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Effect of Financial Structure on Financial Performance of Listed Industrial Goods Companies in Nigeria

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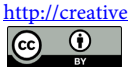

Abstract

This study investigates the effect of financial structure on the financial performance of listed industrial goods companies in Nigeria. The study adopted a population of all 13 listed industrial goods companies on the Nigerian Exchange Group and employed ex post facto research design method covering the period of 2013 to 2023. Secondary sources of data were collected, which included financial reports of the 13 listed industrial goods companies. Data collected was analyzed using Panel Least Square regression. The findings revealed that all three financial indicators have a negative and statistically significant effect on financial performance. This accounts for R2 value of 0.78. It is then recommended that the management of industrial goods companies should first consider internal financing such as shareholder's capital and retain profit before short-term debts (short term bank loans) and long-term debts.

Subject Areas

Business Finance, Business Management

Keywords

Financial Structure, Long-Term Financing, Short-Term Financing, Financial Performance, Return on Asset (ROA)

1. Introduction

1.1. Background to the Study

In recent times, the effect of financial structure and organizational performance has remained one of the most prevalent and discussed issues in corporate financial management literature since the seminal publication by the two American finan-

cial economists Franco Modigliani and Merton Miller in 1958 [1]. Consequently, this has continued to attract renewed interest among researchers and practitioners in different economies such as Nigeria due to the nascent nature of its financial system [2]. The developing nature of the Nigerian financial system makes financial structure an utmost factor in firms' financing and investment commitments. Financing and investment decisions are two major strategic decisions that fundamentally determines the efficiency of firms' risk minimization and returns maximization strategy; hence, their survival, growth and development in the dynamically competitive marketplace coupled with limited financial resources [3].

The relative composition of debt and equity in structuring a firm's (especially limited liability firms) capital has become a puzzle in capital investment decisions since Franco Modigliani and Merton Miller (popularly referred to as M & M) groundbreaking research papers in 1953 and 1963 on the theorem of financial structure. Although the MM theorem argues that financial structure, based on certain assumptions (such as the absence of tax, transaction cost, borrowing cost, floatation cost and corporate dividend tax as well as symmetry of information), is irrelevant to overall firms' value. Majority of documented studies have argued that, financial structure does not only mirror a firm's financial policy but it also influences profitability and shareholders' wealth because of the presence of tax, transaction cost, borrowing cost, floatation cost, corporate dividend tax as well as symmetry of information especially in most financial markets including Nigeria.

Consensually, poor financial structure inevitably leads to financial distress and consequently bankruptcy, hence, an appropriate mix of debt and equity reduces agency costs and increases returns. However, there has not been agreement-in-literature on how a firm can achieve optimal capital structure, because each of the major sources of finance (debt and equity) offers complimentary merits and demerits. For instance, while the usage of debt provides tax-shield and acts as managerial disciplinary measure leading to an increase in cash-flow, yet it can lead to financial distress and possibly bankruptcy. On the other hand, equity usage requires no obligatory repayment, thus, no possibility of bankruptcy, though it can lead to dilution of control [4].

1.2. Statement of the Problem

Apparently motivated by the relative merits of both debts and equity, evidence from published literature has shown clearly that while there is a consensus on financial structure and firm performance relationship, the nature and significance of such relationship as well as the direction of causality has not only remained a bone of contention (theoretically, empirically and even practically). It has continuously become an enigma in corporate financial economies, most particularly within the context of developing market economies in which Nigeria is not exempted. Also, a close analysis of the financial statements of listed industrial goods companies in Nigeria reveals that they considerably use both debt-financing and equity-financing in their capital structure. However, a closer analysis of the rela-

tive sizes (weight) of both financing sources, based on reported figures in their financial statements, shows that debt-financing remains slightly higher for most listed industrial goods companies. The costlier nature of raising equity-capital and dilution of ownership capable of complicating future decision-making are plausible reasons for debt-capital preference. Nevertheless, the high-leverage position of these firms makes them prone to agency costs (bankruptcy cost or financial distress) that can eventually crystallize into drains on their scarce financial resources.

1.3. Objectives of the Study

This research seeks to achieve the following objectives:

a. investigate the effect of debt-equity financing on return on asset of listed industrial goods firms in Nigeria.

b. examine the effect of short-term debt-financing on return on asset of listed industrial goods firms in Nigeria.

c. determine the effect of long-term debt-financing on return on asset of listed industrial goods firms in Nigeria.

1.4. Research Hypothesis

This study is guided by the following null hypotheses:

a. H01: Debt-equity financing has no significant effect on return on asset of listed industrial goods firms in Nigeria.

b. H02: Short-term debt financing has no significant effect on return on asset of listed industrial goods firms in Nigeria.

c. H03: Long-term debt financing has no significant effect on return on asset of listed industrial goods firms in Nigeria.

2. Literature Review

2.1. Concept of Financial Structure

Globally, companies need funding for their operational sustainability. Usually referred to as capital, the funds source and its availability determines earning ability of firms. Prominently, two sources (namely, internal or external) exist to generate the much-needed capital for firms. According to [5], while internal sources (such as retained earnings) connote funds raised within a firm, external funds (such as equities and debts) connote funds generated outside a firm. Within these two ubiquitous financing sources, economists and financial experts have been arguing on how the proportion of each financing source maximize shareholders' wealth and ensure cost minimization of capital towards ensuring firms' performance [6]. This is commonly referred to as optimal debt-equity structure.

Debt-financing refers to funds raised through the sale of bonds, raising mortgages, or raising loans from financial institutions (such as banks). Basically, debt-financing comes from two major sources, namely, long-term, and short-term debt financing. Long-term debt-financing refers to financing sources that extend over

a year, while the short-term debt-financing is less than a year [7]. Equity-financing on the other hand, refers to method of financing arising from the sale of firms' shares, usually in stock exchange market. This implies, through equity-financing, interested members of the public can own a portion of a firm's ownership [8].

Debt-financiers possess minimum control concerning the management of a firm, although they are contractually bound to be paid before any class of capital provided is paid returns on investments. Their returns on investment are fixed. On the other hand, equity-financiers are the main controller of a firm through their voting rights. Though they are the residual receivers of a firm's income after each, and every class of capital-providers has been paid; they are the highest risk-bearer and their returns on investments (called dividends) are not fixed.

Short-term debt financing refers to the utilization of financial instruments (usually loans) to finance business activities within a term of less than one year. It simply means business financing from short-term sources; it is also referred to as working capital financing [9]. Short-term finance is one of the primary functions of finance that manages the demand and supply of capital for an interim period [10]. The key part of the short-term financing component is the time aspect, as short-term equates to 12 months or less. The commonly used type of this form of financing is trade credit, which refers to when credit is granted by a supplier who allows payment to be made later. Funds are also sourced from the banks for short-term loans.

Long-term debt financing is regarded as a financial instrument with maturity exceeding one year such as bank loans, bonds, leasing and other forms of debt financing, it also includes public and private equity instruments, maturity refers to the length of time between the origination of a financial claim (loan, bond, etc.) and the final payment date at which point the remaining principal and interest are due to be paid [11]. Extending the maturity structure of finance is often considered to be at the core of sustainable financial development. Long-term financing contributes to faster growth, greater welfare, prosperity and enduring stability by reducing rollover risks for borrowers and by increasing availability of long-term financial instruments. Long-term financing shifts risks to the providers because they have to bear the fluctuations in the probability of defaults and changing conditions in the financial markets.

Size in corporate settings refers to total assets. This is defined as the aggregate resources used by a company it its day-to-day operations [1]. Basically, two basic types of assets have become important in a company's life, judging by what is domiciled in virtually all the consumer goods firms' reports: current and fixed assets [12]. The current assets (such as cash, and its equivalents, stock, pre-paid liabilities, accounts receivables including other liquid assets) connote assets which are either cash or can be easily converted into cash in less than a year vis-à-vis the standard business operations. The fixed assets on the other hand entail assets that are usually held by companies for more than a year. They usually last above three years. They are assets (such as lands, equipment, and buildings etc.) that cannot be easily/quickly converted into cash. The assets (current or fixed) occupy a strategic

importance in a corporate life. In fact, there is no gainsaying to the fact that, management's ability to deliver expected results largely depends on the assets at their disposal, because effective utilization of these assets largely determines corporate fiscal earnings [3].

2.2. Concept of Financial Performance

Performance in financial and management parlance, though a multidimensional concept, refers to the subjective evaluation of a firm's resource utilization efficiency, or goals actualization degree, and so on [13]. [14], posits that, of all financial performance indicators, profitability performance has received wider recognition especially in corporate financial literature. The major objective of every firm is to generate enough profit to remain in business and grow. This implies that without enough profits, no firm can even achieve its strategic objective. There is no gainsaying that among the corporate performance indicators (such as liquidity, solvency and efficiency), profitability assumed the topmost importance because of its far-reaching and extensive effect on other financial performance indexes.

The centrality of profitability to every business function makes it to be a general measure of managerial efficiency. Although profitability is a nebulous construct; thus, meaning different things to different people, however, one common position is that it is an amalgam of two terms, namely, profit and ability [15]. The former is a relative concept, the latter an outright subtext. The profit connotes the ability to generate more income than costs [16]. In other words, a firm's ability to ensure that its revenues outweigh its expenditures (or expenses). Mathematically, profit is what is left after total expenses are deducted from total revenue. However, profit and profitability connote two separate things; while the excess of revenue over cost is called profit, profitability connotes the consistency in profit generation. Simply put, ability to make profit consistently [17]. This means the fact that a firm reports a profit does not mean that it is profitable; that, profit does not connote profitability, but profitability connotes profit. Profitability signals the future survivability and competitive advantage of a firm because it leads to, ceteris paribus, expansion of business, increase in earnings to shareholders and market-value of a firm's share.

Return on Asset (ROA)

Generally, management, especially listed firms, strive to ensure profitability because it is the foremost indicator of their performance. Thus, whenever the annual reports and accounts are released, stakeholders (investors and shareholders) hurry to grab a copy and examine the profitability of their firms. In assessing profitability of listed firms, most documented studies commonly rely on ratios because of the believe that it unveils salient information which are usually difficult to obtain using prima facie figures in the annual reports and accounts. To this end, common ratios used especially by debt-equity proportion studies are the Returns on Investment (ROA) and Return on Equity (ROE). ROA expresses the financial relation-

ship existing net profits and total assets, while ROE reveals the relationship between net profits and total equity. Specifically, ROA indicates how managers use each unit of assets to generate returns. The higher the values of the ROA, the higher the managerial efficiency in terms of assets utilization. Based on the general application of ROA in financial structure studies [18] and their relevance to the current study, consequently, ROA is used in this study to be the profitability metric (See Figure 1).

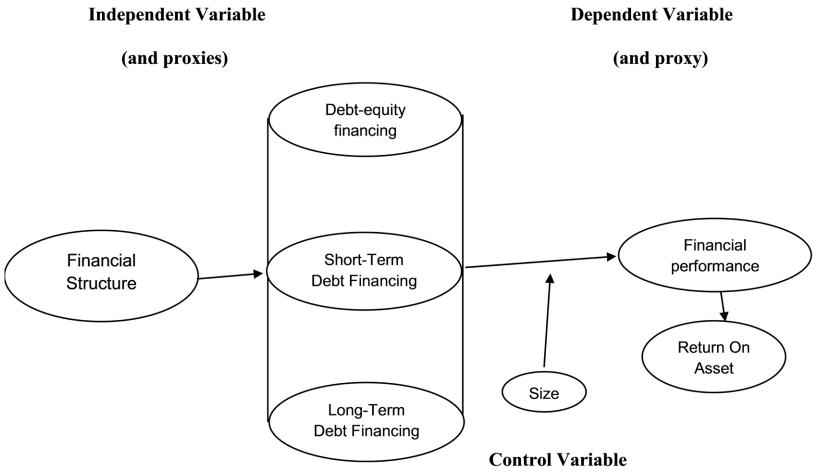

Figure 1. Conceptual framework.

2.3. Theoretical Review

The following theories were reviewed during the course of this study.

2.3.1. Irrelevancy of Debt-Equity Proportion Theory

The irrelevancy (or insignificancy) of debt-equity proportion theory was propounded in the 1958 groundbreaking publication of Franco Modigliani and Merton Miller theory (commonly called the MM theory). Specifically, the MM hypothesis stresses that the debt-equity relationship (whether debt is more than equity or otherwise; or that debt is solely used, or equity is solely used) does not affect firm's value. Considering the fact that the firm's value is not determined by its dividend policy or its capital raising decision through the sale of stock/debt, thus, the MM hypothesis is fondly referred to as the capital structure irrelevancy principle. The MM theory is premised on the assumption that a perfect capital market exists. In a perfect capital market, information is freely accessible by insiders and outsiders.

Also, there is absence of transaction, bankruptcy, floatation costs and taxation. In view of these, MM maintains that whether a firm is highly levered or lowly levered, it has no bearing on its market value but instead, the operating income, besides investment risks, influence a firm's market value. In other words, MM theory advocates that firm's value should be uniform with its market value including its weighted average capital cost because the firm's value is endogenously determined by the operational risks and returns and not the structure of its financing opera-

tions [19].

The MM theory of capital structure latter (in 1963) acknowledged and factored in, the existence of corporate tax due to its tax-shield benefit and that debt servicing can reduce corporate tax and firm value. Though, the MM theory gained prominence at the early stage and succeeded in reshaping modern philosophy of corporate finance, however, its validity has however short-lived by its apparent shortcomings [20]. The singular fact that, there is no perfect capital market anywhere in the world invalidates the credibility of the MM theorem, hence, its assumptions are unrealistic.

2.3.2. Trade-Off Theory

This theory was advocated by Myers (1977). Trade-off theory states that opportunity cost exist between additional debts and higher indebtedness costs. Trade-off theory encourages firms to take on more debts and lower their equity usage, because of the existence of tax-relief. According to advocator of this theory, trade-off theory states that, in view of the existence of imperfect capital market, firms should ensure a trade-off between the risks and returns in order to ensure optimal debt-equity structure. Optimal debt-equity structure is achieved when net tax-advantage of debt-financing leverage implicit cost with the assumption that both firm's assets and investment decisions are noon-existing. By trade-off, it means that a firm should not only mix debt and equity but should also ensure that they balance costs and benefits [21].

Two forms of trade-off theories have been identified in literature, namely, the static and dynamic trade-off theory [22]. While the former theory, agrees with the existence of optimal debt-equity proportion, the latter does not agree with this, rather it recognizes the importance time (that is, financing margin and future anticipation). The time of debt payment by some firms is always the same with the time some firms want to raise debts, some firms may even want to pay and raise another debt at the same time. This, therefore, increases the treat of high financing in the future. Nevertheless, it enables firms to plan for their optimal level ahead. Due to its realistic template, the dynamic trade-off theory has found wide empirical acceptance than the static theory [23]. Trade-off theory is not without certain assumptions. The singular fact that theory encourages higher use of debts for firms makes the problem of financial distress and bankruptcy issues part and parcel of trade-off theory.

2.3.3. Agency Cost Theory

This theory was developed by Jensen and Meckling (1976). This theory postulates that the usual conflict of interest arising from the normative principal-agent disagreements can be resolved using debt-equity proportion. Organizationally, a firm has different stakeholders (employees, management, shareholders and creditors) with different and sometimes conflicting interests, the failure to balance these differing interests can affect the way a firm is managed and consequently affect its performance. Although, there are different stakeholders (divided majorly into in-

ternal and external stakeholders), the major stakeholders a firm has are the shareholder (internal stakeholder) and debtholders (external stakeholder). Each of these interest group has its preference and objectives. Consequently, when determining appropriate financing method, there is need to strike a balance to ensure that each major interest group (shareholders and debtholders as well as managers) are well compensated. In unifying the divergent interests, appropriate debt-equity structure considers the varying interests and ensures that balance ensues.

The agency cost theory stresses that when determining debt-equity structure, agency cost arises. The agency cost is between the shareholders and managers on the financing mode to be employed; while shareholders, due to their aversion to dilution of control, prefer debt-financing to raise fresh stocks, however, the management on the other hand, prefers fresh equity capital to debt-financing because debt-financing prevents managerial opportunism and discourage empire-building [24].

2.3.4. Selected Theory

This study adopted the trade-off theory on relevance to the effect of financial structure on financial performance of listed industrial goods companies. The trade-off theory was postulated by Myers (1977). It maintains that, in the use of each financing source, a firm should strike a balance between the costs and benefits of each financing source since no single one is the best. Debt-financing attracts tax-benefits advantage but a financial distress cost as well as bankruptcy cost of debt, hence, the marginal benefit of debt-usage falls as its use increases while the marginal cost falls. Therefore, a firm need to trade-off on its debt and equity usage. Critiques of the theory such as [25] state that the theory focuses primarily on financial considerations such as tax benefits and cost of financial distress thereby neglecting non-financial factors like corporate governance and social responsibility. The Trade-off theory is relevant to this study as it predicts that the optimal capital structure exists and is determined by the achievement of balance between tax benefits and cost of debt considering other variables constant [26].

2.4. Empirical Review

Substantial empirical evidence exists on financial structure, debt-equity proportion and firm performance in Nigeria and beyond. More recently, [27] relied on annualized panel data collected between 1999 and 2018 to determine the effect of financial structure measures on fifteen quoted non-financial firms' performance. It was found that short-term debt to total asset ratio, long-term debt to total asset ratio and total debt to total asset ratio significantly influence performance measures (returns on equity and Tobin's Q). However, long-term debt to total asset ratio, debt-equity ratio and total debt to total asset ratio exhibited significant negative effect on return on assets. However, a related study by [28] investigated how financial leverage impact performance of quoted Nigerian pharmaceutical firms, contradicted [27]. The authors applied econome-

ric methods to analyze the panel data obtained from audited firms' financial statements between 2003 and 2018. Findings reveal that while debt-to-equity ratio positively affects returns on assets and returns on equity significantly, debt ratio and interest coverage ratio both exhibited negative effect on the performance indicators significantly.

[29], conducted a study with emphasis on pharmaceutical companies, the study looked at "financial structure and financial performance of companies in the pharmaceutical industry." The study's main goal was to see how capital structure affected the companies' financial performance. Ex-post facto research was used because the study is a longitudinal survey. Data was analyzed using the generalized method of moments (GMM) and vector Error Correction Model. Short-term debts have a considerable impact on bank profitability in the short term, while long-term debt have a major impact in the long run, according to the study's findings. Furthermore, profitability as assessed by ROA was discovered to be negatively related to both short-term and long-term debts. The findings reveal that there is the need to focus on internal sources of finance.

[30], studied the impact of financial structure on firm's value in Nigeria. According to the findings, there is a link between debt-equity proportion and business value, as evaluated by Tobin's Q. The study's universe is Nigeria's publicly traded enterprises, with the Nigerian Exchange Group serving as the representative sample. The data comes from financial statements of the companies. This research used a balanced panel of data to examine the same group of enterprises throughout a 5-year period from 2011 to 2014, resulting in 65 companies and 325 observations.

[31], in their focus on the impact of financial structure and performance of selected Nigerian multinational firms from 2012 to 2016. They employed return on asset and firm growth rate as proxies of company financial success, while short term and long-term financing were used as proxies of corporate governance. Secondary data gathered from four global corporations was evaluated using static panel estimate techniques. While long term financing had a considerable negative influence on return on assets, long-term had no effect. The study's findings also revealed that long term financing has a negligible impact on a company's growth rate.

[32], looked at the impact of debt-equity financing on financial performance in Nigerian banking and found that the proportion of the capital structure mix has a strong positive effect on financial performance, implying that management commitment to firm performance is closely linked to their choice of debt-equity ratio.

The influence of financial structure on profitability of selected consumer goods companies in Nigeria was studied by [33]. The researchers used a 13 consumer goods companies in a longitudinal study. Using multiple regression, the data was analyzed. The profitability of consumer goods companies was discovered to be linked to long-term and short-term debts. The proxies were found to be significantly re-

lated to the profitability of the Deposit Money Banks.

[34], examined how financial structure contributes to firm's financial performance. Financial structure was measured using long-term debt short-term debt, and size, while financial performance was measured using ROA, ROE, and Earnings per share, Price Earnings ratio. The study used a descriptive-undiagnostic approach to its investigation. From 2009 to 2013, the top five automobile firms in India were chosen based on market capitalization. Secondary data from the PROWESS database was used in the research. The data was analyzed using multiple regression analysis. For all performance indicators, neither the size of the board nor the frequency with which it met were statistically significant.

To determine the impact of financial structure on the financial performance of deposit money banks (DMBs) in Nigeria, [35] researched "financial structure and financial performance of deposit money banks in Nigeria." They adopted a longitudinal survey using panel data and used Hausman test and other econometric tools to analyze the data. Deposit Money Bank's financial success was found to be favorably connected to capital structure.

Debt-equity capital structure in the Nigerian consumer goods sector was studied by [36]. Debt-equity proportion, short-term debt and long-term debts were used to assess capital structure, whereas ROA was used to determine performance. A longitudinal study methodology was used to collect data from financial statements of publicly traded consumer goods companies. Data was analyzed using the least squares method. Consumer goods companies' performance in Nigeria has been found to be influenced by the proportion or mix of capital structure.

With a focus on selected firms listed at the Nairobi Securities Exchange, [37] investigated financial structure and its effect on the Financial Performance of a select number of firms listed in Nairobi Securities Exchange. Purposive sampling was used to choose five firms, and secondary data was taken from their financial statements to compute key financial ratios (ROA and ROE). A regression analysis was performed on the data. Financial structure was found to have a significant relationship with ROA and likewise found to have a substantial positive relationship with ROE.

[38], conducted a multi-sectoral analysis of the effectiveness of financial structure practices adopted by insurance firms over two reform periods of 2012 - 2013 and 2015 - 2016. Only in the 2012 - 2013 era does the analysis find that post-reform implications of financial structure to have a meaningful impact on financial performance.

Also, [39] studied the effect of capital structure and profitability in the textile sector of Pakistan. Panel data, pooled regression, fixed effect regression, and random effect regression were all employed in the research. According to the findings, financial structure proxied by debt and equity proportion is the single most important factor influencing profitability in the textile sector. According to the findings, the right combination of debt and equity and the proper business strategy, boosts firm's profitability.

Literature Gap

Based on the review carried out of empirical studies, two research gaps were identified based on population and theoretical framework adopted.

The first gap identified is that most of the previous studies reviewed made use of pharmaceutical, consumer goods and conglomerate firms as the population of their study. Therefore, this led to the adoption of listed industrial good firms as the population of this study.

The second gap identified is in the theoretical framework adopted by previous research that was reviewed. Most of the previous works done were hinged widely on the pecking-order theory or the agency cost theory. This research underpins the trade-off theory which implies that opportunity cost exists between additional debts and higher indebtedness costs, it encourages firms to take on more debts and lower their equity usage.

3. Methodology

This chapter reviews the general method of investigation that was adopted for the study and provides information on the research design, methods of data collection and type of data used in the research work and finally a method of data analysis employed.

3.1. Research Design

This study adopts an ex-post facto (after-the-fact) research design which is an alternative to classical experimental (quasi) methods for establishing causal relationships between events and circumstance, it explains how an independent variable affects a dependent variable [40]. The justification for using ex-post facto is that the study utilizes existing quantitative data on past events for which the relevant variables cannot be manipulated. For this reason, both the dependent and independent variables are observed between 2013 and 2023 period. The population of the study comprises the industrial goods companies listed in the Nigerian Exchange Group as of 31st December 2023. All thirteen companies form the sample of this study as it adopts a census sampling technique.

3.2. Sources and Methods of Data Collection

This study was based on secondary source obtained from the annual financial statements of the selected listed industrial goods' companies from 2013 to 2023. The data extracted for financial structure are debt-equity financing, short-term debt financing, and long-term debt financing while for financial performance, the profitability (conceptualized by ROA) was used. Also, data was generated on the intervening variable (size).

It is important to state that, this study made use of panel data—an amalgam of both time-series ("i") and cross-sectional ("t") observations. Data obtained from a firm's financial statements and accounts is only a time-series data; but data collected across different firms is cross-sectional data. The adoption of panel data

was considered pertinent because of its consideration for overlooked individual-firm specific-effects that are potentially collinear with other exogenous variables factored into model development. Hsiao and Wang (2010) posited that, panel data integrates inter-individual and intra-individual dynamics towards bolstering the accuracy of model parameters inferences, reducing the misplaced variables likelihood towards the simplification of empirical deductions.

3.3. Model Specification

Model specification involves the determination of the dependent and explanatory variables in a model.

In line with the hypotheses of this study, the functional model using relevant proxies to the study is as follow:

$$ROA_{it} = f\ (DEF_{it}, STDF_{it}, LTDF_{it}, SIZ_{it}) \qquad \text{eqn-(1)}$$

The functional specification model (eqn-1) is econometrically rewritten as follows:

$$ROA_{it} = \beta_0 + \beta_1\ DEF_{it} + \beta_2\ STDF_{it} + \beta_3\ LTDF_{it} + \beta_4\ SIZ_{it} + V_{it} \qquad \text{eqn-(2)}$$

Where:

f = functional relationship

t = time-series observations of the variables

i = cross-sectional observations

0 = Intercept of relationship in the models

$V = a_i + \varepsilon_{it}$ (composite error)

ROA = Return on Asset

DEF = Debt-Equity Financing

STDF = Short-Term Debt Financing

LTDF = Long-Term Debt Financing

SIZ = Size

3.4. Method of Data Analysis

Panel data obtained were empirically analyzed using both descriptive and econometric techniques. The use of both methods is to obtain deeper insight into the data components and characteristics. Estimation techniques were employed to test the data obtained from the financial statements.

The estimation techniques cover the correlation and regression analysis. For the regression analysis, the panel least square was adopted to account for individual heterogeneity since the data used has a time-series and cross-sectional data properties. The Hausman Test was conducted to select the suitable model between fixed effects and random effects.

4. Data Presentation, Interpretation and Analysis

4.1. Pre Estimation (Descriptive) Analysis

Table 1 indicates the descriptive analysis to unveil the descriptive nature of the

data. The result shows that ROA has an average of 2.36 and a std. dev. of 5.43. This means that some of the sampled firms performed impressively, and this explains the wide variation in their ROAs. The financial implication of this is that some of the firms have excellently made use of their assets to generate higher returns. This is supported by the wide range between the max. and min. values of 30.25 and −10.51. ROA is positively skewed with a value of 3.20 which suggests the occurrence of major fluctuations during the research period.

Additionally, the DEF shows a mean and std. dev. values of 9.48 and 25.44, the implication of which is that the selected companies have shown wide deviation with regards to the debt-equity proportion. Therefore, the insinuation of whether their capital structure is ineffectual cannot be supported. The DEF is positively skewed with a value of 6.83 which suggests the occurrence of major fluctuations during the research period.

Furthermore, the STDF shows a mean and std. dev. values of 7.32 and .55, the implication of which is that the selected companies shave shown wide deviation with regards to the short-term funds. Therefore, the insinuation of whether their capital structure is ineffectual cannot be supported. The STDF is negatively skewed with a value of −1.72 which suggests the occurrence of major fluctuations during the research period.

The descriptive table (See Table 1) shows that LTDF has a mean and std. dev. values of 5.67 and .76; this implies that the sampled firms have not maintained wide debts usage, not as much as the STDF. Within the financial context, it can be posited that the sampled firms are similar in their long-term debt usage which is usually in form of bank loans as there is no developed debt market in Nigeria. The LTDF is negatively skewed with a value of 1.83 with a leptokurtic value of 5.99 which suggests the occurrence of major fluctuations.

Lastly, the SIZ has a mean and std. value of 5.88 and 0.44. This means that the companies' total assets have not shown any much deviation. In other words, the companies' total assets are much closer (in values). The SIZ is negatively skewed with a value of −0.42 which suggests the nonoccurrence of major fluctuations.

Table 1. Descriptive statistics.

	ROA	DEF	STDF	LTDF	SIZ
Mean	2.362700	9.480711	7.324325	5.673513	5.878471
Std. Dev.	5.428203	25.43564	0.553953	0.755288	0.438171
Skewness	3.201268	6.830129	−1.722957	−1.830440	−0.423311
Kurtosis	17.59025	49.21821	4.745533	5.999969	1.841921
Probability	0.000000	0.000000	0.000000	0.000000	0.094606
Observations	110	110	110	110	110

Source: Author's computation (2025).

4.2. Estimation Analysis

4.2.1. Correlation Analysis

Table 2 highlights the correlation statistics which establishes the association and the nature of the relationship between the research variables. From the correlation result, DEF demonstrated a positive relationship of 0.156 with STDF; implying that there exists a significant positive relationship between DEF and STDF such that increase in DEF by 15.6% will lead to increase in STDF by the same value. Furthermore, DEF has a positive correlative value of 0.392 (with a p-value of 0.013) with the LTDF; implying that there exists a significant relationship between the DEF and LTDF such that increase in DEF by 39.2% will lead to increase in LTDF by the same value. On the other hand, the DEF reveals a positive relationship value of 0.269 (with p-value of 0.027) with the ROA; implying that there exists a significant positive relationship between the DEF and ROA such that increase in DEF by 26.9% will lead to increase in ROA by the same value.

Also, STDF has a positive correlative value of 0.215 with the LTDF; implying that there exists a significant relationship between the STDF and LTDF such that increase in STDF by 21.5% will lead to increase in LTDF by the same value. On the other hand, the STDF reveals a positive relationship value of 0.105 with the ROA; implying that there exists a significant positive relationship between the STDF and ROA such that increase in STDF by 10.5% will lead to increase in ROA by the same value.

More so, the LTDF shows a value of 0.198 with the ROA; implying that there exists a significant positive relationship between the ROA such that increase in LTDF by 19.8% will lead to increase in ROA by the same value. More so, the LTDF indicates a correlation value of 0.392 with the DEF; implying that there exists a significant relationship between the LTDF such that increase in LTDF by 39.2% will lead to increase in DEF by the same value. Lastly, another descriptive evidence from the correlation result above is that the SIZ indicates a value of 0.977 with the ROA; implying that there exists a significant positive relationship between SIZ and ROA such that increase in SIZ by 97.7% will lead to increase in ROA by the same value.

Table 2. Correlation analysis.

	ROA	DEF	STDF	LTDF	SIZ
ROA	1	−0.269*	0.105**	0.198	0.977
DEF	−0.269*	1	0.156	0.392**	0.459**
STDF	0.105**	0.156	1	0.215	0.211
LTDF	0.198	0.392**	0.215	1	0.145
SIZ	0.977	0.459**	0.211	0.145	1
N	110	110	110	110	110

Source: Author's computation (2025).

4.2.2. Regression Analysis

Selection of Appropriate Panel Data Analysis

Hausman Specification Test provides the basis for selecting the appropriate model (fixed or random) which is best suitable for analyzing the model. The null hypothesis underlining the Hausman test is that the fixed effects and random effects estimators does not differ substantially. If the null hypothesis is accepted, the conclusion is that the random effects model is the appropriate model. If rejected, the conclusion is that the random effects model is not appropriate therefore adopting fixed effects model (Gujarati and Porter, 2010).

From the Hausman Test in Table 3, results show that it has a Chi Square Statistic value of 1.88 with a P value of 0.076 which is higher than the 5% significance level, the implication of which is that the random effect model is appropriate for our regression model.

Table 3. Correlated random effects-hausman test.

Test period: random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d. f.	Prob.
Period random	1.880228	4	0.0757

Source: Author's computation (2025).

Regression Model

Table 4 depicts that the DEF has a negative coefficient value of −0.1054 and a p-value of 0.0313 on ROA. This means that 1% increase in DEF will lead to 10.54 percent decrease in the firms' performance (proxied by the ROA). The result is significant in view of the p-value. Also, STDF depicts a negative coefficient value of −0.1357 and a p-value of 0.0124 on ROA. This means that 1% increase in STDF will lead to 13.57 percent decrease in the firms' performance (ROA). The result is significant in view of the p-value. The LTDF was also found to have a negative coefficient value of −0.2822 with a p-value of 0.0009 on the ROA. This implies that 1% increase in LTDF, holding other variables constant, will lead to 28.22% decrease in the ROA. The result is insignificant in view of the p-value.

Lastly, the SIZ shows a positive coefficient value of 1.64561 and a p-value of 0.0010 on the ROA. This implies that, when other variables constant, 1% increase in SIZ will lead to 164.51 percent increase in the firms' ROA. The result is significant in view of the p-value.

The coefficient of determination, $R^2 = 0.776870$ shows that 77.69 percent of variation in firms' performance (proxied by the ROA) of the selected firms represented by ROA (Returns on Assets) is explained by the independent variables (financial structure variables: DEF, STDF and LTDF). The Adjusted R-square shows that even after adjusting for the degree of freedom the model could still explain about 77% of the total systematic variations in firms' performance (proxied by the ROA), only about 23% of the systematic variation of firms' profitability performance was left unaccounted for by the model which has been captured by the

stochastic disturbance term in the model. This means that other factors apart from debt-equity proportion were left unexplained by the model.

Table 4. Model (random effects).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.798827	1.148689	0.069543	0.9449
DEF	−0.105411	0.047222	−2.232257	0.0313
STDF	−0.135703	0.075224	−2.518782	0.0124
LTDF	−0.282220	0.780983	−2.404413	0.0009
SIZ	1.645606	4.619257	3.562490	0.0010
R-squared	0.776870	Mean dependent var		2.362700
Adjusted R^2	0.758774	S. D. dependent var		5.428203
F-statistic	9.728002	Durbin-Watson stat		1.978575
Prob(F-statistic)	0.000034			

Source: Author's computation (2025).

Test of Hypotheses

H01: Debt-Equity financing have on the profitability of listed industrial goods companies in Nigeria.

With regards to the influence of debt-equity financing, empirical evidence from the model result shows that DEF has a coefficient value of −0.1054, a t-Statistic value of −2.23 and a p-value of 0.03. This means that DEF has a significant negative effect on the ROA in view of the p-value (0.03) which is far less than 5%. Thus, the null hypothesis above is rejected. The study concludes that debts-equity proportion have significant effect on the profitability of listed Industrial goods companies in Nigeria.

H02: Short-term debt-financing have on the profitability of listed industrial goods companies in Nigeria.

With regards to the significance of the influence of short-term financing on the profitability of listed firms' profitability in Nigeria, empirical evidence from the Model shows that STDF has a coefficient value of −0.1357, a t-Statistic value of −2.51 and a p-value of 0.01. This means that STDF has a significant negative effect on the ROA in view of the p-value (0.01) which is less than 5%. Thus, the null hypothesis above is rejected and the study concludes that short-term financing has significant effect on the profitability of listed industrial goods companies in Nigeria.

H03: Long-term debt-financing have on the profitability of listed industrial goods companies in Nigeria.

With regards to the significance of the influence of long-term debt on the profitability of listed firms' profitability in Nigeria, empirical evidence from the model shows that LTDF has a coefficient value of −0.2822, a t-Statistic value of −2.40 and a p-value of 0.0009. This means that LTDF has a significant negative effect on the

ROA in view of the p-values (0.0009) which is far less than 5%. Thus, the null hypothesis above is rejected and the study concludes that long-term financing has significant effect on the profitability of listed industrial goods companies in Nigeria.

4.3. Discussion of Findings

Results from the analyses have shown that debt-equity financing, short-term and long-term debts have effect on the profitability of listed industrial goods companies in Nigeria. These findings agree with the theoretic position adopted by this study. In view of these findings, the trade-off theory stresses that firms should ensure a trade-off between the risks and returns in order to ensure optimal debt-equity structure. By trade-off, it means that a firm should not only mix debt and equity but should also ensure that they balance costs and benefits. Relating trade-off theory to the finding of this study, it implies that trade-off is needed between debt-equity proportion to improve profitability of firms. According to pecking-order theory, firm should start its financing using internal means (in this case, the retained earnings) and when depleted or is not enough, then external financing means can be considered. Within external financing means, debt-financing should be prioritized.

Publicly traded manufacturers may resemble high-leverage financial firms. The average debt borne by individuals supports this. Our manufacturing companies have below-average leverage ratios. Nigerian listed industrial businesses also have low returns on equity. Leverage lowers earnings. Debt-to-equity ratios inversely affect asset returns. Debt reduction boosts corporate profitability. Debt financing must be weighed. The company's debt may dissuade investors. In conglomerate insolvencies, creditors who possess securities collateralized by the firm's assets are paid first. Companies with fewer debt are preferred by cautious investors. Stock prices and earnings volatility rise as multinational corporations' break-even point approaches forecast sales due to rising loan interest payments. Hazards, lender distrust, and loan agreement violations are possible. If a company borrows money, it risks defaulting on its debts and hurting its stakeholders.

Debt may increase risk if a company's profits are volatile. Reduce debt utilization risk and encourage companies to use equity financing instead. The preference for debt after internal financing hinges on the tax-deductibility and it signaling-effect. Debt usage is a signal to stakeholders that managers are efficient; when a firm uses debt, it implies that managers strive to ensure good returns to cover debt-interest. Relating the finding to the pecking-order theory, increasing debt-to-equity usage can help improve firms' profitability in Nigeria. The agency cost theory of capital structure posits that a convergence of interests can be reached between capital providers (debt-providers and equity-providers) through trade-off of agency costs that ensure increase debt-usage [3].

Thus, the inclusion and usage of debts prevent managerial opportunism, discourages highhandedness, bolster efficient debt-serving strategy, ensure financial

discipline of managers and guarantee increasing returns on shareholders' investments. This therefore suggests that debt-equity proportion significant influences firms' profitability performance as reported by [5].

The hypotheses suggest that publicly traded manufacturers are financial firms with a significant amount of leverage. This is supported by the median debt. The leverage mixes of our industrial enterprises exhibit lower levels of equity intensity. Industrial companies listed in Nigeria exhibit suboptimal returns on equity for their investors. Low-leverage firms outperform high-leverage firms in terms of earnings. The negative correlation between asset returns and the debt-to-equity ratio is the reason for the aforementioned relationship [14]. In order to improve profitability, it is imperative for businesses to decrease their debt. It is imperative to take into account the costs and benefits associated with debt financing. The indebtedness of the company may discourage investors who are averse to risk. At the outset of insolvency, conglomerate corporations prioritize the repayment of creditors who hold securities that are collateralized by the assets of the firm. This action is rationalized by the company. Hence, shareholders who are concerned about debt are likely to favor companies with lower levels of debt. The escalation of loan interest payments has a direct impact on the break-even point of a multinational corporation, causing it to move in closer proximity to the anticipated sales level. This, in turn, leads to an elevation in earnings volatility and share price. Possible outcomes include risks and loss of lender confidence.

5. Conclusions

Empirical revelations of this study have enabled the following decisions to be reached. First, debt-equity financing drives the profitability of listed industrial goods companies in Nigeria. This implies that higher debt-to-equity proportion is harmful to firms' profitability performance due to the fixed contractual obligation (in form of interest payments) paid to the creditors, irrespective of the profits accruing to firms. Besides the fact that the amount of profits that accrue to a firm yearly cannot be perfect predicted because of some exogenous factors, nonetheless, they are obligated to pay the debt-capital providers their interests as at maturity; even before paying any other capital-providers (such as the equity-capital providers) regardless of their profit size that year. Consequently, their net profit is not only threatened, their retained earnings and returns to shareholders as well as their cash-flow level stand at risk. In situations where firms' profit size is not enough to pay interests and/or repay debts, they are legally mandated to raise fresh debts or dispose of some of their fixed assets to liquidate their debts. In view of this, increasing debt-equity proportions seriously affect industrial goods companies' returns in Nigeria.

Also, this study concludes that long-term debt strongly affects industrial goods companies' profitability in Nigeria. Excessive reliance on long-term debt (mostly in form of bank loans for Nigerian listed firms) does not only put a firm's control in the hands of the creditors whose sole interest is to safeguard their interest re-

gardless of whatever happens to the firm revenues, but also place firm's assets under strict restriction; preventing the future usage of those assets to source for finance. It is also concluded that debt-equity proportion among listed firms is equally the same. No firm in Nigeria rely wholly on debt or equity; they all mix equity and debts together to finance their operations. Overall, this study concludes that debt-equity proportion strongly influences listed industrial goods companies' profitability in Nigeria. In other words, optimal debt-equity proportion reduce financing (or corporate) risks, reduce liquidation and bankruptcy crises, improve shareholders' wealth, and enhances profit maximization objective of listed industrial goods companies.

5.1. Recommendations

The following recommendations are put forward based on the findings of this study:

i. Management of industrial goods companies should put debt-equity financing at the level that commiserate with shareholders' highest risk tolerance level. It is recommended that the proportion of debt to equity should be at a near equilibrium thereby striking a balance between the two forms of financing.

ii. The industrial goods companies' management is advised to structure their debt-equity proportion in a way that best fit their operations. Their debt-equity proportion should not be based on industry benchmarks.

iii. The firms' management should consider long-term debt usage as the last financing option. If used, extreme caution should be exercised in its usage. Priority should be given to internal financing such as shareholders capital, retained earnings then short-term debts (short-term bank loans).

5.2. Suggestions for Further Study

This study advises that the following research areas be explored by future related studies due to the methodological constrains faced during this project. First, future related research should explore the relationship between financial structure and other listed sectors. This becomes important since the effects of financial structure might be different. In fact, there is a need to carry-out a study on the sectorial effects of financial structure on at least two different sectors. Also, future studies should explore a triangulation methodology in which they analyze secondary data as well as capture financial structure decisions from stakeholders through primary data collection. Finally, the years covered by future studies should be lengthier than the current one for a more robust finding.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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