
Moderating Role of Board Size on Debt Capital and Firm Performance of Quoted Industrial Goods Companies in Nigeria

Noah Ugbede,¹ Ekpa Felix,¹ Odobi David O,¹ Eidicha M.J.¹
Egwuaba Maclord W.¹

¹ Department of Accounting, Faculty of Management Sciences, Prince Abubakar Audu University, Anyigba, Kogi State, Nigeria

doi: <https://doi.org/10.37745/ejafr.2013/vol11n101935>

Published September 23, 2023

Citation: Ugbede N., Ekpa F., Odobi DO., Eidicha MJ., and Egwuaba MW (2023) Moderating Role of Board Size On Debt Capital and Firm Performance of Quoted Industrial Goods Companies in Nigeria, *European Journal of Accounting, Auditing and Finance Research*, Vol.11, No. 10, pp.19-35

ABSTRACT: *Financing sources of any corporate organization are a serious determinant of its performance because either equity or debt financing has its cost. The interaction between them has to be evaluated periodically. Against this background, this study establishes the Moderating role of board size on debt capital and the firm performance of industrial goods companies in Nigeria. The population of the study comprises the thirteen industrial goods companies quoted on the Nigeria Exchange Group (NGX). The population was wholly sampled for the study. Debt financing represented by debt-to-total asset was the independent variable, while, firm performance) was measured by return on assets (ROA). The panel data were obtained from the financial statements of the companies from 2012-2021. The study adopts a bi-model approach for clarity of presentation and analysis. The analysis was conducted with the aid of the pooled Ordinary Least Square Multiple Regression method and the result from Model I showed that debt capital has a significant negative effect on the firm performance of the sampled companies. The result from Model II indicated that board size has an insignificant positive moderating effect on debt capital and firm performance. The study recommends that the management of industrial goods companies in Nigeria should keep debt capital at its lowest to improve their performance.*

KEYWORDS: board size, debt capital, firm performance, moderating variable and return on asset.

INTRODUCTION

Debt capital may be long-term debt capital or short-term debt capital. Holders of debt capital are lenders and not owners of the business. The owners of these resources are creditors and do not constitute the firm's ownership. Outright borrowings by a company make her a debtor to the

lenders. This could be through the issuance of debentures, bonds, or other forms of debt instruments. The holders of these funds are entitled to a fixed amount of interest to be paid before the shareholders. They have less control over the decisions of the firms. Debt financing of a firm is an aspect of its capital structure which comprises its total equity and debt for which firms may issue various securities, Decisions relating to the capital structure involve several issues such as; the consequential cost, tax implications, and interest rate. These factors cause variations in financial leverage across firms (Mauwa *et al.* 2016).

Firm performance refers to the potential of a firm to be financially successful and may be assessed before entering into a business or it may be used to analyze a venture that is currently operating with profit or loss. Adediran and Alade (2013) pointed out that the analysis of corporate performance is concerned basically with the development of modelling methodology to help in the diagnosis of past performance and help to provide a framework for ascertaining the impact of changes in operating metrics as a guide for future planning. Siminica *et al.* (2012) affirmed that firm performance is the ability of a firm to achieve set objectives that maximize the wealth maximization of the shareholder, especially through profit generation.

Board size refers to the total number of directors on the board of a company. Board members usually have diverse knowledge, skills, expertise, and resources to help in realizing the company's set objectives and they are responsible for monitoring the activities of the management to align with the interests of the shareholders and other stakeholders. Lai (2013) notes that a moderator is an independent variable that influences a relationship between another independent variable and a dependent variable. In this study, board size is used as the moderating variable on the relationship between debt financing and firm performance of firms in the industrial goods subsector. Board size satisfies the requirement that for a variable to qualify as a moderator in a relationship between two variables, it must have a direct link with the dependent variable.

Industrial goods companies form a subsector of the manufacturing industry which also include the consumer goods companies. Industrial goods companies produce goods that include chemicals, paints, tires, bags, cables, and cement among others. Their activities are governed by the Nigerian Code of Corporate Governance which was last reviewed in 2018 by the issuer: the Financial Reporting Council (FRC). The performance of the industrial goods companies in Nigeria has been so poor that between 2008 and 2021, 18 of the companies were delisted from the Nigerian Exchange Group (NGX) due to various reasons (NGX, 2022).

Information available on the website of the Nigerian Exchange Group (2022) reveals that between 2008 and 2021, 18 industrial goods companies were delisted from the exchange. While four of the companies (Nigerian Bottling Company 2011; Avon Crown Caps 2017; Paints and Coating Coy (2018) and First Aluminum (2019) were delisted due to voluntary decisions, others such as Cement Company of Northern Nigeria and Nigerian German Chemicals delisted in 2020 and 2021 respectively are among the twelve (12) companies removed from the exchange due to regulatory sanctions. The remaining two companies: Nigerian Bags Manufacturing Company and Portland

Paints and Product merged with Nigerian Flour Mills plc in 2013 and Chemical and Allied Products in 2021 respectively. The reasons leading to being delisted by whatever perspectives cannot be divorced from underperformance. It is therefore necessary that factors that have the potential to influence companies' performance such as the capital structure be regularly examined. Furthermore, there is a scarcity of studies that included a moderating variable in the evaluation of the effect of debt capital on firm performance in the industrial goods companies in Nigeria, whereby, previous studies have been dealing with the direct effect of this independent variable on the dependent variable without any attempt to find how their interaction could be influenced by a third variable.

The main objective of this study is to evaluate the Moderating role of board size on debt capital and firm performance of industrial goods companies in Nigeria, while the specific objectives are to:

- i) Estimate the effect of debt capital on the firm performance of industrial goods companies in Nigeria; and
- ii) investigate the moderating effect of board size on debt capital and firm performance of industrial goods companies in Nigeria.

To achieve the stated objectives, the following Null hypotheses were formulated.

Ho₁: Debt capital exerts no significant effect on the firm performance of industrial goods companies in Nigeria; and

Ho₂: Board size does not have a significant moderating effect on debt capital and firm performance of industrial goods in Nigeria.

Conceptual Framework of the Study

The conceptual framework of this study consists of debt financing (DF), representing the independent variable capital structure, while, returns on asset (ROA) measures financial performance. Board size was used as a moderating variable.

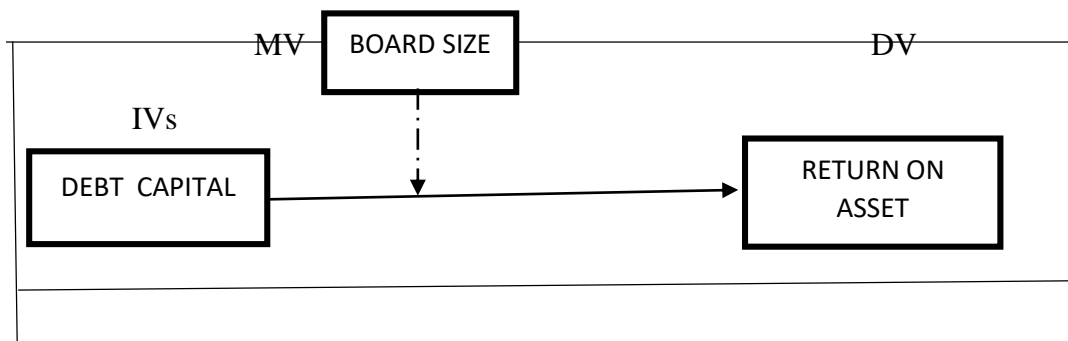


Figure 2.1 The Framework of the Study
Adapted from Fujaria and Isnalita (2018).

Debt Capital and Financial Performance

Debt capital can be defined as a class of source of funds that makes the holder a creditor of a firm but not a part owner and can be divided into long-term debt and short-term debts. Debt financing is a method of obtaining capital to operate a business through borrowing money (Khalil, 2014). The borrowing firms pay back the principal that they borrow plus whatever rate of interest they are charged. The interest rate is the rent for the use of money that is borrowed (Marks & Robbins, 2009). David and Olorunfemi (2010) observed that a company that uses debt capital benefits because interest is tax-exempt, thus, the increase in financial leverage leads to a decrease in the weighted average cost of capital due to the lower cost of debt capital, so the value of the company increases with the use of debts. For this study, Kwarbai *et al.* (2016) stated that even though debt financing is riskier compared to equity, it is one of the crucial means of sourcing funds in executing viable investments in a firm thus enhancing the financial performance, adding that the tax shield on debt interest tends to reduce the tax expenses and therefore leads to increase in the after-tax returns. Olowolaju, (2013) opined that the performance of highly geared firms is dependent on the right usage of debt capital because debt enables ownership and control retention, tax shield, increases in liquid assets, and financial freedom. For this study, debt capital is the portion of the firm's total capital that is financed by borrowed funds.

Financial Performance

Nuryaman (2012) defined performance as a description of the level of achievement of the implementation of activities programs or policies in realizing the goals, purpose, mission, and vision of the establishments as stated in the formulation and long-term schemes (strategic planning) of a firm. Mardiana *et al.* (2018) defined performance as the achievement of the purpose of a particular activity or occupation as measured by a standard noting that assessment of a firm's performance is essential for every stakeholder in competitive financial markets such as management, customers, business partners, and government. It can generally be said that performance is the achievement that can be achieved by firms in a particular period. Return on asset (ROA) represents a better measure of the ability of the firm to generate returns on its portfolio of assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Other measures of bank performance include return on equity/investment (ROE) as the net income per naira of equity capital and net interest margin (NIM) which is the difference between interest income and interest expenses as a percentage of total assets and others. For this study, financial performance is the efficiency with which a firm generates profit using the available assets.

Board Size (The moderating Variable) and Financial Performance

Board size refers to the number of directors on a company's board. It is a statutory requirement that each corporate board should be composed of both executive and independent non-executive members. For a variable to be qualified as a moderator in a relationship, the variable must be capable of having a direct relationship with the dependent and the independent variables. Previous literature exposed the relationship between board size and performance because large boards have

a range of expertise to help make better decisions for better performance. Topal and Dogan (2014) observed a significant relationship between board size and return on assets but an insignificant relationship between board size and Tobin's Q. Aina (2013) found a positive relationship between the board size and performance. Ammari *et al.* (2014) asserted that a board with a large number of directors provides enough people to more easily manage the workload of the board as the responsibility is divided among many members for better performance

The Underpinning Theory: Pecking Order Theory:

The theory that underpins this study is the Pecking Order Theory which was first developed by Donaldson (1961), supported by Myers (1984) and Myers and Majluf (1984). The theory holds that by the financing pecking order, firms prefer internal finance and if external finance is required, firms issue less risk debt and then equity as a last resort. This theory looks at the least cost of financing mix, as it argues that firms do not try to reach the "optimal" capital structure, as the trade-off theory claims, because firms employ the least resistance and least costly financing mix. The pecking order theory assumes that information asymmetry problems between insiders and outsiders of a firm lead to increases in the cost of external capital and agreement. This theory was chosen as the underpinning theory because of its provision for the scale of preference in alternative funding choices in certain prevailing conditions to maximize returns on shareholders' wealth, which is the purpose of this study.

Empirical Review

Anozie *et al.* (2023) examined the impact of capital structure on the financial performance of Nigerian oil and gas companies. Using an *ex-post facto* research methodology, the specific objectives were to find out how the short-term debt to total asset, long-term debt to total asset, and total debt to total equity affect return on assets (ROA). The data used cover the years 2011 to 2020 and were compiled from the annual financial reports of five Nigerian oil and gas companies. Descriptive statistics and panel regression analysis were used to analyze the data. The findings showed that while long-term debt to total assets has a negative significant influence on return on assets, short-term debt to total assets and total debt to total equity had positive insignificant. The study recommended that managers of oil and gas companies should reduce the amount of long-term debt they have because doing so hurts their performance and that they should exercise caution when making capital structure decisions.

Nguyen *et al.* (2023) explored how the capital structure has an impact on the Vietnamese company's profitability. The specific objectives were to establish the effect of long-term debts, short-term debts and liquidity on return on equity and return on assets. The quantitative data obtained from 300 Vietnamese firms for the period from 2012 to 2018 were analyzed using linear regression. The findings indicated that firm profitability, represented by return on equity (ROE) and return on assets (ROA), was associated with liquidity and debt. The results showed that there was a positive relationship between liquidity and profitability of firms, while there was a negative relationship between long-term debt and profit maximization. Moreover, the short-term loan also has a positive impact on the firm's profitability. The study recommended that future findings will

become more convincing by including external indicators to profoundly contribute to the literature on capital structure in emerging markets.

Chukwu *et al.* (2022) determined the relationship between capital structure and corporate financial performance of deposit money banks listed on the Nigerian Exchange Group. The specific objectives were to examine the effect of debt ratio and equity ratio on return on asset (ROA) and the net profit margin (NPM) and the moderating effect of board diligence on the relationship. The study used the *ex post facto* research design and data from thirteen (13) DMBs over the period 2010 to 2018. The multiple regression was used to analyze the data. The results revealed a negative and insignificant relationship between debt ratio and return on assets (ROA), a negative and insignificant relationship between debt ratio and net profit margin (NPM), and a positive and significant relationship between equity ratio and ROA. The study also revealed a positive and significant relationship between equity ratio and NPM. The results further showed that board diligence positively moderates the relationship between capital structure (CS) and financial performance (CFP) in the banking industry. The study recommended that banks should rely more on equity capital than debt capital in their capital structure decisions, and boards must be allowed to play their role to foster healthy financial performance.

Dodoo *et al.* (2022) evaluated the effect of capital structure on the company for a decade from 2008 to 2017 using a panel data sample representing 15 non-financial firms registered on the Ghana stock exchange. The specific objectives were to investigate the effect of short-term, and long-term debts and debt-to-equity ratio on return on equity. The study used a Step System generalized method of moment (GMM) and ordinary least squares (OLSs) regression methods to show that capital structure (STD and LTD) harms company performance as assessed by return on asset (ROA). Capital structure has no substantial impact on firm performance as assessed by return on equity (ROE). The study offers no recommendations.

Sivalingam and Kengatharan (2022) evaluated the relationship between capital structure and financial performance of listed licensed commercial banks in Sri Lanka. The specific objectives were to find out the effect of total debt to total assets ratio, long-term debt to total assets ratio, and short-term debt to total assets ratio on financial performance. Panel data were used to conduct the empirical study which were extracted from the annual reports of 10 selected banks for the period from 2007 to 2016. Return on assets (ROA), and return on equity (ROE) were used as financial performance measures. The size of the banks and growth in bank deposits were considered as control variables. Descriptive statistics, correlations, and fixed effect were used for estimation after the Hausman specification test, The results showed that the total debt to total assets ratio was significantly negatively related to ROA, however, growth in bank deposits was significantly and positively related to ROA. Size, short-term debt to total assets ratio, and long-term debt to total assets ratio did not show any relationship with ROA. The study recommended that financial managers should try to finance from internal sources rather than relying heavily on debt capital in their capital structure.

Fauzi *et al.* (2022) ascertained the effect of capital structure on the performance of telecommunications firms. The specific objective was to estimate the effect of debt to total asset ratio on financial performance. The firm performance was measured by return on assets. Data from telecommunication firms in 62 countries for the period of year 2010-2020 were analyzed with the aid of a dynamic data panel regression model using the generalized method of moment approach. The empirical results indicated that capital structure represented by debt-to-total asset) of telecommunication firms has a significant effect on firm performance in developed and developing countries as well as in integrated and wireless telecommunication firms. No recommendations were made.

Abosede (2021) analyzes the relationship between indebtedness and the financial performance of quoted Nigerian downstream oil and gas companies. The specific objectives of the study were to find out whether or not indebtedness has a relationship with the financial performance of the quoted Nigerian downstream oil and gas companies, using return on asset (ROA) and return on capital employee (ROCE) as proxies to financial performance. Secondary data from 11 listed oil and gas companies on the Nigeria Stock Exchange from 2007-2019 were used in the study. The data generated were analyzed using multiple regressions to examine the relationship between the variables. Indebtedness is proxied by long-term debt, short-term debt, and total debt, using the pooled ordinary least square, fixed effect, and random effect models. The study found that long-term debt negatively and significantly impacts the financial performance of quoted Nigerian downstream oil and gas companies. The study recommended that listed downstream oil and gas firms in Nigeria should make effective use of long-term debts to enhance their capital employed to generate more return on investment to cover the cost of capital and increase their retained earnings.

Achieng *et al.* (2018) evaluated the effects of debt capital components on firm performance. The specific objectives were to establish the effect of short-term debt, long-term debt, and total debt on firm financial performance measured by return on assets and return on equity of listed firms in Kenya. The study utilized pooled ordinary least squares (OLS), fixed effects (FE), and random effects (RE) to analyze the effects of debt on the financial performance of 40 non-financial firms listed on the Nairobi Securities Exchange between 2009 and 2015. Empirical results show that short-term, long-term, and total debt have negative and statistically significant effects on returns on assets across OLS and RE. However, the debt measures have no significant effects on returns on equity across all estimation methods. The study recommended that financial managers should adjust debt levels to ensure that they operate at the optimum points and that credit institutions should only finance businesses up to the point where profitability is maximized to mitigate against default risks associated with overleveraging.

Nwude *et al.* (2016) investigated the impact of debt structure on the performance of Nigerian quoted firms. The specific objective was to determine the effect of debt financing on firm performance. The data were collated from the annual reports of the sampled firms and Nigerian Stock Exchange factbooks. The study employs three regression estimations (Pooled OLS, Fixed

Effects, and Random Effects) as a result of unobserved heterogeneity in the dataset. The result from the regression estimations showed that debt structure has a negative and significant impact on the performance of Nigerian quoted firms within the period under review. The study concludes that debt structure contributed negatively to the performance of Nigerian quoted firms, thereby agreeing with the pecking order theory. The study recommended that there is a need for Nigerian quoted firms to balance the trade-off between the benefits of debt and bankruptcy costs, implying that a firm needs to choose a debt ratio at a certain proportion to be better off.

Iheanyi *et al.* (2016) evaluated the effect of capital structure on the performance of banks in Nigeria. The specific objective was to identify the relationship that exists between highly geared capital structure and lowly geared capital structure on performance indices such as return on equity and return on assets. Four (4) banks were used and their audited financial statements were analyzed to generate both the dependent and independent variables for twelve years (2002-2013). The statistical tool applied is ordinary least square and the result shows that a highly geared capital structure increases the performance of deposit money more than a lowly geared capital structure. The study recommended that banks should employ more debt capital to maximize return on investment, and when this external debt is to be used, the banks should search for low-interest-bearing loans so that the benefit from the loan will exceed the financial cost associated with the debt.

Bokhari and Khan (2013) investigated the effect of capital structure on the performance of firms from the non-financial sector of Pakistan. The specific objectives were to estimate the effect of Short-term debt (STD), long-term debt (LTD), and total debt (LEV) on firm performance using ROA and ROE. Non-financial firms listed on the Karachi Stock Exchange were taken as the sample size for the study. For measuring the performance of the firm return on assets (ROA), return on equity (ROE), net profit margin (NPM), and earnings per share (EPS) were used as proxies. Short-term debt (STD), long-term debt (LTD), and leverage of the firm or total debt (LEV) were variables for the capital structure. The total number of firms was 441, due to incomplete data it came down to 380 firms. Ordinary Least Square (OLS) method was used to analyze the performance, data is taken from 2005 to 2011 (7 years). Short-term debt (STD), long-term debt (LTD), and leverage of the firm (LEV) hurt return on assets (ROA), and return on equity (ROE) has a negative relation with all the capital structure variables but with long-term debt (LTD) and leverage of the firm (LEV) was insignificant. The study recommended that whatever source of finances a firm is using there is a need for efficient use of the resources.

Gap in Literature

This study fills a major gap by introducing a moderating variable on the effect of debt capital on financial performance measured by the return on asset (ROA) of industrial goods companies in Nigeria. Secondly, this study fills the environmental gap created by the paucity of previous studies carried out on industrial goods, coupled with the paucity of Nigerian studies conducted on this relationship in 2023 as only Anozie *et al* (2023) was a Nigerian study.

METHODOLOGY

This study adopted the *ex post facto* research design because of the availability of the data in a secondary form obtainable from the annual reports of the selected industrial goods companies in Nigeria. The population of the study consists of the 13 industrial goods companies on the Nigerian Exchange Group (NGX) as of 31st December 2022. The sample size is the same 13 quoted industrial goods companies. This study adopted the Census sampling technique that is usually employed when the entire population is sampled for study. The study used secondary panel data which were extracted from the financial statements of the sampled companies for the various years involved. The hypotheses testing was conducted with the aid of pooled ordinary least square multiple regression techniques.⁹

Variable Definition and Justification

Table 1 The variable Definition and Justification

Table 1 The variable Definition and Justification.

Variable	Type	Measurement	Justification
Returns on Asset (ROA)	Dependent	Net profit divided by total assets	Anozie <i>et al.</i> (2023); Sivalingam and Kengatharam (2022); Abosede (2021).
Debt Capital Ratio (DCR)	Independent	Ratio of capital financed by borrowed funds.	Nguyen <i>et al.</i> (2023); Dodoo <i>et al.</i> (2022); Tanko <i>et al.</i> (2021).
Board Size (BS)	Moderating	Number of members of board of directors of a firm.	Yasser <i>et al.</i> (2015); Eisenberg <i>et al.</i> (2014); Aina (2013).

Source: Researcher’s Compilation (2023).

Model Specification

The study adopts a bi-model approach, where model I considers only the direct relationship between debt capital and the financial performance measured by return on an asset with the moderating variable (board size) without playing the moderating role. The second model (Model II) captures the indirect effect of the independent variables on the dependent variable moderated by the moderated board size.

Model I: The specified linear regression equation for this study as used by Borau *et al.* (2015) is expressed as follows:

$$ROA = f(DCR + BS)$$

Representing the above equation in econometric terms, it becomes

$$ROA_{it} = \alpha_0 + \beta_1 DCR_{it} + \beta_3 BS + \mu_{it} \dots\dots\dots (Model 1).$$

Model II: The specified linear regression equation for Model II is presented below:

$$ROA = f(DCR+ BSZ*DCR)$$

Restating the above equation econometrically, it is as follows:

$$ROA_{it} = \beta_0 + \beta_1 DCR_{it} + \beta_2 BS * DCR_{it} + \mu_{it} \dots \dots \dots \text{(Model II)}$$

Where: ROA = an indicator for the dependent variable (Return on Asset)

- β_0 = Intercept term (a constant);
- β_1 = Coefficient of Debt Capital Ratio;
- β_2 = Coefficient of Board Size-moderated Debt Capital Ratio;
- DCR = a predictor for Debt Capital Ratio;
- BS = a predictor for Board Size;
- BS*DCR = a predictor for board size-moderated Debt Capital Ratio;
- μ = Stochastic error term (representing the combined effect of omitted variables);
- i = Firms;
- t = Periods;
- f = Functional relationship.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 2 below presents the summarized description of the variables used in this study.

Table 2 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	130	0.0238	0.0346	-0.08	0.242
DCR	130	0.8376	0.0852	0.1	0.965
BS	130	10.90	1.6351	8	17

Source: STATA 12 output (2023).

Table 2 above revealed that return on asset has a mean of 0.0238 which indicates that the examined industrial goods companies have an average of 2% of their total assets as profit during the Ten (10) year period of the study. ROA has a standard deviation of 0.0346 which is greater than the mean (0.0238), indicating that the ROA was more widely dispersed and therefore had a faster growth rate during the period of this study. Debt capital has a minimum value of 0.1 and a maximum of 0.965. Debt capital ratio and board size have mean values (0.8376 and 10.90 respectively) which are higher than their standard deviations (0.0852 and 1.6351 in that order) signifying that they were less widely dispersed around their means and therefore had slow growth rates.

Pearson Correlation

Table 3 below shows the coefficient of the variables in the Pearson correlation test for multicollinearity among the independent variables in this study. The decision rule is to accept the presence of multicollinearity among two independent variables if they correlate above 0.85 or

reject the presence of multicollinearity in the model if no two independent variables correlate above 0.85.

Table 3 Pearson Correlation Matrix

Variable	ROA	DCR	BS
ROA	1.000		
DCR	-0.063	1.000	
BS	0.179	-0.043	1.000

Source: STATA 12 Software Output (2023).

The results from Table 3 above revealed that the debt capital ratio (DCR) correlates negatively with ROA at -0.063, meaning that increasing the ratio of debt to equity in these industrial goods companies in Nigeria will lower the ability to use their assets to make a profit. BS correlates positively with ROA at 0.179. The results indicated multicollinearity is not a problem in the models.

Normality Test

Table 4 below presents the results of the residuals normality test using the Skewness/Kurtosis method which is recommended for studies with small sample sizes. The decision rule is that any model with a p-value lower than or equal to 0.05 has residuals that were not normally distributed, while, any model with a p-value higher than 0.05 has normally distributed residuals.

Table 4 Skewness/Kurtosis Test for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
residuals	130	0.7477	0.9827	1.43	0.2117

Source: STATA 12 output (2023).

Table 4 above shows that the model has a p-value of 0.2117 which is higher than the critical p-value of 0.05. This result indicated that the model has residuals that were normally distributed. The normality implies that the model assumed linearity and so can be estimated with the ordinary least square (OLS) regression method.

Breusch-Pagan/Cook-Weisberg Test for Heteroskedasticity

Table 5 below depicts the result of the heteroskedasticity test using the Breusch-Pagan/Cook-Weisberg method to determine the stability of the residual variance in the models. The decision rule is to reject the null hypothesis of constant variance if the model has a p-value lower than or equal to a critical p-value of 0.05 or accept the hypothesis if the model has a p-value higher than the critical p-value of 0.05.

Table 5 Multicollinearity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance
 Variables: fitted values of roa
 chi2(1) = 14.74
 Prob > chi2 = 0.3010

Source: STATA 13 software output (2023).

Table 5 above revealed that the model has a p-value of 0.3010 which is greater than the critical p-value of 0.05. The result signifies that the null hypothesis which states that the model has constant variance is accepted. The direct implication of the finding is that there is no heteroskedasticity in the model and that the results obtained can be used to predict future output.

Regression Analysis for Model I

Table 6 below shows the Regression analysis of Model I using the pooled Ordinary Least Square method. The result was used to estimate hypothesis i.

Table 6 Regression Analysis of Model I

roa	Coef.	Std. Err.	t	P> t
DCR	0.0881	0.0344	2.56	0.001***
BS	0.0034	0.0018	1.89	0.055
_cons	0.0497	0.0263	0.04	0.971
R-Sqd				0.4425
Adj. R-sqd				0.3966
F – statistics				80.13.
Prob >F				0.000***

Note: ** = 5% and *** = 1% significance levels.

Source: STATA 12 output (2023).

Table 6 above revealed that the model has an R-squared (coefficient of determination) adjusted for the degree of freedom of 0.3966 which connotes that the model’s independent variable (debt capital and the moderating variable (board size) were jointly accountable for approximately 40% variations in the financial performance of the industrial goods companies in Nigeria from 2012-2021. A positive F-statistics of 80.13 and a prob>F of 0.000 (significant at 1%) indicated that the model is fit and results obtained were not by coincidence.

Regression Analysis for Model II

Table 7 below shows the Regression Analysis of Model II using the Pooled Ordinary Least Square regression method. The result was used to test hypothesis ii.

Table 7: Regression Analysis (Model I)

roa	Coef.	Std. Err.	t	P> t
BS_DCR	-0.0404	0.0318	-1.27	0.263
DCR	0.0990	0.0416	2.38	0.022**
_cons	0.0162	0.0146	1.11	0.221
R-squared				0.5909
Adj R-squared				0.5147
F-statistics				83.14
Prob>F				0.002

Note: ** = 5% significance level

Source: STATA 12 output (2023).

Table 7 above revealed that model II has an R-squared (coefficient of determination) adjusted for the degree of freedom of 0.5147 which means that the model's independent - debt capital (DCR) and its board size-moderated form account for approximately 51% of changes that occurred in the financial performance of the Nigerian industrial goods companies from 2012 -2021 using return on asset (ROA) as the metric for performance. Table 7 also reveals a positive F-statistics of 83.42 and a prob>F of 0.002 (significant at 1%) indicating that the model is fit and results obtained were not by chance.

Test of Hypotheses

Table 6 above revealed that debt capital (DCR) has a significant (0.001) positive (2.56) effect on financial performance measured by return on assets (ROA) of the sampled industrial goods companies in Nigeria from 2012-2021 having a coefficient of 0.0881. The decision rule is to accept the formulated null hypothesis if the p-value is higher than 0.05 or reject the hypothesis if the p-value is less than or equal to 0.05. Based on the decision rule, with a p-value of 0.001, hypothesis one (H_{01}) which stated that debt capital has no significant effect on the financial performance of industrial goods companies in Nigeria is rejected.

Table 7 above revealed that board size (BS) has an insignificant (0.263) negative (-1.27) moderating effect on debt capital (DCR) and financial performance measured by return on assets (ROA) of the studied industrial goods companies in Nigeria from 2012-2021 with a coefficient of -0.0404. The decision rule is to accept the formulated null hypothesis if the p-value is greater than 0.05 or reject the hypothesis if the p-value is less than or equal to 0.05. This means that based on the decision rule, hypothesis two (H_{02}) which stated that board size has no significant moderating effect on the financial performance of the industrial goods companies in Nigeria is accepted. When the effect of debt capital on return on asset from both Models is compared, it can be observed that debt capital has a significant positive effect on financial performance in Model I which captures the direct relationship between the variables, but in Model II, when moderated by board size, debt

capital showed an insignificant negative effect on financial performance. The positive direction in model I was however changed to negative in model II.

DISCUSSION OF FINDINGS

Table 6 above revealed that debt capital (DCR) has a significant negative effect on return on assets which measures the financial performance of industrial goods companies in Nigeria from 2012-2021 with a coefficient of -0.0881, a t-stat of 2.56, and a p-value of 0.001. This finding implies that if the other independent variables are kept fixed, a unit increase in debt capital leads to a 0.09 unit increase in financial performance. This finding tallies with those of Sivalingan and Kenetharan (2022); and Abosede (2021) who established that debt capital has a significant effect on financial performance, however, contradicts those of Chukwu *et al.* (2022); Achieng *et al.* (2018) who reported that debt capital has an insignificant effect on financial performance. This finding supports agency theory which advocates for moderate debt financing.

Table 7 above indicates that board size (BS) has an insignificant negative moderating effect on debt capital (DCR) and financial performance measured by on return on asset (ROA) of industrial goods companies in Nigeria from 2012-2021 with a coefficient of -0.0404, a t-statistic of -1.27 and a p-value of 0.263 (insignificant at all levels), connoting that, if the other independent variables are held down, board size is not a suitable influencer of the effect of debt capital on financial performance measured by return on assets

CONCLUSION AND RECOMMENDATIONS

Capital structure decision is a very important determinant of how profitable a firm can be as it affects its financing sources and the cost associated with each method used. Debt capital has a limit to which it should be employed because of the associated costs which may reduce profitability and diminish financial performance leading to a negative albeit insignificant effect. Board size is a weak moderator on the effect of debt capital and the financial performance of industrial goods companies in Nigeria. From the findings of this study, the following recommendations are made.

- i) Management of industrial goods companies in Nigeria should minimize their dependence on borrowed funds as a source of financing their activities because of the high cost associated with it as it has a negative even though insignificant effect on financial performance.
- ii) In analyzing the effect of debt capital and financial performance of industrial goods companies in Nigeria, board size should not be considered as it fails to significantly moderate the relationship.

REFERENCES

- Abosede, S. A. (2021). Impact of indebtedness on the financial performance of quoted downstream oil and gas companies in Nigeria. *International Journal of Academic Research in Accounting Finance and Management Sciences*, 10(4), 8-21.
- Achieng, B. O., Muturi, W. M., & Wanjare, J. (2018). Effect of debt financing options on the financial performance of firms listed at the Nairobi Securities Exchange, Kenya. *Research Journal of Finance and Accounting*, 9(10), 150-164.
- Adediran, S. A., & Alade, S. O. (2013). Dividend policy and corporate performance in Nigeria. *American Journal of Social and Management Sciences*, 4(2), 71-77. <https://doi.org/10.5251/ajsms.2013.4.2.71.77>.
- Aina, K. (2013). Board of directors and corporate governance. *International Journal of Business, Finance and Management Research*, 1(1), 21–34.
- Ammari, A., Kadria, M., & Ellouze, A. (2014). Board structure and firm performance: Evidence from French firms listed in SBF 120. *International Journal of Economics and Financial Issues*, 4(3), 580-590.
- Anozie, O. R., Muritala, T. A., Inim, V. E., & Yisau, N. S. (2023). Impact of capital structure on the financial performance of oil and gas firms in Nigeria. *Future Business Journal*, 9(11), 1-9.
- Bokhari, H. W., & Khan, M. A. (2013). The impact of capital structure on firm's performance: A case of the non-financial sector of Pakistan. *European Journal of Business and Management*, 5(31), 111-137.
- Chukwu, G. J., Egbuhuzor, C. A., Namapele, A., Willy, N. O., Chukwu, A. N., Okoba, D., & Ebilaowei, P. (2022). Capital structure and financial performance of listed commercial banks in Nigeria: The moderating effect of board diligence. *British Journal of Applied Science and Technology*, 41(32), 21-32.
- David, D. F., & Olorunfemi, S. (2010). Capital structure and corporate performance in Nigeria petroleum industry: Panel data analysis. *Journal of Mathematics and Statistics*, 6(2), 168-173.
- Dodoo, R. N.A., Kumi, M., & Mangudhla, T. (2022). The effect of capital structure on firm performance: Empirical evidence from an emerging economy. *EuroMed Journal of Management*, 5(1), 1-11.
- Donaldson, G. (1961). *Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity*. Boston: Division of Research, Harvard School of Business Administration.
- Eisenberg, T., Sundgren, S., & Wells, M. T. (2014). Larger board size and decreasing firm value in small firms. *Journal of Financial Economics*, 48(1) 35-54.
- Fauzi, R. A., Achsani, N. A., Andati, T., & Anggraeni, L. (2022). The effect of capital structure on telecommunication firm performance: International evidence. *International Journal of Finance and Banking Studies*, 11(2), 98–108. <https://doi.org/10.20525/ijfbs.v11i2.1798>.
- Financial Reporting Council (FRC) (2018). *Code of corporate governance*.

- Fujaria, A. Z., & Isnalita, M. (2018). The effect of profitability, liquidity, leverage, and firm growth of firm value with its dividend policy as a moderating variable. *International Journal of Managerial Studies and Research*, 6(10), 55-69.
- Iheanyi, I. H., Sotonye, I., & Ejiodamen, E. A. (2016). Impact of capital structure on the performance of deposit money banks: A study of selected deposit money banks in Nigeria. *International Journal of Economics and Business Management*, 2(7), 23-34.
- Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behaviour, agency costs and capital structure. *Journal of Financial Economics*, 1(3), 11- 25.
- Kennedy, D. A. (2008). Reflections on mediation. *Organizational Research Methods*, 11(1), 353-358.
- Khalil, V. (2014). Examining the relationship between debt financing and profitability in cement industries. *International Journal of Accounting Research*, 1(11), 37-42.
- Kwarbai, J. D., Olayinka, I. M., Ajibade, A., Ogundajo, G., & Omeka, O. (2016). Leverage analysis and corporate earnings: A study of food and beverage firms in Nigeria. *Journal of Accounting and Financial Management*, 2(4), 28-42.
- Lai, Y. H. (2013). The moderating effect of organizational structure in knowledge management for international ports in Taiwan. *International Journal of Computer and Informative Technology*, 2(2), 240-246.
- Mardiana, K., Puji, E. P., & Dianata, A. W. M. (2018). The effect of risk management on financial performance with good corporate governance as a moderation variable, *Management and Economics Journal*, 2(3), 257-268.
- Marks, K. H., & Robbins, L. E. (2009). *Financing growth* (2nd ed.). John Wiley and Sons Publishers.
- Mauwa, J., Namusongeand, G. S., & Onyango, S. (2016). Effect of capital structure on the financial performance of firms listed on the Rwanda stock exchange. *European Journal of Business, Economics and Accountancy*, 4(4), 1-11.
- Myers, S. C. (1984). The capital structure puzzle. *Journal of Finance*, 39(1), 575-92.
- Myers, S. C., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(1), 187-222.
- Nguyen, S. L., Pham, C. D., Truong, T. V., Phi, T. V., Le, L. T., & Trang T. T. V. (2023). Relationship between capital structure and firm profitability: Evidence from Vietnamese listed companies. *International Journal of Financial Studies* 11(45). <https://doi.org/10.3390/ijfs11010045>.
- Nuryaman, N. (2012). The influence of intellectual capital on the firm's value with the financial performance as an intervening variable. *Social and Behavioral Sciences* 21(1), 292 – 298. <https://doi.org/10.1016/j.sbspro.2015.11.037/>.
- Nwude, E. C., Itiri, I. O., Agbadua, B. O., & Udeh, S. N. (2016). The impact of debt structure on firm performance: Empirical evidence from Nigerian quoted firms. *Asian Economic and Financial Review*, 6(11), 647-660.

- Olowolaju, P. S., (2013). Nigeria ailing industries and the capital structure theory: A need for concern. *Journal of Management Policy*, 12(69), 140 –153.
- Siminica, M., Circiumaru, D., & Simion, D. (2012). The correlation between the return on assets and measure of financial balance for Romanian companies. *International Journal of Mathematical Models and Methods in Applied Sciences*. 6(2), 249 – 256.
- Sivalingam, L., & Kengatharan, L. (2022). Capital structure and financial performance: A study on commercial banks in Sri Lanka. *Asian Economic and Financial Review*, 8(5), 586-98. <https://doi.org/10.18488/journal.aefr.2018.85.586.598>
- Tanko, U. M., Siyanbola, A. A., Bako, P. M., & Dotun, O. V. (2021). Capital structure and firm financial performance: The moderating effect of board financial literacy in Nigerian listed non-financial companies. *Journal of Accounting Research, Organization and Economics*, 4(1), 48-66.
- Topal, Y., & Dogan, M. (2014). Impact of board size on financial performance: The case of BIST manufacturing industry. *International Journal of Business Management and Economic Research*, 5(4), 74-79.
- Yasser, Q. R., Entebang, H., & Mansor, S. A. (2015). Corporate governance and firm performance in Pakistan: The case of Karachi stock exchange (KSE). *Journal of Economics and International Finance*, 3(August), 2(30), 482–491.