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Capital Structure and Firms' Performance in Nigeria

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Abstract: *This study examined the effects of capital structure on the performance of selected quoted manufacturing firms in Nigeria from 2015 to 2024. Four models were specified to capture the influence of capital structure on the selected firms' performance. Capital structure was proxied by equity (EQF) and total debt of firms (TDF) while firms' performance, by returns on assets (ROA), earnings per share (EPS) and dividend per share (DPS). Data were sourced from the annual financial reports and balance sheets of the selected firms in various years. The Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests were conducted to test for the stationarity of the series, while the Panel Ordinary Least Squares (POLS) estimation technique was adopted to test for the long run relationship of the series. The fixed and random effects estimation was also conducted while the Hausman test allowed us to select which model was more efficient for the analysis. The findings revealed that both equity and debt were positive but only debt was significant in explaining changes in returns on assets. Equity was negative while debt was positive but both were significant in explaining changes in earnings per share of the selected firms. Equity was negative while debt was positive but both were not statistically significant in explaining changes in dividend per share. The study recommended that an optimal mix of equity and debt financing will be appropriate for optimal utilization of assets and debt to leverage returns. Firms should embark on more holistic and strategic policies geared towards increased profitability and decreased number of outstanding shares at the same time. Equity and debt can be leverage to create value for shareholders through increased financial leveraging, tax benefits, cost of debts and equity financing.*

Keywords: Capital structure, firms' performance, total debt of firms, returns on assets, earnings per share, dividend per share, market price per share

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INTRODUCTION

In the dynamic realm of corporate finance, the capital structure decisions of firms represent a cornerstone determinant of their financial health and operational performance. The configuration of capital comprising debt, equity, and other financial instruments affects not only the cost of capital but also the risk profile and growth prospects of companies (Luo & Jiang, 2022). Within this context, understanding the interrelationship between capital structure choices and firm performance outcomes assumes paramount importance for both scholars and practitioners.

This introduction sets the stage for a comprehensive exploration of the nexus between capital structure and firm performance within the specific context of Nigerian companies. Nigeria's economic landscape is characterized by a unique blend of opportunities and challenges, shaped by diverse market conditions, regulatory frameworks, and institutional environments (Abubakar et al., 2022). Against this backdrop, elucidating how capital structure decisions impact the operational efficiency, profitability, and market valuation of firms in Nigeria holds significant implications for stakeholders ranging from corporate managers to policymakers and investors.

Capital structure is one of the important decisions by finance managers. Darmono et al., (2024) defined capital structure as the various means of financing a firm, that is, the proportionate relationship between debt and equity. Bui et al., (2023) further stated that capital structure is a significant managerial decision because it influences the shareholder's return and risk as the market value of the share may be affected by the capital structure decisions. In making capital structure decisions, corporate managers are expected to seek answers to the following questions: how should the investment project be financed; does the way in which the investment projects are financed matter; how does financing affect the shareholders' risk, return and value; does there exist an optimum financing mix in terms of the maximum value to the firm's shareholders; can the optimum financing mix be determined in practice for a company; and what factors in practice should a company consider in designing its financing policy? The pioneer of this debate and studies on capital structure theory is (Sunitha, 2024). The general direction of opinion of researchers is that a firm should determine and chose an optimal level of debt and equity combination based on the trade-off between the cost and benefits of debt. Some companies according to Homauni et al., (2023), do not plan their capital structure but rather evolve from financial decisions taken by the financial managers without a formal policy and planning. Thus, their capital structure is reactive because they are products of past operating decisions rather than planned decisions. A company that do not plan its capital structure may have difficulties in raising funds to finance its operations in the future and may not be able to economize its use of funds. It is the general opinion among researchers that each firm should plan its capital structure in such a way that it will maximize its use of funds and to be able to adapt to changing situations. Therefore, the financial manager should plan an optimum capital structure for the company so as to maximize the market value of the firm. There have been several studies on the effect of capital structure on firm performance in developed countries. However, empirical studies on capital structure and its implication on firm performance in developing countries, especially in Nigeria, are very scanty. Also, after the bank consolidation exercise in Nigeria, there have not been any serious study on how the

emerging capital structure has affected bank performance. Most banks in Nigerian have not been taking the advantage of debt in their capital structure mix as reflected on their financial statements (Yusuf & Mohd, 2021).

The rationale behind this study stems from the recognition that while extensive research has been conducted on the relationship between capital structure and firm performance in global contexts, there exists a notable dearth of empirical studies focusing specifically on Nigerian firms (Ahmed et al., 2024). Given the distinctiveness of Nigeria's economic milieu, characterized by factors such as volatile market conditions, evolving regulatory frameworks, and infrastructural constraints, extrapolating findings from studies conducted in other jurisdictions may yield limited insights.Moreover, the study aims to shed light on the implications of these capital structure choices for firm performance, spanning dimensions such as profitability, operational efficiency, and market valuation (Ullah et al., 2020). Recognizing the multifaceted nature of this relationship, the research endeavours to unravel the moderating influences of firm-specific characteristic, industry dynamics, and macroeconomic factors on the observed associations between capital structure and firm performance metrics.

Ultimately, this research aspires not only to contribute to the academic discourse on corporate finance but also to offer actionable insights for Nigerian firms, policymakers, and investors. By fostering a deeper understanding of the interplay between capital structure decisions and firm performance outcomes in the Nigerian context, this study seeks to inform strategic decision-making and facilitate the formulation of policies conducive to sustainable growth and financial resilience within the Nigerian corporate sector. Poor performance of firms sometimes arises from the lack of comprehensive understanding regarding how Nigerian firms navigate capital structure decisions on the backdrop of multifaceted challenges, including volatile market conditions, regulatory uncertainties, and infrastructural deficiencies. Consequently, there exists a pressing need to delve into the complexities inherent in capital structure determination and its implications for firm performance within the Nigerian context.

Hypotheses of the Study

The effects of capital structure on firms' performance in Nigeria was tested using the following hypotheses:

H_{O1}: There is no significant relationship between equity and total debt of firms and returns on asset of selected quoted manufacturing firms in Nigeria.

H_{O2}: There is no significant relationship between equity and total debt of firms and earnings per share of selected quoted manufacturing firms in Nigeria.

H_{O3}: There is no significant relationship between equity and total debt of firms and dividend per share of selected quoted manufacturing firms in Nigeria.

LITERATURE REVIEW

Capital Structure

Capital structure indicates the combination of debt and equity finance. In contrast to Ayaz et al., (2021), most capital structure theories state that leverage can be related to firm performance. However, studies

that investigate the impact of capital structure on firm performance show mixed empirical results. According to Tian et al., (2024), the financial structure choices of a firm have an impact on the performance of the firm because fluctuations in firm performance can partly be explained by the differences in capital structure. Chen et al., (2021) argued that the relation can be stronger or weaker, depending on the industry in which the company operates.

Multiple existing studies find empirical evidence that leverage impacts firm performance. Arhinful & Radmehr (2023) examined the relation between debt ratios and firm performance based on a sample of non- financial companies listed in Egypt. The author finds that there is a negative impact of debt ratio on performance. That means that an increase in debt relative to total assets will result in lower firm performance. Also Ahmed et al., (2024) finds a negative impact of capital structure on firm performance for firms that operate in the engineering sector and are based in Pakistan. The author concludes that an increase in debt ratio influences performance in a negative way. Also, based on a study of 117 listed companies in China, researchers find that debt ratio is negatively and significantly related to firm performance (Wei et al., 2020). In addition, Ayaz et al., (2021) found empirical evidence that the relation between capital structure and firm performance significantly negative, based on sample of Malaysian companies. The study of Arhinful & Radmehr (2023) shows a negative relation between leverage and firm performance for non-financial firms in Thailand. Olusola et al., (2022) also investigated the impact of capital structure on firm performance using a sample of 167 Jordanian companies. Their results show a negative and significant impact of capital structure on both the accounting and market measures of firm performance. Additionally, Ronoowah & Seetanah, (2022) investigated the relation between capital structure and firm performance to provide a better understanding of how to make financial decisions. Based on U.S. firms, they found a negative relation between leverage and return on assets. Riaz et al., (2023) found a negative relation between leverage and profitability based on Slovenian firms. Multiple other studies provide the same negative relation between capital structure and firm performance. These findings are in line with the proposition of pecking-order theory.

On the other hand, the study of Ahmed et al., (2024) shows that the performance of Iranian firms increases as a result of an increase in debt ratio. Also Nazir et al., (2021) find a positive and significant relation between debt ratio and firm performance. Tian et al., (2024) investigated the influence of capital structure on firm performance based on 36 Bangladeshi firms. They used four performance measures as dependent variables and three ratios of capital structure as independent variables. The results show a positive and significant relation between earnings per share and short-term debt.

Debt Financing: The capital that businesses raise through borrowing money and pay back over time is known as debt finance. The benefit of debt financing is that the business relationship terminates when the loan is repaid, leaving no further responsibilities, and the interest paid on the loan is tax deductible. Debt holders are creditors who receive a set percentage in return for their loan to the company; they are not the owners of the business. Since interest on debt is a component of a business's operating expenses, interest on debt capital is paid in full before any dividends are distributed to equity holders. Borrowing money from outside sources without relinquishing ownership is known as debt finance. That instance, using external funding to fund corporate activities comes with extra costs known as the "coupon rate" (cost of

borrowing). If this coupon rate is not met, the borrowing company may suffer significant repercussions. The initial claim on the company's assets belongs to the debt capital holders, who are less risky than shareholders (Myers, 2005).

Optimal Capital Structure

Companies that use more debt than equity to finance their assets and fund operating activities have a high leverage ratio and an aggressive capital structure. A company that pays for assets with more equity than debt has a low leverage ratio and a conservative capital structure. That said, a high leverage ratio and an aggressive capital structure can also lead to higher growth rates, whereas a conservative capital structure can lead to lower growth rates. Determining the optimal capital structure is a vital and difficult issue for all financial decision makers. Using only debt in the capital structure can be risky because of the potential for bankruptcy, even with the tax sheltering advantages (Huang & Thi, 2003). Since the company needs money to finance new investments, issuing only shares is also bad for it because shares might not always generate the money needed to pay for these expenses (Huang & Thi, 2003). Therefore, the main argument is that in order to achieve overall profitability, enterprises must select the optimal debt-to-equity ratio. Because debt financing is more limited and has a lower overall cost, using more of it maximizes stockholder earnings per share. However, it also increases the financial risk. It makes investors look for higher needed rates of return on their investment to counter financial risk. As a result, businesses ought to try to keep their capital structure optimal (Abu, 2015). The ideal capital structure is one that increases corporate value while minimizing capital expenses. According to Adekunle (2010), it is precisely defined as the mix of debt and equity meant to accomplish the stated managerial goals of increasing the firm's wealth and reducing the overall cost of capital.

Capital Structure Decision

A company's capital structure refers to the various ways it finances its assets (Berger & Wharton, 2002). Essentially, the business can choose to manage its finances using either debt or equity. Because it impacts earnings before interest and taxes as well as the market value of the company's shares, every financial decision-maker must thoroughly analyze asset financing in order to identify the optimal financing mix (Negasa, 2016). Many factors, such as the firm's characteristics, the status of the economy, and managers' opinions, influence the financing mix that a business chooses for its capital structure (Chechet & Olayiwola, 2014). Therefore, selecting the appropriate financial structure is one of the most important decisions that public interest entitlements must make. A bad choice has the power to ruin any company's whole fortune. In order to identify the factors that must be taken into account while selecting the best funding combination, it is vital to take intentional action in the right direction at the right time. Managers' decisions on an organization's capital structure have a significant influence on its risk and return.

Firms' Performance

Firm performance is a wide term that measures how well a business accomplishes its objectives. It includes non-financial criteria like customer happiness, innovation, and environmental responsibility as well as financial indicators like profitability and market value. Since many stakeholders have distinct requirements and wants that must be satisfied independently, it is crucial to assess performance using both financial and non-financial data to obtain a comprehensive picture. In other words, firm performance is a

measure of a company's performance that may be influenced by both the market in which it operates and the company's own efficiency. It is often referred to as financial stability or financial health in the financial industry. A company's performance can be assessed using a variety of financial metrics. Revenue, return on equity, return on assets, profit margin, sales growth, capital sufficiency, liquidity ratio, and stock prices are a few examples of common financial metrics. Certain financial measures will have greater significance than others depending on the industry in which the business works.

Dimensions and Approaches of Capital Structure

Over time, several theories of capital structure have been established; a few of these are briefly described below.

Net Income Approach

The Net Income approach's financial leverage is a significant factor in determining a company's optimal capital structure, which is one in which the company uses no debt, or zero financial leverage, in which case the overall cost of capital equals the equity capitalization rate. That strategy was first proposed by Donaldson (1961), demonstrating that the choice of capital structure affects the firm's valuation. A change in financial leverage will result in a proportionate change in the firm's value and cost of capital. The weighted cost of capital will fall and get closer to the cost of debt as the degree of leverage gets closer to one (Petersen & Rajan, 1994). The basic idea behind this strategy is that by increasing the amount of debt in the capital structure, the company can raise its value and reduce its overall cost of capital (Pandey, 1995). This method's fundamental presumptions are:

(i) No corporate taxes
(ii) Cost of debt is less than cost of equity (Kd <Kc)
(iii) Cost of debt remains constant to acceptable range leverage.

From the above assumption, the overall cost of capital can be presented as:

$$Ko = O/V$$

Where Ko- Overall Cost of Capital
O- Earnings before interest and taxes
V- Total Value

A company's overall worth increases and its cost of capital decreases as it uses a higher amount of debt. When choosing the optional capital structure, the firm's value is highest and its weighted average cost of capital (WACC) is lowest. This strategy states that a company will have the highest value and lowest cost of capital when it uses 100% debt financing, or as much debt as possible.

Net Operating Income Approach

This tactic was also put out by Babalola & Abiodun (2013), who claimed that the firm's value is unaffected by the capital structure chosen. Changes in leverage have no impact on the firm's worth or total cost of capital. The cost of equity is expected to climb linearly with increased leverage. As a result, neither the weighted average cost of capital nor the overall worth of the company change. The company's total value is unaffected by its capital structure. No matter how much financial leverage is used, the overall cost of capital remains constant because any benefits from debt financing will be offset by higher equity costs.

Investors don't care if the capital structure changes because there isn't an optimal one (Paramasivan & Subramanian, 2009). The underlying presumptions of this technique are as follows:

(i) Debt capitalization rate (Kd) remains constant.
(ii) Overall cost of capital (Ko) remains constant.
(iii) Market value of equity is the residual value.
(iv) Overall capitalization rate depends on Business risk and it is independent to the capital structure.
(v) No corporate taxes and income taxes.
(vi) The use of less costly debt funds increases the rises of shareholders. This causes equity capitalization rate (Ke) to increase.

$$Ke = E/S$$

Where Ke- Cost of equity
E- Earning available to equity share holders
S- Market value of stock

Traditional Approach

According to this approach, an optimal mix of debt and equity capital can reduce the weighted average cost of capital and raise the firm's value up to a certain debt level. Only a range of acceptable financial leverage is covered by the weighted average cost of capital (WACC); beyond that, it starts to climb as financial leverage rises. As a result, when a company's weighted average cost of capital is at its lowest, it has the perfect capital structure and increases its value. A wise mix of debt and equity can increase the firm's value or reduce financing costs (Negasa, 2016). There are methods to increase the firm's value or reduce the cost of capital. With a fair level of leverage, the weighted average cost of capital (WACC) falls as low debt is replaced with costly equity capital. Because of financial leverage and the risk it presents to shareholders, stock prices will increase. Nonetheless, it is generally accepted that the lower cost of debt more than balances the higher cost of equity at a suitable level of leverage.

Modigliani- Miller approach (MM-Approach)

Modigliani and Miller (1958) first proposed that the link between leverage and the cost of capital could be explained using the net operating income technique. They effectively refute the traditional wisdom by offering behavioral support for the overall cost of capital, which remains constant at all leverage levels. These are the presumptions:
(i) Capital markets are perfect.
(ii) No transaction cost, investors are free to sell and buy the securities and they can burrow without any restriction.
(iii) The absence of corporate and personal taxes are assumed Modigliani and Miller removes this assumption later.
(iv) Expected values of the probabilities distribution of expected operating earnings for all future periods are same as present operating earnings.

Determinants of Capital Structure

Earnings per Share (EPS)

Earnings per share (EPS) speak to a company's profitability and is one of the most popular metrics that analysts point to when evaluating a stock. It represents a company's net income allotted to each share of its common stock. Companies tend to report EPS that's adjusted for extraordinary items and potential share dilution. Basic EPS is calculated as:

EPS = (net income - preferred stock dividends) ÷ (outstanding shares)

Basic EPS doesn't factor in the dilutive effect of shares that could be issued by the company but diluted EPS does. These investments can increase the total number of shares outstanding if the capital structure of a company includes stock options, warrants, and restricted stock units (RSU) and they're exercised. The diluted EPS assumes that all shares that could be outstanding have been issued. This is a more conservative way of using EPS and it's often preferred by analysts compared to non-diluted EPS.

Dividends per Share (DPS)

Dividend per share (DPS) is the number of declared dividends issued by a company for every ordinary share outstanding. It's the number of dividends each shareholder of a company receives on a per-share basis. Ordinary or common shares are the basic voting shares of a corporation. Shareholders are usually permitted one vote per share and they don't have any predetermined dividend amounts.

Dividend per share is calculated by dividing the total number of dividends paid out by a company, including interim dividends, over a period by the number of shares outstanding. A company's DPS is often derived using the dividend paid in the most recent quarter which is also used to calculate the dividend yield. DPS can be calculated using the formula:
DPS = (total dividends paid out over a period - any special dividends) ÷ (shares outstanding).

Returns on Assets (ROA)

Returns on Assets, more commonly known as Return on Assets (ROA), is a financial profitability ratio that measures how efficiently a company is using its total assets to generate net income and profit. A higher ROA indicates better asset management and efficiency, with the formula being Net Income divided by Average Total Assets, expressed as a percentage. It's particularly useful for comparing companies within the same industry to assess operational performance and resource allocation.

Empirical Studies

An empirical review identifies gaps in knowledge and effectively fills them by assessing research done on a certain topic by other authors. The empirical literature on capital structure and firms' performance is quite broad, but it often produces inconsistent findings. The empirical literature is divided into categories based on research done in developed and developing countries, with a focus on studies done in Nigeria. In a research employing correlation analysis, it was discovered that there is a negative correlation between debt and profitability. In a similar vein, Arhinful & Radmehr (2023) discovered a bad correlation between

performance and leverage in Ukraine. In a separate study, Ahn et al., (2022) employed regression analysis on firms listed on both the AMEX (American Stock Exchange) and the NYSE (New York Stock Exchange). The findings showed that there was little to no connection between AMEX the financial success of businesses and the level of debt in their capital structures. On the other hand, it was shown that there was a substantial negative association with NYSE corporations.

Empirical Evidence from Nigeria

Using 87 firms out of 216 firms listed on the Nigerian stock exchange over a five-year period (2007-2011) from the perspectives of static trade-off, agency, and pecking order theory, Chandrasekharan (2012) used panel multiple regression analysis. The study finds that, for Nigerian listed firms, the firm's size, growth, and age are significant with the debt ratio of the firm, while profitability and tangibility are not. Capital structure is a trade-off between the costs and benefits of debt, according to Babalola (2014), who used triangulation analysis on 31 manufacturing firms with audited financial statements for a fourteen-year period (1999-2012) from a static trade-off point of view. It has been disproved that large firms are more likely to maintain higher performance than middle firms under the same level debt ratio. In a different study, the capital structure of Nigeria's manufacturing sector is consistent with trade-off theory, and the hypothesis that corporate performance is a nonlinear function of capital structure was tested using regression analysis and a sample of ten firms over a ten-year period (2000-2009) from an agency and statis trade-off point of view. Using three manufacturing firms chosen at random from the food and beverage categories during a five-year period (2007–2011), Akinyomi (2013) applied the static trade-off and the pecking order theory point of view. Using correlation analysis, he found that while long-term debt to capital is significantly and relatively related to return on equity and return on assets, short-term debt to total debt, debt to capital, and debt to common equity are all significantly and positively related to these metrics. He also used return on equity and return on assets to test his hypothesis, which found a substantial correlation between capital structure and financial performance. Taiwo (2012) used the static trade-off, pecking order, and agency theory points of view to examine ten companies listed on the Nigerian Stock Exchange over a five-year period (2006–2010) and found a negative relationship between equity of firms and dividend per share of firms. Ayaz et. al (2021) adopted the Im, Pesaran, and Shine unit root test as well as the Panel Least Square test to arrive at his conclusions, which showed that the sampled firms were unable to make prudent use of the fixed asset composition of their total assets to improve their firms' performance. Bassey et. al (2013) used the agency cost theory to examine a sample of 60 unquoted agro-based businesses in Nigeria during a six-year period (2005–2010) on capital structure performance and found a positive relationship between market price per share and total debt of firms. The study of Iwedi et.al (2020) adopted Ordinary Least Squares regression and descriptive statistics to show that the only factors that significantly influenced both the long-term and short-term debt ratios were the owners' growth and educational attainment. The assets structure, age, gender, and export status had a significant impact on the long-term debt ratios, while the firms' size, profitability, and business risk were the main factors influencing the short-term debt ratio for the firms under study. The comparative study of Riaz et al. (2023) examined the influence of capital structure on firms performance of G-20 firms, using panel OLS and found a positive relationship between capital structure and firms' performance in the long run. Yusuf & Mohammed (2021) examined the impact of government debt on economic growth in Nigeria between

1990 and 2020 and found a negative relationship between government debt and economic growth in Nigeria.

According to the current literature evaluation, the specific topic covered in this study which examines the impact of capital structure on the financial performance of enterprises in the Nigerian manufacturing sector has not yet been comprehensively investigated by scholars working in this field. Thus, bridging this research gap is the aim of our endeavour.

METHODOLOGY

The research method adopted for this work is ex post facto. *Ex post facto* research is ideal for conducting social research when is not possible or acceptable to manipulate the characteristics of human participants. The population of the study include all the 66 quoted manufacturing firms in the Nigeria Exchange Commission (NGX) (NBS, 2023). This was limited to firms classified under conglomerates, industrial goods and consumer goods sector. During the period of this study the bulk of equity and debt from firms, in the Nigerian Exchange Commission, were from the industrial and consumer goods sector (Fijabi, Ajao & Ajibade, 2023).

The sample of this study includes ten (10) leading quoted manufacturing firms in the Nigerian Exchange Commission, from the consumer and industrial goods sector (see Table 1). The purposive or judgmental sampling technique was adopted in selecting the leading manufacturing firms in Nigeria.

Table 1: List of Selected Quoted Manufacturing Firms in Nigeria

S/N	COMPANY	MD/CEO
1	Dangote Group Nigeria plc	Mr. Aliko Dangote
2	Unilever Nigeria plc	Mr. Tim Kleinebenne
3	Nestle Nigeria plc	Mr. Wassim Elhusseini
4	Cadbury Nigeria plc.	Mr. Oyeyimika Adeboye
5	BUA Foods Plc	Dr. Ayodele M. Abioye
6	Lafarge Africa Plc	Mr. Lolu Alade-Akinyemi
7	Flour Mills of Nigeria Plc	Mr. Omoboyede Olusanya
8	PZ Cussons Nigeria Plc	Mr. Dimitris Kostianis
9	Guiness Nigeria Plc	Mr. Girish Sharma
10	International Breweries Plc	Mr. Carlos Coutino

Source: Nigerian Exchange Commission Website, 2025

Data on Equity of firms (EQF), Total Debt of firms (TDF), Earnings per Share (EPS), Dividend per Share (DPS) and Return on Assets (ROA) of selected quoted manufacturing firms in Nigeria were sourced from the Annual Financial Statements, The Nigerian Exchange Commission (NGX) and Nigeria Bureau of Statistics (NBS) for the period under review. These data were measured using market-based measures and accounting-based measures. Accounting-based measures are based on the financial statements of the firm while market-based measures rely on investor perception. This study used ROA, EPS, DPS and MPS to

operationalise firms' performance. The independent variables of this study are capital structure proxy by Equity of firms (EQF) and Total Debt (TDF) of the selected firms. A firm's capital structure shows how the assets of the firm are financed and refers to the combination of debt and equity finance (Ullah et al., 2020).

The Panel Ordinary Least Square (POLS) estimation technique was used to regress the effects of capital structure on firm's performance in Nigeria. This regression model not only investigates if there are relationship between the dependent and independent variables, but also estimates the size of the effect (Jarantow et al., 2023). For a more robust analysis, the fixed and random effects of the models were estimated. The fixed effect estimation is suitable for effective control of the unobserved heterogeneity that may correlate with the independent variables, leading to a more reliable, precise and accurate estimate (Freeman & Weidner, 2023). However, the random effect estimates give room for the addition of random variables in our models, which are relevant to correlated series or when making generalizations beyond the specific groups in our study.

To capture the influence of capital structure on selected quoted manufacturing firms' performance, four econometric models are functionally expressed as:

Model 1: Return on Assets - Equity and Total Debt of Firms

$$ROA = f\,(EQF, TDF) \quad (1)$$

Transforming equation (3.1) into its explicit form;

$$ROA_{it} = a_o + a_1\, lnEQF_{it} + a_{2l}\, lnTDF_{it} + \mathcal{E}_{it} \quad (2)$$

Model 2: Earnings Per Share - Equity and Total Debt of Firms

$$EPS = f\,(EQF, TDF) \quad (3)$$

Transforming equation (3.3) into its explicit form;

$$EPS_{it} = a_o + a_1\, EQF_{it} + a_2\, TDF_{it} + \mathcal{E}_{it} \quad (4)$$

Model 3: Dividends per Share - Equity and Total Debt of Firms

$$DPS = f\,(EQF, TDF) \quad (5)$$

Transforming equation (3.5) into its explicit form;

$$DPS_{it} = a_o + a_1\, EQF_{it} + a_2\, TDF_{it} + \mathcal{E}_{it} \quad (6)$$

Where:

ROA = Return on Assets; EPS = Earnings per Share; DPS = Dividend per Share; MPS = Market Price per Share ; EQF= Equity of Firms; TDF = Total Debt of Firms

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RESULTS

Table 2: Summary of Unit Root Test (At first difference)

Dangote, Unilever, Nestle & Cadbury Nig. Plc					
Test	ROA	DPS	EPS	EQF	TDF
Levin, Lin & Chu (*t-stat.*)	-3.86356 (0.0001)**	-4.36266 (0.000)**	-5.85137 (0.000)**	-4.22494 (0.000)**	-2.64211 (0.004)**
Im, Pesaran and Shin (*W-stat.*)	-1.62432 (0.0422)**	-1.99275 (0.023)**	-1.80567 (0.035)**	-1.75569 (0.039)**	-1.94425 (0.000)
ADF-Fisher (χ^2)	16.2390 (0.0039)**	18.8580 (0.015)**	17.4535 (0.025)**	17.6190 (0.024)**	21.0982 (0.006)**
PP-Fisher (χ^2)	19.4109 (0.0012)**	23.2925 (0.003)**	17.3795 (0.026)**	20.0371 (0.010)**	21.3450 (0.006)**

Source: Author's Computation, using E-views 12

Note: ** (***) denote statistical significance at the 5% (10%) level. The optimal lag length was selected automatically using the Akaike Information Criterion

Table 2 presents the results of the panel unit root tests performed on the series in first differences. The purpose of this test is to verify the existence of additional unit roots, thus determining the order of integration of the series. The results indicate that the difference series are stationary, which implies that the series are integrated at order one, that is, are I (1). Establishing the existence of a long run relationship between returns on assets, dividend per share, earnings per share, equity of firms and total debt of firms of selected quoted manufacturing firms in Nigeria qualifies this study to estimate the Panel Ordinary Least Square (POLS).

Table 3a: POLS Estimation for Selected Manufacturing Firms in Nigeria

Model 1: Returns on Assets Vs Equity of Firms & Total Debt of Firms (ROA vs EQF & TDF)			
Variables	Dangote, Unilever, Nestle & Cadbury Nig. Plc		
	Coefficient	t-statistic	Prob.
C	0.067451	0.054004	0.9572
EQF	4.08E-08	0.721233	0.4753
TDF	1.04E-07	8.219075	0.0000
$ROA\ it = ao + a_1\ lnEQFit + a_{2l}\ lnTDFit + Ɛit$			
Model 2: Earning Per Share Vs Equity of Firms & Total Debt of Firms (EPS vs EQF & TDF)			
	Coefficient	t-statistic	Prob.
C	15.88182	7.062986	0.0000
EQF	-3.13E-07	-3.075890	0.0039
TDF	2.38E-07	10.47439	0.0000
$EPSit = ao + a_1\ EQFit + a_2\ TDFit + Ɛit$			
Model 3: Dividend Per Share Vs Equity of Firms & Total Debt of Firms (DPS vs EQF & TDF)			
	Coefficient	t-statistic	Prob.
C	77.12976	3.634746	0.0008
EQF	-1.13E-06	-1.174639	0.2476
TDF	1.81E-07	0.842075	0.4052
$DPSit = ao + a_1\ EQFit + a_2\ TDFit + Ɛit$			

Source: Author's Computation using E-views 12

Table 3a represents the Panel Ordinary Least Squares (POLS) estimation results for the selected manufacturing firms in the Nigerian Exchange Commission (NGX). Model 1 presents the estimation results, showing the influence of equity of firms (EQF) and total debt of firms (TDF) on returns on assets of the selected firms. A 1 percent increase in EQF will bring about 4.08 percent increase in returns on assets (ROA) while a 1 percent increase in TDF will bring about a 1.04 increase in ROA of the selected manufacturing firms. The results from model 1 show that both EQF and TDF have positive influence on ROA, within the period under study. The results further show that TDF is statistically significant in explaining changes in ROA because its probability value of 0.0000 is less than 0.05. However, EQF is not statistically significant in explaining variations in ROA because its probability value of 0.4753 is greater than 0.05.

Results from model 2 show the influence of EQF and TDF on Earnings per Share (EPS). A 1 percent increase in EQF will bring about 3.13 decrease in EPS while a 1 percent increase in TDF will trigger a 2.38 percent increase in EPS of the selected firms. Both explanatory variables (EQF and TDF) are both statistically significant in explaining changes in the dependent variable (EPS) as their probability values are less than 0.05.

Estimated results from model 3 show the influence of EQF and TDF on Dividend Per Share (DPS) within the period of study. The results show that a 1 percent increase in EQF will bring about 1.13 decrease in DPS while a 1 percent increase in TDF will trigger a 1.31 increase in DPS. EQF and TDF are not statistically significant in explaining changes in DPS because their probability values are greater than 0.05.

Table 3b: Fixed Effect Estimation for Model I

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	8.140002	0.605302	13.44784	0.0000
EQF	-2.83E-07	3.06E-08	-12.89742	0.0000
TDF	1.02E-07	4.00E-09	25.51486	0.0000

Author's Computation, 2025

The fixed effect estimation in table 3b accounts for individual heterogeneity of the model only in the intercept. Thus, it shows that the group-specific effects are fixed. This implies that the variables do not change across the population. The probability values of EQF and TDF are less than 0.05, which means that they are statistically significant in explaining changes in ROA. EQF and ROA are inversely correlated implying that a 1 percent increase in EQF will bring about a 2.83 percent decline in ROA. However, TDF and ROA are positively correlated implying that a 1 percent increase in TDF will bring about 1.02 increase in ROA through leverage. The selected firms were able to generate higher profits than the borrowing cost. Thus, the borrowed funds used in the acquisition of assets generated returns higher than the rate of interest on the debt.

Table 3c: Random Effects Estimation for Model I

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	6.070991	1.346183	4.509781	0.0000
EQF	-3.95E-07	2.79E-08	-10.13584	0.0000
TDF	1.02E-07	4.00E-09	25.61346	0.0000

Author's Computation, 2025

Table 3c presents the random effect estimation for model 1. ROA represents the random variable due to changes in EQF and TDF. Other unobserved factors influencing ROA are captured in the error term of model 1. The coefficient of EQF is negative, implying that a 1 percent increase in EQF will bring about a 3.9 percent decrease in ROA while a 1 percent increase in TDF will bring about a 1.02 percent increase in ROA. The probability values of the coefficient are statistically significant in explaining changes in ROA. Table 4.4c presents the Hausman test to determine which model is more efficient for our analysis.

Table 3d: Hausman Test for Model I

Test Summary	Chi-Sq. Stat.	Chi-Sq. d.f	Prob.
Cross section random	80.069746	2	0.0000
Cross-section random effects test comparison			
Variable	Fixed	Random	Var. (Diff)	Prob
EQF	-0.00000	-0.00000	0.00000	0.00000
TDF	0.00000	0.00000	0.00000	0.00000

Author's Computation, 2025

The Hausman test for model 1 is presented in table 3d. The Hausman test allows the selection of the model more efficient for this analysis. The null hypothesis of the Hausman test is random effect model is more efficient than the fixed effect model. From the figures on table 4.4c, we accept the null hypothesis that the random effect is more efficient. The probability value of the Hausman test results of 0.0000 implies that we reject the null hypothesis and accept the alternative hypothesis that the fixed effect model is more efficient.

Tables 4a, 4b and 4c present the fixed effect estimation, random effect estimation and the hausman test for model 2.

Table 4a: Fixed Effect Estimation for Model 2

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	10.46094	3.084664	3.391274	0.0018
EQF	-2.56E-08	1.56E-07	-0.164048	0.8707
TDF	2.41E-07	2.04E-08	11.83203	0.0000

Author's Computation, 2025

From the estimation results in table 4a, the probability value of TDF is 0.0000 implying that it is statistically significant in explaining changes in EPS. However, EQF is not statistically significant in explaining changes in EPS because the probability value of 0.8707 is greater than 0.05. Furthermore, a 1 percent increase in EQF will bring about a 2.56 decrease in EPS while a 1 percent increase in TDF will bring about a 2.41 increase in EPS for the selected manufacturing firms under study.

Table 4b: Random Effect Estimation for Model 2

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	15.88182	2.012156	7.892939	0.0000
EQF	-3.13E-07	9.12E-08	-3.437329	0.0015
TDF	2.38E-07	2.04E-08	11.70520	0.0000

Author's Computation, 2025

The random variable in model 2 is EPS while the explanatory variables are EQF and TDF. From the estimation results in table 4b, EQF and TDF are both statistically significant in explaining changes in EPS of the selected manufacturing firms, with probability values less than 0.05. A 2 percent increase in EQF will bring about a 3.13 decrease in EPS while a 1 percent increase in TDF will bring about a 2.38 increase in EPS of the selected manufacturing firms.

Table 4c: Hausman Test for Model 2

Test Summary	Chi-Sq. Stat.	Chi-Sq. d.f	Prob.
Cross section random	12.068554	2	0.0024
Cross-section random effects test comparison			
Variable	Fixed	Random	Var. (Diff)	Prob
EQF	-0.00000	-0.00000	0.00000	0.0231
TDF	0.00000	0.00000	0.00000	0.0007

Author's Computation, 2025

The Hausman test estimation results from table 4c show that we can accept the null hypotheses that the random effect model is more efficient than the fixed effect model. The probability values of both variables (EQF and TDF) are both statistically significant in explaining random effects in the dependent variable, EPS of the selected manufacturing firms in Nigeria. The probability value of the Hausman test results of 0.0024 implies that we reject the null hypothesis and accept the alternative hypothesis that the fixed effect model is more efficient.

Table 5a: Fixed Effect Estimation for Model 3

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	73.32290	25.98759	2.821459	0.0079
EQF	-1.02E-06	1.31E-06	-0.772167	0.4453
TDF	2.10E-07	1.72E-07	1.226041	0.2286

Author's Computation, 2025

Table 5a presents the estimated results for model 3. EQF and TDF are both not statistically significant in explaining changes in DPS for the selected manufacturing firms. Furthermore, a 1 percent increase in EQF will bring about a 1.02 decrease in DPS. However, a 1 percent increase in TDF will bring about a 2.1 increase in EPS. Table 4.6b presents the random effect estimation of model 3.

Table 5b: Random Effect Estimation for Model 3

Variable	Coefficient	Std. Error	t-stat.	Prob.
C	77.12976	16.95194	4.549906	0.0001
EQF	-1.13E-06	7.68E-07	-1.470391	0.1499
TDF	1.81E-07	1.71E-07	1.054094	0.2987

Author's Computation, 2025

From table 5b the random variable is DPS and TDF and EQF as explanatory variables. Both explanatory variables are not statistically significant in explaining changes in DPS because their probability values are both greater than 0.05. Furthermore, a 1 percent increase in EQF will bring about a 1.13 percent decrease in DPS of the selected manufacturing firms while a 1 percent increase in TDF will trigger a 1.81 increase in DPS. Table 4.6c presents the Hausman test estimation for model 3.

Table 5c: Hausman Test for Model 3

Test Summary	Chi-Sq. Stat.	Chi-Sq. d.f	Prob.
Cross section random	23.291980	2	0.0000
Cross-section random effects test comparison			
Variable	Fixed	Random	Var. (Diff)	Prob
EQF	-0.00001	-0.00001	0.00000	0.9148
TDF	0.00000	0.00000	0.00000	0.0000

Author's Computation, 2025

The Hausman test estimation results from table 5c show that we can accept the null hypotheses that the random effect model is more efficient than the fixed effect model. The probability value of TDF is statistically significant in explaining random effects in the dependent variable, EPS of the selected manufacturing firms in Nigeria, while EQF is not statistically significant because the probability value of 0.9184 is greater than 0.05. The probability value of the Hausman test results of 0.0000 implies that we reject the null hypothesis and accept the alternative hypothesis that the fixed effect model is more efficient.

DISCUSSION

In model 1, the independent variables, Equity of Firms (EQF) and Total Debt of Firms (TDF), both have positive influence on Returns on Asset (ROA) of the selected firms. This implies that EQF provided steady flow of capital and reduced the financial distress risk of the selected firms, which ultimately aided better decisions and higher profitability (Banabo & Aganaba, 2024). Furthermore, the firms' creditworthiness was enhanced, which made them access debt financing much easier and hence, expand their operations and Returns on Assets (ROA) (Arhinful & Radmehr, 2023). Total Debt of Firms (TDF) provided huge

capital base for investment, acquisition of new assets, or expand existing operations, increase profitability and hence, ROA for the selected manufacturing firms (Obuya, 2017).

In model 2, the independent variable, EQF is negatively correlated with the dependent variable Earnings per Share (EPS). This implies that the former diluted the ownership and hence, reduce the values of existing shares. This is due to the fact that more shares vying for same amount of net income, decreased earnings for each share. However, TDF is positively correlated with EPS. This implies that TDF increased profitability by reducing the cost of capital of firms. This is possible because the payments of interest on debt was deducted from taxes, which reduces the general burden of tax and hence increase profits after taxes (Fischer & Jensen, 2024). Furthermore, total debt of firms increased the returns to equity shareholders because the firms' operating income was greater than the expenses on interest (Ahmed et al., 2024). This is called financial leverage.

In model 3, the dependent variable, EQF is negatively correlated with the dependent variable Dividend per Share (DPS). The high dividend payout percentage negatively influenced equity value by a reduction in firms' re-investment (Arhinful et al., 2024). However, TDF is positively correlated with DPS. This implies that the increased debt ratio of the selected firms brought expansion in operations, increased profitability and higher Dividend per Share (DPS) for the selected manufacturing firms (Iwedi et al., 2020).

CONCLUSION

It is pertinent to understand the effects of a mix of debt and equity on firms' performance in the Nigerian Exchange Commission (NGX). This is because an optimal capital structure minimizes capital cost and maximizes profits. To achieve a sustainable profitability, there must be a balance between the benefits of debt and the associated risks with excessive leverage. When optimally fixed, leverage can increase the earnings of firms, especially when their operating income (earnings before taxes and interest) are higher than their interest payments with additional profits. The capital structure of the firms has influenced their performance significantly, through returns on assets, earnings per share and dividend per share. However, it is also pertinent to balance the risk of debt and profitability. This is because a balanced capital structure is a trade-off between higher profits potential and the associated risk from rising debt. Furthermore, a flexible capital structure allows firms to adapt to the dynamic conditions of the market and economic shocks. In a nutshell, the selected firms' capital structure was significant in explaining changes in their financial performance during the period of study. Through the strategic management of their equity and debt mix, the firms can optimize cost of capital, returns on assets, earnings per share, dividend per share and market price per share.

RECOMMENDATIONS

i. To enhance returns on assets through an optimal mix of equity and debt financing, firms should strategically utilize debt to leverage returns, utilize assets optimally and effective manage their capital

structure. Equity provides sustainable access to strategic resources and partnerships while debt permits investment beyond the firms' owned capital.

ii. To enhance firms' earnings per share through debt and equity financing, policy measures to increase profitability and decrease the number of outstanding shares should be pursued. Increasing the earnings per share through debt financing is possible if only the returns on assets financed by debt are higher than the interest cost on such debt. However, equity financing can boost earnings per share when the increased profits arising from new equity are higher than dilutive impact of the new shares.

iii. To enhance firms' dividend per share through equity and debt financing, firms should leverage debt to increase earnings and distribute a percentage of the increased earnings as dividends to shareholders. This strategy is best when the cost of financing the debt is much lower than the expected return on the funded investment.

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