

# THE RELATIONSHIP AND EFFECT OF CAPITAL STRUCTURE ON FINANCIAL DISTRESS OF PUBLIC QUOTED NON-FINANCIAL FIRMS IN NIGERIA

Onyenekwe, Florence Ifeoma<sup>1</sup> Amah, Peter Ngozi<sup>2</sup> Ogege, Samson<sup>3</sup>

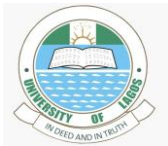
## Abstract

*This paper focuses on capital structure and its relationship and effect on distress of public quoted non-financial firms in Nigeria. The study's major objective is to explore the effect of capital structure on the financial distress of publicly quoted non-financial firms on the Nigeria Exchange (NGX). Independent variables, financial leverage (debt to assets), short-term debt to equity, and long-term debt to equity, were considered to represent the capital structure. The Altman Z-score was used to measure financial distress. The assumptions of trade-off theory, pecking order theory, and agency theory guided this study. The study adopted an ex post facto research design. Secondary data from the financial statements of publicly quoted non-financial firms in Nigeria from 2011 to 2021 were used. A fixed-effects regression analysis technique has been employed to help answer the hypotheses. The study discovered that converting short-term debt to equity has an insignificant positive effect on financial distress. In contrast, long-term debt to equity has an insignificant negative effect on the financial distress of publicly quoted non-financial firms in Nigeria. As a result, this study recommends considering other factors such as the operating environment not included in the analysis, which could also influence financial distress. It also recommended that businesses should promote prudent financial management.*

**Keywords:** capital structure, financial distress, debt to assets, Long-term debt to equity

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<sup>1</sup> Department of Finance, University of Lagos, Nigeria, Email: [florenceonyenekwe@gmail.com/](mailto:florenceonyenekwe@gmail.com/)



<sup>2</sup> Department of Finance, University of Lagos, Nigeria, Email: [peeamah@yahoo.com](mailto:peeamah@yahoo.com)/  
[pamah@unilag.edu.ng](mailto:pamah@unilag.edu.ng)

<sup>3</sup> Department of Finance, University of Lagos, Nigeria Email: [sogege@unilag.edu.ng](mailto:sogege@unilag.edu.ng)

## 1. INTRODUCTION

Financial distress has become topical subject in practically every market worldwide. The world has experienced countless incidents of financial distress and the eventual collapse of internationally respected corporations during the last two decades. The sudden failure of some firms such as Barings Bank, China Forest, Enron, Olympus Corporation, Parmalat, Royal Bank of Scotland, Securrency, and Satyam that once represented the icons of corporate financial stability before declaring bankruptcy had a significant impact on the global economy and called into question the fundamentals of the majority of these companies (Mallin, 2013; Muigai, 2016; Ikpesu & Eboiyehi, 2018). For instance, the collapse of the UK retail company British Home Stores in April 2016 affected all stakeholders, including the 11,000 individuals employed by the company, which cost the taxpayer about £35 million. Particularly, financial distress detection has become more relevant because of the 2007 financial crisis, in which many firms became financially distressed and filed for bankruptcy (Li & Zhong, 2013; Altman et al., 2019). *Financial distress* is a situation where an individual, business, or organisation is experiencing significant difficulty meeting its financial obligations. It is typically characterised by a lack of liquidity, an inability to generate sufficient cash flow, and a high level of debt relative to income or assets. It is referred to a situation where a firm is unable to generate sufficient funds to meet its financial obligations when due (Andrade & Kaplan, 1998; Ufo, 2015), it arises when firms fail to honour their financial obligation to suppliers and creditors (Ikpesu & Eboiyehi, 2018). In literature, several empirical studies have accounted for the cause of financial distress in firms to include insufficient cash flows, volatile profitability and decline in assets-liability ratio, loss of confidence by the creditors and suppliers, poor capital structure, weak corporate governance, and severe competitions for factors of production and markets (Outecheva, 2007; (Muigai, 2016; Lee & Manual, 2019). Research findings by Rajan and Zingales (1995) and Al-Slehat et al. (2020) showed that financing decision plays a critical and vital role in determining the interim financial performance of a firm as well as its long-run survival.

Empirical studies on financial distress have recognised capital structure as a key variable influencing and determining financial distress (Ohlson, 1980; Muigai, 2016; Muigai & Muriithi, 2017). According to Chen (2010), capital structure refers to how a firm finances its

operation through a mixture of debt and equity or a combination of both. It is also called the mix of various financing firms employed to fund their operations (Fabozzi & Drake, 2009). Besides, many scholars such as Bei & Wijewardana, 2012; Lee & Manual, 2019; Kofi, 2021 also posited that the main cause of financial distress is inappropriate financial decisions, which mostly refer to the firm's capital structure.

## **2.0 REVIEW OF LITERATURE**

Existing studies shows that capital structure is still the most debatable element that could affect the financial distress level of the company. Studies carried out by Akhtar et al. (2012), Vithessonthi and Tongurai (2015), Gameel and El-Geziry (2016), Lee and Manual (2019), and Kofi (2021) have found that increases in debt instruments could increase the financial distress level of the company. However, Abu-Rub (2012) and Bei and Wijewardana (2012) found that an increase in debt could decrease the financial distress level of the company. Moreover, Modigliani and Miller (1958) and Pratheepkanth (2011) concluded that capital structure does not affect a firm's financial distress level. Besides, the mixed results among the empirical studies could be explained by the different variables, measurements and target countries observed. Given this situation, it is necessary to undertake further observation of this area directly.

The study looks at how capital structure (short-term debt to equity, long-term debt to equity, and debt to assets) affects financial distress for a sample of 69 publicly quoted non-financial firms in Nigeria, covering a period of 2011 to 2021.

Some theories are relevant to this study and they include the trade off theory and the pecking order theory. In the 1970s, Robichek, Myers and Kraus developed the trade-off theory. It is considered that the increase in debt worsens the financial condition of firms due to increased financial risks and bankruptcy costs. Debt level increases the risk of bankruptcy (i.e., bankruptcy costs) because the creditors will require higher interest rates as the debt-to-equity ratio increases. The possible payoffs to stockholders and the present market value of their shares are also reduced (Brealey et al., 2019). Bankruptcy costs consist of direct and indirect costs (Li, 2020). Branch (2002) and Gemar et al. (2019) argue that the direct cost of dealing with bankruptcy is mostly paid to professionals (such as lawyers and accountants). And indirect costs include the costs of a short-run focus and costs caused by a loss of market share.

Myers (1984) found that by including market imperfections, firms appeared to get an optimal debt-equity ratio that maximises its value by weighing the advantages and the disadvantages of debt. Following the trade-off theory, firms would set up a target debt ratio to maximise debt tax shields and minimise debt-related bankruptcy costs. Bankruptcy costs play an important role in determining the optimal capital structure because a large part of the value of a bankrupt firm is used to deal with its predicament. The cost of dealing with a bankruptcy adversely affects the risk premium, capital cost, and the tax rates required (Branch, 2002; Li, 2020).

The pecking order theory was proposed by Myers and Majluf in 1984. The pecking order theory starts with asymmetric information. Managers know more than investors. Information asymmetry affects the choice between internal and external financing and new issues of bonds and equity securities. The pecking order theory indicates that investment is financed first with internal funds, then new debt issues, and finally with new equity issues. In this theory, there is no well-defined debt-equity target mix. The pecking order theory believes that the most profitable firms often borrow less because they do not need outside capital. Less profitable firms issue debt because they do not have enough internal capital to invest (Myers & Majluf, 1984; Li, 2020).

Unlike the trade-off theory, the pecking order theory does not mention the optimal debt ratio that maximises the firm's value. The pecking order theory states that firms prefer internal to external financing and debt to equity. Internal financing involves fewer transaction costs and issuing costs than other sources. Moreover, issuing debt has lower information costs than equity (Shahar et al., 2015; Altin, 2022).

The theoretical implication of the pecking order theory is that there is a clear financing hierarchy and no well-defined target debt ratio, as suggested under the trade-off theory. This theory provides for preference to use internal funds in place of external funds that encapsulate debt and equity to preserve value and firm stability. The implication is that increased use of external capital, such as debt and equity, influences the firm value negatively and increases the chances of financial distress. This theory explains why it's important to maintain a target capital structure that mitigates the effect of financial distress (Wesa & Otinga, 2018).

Abdioğlu (2019) used fixed-effect regression analysis to investigate the effect of capital structure on financial distress in 163 listed Turkish manufacturing firms from 2007 to 2017.

The findings show a significant negative relationship between leverage and financial distress.

Long-term debt has a significant positive effect on financial distress, while short-term debt has a significant negative effect.

Lee and Manual (2019) used fixed-effect regression analysis to examine the effect of capital structure on financial distress for a sample of 74 listed non-financial firms in Malaysia from 2013 to 2017. The findings showed that short-term and long-term debt have an insignificant influence on financial distress.

Lucky and Michael (2019) used fixed-effect regression analysis to explore the relationship between capital structure and financial distress for a sample of 15 listed non-financial firms in Nigeria from 2008 to 2017. Capital structure was measured by short-term debt, long-term debt, total debt-to-asset ratio, and debt-to-equity ratio. They found that short-term debt, long-term debt, total debt-to-asset ratio, and debt-to-equity ratio have an insignificant influence on financial distress. The findings showed that short-term and long-term debt have an insignificant influence on financial distress.

Negoro and Wakan (2022) utilised fixed-effect regression analysis to examine the impact of capital structure on financial distress for 17 construction and building firms listed on the Indonesia Stock Exchange (IDX) between 2018 and 2020. The results show no significant correlation between leverage and financial distress.

### **3.0 Methodology**

In this study, an ex post facto design was used. The sample encompasses a total of sixty-nine non-financial firms that are listed in Nigeria, spanning from 2012 to 2021. The present investigation employs a dataset sourced from selected firms' publicly audited financial statements.

### **3.2 MODEL SPECIFICATION**

The model employed was adopted and modified study of Ain et al. (2021). The following are the panel multiple regression models with an error term ( $\mu$ ):



$$ALT_{it} = \beta_0 + \beta_1 BI_{it} + \beta_2 SDE_{it} + \beta_3 LDE_{it} + \beta_4 DOA_{it} + \beta_5 LIQ_{it} + \beta_6 FMS_{it} + \mu_{it} \quad \dots (1)$$

Where:

ALT = Financial Distress

SDE = Short-Term Debt to Equity

LDE = Long-Term Debt to Equity

DOA = Debt to Assets

LIQ = Liquidity

FMS = Firm Size

$\mu$  = Error Term

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ , and  $\beta_6$  = parameters

### 3.3 Measurement of Variables

Variable	Measurement	Sources
Dependent Variable		
Financial Distress	The formula for the Altman Z-score is as follows: Z-score = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E Where: A = Working Capital/Total Assets B = Retained Earnings / Total Assets C = Earnings Before Interest and Taxes (EBIT) Assets D = Market Value of Equity/Total Liabilities E = sales/total assets	Lucky and Michael (2019) Balagobei and Keerthana (2022)
Independent variables		
Short-Term Debt to Equity	The ratio of short-term debt to equity	Abdioğlu (2019) Lee and Manual (2019)
Short-Term Debt to Equity	The ratio of long-term debt to equity	Abdioğlu (2019) Lee and Manual (2019)
Total debt to total assets	The ratio of total debt to total assets	Owino (2019) and Negoro and Wakan (2022)
Control variables		
Liquidity	The quick ratio is calculated by dividing the sum of a company's cash and cash equivalents, short-	Wesa and Otinga (2018) Ceylan (2021)

	term marketable securities, and accounts receivable by its current liabilities.	
Firm Size	it is measured as a natural logarithm of total sales	

## 4. RESULTS AND DISCUSSION

### 4.1.1 Descriptive statistics

Table 4.1: Descriptive statistics

	ALT	SDE	LDE	DOA	LIQ	FMS
Mean	1.1464	1.5086	0.9713	64.2868	0.8865	20.2730
Max	8.41	154.23	99.69	395.45	8.09	27.9557
Min	-7.44	-329.4	-13.77	6.34	0	10.2897
Std. Dev	1.3401	14.7498	5.1780	38.1793	0.7153	4.8177
OBS	759	759	759	759	759	759

**Source: Author's Computation (2023)**

The mean of the Z-score index of the progressed sample data is at 1.146, indicating that most of the observed companies were at a considerable risk of going into financial distress in relation to Altman's distress zones (a score less than 1.81). Furthermore, Table 4.1 shows that short-term debts to equity (SDE) have a mean of 1.509 and a standard deviation 14.75. The short-term debt ratio measures the proportion of a company's short-term debt relative to its equity. In this case, the mean value of 1.509 indicates that, on average, the company's short-term debt is slightly higher than its equity. The standard deviation of 14.750 is quite large compared to the mean. This suggests significant variability in the short-term debt-to-equity ratio within the data set. The large standard deviation implies that some companies in the data set may have very high short-term debt-to-equity ratios while others may have very low ratios. This variability could indicate differing financial situations of risk profiles among the companies. From the above assertion, the average short-term debt-to-equity ratio is slightly above 1,

indicating that, on average, the company has more short-term debt than equity. However, the large standard deviation suggests considerable variation in the ratio among the companies being analysed.

The long-term debt-to-equity ratio (LDE) measures the proportion of a company's long-term debt relative to its equity. Table 4.1 illustrates that among the selected non-financial firms, the mean value of 0.971 of long-term debt to equity indicates that, on average, the company's long-term debt is lower than its equity. It is also important to consider the standard deviation of 5.178. Compared to the mean, this standard deviation is relatively high, suggesting a notable variability in the long-term debt-to-equity ratios within the data set. The large standard deviation implies that some companies in the data set may have significantly higher long-term debt to equity ratios, while others may have lower ones. This variability could reflect different financial situations or risk profiles among the companies being analysed.

The debt-to-assets ratio measures the proportion of a company's total debt relative to its total assets. The results in Table 4.1 showed that among the observed non-financial firms, debt to assets (DOA) has a mean of 64.2868, with a standard deviation of 38.1793. This indicates that approximately 64.287% of a company's total assets are financed by debt. A higher debt-to-assets ratio suggests that a larger portion of the company's assets is funded by debt, indicating higher financial leverage. This can be beneficial in some cases, as debt can provide access to capital for investment and growth opportunities. However, a high debt-to-assets ratio also implies a higher risk since a larger portion of the company's assets is subject to potential default or financial strain if it faces challenges in repaying its debt obligations. A debt-to-assets ratio of 64.287% indicates that a significant portion of the company's assets is financed through debt, suggesting a notable level of financial leverage that should be carefully monitored and managed.



#### 4.1.2 Test for Multicollinearity

The Spearman correlation coefficient (correlation matrix) and variance inflation factor (VIF) are used to test for multicollinearity. Table 4.2 shows the correlation matrix, whereas Table 4.3 shows the VIF results.

Table 4.2 Correlation Matrix

	ALT	SDE	LDE	DOA	LIQ	FMS
ALT	1.0000					
SDE	0.0318	1.0000				
LDE	-0.0605	0.4747	1.0000			
DOA	-0.4532	0.0209	0.0931	1.0000		
LIQ	0.2882	-0.0179	-0.0531	-0.3373	1.0000	
FMS	0.3006	-0.0355	-0.0758	-0.1421	-0.0645	1.0000

Source: Author's Computation (2023)

Table 4.2 variance inflation factors

	VIF	1/VIF
LDE	1.31	0.7649
SDE	1.29	0.7741
DOA	1.17	0.8548
LIQ	1.15	0.8724
FMS	1.04	0.9612
Mean	1.19	

Source: Author's Computation (2023)

According to Table 4.2, the strongest correlation, 0.4747, is between short-term debt to equity (SDE) and long-term debt to equity (LDE), suggesting no multicollinearity among the independent variables. Moreover, according to Table 4.3, none of the independent variables' variance inflation factors (VIF) exceeded the threshold of 10, indicating no multicollinearity among the independent variables.

## 4.2 Econometric Analysis

Table 4.4 displays the results of the Hausman test. The p-value is less than 0.05, indicating that the alternative hypothesis (fixed effect) is preferred to the null hypothesis (random effect).

The  $R^2$  value is 68%, which indicates that the three independent variables can account for at least 68% of the variability in the financial distress of Nigerian non-financial firms.

Table 4.4 Regression Results

Variables	POOL	FEM	REM
C	0.1479	-4.7435	-0.3024
P-Value	0.5123	0.0000	0.4885
LDE	-0.0076	-0.0004	-0.0005
P-Value	0.4038	0.9572	0.9372
SDE	0.0060	0.0006	0.0012
P-Value	0.0591	0.8138	0.5827
DOA	-0.0123***	-0.0101***	-0.0112***
P-Value	0.0000	0.0000	0.0000
LIQ	0.3486***	0.2011***	0.2140
P-Value	0.0000	0.0000	0.0001
FMS	0.0731***	0.3137***	0.0977***
P-Value	0.0000	0.0000	0.0000
F-statistic	63.2684***	20.0000***	32.8017***
P-Value	0.0000	0.0000	0.0000
R-squared ( $R^2$ )	0.2958	0.6806	0.1789
Hausman Test		22.6286***	
P-Value		0.0000	

**Long-term debt to equity:** Long-term debt to equity, with a p-value of 0.9572 and coefficients of -0.0004, has an insignificant negative effect on financial distress. This implies that an increase in long-term debt to equity does not impact the financial distress of listed non-financial

firms in Nigeria. The result corroborates the findings of Lee and Manual (2019), who found an insignificant correlation between long-term debt and financial distress. However, Abdioğlu (2019) found a significant positive relationship between long-term debt and financial distress.

**Short-term debt to equity:** short-term debt to equity, with a p-value of 0.8138 and coefficients of 0.0006, has an insignificant positive effect on financial distress. This implies that an increase in short-term debt to equity does not impact the financial distress of listed non-financial firms in Nigeria. The result corroborates the findings of Lee and Manual (2019), who found an insignificant correlation between short-term debt and financial distress. However, Abdioğlu (2019) found a significant negative relationship between short-term debt and financial distress.

**Debt to assets:** Debt to assets, with a p-value of 0.0000 and coefficients of -0.0101, significantly negatively affects financial distress. The significant negative impact of debt to assets on financial distress implies that increased debt to assets will reduce the likelihood of financial distress of listed Nigerian non-financial firms. These results corroborate the findings of Abdioğlu (2019), who found a significant negative correlation between debt to assets ratio and financial distress. However, Rahmayanti and Hadromi (2017) found a significant positive correlation between debt to assets ratio and financial distress.

## 5.0 CONCLUSION AND RECOMMENDATIONS

The study's objective was to investigate the relationship and effect of capital structure on the financial distress of publicly quoted non-financial firms on the Nigeria Exchange (NGX). The study adopted an ex post facto research design. Secondary data from the financial statements of publicly quoted non-financial firms in Nigeria from 2011 to 2021 has been employed. Capital structure was measured by financial leverage (debt to assets), short-term debt to equity, and long-term debt to equity. The Altman Z-score was used to measure financial distress. The assumptions of trade-off theory and pecking order theory guided this study. A fixed-effects regression analysis technique has been employed to help investigate the issues of interest. The study discovered that converting short-term debt to equity has an insignificant positive effect

on financial distress. In contrast, long-term debt to equity has an insignificant negative effect on the financial distress of publicly quoted non-financial firms in Nigeria. *As a result, this study recommends considering other factors such as the operating environment not included in the analysis, which could also influence financial distress.* It also recommended that businesses should promote prudent financial management. Whereas short-term debt may not significantly impact financial distress, it is also important for businesses to monitor and manage their debt levels effectively, optimise cash flow management and maintain a healthy balance between short term debt and other financial resources that can help mitigate potential risk.

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