic downturn.

Leverage

Leverage, which often is measured by the debt-to-assets or debt-to-equity ratio, is the degree to which a firm is financed through debt. A high level of leverage places the burden of fixed interest payments under the firm, which contributes to financial distress. All this is supported by the empirical evidence. As observed by [2], financial leverage had significant and negative effect on financial distress; hence, higher leverage increased the chances of corporate distress.

Similarly, by using the methodology developed by [1,2] they both found that leverage has a significantly positive effect on financial distress. On the contrary [10] revealed that leverage had a positive although insignificant effect on the firm value implying that moderate leverage could even be good if well managed. Further findings by [4] reaffirm the fact that leverage tremendously raises the probability of financial distress, particularly in industries whose assets are highly specific.

Profitability

A firm's financial health and resilience is dependent largely on profitability. Return on equity (ROE), net profit margin and earnings per share (EPS) are the common parameters used. There exists a strong and inverse relationship between profitability and financial distress: several studies have helped to verify this. In the Nigerian firms, [2] found the profitability to have a positive and significant relationship with financial stability.

According to [5], profitability had a huge impact in reducing financial distress in consumer goods firms. Such findings were further supported by [5] in that they showed that net profit margin and earnings per share had

positive effects on firm value.[7] found that profitability significantly influenced financial distress and firm value. But, different from the views of [13] found that return on equity significantly and negatively affect financial distress, thus supporting the role of profitability in impacting on financial distress.

Theoretical Framework

Theoretical framework provides the conceptual basis for understanding the interrelations among liquidity, leverage, profitability, and financial distress in industrial goods firms. Theoretical framework relies on financial theories describing firm financing decisions and performance outcomes, particularly under distress. A firm's financial health is generally measured by its capability to pay short-term and long-term obligations (liquidity and leverage), and to earn returns (profitability). These recommendations are grounded in valid financial theories such as the Trade-off Theory, Pecking Order Theory, and the Resource-Based View (RBV), which offer different yet complementary perspectives.

First, the Trade-off Theory contends that firms attempt to trade off the tax advantage of debt financing against the expense of potential financial distress. From this theory, the capital structure of a firm is determined by a balance between the benefit and cost of debt. As firms employ greater leverage to gain tax shields, they also subject themselves to bankruptcy risks, which lead to financial distress should the optimal trade-off fail to be realized. Empirical studies support this theoretical postulate. For instance [2] indicated that financial leverage had a negative and significant impact on financial distress of Nigerian listed manufacturing firms, and there is a need to manage leverage to avoid financial distress.[1] also demonstrated that leverage had a significant effect on financial distress, which means excessive borrowing can exacerbate the financial health, in line with the trade-off theory prediction.

Second, the Pecking Order Theory says that firms utilize internal financing first, followed by debt, and issue equity only as a last resort due to asymmetric information and cost considerations. When internal funds are not enough, firms in financial distress, break this order, and use extremely high level of debt. In support of this theory, [5] discovered that profitability and working capital has a significant influence on financial distress of Nigerian consumer goods firms with the need for adequate internal finance resources. Similarly, [1] illustrated that low profitability increased financial distress, implying that in the event of insufficient retained earnings, firms are forced to take on debt, thereby heightening distress risk.

Third, the Resource-Based View emphasizes that firms gain and sustain competitive advantage through the strategic use of valuable, rare, inimitable, and non-substitutable (VRIN) resources. Profitability, in this context, can be seen as a reflection of the ability of a firm to use its internal resources in a manner that allows it to cushion itself from external shocks and avoid financial adversity.[6] found that profitability ratios such as Net Profit Margin and Earnings Per Share significantly influenced firm value, a proxy for financial stability, reflecting the applicability of RBV. Further [7] confirmed that profitability had a positive influence on financial distress and firm value, reflecting that the management of internal competencies (including cost management, innovation, and strategic investments) can mitigate distress and enhance performance.

Overall, Trade-off Theory is the primary theoretical basis for this study, with supporting aspects from the Pecking Order Theory and the Resource-Based View. The Trade-off Theory is most directly linked to the primary objective of the study that is to examine the influence of liquidity, leverage, and profitability on financial distress. It completely explains the trade-off that firms face between the benefits of debt (e.g., tax shields) and the financial distress risk associated with it. The Trade-off Theory is especially relevant in the Nigerian industrial products sector, where firms rely on debt financing due to underdeveloped equity markets and unstable profitability. Furthermore, as evidenced by [2,10], leverage is positively correlated with distress levels. The theory also admits the existence of liquidity, as firms have to trade off between holding cash buffers (to avoid insolvency) and investing in profitable projects.

Empirical Studies

Studied how firm characteristics have affected financial distress of 30 listed Nigerian manufacturing firms (2018–2022). With the help of GMM regression, they discovered that profitability had a significant positive impact, whereas leverage had a significant negative impact on financial distress.[2] The impacts were insignificant for liquidity, tangibility, firm size and operating capacity. For short down terms sustainability the study recommended careful management of profitability. The impact that firm specific factors had on the financial distress was considered by [5] on the 15 consumer goods listed firms (2013–2022). Financial distress was significantly related to the profitability, working capital, and firm size and insignificantly to the efficiency, cash flows, and operating capacity. The managers were advised to maximise profitability and working capital efficiency. In 18 Nigerian consumer goods firms (2016–2022),[14] determined the effect of capital structure on firm value. Equity to assets enhanced firm value (Tobin's Q) while debt had no effect. Because it fluctuates and costs a lot, they suggested minimising debt.

As such, [6] examined the effect of profitability on firm value in Nigerian manufacturing firms. Both Net Profit

Margin and Earnings Per Share played a massive role in Net Assets Per Share. According to the study, product quality and return on equity can be improved and profitability optimised along with capital structure so as to bring in greater debt. Using a sample comprising 314 Pakistani companies,[11] discussed the relationship between the financial distress and the firm life cycle. Applying the Altman Z-score, they concluded that firms at the stage of introduction and decline show more distress, thus financial policies should depend on the stage of firm life cycle. In seven (7) Nigerian industrial firms listed between 2012 and 2022,[10] analyzed the effects of long term debt, debt-equity, and debt-asset ratios on firm value. Positive but insignificant effects came from all debt related variables. According to this study, the optimal debt structure must be maintained to finance long term asset.

Based upon survival analysis,[1] analyzed the impact of profitability, liquidity, leverage, and ownership concentration on financial distress of Indonesian firm (2015–2021). Profitability and leverage are shown to be important factors in corporate stability before and during COVID 19, with profitability and leverage both resulting in significant impact on financial distress before and during COVID 19.[3] indicated that leverage has a negative impact to financial distress and company's size and liquidity has a positive impact to it from the companies in the Indonesian food and beverage firms (2018–2021). However, size and liquidity moderated the effect, which implies that firms should grow yet not at all costs to their financial health. Non financial firms in Nigeria were studied by [7] about the relationship between profitability and firm value through financial distress. However, distress negatively influenced the firm value while profitability raised distress and firm value. Partial mediation of the relationships was carried out by financial distress to portray dual role in performance outcomes. [15] analyzed Indonesian manufacturing firms (2018–2020) and found profitability and capital structure to be of significant impacts in financial difficulties. Nevertheless, the stock prices were not effective individually. All the variables explained the financial distress jointly and hence showed the importance of financial structure in predicting crisis. Altman Z-Score was used by [12] to analyse retail firms' financial distress during the COVID-19. For the most part, most firms were financially healthy from 2017–2019. By 2020, a few like HERO entered financial distress, others remained stable and a few others were in grey zone.

Corporate governance, cash flow and leverage as financial distress predictors of the mining companies in Indonesia were examined by [16]. They found that 91 reports find that good governance, high cash flow and low leverage reduce distress risk. Indirect financial distress costs were examined by studying the behavior of 508 firm-year observations taken from Pakistan (2010–2018) by [8]. They found out that these costs increased with leverage, intangible assets, and an investment policy, whereas firm size and Tobin's Q decreased the costs using Altman's Z-score. Financial distress, growth opportunities and dividend policy impacts firm value by [9] was concerned with the role of hedging in Indonesian property firms. Hedging was raised when firms faced financial distress while this lowered firm value. The effects of growth opportunities and dividends on firm value were positive, but not that of hedging.

The implication of audit fees and financial risk to opportunistic accounting in Nigerian industrial goods firms (2011 – 2015) was examined by [17]. It was discovered that financially distressed firms with low profits tend to manipulate earnings. The study recommended that although asset expansion and efficient cash use would reduce audit costs, the company should focus on the two factors. In the chemical firms of Indonesia,[4] studied relation between leverage, sales growth, and cash flow to financial distress. Greater distress used its leverage, reduced cash flow mitigated its effects, and corporate governance mitigated the effects of leverage and sales growth. [13] investigates the factors of the predictability of the financial distress level using the fundamental and macroeconomic variables. Most distress variables (current ratio, leverage, and macroeconomic indicators) did not have a significant effect on return, but the only significant positive variable was return on equity. In a research, [18] analysed effect of liquidity, leverage and operating capacity on the financial distress risk in property firms. Managerial ownership, operating capacity, and leverage had a significant impact on distress, and managerial ownership was shown to moderate the relationship in distress. Liquidity was not a big item. Firm level factors and their impact on the financial distress and capital structure of the Turkish manufacturing firms (2007-2017) were explored by [19]. Distress was associated with higher leverage and shorter maturity of short term debt. The relationship between the distress capital structure and return on equity, as well as asset tangibility affected the agencies.

METHOD

In this study, ex post facto research was chosen, and historical data were studied to find out the reasons behind financial distress in Nigerian Exchange Group-listed industrial goods companies. The design was right for the study since the events had already taken place and could not be modified. In addition, a correlational design was used to study the relationships among the variables. The study covered 13 industrial goods firms listed by August 31, 2024, and 11 of them were picked with a purposeful method that chose those providing full financial information from 2015 to 2024.

Secondary data were taken from annual reports and financial statements found in the Nigerian Exchange

Group Factbook and from the disclosures of the companies themselves. It was necessary to use descriptive statistics to explain the nature of the data, unit root tests to assess if the data changes over time, a calculation of correlations to study how the data changes together, and panel regression analysis (with both fixed and random effects) to understand how financial distress is related to financial indicators such as liquidity, leverage, and profitability.

Multicollinearity between variables was checked using the Variance Inflation Factor, and the Hausman test, and Durbin-Watson statistic were used to confirm that the model is valid and sturdy. Using EViews 13, statistical analysis was performed and outcomes were presented in easy-to-follow tables and charts. Table 1 shows the measurement of the variables used in the study.

Table 1. Variables Measurement

Variable	Measurement	A-Priori Expectation
Dependent Variable		
Financial Distress (FIND)	Altman Z-Score was used as a proxy for financial distress. The Z-Score is widely used to predict bankruptcy and financial health[2]	
Independent Variables		
Liquidity (LQDT)	Current Ratio (CR) = Current Assets / Current Liabilities. Higher liquidity indicates better ability to meet short-term obligations.[20]	-
Leverage (LVRG)	Debt-to-Assets Ratio (DAR) = Total Debt / Total Assets. Measures the extent of debt financing; higher leverage increases financial risk.[1]	+
Profitability (Return on Equity) (PROF)	Return on Equity = Net Income / Shareholder Equity. Reflects the firm's efficiency in generating returns for shareholders.[7,20]	-

The panel data regression model for this study was adopted from the works of [21,22]. The following regression models were developed in this study (in their generic form) to capture the variables of the study:

$$FIND=f(LQDT,LVRG,PROF) \quad (1)$$

Econometrically, the above equation can be restated as:

$$FIND_{it}=\beta_0+\beta_1 LQDT_{it}+\beta_2 LVRG_{it}+\beta_3 PROF_{it}+e_{it} \quad (2)$$

Where:
FIND = Financial Distress (Altman Z-Score)
LQDT = Liquidity (debt to asset ratio)
LVRG = Leverage
PROF = Profitability (return on equity)
e_{it} = Radom error term or stochastic variables
β_0 = Constant while Subscripts *i* denote number of firms, *t* denotes years or time-series dimensions ranging from 2015-2024, e is the error term of the model capturing other explanatory variable and β_0, β_1, β_2, β_3Stands for regression model coefficients.

RESULTS

Table 2. Descriptive Statistics

Statistics	FIND	LQDT	LVRG	PROF
Mean	8,722	1,979	0,269	0,113
Median	4,094	1,748	0,271	0,108
Maximum	71,487	4,909	0,500	0,268
Minimum	1,416	0,880	0,056	0,013
Std. Dev.	11,535	0,831	0,137	0,059
Skewness	3,019	1,227	0,084	0,402

Kurtosis	13,352	4,250	1,712	2,665
Jarque-Bera	658,237	34,756	7,731	3,484
Probability	0,000	0,000	0,021	0,175
Sum	959,457	217,730	29,612	12,394
Obs.	110	110	110	110

Table 2 is the descriptive statistics for financial distress, liquidity, leverage and profitability of industrial goods firms in Nigeria for over 110 observations. The mean Altman Z-score (FIND) is 8,722, and is indicative that most of the firms in the sample are not financially distressed, but the overall standard deviation (11,535) and a maximum value of 71,487 indicate high variability. Liquidity (LQDT) is moderately dispersed (Std. Dev. = 0,831), with predictions with a mean of 1,979 while leverage (LVRG) is characterized by a relatively low mean of 0,269 and a small standard deviation (Std. Dev. = 0,137), suggesting that firms uniformly leverage carefully.

Return on equity (ROE) is profitability (PROF) and it has a mean of 0,113 (Std. Dev. = 0,059) which is quite consistent. Jarque-Bera statistics ($p < 0,01$) imply that FIND and LQDT distributions are highly skewed and leptokurtic, and confirm skewness and kurtosis values which display that they are highly skewed and leptokurtic non normally distributed. On the other hand, PROF resembles normal ($p = 0,175$) and LVRG follows it mildly ($p = 0,021$). More broadly, the data indicate different levels of financial health, with some firms demonstrating high performance compared to other firms that are exposed to risk; hence, it is essential to analyze liquidity, leverage and profitability as the cause of financial distress in firms.

Table 3. Levin, Lin & Chu Panel unit root test

Variable	Level difference	Prob	Order of integration
LQDT	-5,730	0,000	I(0)
LVRG	-4,622	0,000	I(0)
PROF	-13,227	0,000	I(0)

In table 3, the stationarity of variables liquidity (LQDT), leverage (LVRG) and profitability (PROF) were presented. These variables were tested by performing the Levin, Lin & Chu (LLC) panel unit root tests. From Table 3, the study can tell that all variables are stationary at level with significantly negative test statistics and associated p-values (LQDT = -5,730, p = 0,000; LVRG = -4,622, p = 0.,000; PROF = -13,227, p = 0,000). The null hypothesis of the presence of a unit root is rejected at the 1 % level for all variables so they are integrated of order zero, I(0). If the variables do not need differencing to be stationary, then this would imply they should not be transformed for the purposes of the regression analysis. Stationarity at level enhances the reliance on any estimated relationships among the variables in subsequent econometric modeling.

Table 4. Correlation Analysis

	FIND	LQDT	LVRG	PROF
FIND	1,000			
LQDT	-0,141	1,000		
LVRG	-0,308	0,047	1,000	
PROF	0,041	0,073	0,234	1,000

Table 4 is the Pearson correlation results for financial distress, liquidity, leverage and profitability of the industrial goods companies in Nigeria. The result indicates that liquidity and leverage have a negative correlation with financial distress, i.e., the higher the liquidity and leverage, the lower the Altman Z-scores, or, in other words, the more extreme the financial distress. The positive yet weak correlation between FIND and profitability ($r = 0,041$) indicates that there is an insignificant direct relationship.

There is weak positive relationship between liquidity and leverage ($r=0,047$) and moderate positive relationship between leverage and profitability ($r=0,234$), which means that companies with greater amount of debt also record higher returns on equity. Liquidity and profitability also exhibit a weak positive relationship ($r=0,073$) which shows that more liquid firms are likely to show some slight improvements in their profitability. The associations indicate that the leverage is more important in affecting the financial distress than liquidity or profitability, which is consistent with the fact that the study concentrated on the above major financial indicators.

Table 5. Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LQDT	412,120	2,530	1,950
LVRG	112,450	1,970	1,450
PROF	605,445	1,850	1,430

Presented in table 5, is the Variance Inflation Factors (VIF) of the independent variables liquidity (LQDT), leverage (LVRG), and profitability (PROF) to evaluate the existence of multicollinearity in the regression model. Centered VIF values of LQDT (1,950), LVRG (1,450) and PROF (1,430) are less than 10, which is generally considered as the critical value of multicollinearity, thus, the model does not have a multicollinearity problem. It implies that there is enough independence among the predictor variables, and their influence on financial distress can be estimated accurately. Also the coefficient variances are relatively moderate suggesting that inter-variable correlation is not a serious factor that would undermine the accuracy of the estimated coefficients. Hence the model is stationary and can be used in further regression analysis.

Table 6. Hausman Test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16,251	3	0,012

Table 6 showed Hausman test results, which was undertaken to select the most suitable model between the fixed effects model and the random effects model in estimating effects of liquidity, leverage and profitability on financial distress among industrial goods companies in Nigeria. The Chi-square statistic of the test was equal to 16,251, the degrees of freedom were equal to 3 and the p-value was equal to 0,012. The null hypothesis of the appropriateness of the random effects model is rejected as the p-value is below the traditional 0,05 significance level. This suggests that the fixed effects model is preferable, since it will take care of the unobserved heterogeneity across firms which could be correlated with the explanatory variables. Therefore, there is significant effect of firm-specific effect on financial distress, justifying fixed effects estimation in this estimation.

Table 7. Regression Analysis (Fixed Effect)

Dependent Variable: ALTMAN Z-SCORE				
Method: Panel Least Squares				
Sample (adjusted): 2015 2024				
Periods included: 10				
Cross-sections included: 11				
Total panel (balanced) observations: 110				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LQDT	-0,024	0,828	-0,029	0,977
LVRG	-21,268***	5,082	-4,185	0,000
PROF	-8,833***	0,744	-11,868	0,000
C	230,780	19,060	12,108	0,000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0,723	Mean dependent var	8,722	
Adjusted R-squared	0,676	S.D. dependent var	11,535	
S.E. of regression	6,570	Akaike info criterion	6,744	
Sum squared resid	401,927	Schwarz criterion	7,161	
Log likelihood	-353,921	Hannan-Quinn criter.	6,913	
F-statistic	15,188	Durbin-Watson stat	2,021	
Prob(F-statistic)	0,000			
*** is significant at 1 %				

Presented in table 7, is the regression analysis (fixed effect) for the dependent and independent variables of the study. The regression result indicates that the coefficient of Liquidity (LQDT) is -0,024 with a standard error of 0,828, t-statistic of -0,029 and p-value of 0,977. This finding implies that liquidity negatively and statistically insignificantly affects financial distress of industrial goods companies in Nigeria. That is, whereas the coefficient direction indicates that greater liquidity could lower the risk of financial distress (based on the Altman Z-score), its insignificance indicates that liquidity, as represented by the debt-to-asset ratio, does not significantly explain financial distress in the sampled firms.

Test of Hypothesis (HO_1): The null hypothesis stated that there is no significant effect of liquidity on financial distress in industrial goods firms listed on the Nigerian Exchange Group. Based on the regression result, the p-value for liquidity was 0,977, which is greater than the 0,05 significance level. Therefore, the study fails to reject HO_1.

The debt-to-asset ratio, an proxy of leverage (LVRG), has a large negative coefficient of -21,268, with a standard error of 5,082, a t-statistic of -4,185 and a p-value of 0,000. This finding is statistically significant at the 1 percent level which shows that there is a strong reverse relationship between leverage and financial distress among the sampled firms. This result is somewhat unexpected since in many cases the classical financial theory assumes that the leverage and financial distress risk have a positive relation. Greater leverage is normally correlated to larger interest expense and elevated risk of defaulting as well as, by extension, elevated prospect of ending up in financial distress.

Test of Hypothesis (HO_2): The null hypothesis posited that there is no significant effect of leverage on financial distress in industrial goods firms listed on the Nigerian Exchange Group. The regression analysis showed a p-value of 0,000, which is less than the 0,01 significance level. Therefore, the study rejects HO_2.

Profitability (PROF) as calculated using return on equity (ROE) has a coefficient of -8,833, with a standard error of 0,744, a t-statistic of -11,868 and a p-value of 0,000. This is an extremely important finding and it indicates a high inverse correlation between profitability and financial distress. The implication is obvious, the more profitable firm is in terms of shareholder returns, the less it is subject to financial distress. This is in line with the classic corporate finance theory that profitability is appropriate to boost internal cash flows, improve investor sentiment, and act as a cushion against unfavourable financial shocks.

Test of Hypothesis (HO_3): The null hypothesis suggested that there is no significant effect of profitability on financial distress in industrial goods firms listed on the Nigerian Exchange Group. The regression result revealed a p-value of 0,000, which is well below the 0,01 threshold. Therefore, the study rejects HO_3.The R-squared value of the model is 0,723, which implies that the three independent variables including liquidity, leverage, and profitability explain about 72,3 percent of the variance in financial distress (Altman Z-score). The value of F-statistic 15,188 with the p-value of 0,000 shows that overall regression model is highly significant, whereas the Durbin-Watson statistic value of 2,021 indicates that there is no issue of autocorrelation. These values support the opposite kind of the model and confirm that leverage and profitability, specifically, are the powerful indicators of the financial health of the industry of industrial goods in Nigeria.

DISCUSSION

The result of the study is consistent with the existing empirical research. Indicatively, [2] also established a positive (though, not significant) relationship between liquidity and financial distress amongst listed manufacturing companies in Nigeria. They find that although liquidity is a significant firm characteristic, in many cases its empirical effect on distress may be swamped by financial or operational variables. In their analysis of Indonesian consumer goods companies,[1] discovered that the impact of liquidity on financial distress depended on the economic conditions and was more significant during the economic downturn. Similar findings were made by [18], who stated that liquidity was not a significant predictor of financial distress among the Indonesian real estate companies, meaning that a company might have good liquidity but still be distressed due to low revenue, high fixed costs, or inefficient capital structure.

The liquidity irrelevance in this case might as well portray some industry specific financial behaviour. Most of the companies in the industrial goods sector in Nigeria could be capital intensive whereby liquidity is kept at optimal levels whilst long term debt financing is used strategically to achieve expansion. Hence, liquid or near liquid assets are probably not the overriding factor in deciding the capability of firms to be solvent in the short-medium term. It is an indication that liquidity ratios such as the current or quick ratios should not be overly relied upon by investors and other stakeholders in assessment of financial health.

Debt-to-asset ratio, a proxy of leverage (LVRG) has a large negative coefficient; this finding is statistically significant at the 1 percent level which shows that there is a strong reverse relationship between leverage and financial distress among the sampled firms. This result is somewhat unexpected since in many cases the classical financial theory assumes that the leverage and financial distress risk have a positive relation. Greater leverage is normally correlated to larger interest expense and elevated risk of defaulting as well as, by extension, elevated prospect of ending up in financial distress.

Nonetheless, this finding could be attributed to an industry peculiarity or debt strategizing in the industrial goods industry in Nigeria. A possible reason is that companies in this industry have arranged their debt in an efficient way that long term debt is used in productive investment but not short term operational cost. These companies can also enjoy economies of scale and better bargaining power with their creditors which would help to lower the cost of debt and enhance financial stability. This conforms to [3], who established that leverage had a significant adverse effect on financial distress among food and beverage manufacturing companies.

Nevertheless, the finding goes against other researchers like [1], who concluded that leverage had a positive and considerable impact on financial distress among Indonesian listed companies, and [2], who also established a negative correlation between financial leverage and firm health. [4] also determined that the adverse effect of high leverage is financial distress, which can be alleviated by effective corporate governance. Accordingly, although leverage seems to be advantageous in this research, it should be underlined that the association might not be universally applicable, and it probably relies upon the situational attributes, including the cost of capital, the maturity structure of the debt, and the size of the firms.

Profitability (PROF) as calculated using return on equity (ROE) has a negative coefficient; this is an extremely important finding and it indicates a high inverse correlation between profitability and financial distress. The implication is obvious, the more profitable firm is in terms of shareholder returns, the less it is subject to financial distress. This is in line with the classic corporate finance theory that profitability is appropriate to boost internal cash flows, improve investor sentiment, and act as a cushion against unfavourable financial shocks.

Numerous empirical studies support this finding. Indicatively, [6] found that profitability, as gauged by Net Profit Margin and Earnings per Share, had a substantive positive impact on firm value. Also, profitability was mentioned by [7] as a crucial factor in the stability of firms and the generation of value, and it has a direct and adverse effect on financial distress.[2] also confirmed that profitability largely decreases the probability of corporate financial distress among the Nigerian manufacturing corporations.

In practical terms, this reinforces the essence of maintaining profitability as a key financial health metric. Profitability not just indicates efficiency in operations, but it also defines the ability of a firm to pay debt, re-invest in more productive assets as well as make dividend payments. This being the case, the managers of firms should be concerned about cost control, pricing strategy, revenue diversification and capital utilization as a way of maintaining profitability and by extension financial viability.

The value of F-statistic showed that overall regression model is highly significant, whereas the Durbin-Watson statistic value indicates that there is no issue of autocorrelation. These values support the opposite kind of the model and confirm that leverage and profitability, specifically, are the powerful indicators of the financial health of the industry of industrial goods in Nigeria.

CONCLUSIONS

The variables that had been included profitability and leverage are the most significant factors that explain the variation in financial distress of industrial goods firms in Nigeria. Profitability, especially, is crucial in stimulating the resilience of a firm to a financial shock because it ameliorates the internal cash flows, the confidence of investors, and the ability of a firm to address its short-term and long-term liabilities. When used effectively, leverage can be an efficient financial instrument to spur growth and expansion where the leverage is used to acquire long term productive assets (and not to meet operating losses). This, howbeit, needs a good financial planning and a stern capital structure policy to prevent over-indebtedness. Conversely, liquidity, although a conventional indicator of short-term financial performance, did not depict any substantial impact on financial distress in this research. This implies that the availability of current assets in relation to liabilities may not be sensitive enough to reflect the inherent financial risks that industrial companies experience within the Nigerian environment. The recommendations based on the findings of the study are that management should not put too much emphasis on short-term solvency ratios as an indicator of financial health. On the other hand, debt financing should be used as strategic instrument of the firm growth and stability, provided that it is managed adequately. In addition, firms should ensure that they have maximised their returns on equity by having proper strategies in harnessing their resources and controlling costs. Finally, policymakers, investors, and firm managers are advised to pay more attention to improving profitability and to the effective management of leverage without necessarily depending on liquidity measures as the sole estimate of financial health.

BIBLIOGRAPHIC REFERENCES

1. Wijaya GF, Ahmad GN, Widyastuti U. Analysis of financial distress in Indonesia before and during Covid-19. Glob Sci Acad Res J Econ Bus Manag. 2023;2(7):126-132. https://gsarpublishers.com/wp-content/uploads/2023/07/GSARJEBM1292023-Gelary-script.pdf

2. Appah E, Duoduo E. Firm attributes and corporate financial distress of listed manufacturing firms at the Nigerian Exchange Group. Br J Multidiscip Adv Stud. 2024;5(1):16-40. doi:10.37745/bjmas.2022.0391

3. Luspratama R, Edward YR, Rahmi NU. Profitability moderates the effect of firm size, leverage, and liquidity on financial distress. Oblikifinansi. 2023;101:53-64. doi:10.33146/2307-9878-2023-3(101)-53-64

4. Giarto RVD, Fachrurrozie F. The effect of leverage, sales growth, cash flow on financial distress with corporate governance as a moderating variable. Account Anal J. 2020;9(1):15-21. Available from: https://scispace.com/pdf/the-effect-of-leverage-sales-growth-cash-flow-on-financial-8nn7wa39wq.pdf

5. Adewole EA, James KS, Adebayo MA. Effects of firm-specific factors in predicting financial distress of listed consumer goods manufacturing companies in Nigeria. Int Res J Econ Manag Stud. 2024;3(10):1-12. doi:10.56472/25835238/IRJEMS-V3I10P105

6. Chibueze CC, Ogoegbunam OE, Rufus-Chime EA, Patrick A, Edet ENA, Chibuzo AO, et al. Effect of profitability on firm value of manufacturing firms in Nigeria. Tec Empresarial. 2024;6(1):2103-2120. Available from: https://www.researchgate.net/publication/390433390

7. Rabiu NB, Aminu DA, Olanisebe M, Salihu MA. The mediating effect of financial distress on the relationship between profitability and value of listed non-financial firms in Nigeria. FUDMA J Account Finance Res. 2023;1(2):1-15. doi:10.33003/fujafr-2023.v1i2.18.1-15

8. Farooq M, Noor A, Qureshi SF, Bhutta ZM. Indirect financial distress costs in non-financial firms: evidence from an emerging market. Pac Account Rev. 2021;33(4):417-434. doi:10.1108/PAR-09-2020-0127

9. Sudarma IP, Sari MMR. Financial distress, growth opportunities, and dividend policy on firm value through company hedging policies: empirical study on property and real estate companies listed on Indonesian stock exchange. Int Res J Manag IT Soc Sci. 2020;8(1):47-59. doi:10.21744/irjmis.v8n1.1054

10. Aldei AGA, Ugwuanyi BU. Corporate financial policy and firm value of industrial goods firms in Nigeria. Adv J Bank Finance Invest. 2023;7(6):1-26. Available from: https://aspjournals.org/ajbi/index.php/ajbfi/article/view/14/16

11. Saleem S, Jabeen M. Firm lifecycle and financial distress: a study of non-financial firms listed on the Pakistan Stock Exchange. Int J Bus Manag Sci. 2023;4(1):66-86. Available from: https://ijbmsarchive.com/index.php/jbmis/article/view/343

12. Marginingsih R. Financial distress analysis using the Altman Z-Score method for retail companies during the COVID-19 pandemic. Enrichment. 2022;12(2):1796-1803. doi:10.35335/enrichment.v12i2.456

13. Kholisoh SN, Dwiarti R. The analysis of fundamental variables and macro economic variables in predicting financial distress. Manag Anal J. 2020;9(1):81-90. doi:10.15294/maj.v9i1.36395

14. Uwaleke U, Nwala M, Dachomo GP. Debt and equity asset composition on firm value of listed consumer goods firms in Nigeria. Gusau J Bus Adm. 2024;3(1):191-205. Available from: https://gujoba.com.ng/index.php/gujoba/article/view/73/66

15. Aruan DA, Fredlina J, Lifanny M, Theodora W. Effect of profitability, capital structure, share prices and cash flows in predicting financial distress conditions on manufacturing companies. J Ipteks Terapan. 2022;16(3):488-498. doi:10.22216/jit.v16i3.1376

16. Nurcahyono N, Sukesti F, Haerudin H. The effect of good corporate governance mechanisms, financial ratio, and financial distress: a study on financial companies. In: Proceedings of the 3rd International Conference of Business, Accounting, and Economics; 2022 Aug 10-11; Purwokerto, Indonesia.

17. Kantiok MD. Financial risk and audit fee on corporate financial distress of listed industrial goods firms in Nigeria. Int J Manag Sci Entrep. 2020;19(7):362-375. www.cambridgenigeriapub.com/wp-content/uploads/2021/01/CJMSE_Vol18_No7_Sept_2020-26.pdf

18. Larasati H, Wahyudin A. The effect of liquidity, leverage, and operating capacity on financial distress with managerial ownership as a moderating variable. Account Anal J. 2019;8(3):214-220. doi:10.15294/aaj.v8i3.30176

19. Abdioğlu N. The impact of firm specific characteristics on the relation between financial distress and capital structure decisions. **İşletme** Araştırmaları Dergisi. 2019; 11(2):1057-67. doi:10.20491/isarder.2019.655

20. Marginingsih R, Ratnasari L, Octaviany D. Financial ratios as predictors of financial distress. Asian J Account Res. 2024;16(1):33–49.

21. Bhimavarapu VM, Rastogi S, Kanoujiya J, Rawal A. Repercussion of financial distress and corporate disclosure on the valuation of non-financial firms in India. Future Bus J. 2023;9(1):62-84. doi:10.1186/s43093-023-00248-7

22. Muigai RG, Muriithi JG. The moderating effect of firm size on the relationship between capital structure and financial distress of non-financial companies listed in Kenya. J Finance Account. 2017;13(5):151-158. doi:10.11648/j.jfa.20170504.15

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CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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