

# Firm Characteristics and Financial Leverage of Listed Industrial Goods Firms in Nigeria

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*Abstract- The debate on the optimal capital structure has continued unabated over time. This is in view of the importance of capital structure in the attainment of organisational objectives. Different studies have come out with contrasting findings on the effect of capital structure on financial leverage. Consequently, this study was carried out to investigate the effect of firm characteristics on financial leverage using industrial goods firms listed in Nigerian Exchange Group. The broad objective of this study was to evaluate the effect of firm characteristics on financial leverage of industrial good firms in Nigeria. The independent variables of the study was firm characteristics which was proxied by firm size, firm profitability, asset tangibility, market value and the composite effect of firm characteristics, while the dependent variable was proxied by financial leverage. Ex-post-facto research design was adopted. The population of the study consisted of thirteen (13) listed industrial goods firms listed on the Nigerian Exchange Group while a sample size of twelve (12) was taken after dropping the firm which did not meet the requirement for inclusion. The data for the study were extracted from the annual reports and accounts of the sampled companies for the years 2013 to 2022. The data were analysed with descriptive statistics, correlation and panel regression. The E-view statistical packages version 10 was used to analyse the data. The result from the Hausmann test statistics reveals that firm size had a negative and non-significant effect on financial leverage of industrial good firms in Nigeria. Furthermore, firm profitability had a positive and significant effect on financial leverage of industrial good firms in Nigeria, firm asset tangibility recorded a positive non-significant effect on financial leverage of industrial good firms in Nigeria, market value had a negative and non-significant effect on financial leverage of industrial*

*good firms in Nigeria and composite effect of firm characteristics had a significant effect on financial leverage of industrial good firms in Nigeria. The study therefore concluded that the firm characteristics have significant effect on the financial leverage of industrial goods. Based on the above conclusion from the findings of the study, it was recommended amongst others that, firms should increase their scales of operations through increase in liquidity and put these to efficient use in order to enjoy economies of scale. The size of the assets of the firm must not be too large compared to the investment of the firm's businesses so that it can be managed effectively and efficiently.*

*Indexed Terms- Firm Characteristics, Financial Leverage, Listed Industrial Goods Firms, and Nigeria.*

## I. INTRODUCTION

### 1.1 Background to the study

Financing decision is one of the key strategic objectives of any organisation as this decision can either make or mar the success and competitive power of such organisation. Companies would finance their assets and other investments using either debt or equity capital. Financial leverage refers to application of debt financing and borrowed capital the firms, capital structure to increase their operations and profitability (Will, 2021). What constitutes an optimal capital structure for companies still remains as an open debate. Capital structure decisions made by firms have an impact on the net cost or value of firms (Mbonu & Amahalu, 2021). The trade-off theory asserts that organisations prefer good level of obligation by switching the benefits of debts investment against its cost. The theory further explains that ideal level of debt is gained when marginal benefit equals the burdening costs of an

extra part of borrowing. An ideal capital formation can be attained when the cost of capital remains minimum for any organisation (Will, 2021). Prior studies have indicated that firm characteristics affect financial leverage level of organisations.

Firm characteristics are those specific traits that distinguish one company from the other. These features normally influence companies' decisions especially strategic decisions such as financing and investment decisions. Such characteristics include firm size, leverage, liquidity, sales growth, firm age, dividend policy, market share, asset tangibility, auditor type, industry type and many others (Mbonu & Amahalu, 2021). This study focused on firm size, profitability and asset tangibility as factors that affect leverage levels of industrial goods firms in Nigeria. Firm size is a fundamental concept that refers to the magnitude of a company's operations, assets, revenues, or market capitalization (Will, 2021). Firm profitability is a basic notion that assesses a company's capacity to create money from its operations (Uford, Effiong & Charles, 2023). Tangible assets are physical assets that can be employed in the production or operation of a firm.

Larger firms often have more diversified operations and revenue streams, which can contribute to greater stability and cash flow predictability. This stability enhances their ability to service debt and reduces the risk of default. Hence, larger firms can afford to take on higher levels of debt relative to their equity, as they have a stronger capacity to absorb financial shocks compared to smaller ones. According to Graham and Harvey (2021), profitable companies have greater financial flexibility, allowing them to choose their capital structure based on their needs and objectives. This flexibility allows them to optimize debt and equity mix based on risk tolerance, growth plans, and cost of capital considerations (Odiwo, et al., 2023). Tangible assets provide a source of collateral that can be pledged to secure debt financing. Lenders typically prefer tangible assets as collateral because they are easier to value, monitor, and seize in the event of default. As a result, firms with higher asset tangibility have greater access to debt financing, allowing them to incorporate more

debt into their capital structure (Hovakimian, Opler, & Titman, 2019).

The major focus of this study was to examine the effect of firm characteristics on financial leverage of listed industrial goods firms in Nigeria. The industrial goods sector consists of the companies that produce and sell capital goods to other businesses. In contrast to the consumer goods sector that produces goods and services directly consumed by households, the industrial goods sector provides capital goods to other businesses for manufacturing and construction. This sector contributes massively to the growth and development of the Nigeria economy. Thus, their financing mix becomes paramount as any failure to have the right mix of debt and equity in their capital structure can cause forced liquidation as well as lost the entire stakeholders' chain.

### 1.2 Statement of the problem

An erroneous finance mix decision may result in an unexpected and unfavourable outcome which ultimately may result in the liquidation of companies. The decision between equity and debt financing is a significant challenge to management, requiring financial managers to rely heavily on their skills, experience, and intelligence because the capital mix decision has a long-term impact on the firm's future cash flow and going concern status. The extensive body of related previous empirical studies on firm characteristics and financial leverage has presented somewhat conflicting results, others agreeing and some disagreeing with important theories of firms' characteristics globally. The contrasting results warrant further research though most of the studies done in Nigeria focused on firm characteristics and financial leverage of other sectors other than the industrial goods sectors. Most of the studies carried out on the subject matter were done outside Nigeria and did not focus on the industrial goods sector (Anjar, 2021).

In Nigeria, Amahalu (2019), Bashir (2019), Okegbe et al. (2019) and Fagbemi et al., (2022) did not consider the financial leverage of industrial goods sector. Hence, based on this identified gap, this study examined the effect of firm characteristics (firm size, firm profitability, firm assets tangibility, market

value) on the financial leverage of listed industrial goods firms in Nigeria.

### 1.3 Objectives of the study

The major objective of this study was to determine the effect of firm characteristics on capital structure of listed industrial goods firms in Nigeria. However, the specific objectives were to:

1. Examine the effect of firm size on financial leverage listed industrial goods firms in Nigeria.
2. Evaluate the effect of firm profitability on financial leverage of listed industrial goods firms in Nigeria.
3. Determine the effect of firm asset tangibility on financial leverage of listed industrial goods firms in Nigeria.
4. Ascertain the effect of market value on financial leverage of listed industrial goods firms in Nigeria.

### 1.4 Research questions

In order to achieve the above objectives, the following research questions were raised;

1. What effect does firm size have on financial leverage of listed industrial goods firms in Nigeria?
2. To what extent does firm profitability affect the financial leverage of listed industrial goods firms in Nigeria?
3. What magnitude of effect does firm asset tangibility have on financial leverage listed industrial goods firms in Nigeria?
4. What is the effect of market value on financial leverage listed industrial goods firms in Nigeria?
5. What is the composite effect of firm characteristics on financial leverage of listed industrial goods firms in Nigeria?

### 1.5 Research hypotheses

In order to answer the above research questions, the following hypotheses were formulated;

Ho<sub>1</sub>: Firm size has no significant effect on financial leverage of listed industrial goods firms in Nigeria.

Ho<sub>2</sub>: Firm profitability has no significant effect on financial leverage of listed industrial goods firms in Nigeria

Ho<sub>3</sub>: Firm asset tangibility has no significant effect on financial leverage of listed industrial goods firms in Nigeria.

Ho<sub>4</sub>: Market value has no significant effect on financial leverage of listed industrial goods firms in Nigeria.

### 1.6 Scope of the study

This study examined the effect of firm characteristics on financial leverage of industrial goods firms listed on the floor of the Nigerian Exchange Group for the period of 10 years; from 2013 to 2022. The independent variable (firm characteristics) was proxied by firm size, firm profitability, firm asset tangibility, market capitalisation and firm liquidity while the dependent variable (financial leverage) was proxied by debt-to-equity ratio.

## II. REVIEW OF RELATED LITERATURE

### 2.1 Conceptual framework

#### 2.1.1 Firm characteristics

According to Mbonu and Amahalu (2021), firm characteristics are the various types of information presented in financial statements of business organizations that serve as predictors of the firms' accounting information quality and performance. Firm characteristics can also be defined as the behavioural patterns of company's operation which can enable them to achieve their objectives throughout the period of their operations (Amahalu 2019). Firm attributes are firm characteristics or specific traits that distinguish one company from the other. They are those other features that distinguish one company from the other. These features normally influence company decisions and information disclosures as well as risk disclosure in the financial report (Ukpong, 2022). The qualities of a company differ from one another. The characteristics of a company can be established based on the relevant information presented in its financial statements for a specific accounting period (Bunea & Dinu, 2020).

Firm characteristics are those attributes such as firm size, leverage, liquidity, sales growth, capital, firm age, dividend, market share, off balance sheet activities, operating expenses, among others, that affect the operations of a firm (Uford & Etim, 2018).

Firm size is an important factor that frequently relates to the total assets, revenues, or market capitalization of the company. Larger enterprises benefit from economies of scale, increased access to resources, and increased bargaining power (Berger & Udell, 2018). They may also have a stronger market presence, which allows businesses to weather economic downturns more effectively. Smaller enterprises, on the other hand, may be more agile and flexible, allowing them to respond swiftly to market changes and explore niche markets (Storey, 2019). In this study firm attribute is proxied by firm size, profitability and asset tangibility.

### 2.1.2 Measurement of firm characteristics

There are various ways of measuring firm characteristics. However, for the purpose of this study, firm characteristics were measured in terms of size, profitability, asset tangibility and market capitalisation.

#### 2.1.2.1 Firm size

In all sectors of any economy, a firm is either said to be large or small. The amount of capital owned by a firm can be seen in its size. Firm size is a fundamental concept that refers to the magnitude of a company's operations, assets, revenues, or market capitalization. It is an important characteristic that varies across different industries, sectors, and individual firms. A large company is expected to have a well-structured accounting and internal control system and should be able to provide the expertise needed to structure the firm's capital structure. There are various ways to define and quantify the size of a business. Total assets, annual revenues, market capitalization, and number of employees are common measures used to assess firm size (Berger & Udell, 2018). The type of measurement used is determined by the context and purpose of the investigation. Firm size, for example, can be measured in the manufacturing sector by the value of plant and equipment, whereas in the technology sector by market capitalization.

Firm size is among determinant factors of capital structure. The growth and widespread effect of large enterprises-multinational corporations (MNCs) in the context of international integration have demonstrated the importance of scale in firm

performance and business environment. According to Eriotis & Vasiliou (2007), size is closely related to risk and bankruptcy costs; that larger firms are usually more diversified and thus bear less risk compared to smaller ones. Even in the aspect of access to capital, banks are more willing to lend their funds to larger firms partly because they are more diversified and partly because larger firms usually request larger amounts of debt capital than smaller firms. As a consequence, larger firms are usually able to reduce transaction costs associated with long-term debt issuance and can arrange a lower interest rate. Although, it is important to note that large firms can easily have agency problems than smaller ones which may lead to misalignment of interest and corporate failure.

#### 2.1.2.2 Firm profitability

Profitability refers to the earning power or working performance of the business which add up to Investment. According to Adetoso and Akinselure (2016) profit is characterized as the capacity an investment has, to acquire a sizable income from its consistent use in business. Firm profitability is a basic notion that assesses a company's capacity to create money from its operations. It is an important indicator of a company's financial health, efficiency, and potential for value creation. Firm profitability is defined as a company's ability to make earnings or profits in relation to its costs and investments. Net profit margin, return on assets (ROA), return on equity (ROE), and earnings per share (EPS) are some of the financial measures and indicators that can be used to measure it (Titman & Martin, 2011). These indicators reveal the company's efficiency in earning profits from its resources and investments.

Profitability can affect financial leverage in the sense that, profitable firms can bear the interest cost of the firm. A highly profitable firm will have low high interest cover, whereas the reverse is the case for lowly profitable firms (Charles & Uford, 2023). Thus, a company that is stabilized in terms of profitability can adequately finance its operations using debt so as to enjoy the tax savings from interest payments.

#### 2.1.2.3 Firm asset tangibility

The physical nature and qualities of a company's assets are referred to as asset tangibility. Tangible

assets are physical assets that can be touched, seen, or quantified. Tangible assets are physical assets that can be employed in the production or operation of a firm. Land, buildings, machinery, equipment, cars, inventory, and other physical things are examples of assets (Berk & DeMarzo, 2020). These assets are usually listed on a statement of financial position and have a monetary value. Tangible assets depreciate over time as a result of wear and tear or obsolescence (Kieso et al., 2020). Firm asset tangibility can affect a company's investment decisions and expansion strategies. Tangible assets, such as machinery and equipment, are often essential for production capacity expansion and technology upgrades (Gupta & Sapienza, 2022). The level of asset tangibility may determine the ease and cost-effectiveness of such investments. Asset tangibility can contribute to a firm's competitive advantage and differentiation.

Asset tangibility is important in a company's financial structure and investment decisions. Tangible assets can be used as collateral to get loans or obtain lender financing (Myers, 1984). Lenders frequently prefer tangible assets as collateral because they are easier to value and may be seized and sold in the event of a default. The tangibility of assets can influence a company's risk profile and borrowing rates. Lenders may regard firms with larger levels of tangible assets as less risky since these assets provide a cushion in the case of financial trouble or default (Modigliani & Miller, 1958). As a result, organizations with more tangible assets may have lower borrowing costs than enterprises with mostly intangible assets. An entity with a significant number of tangible assets can borrow at a lower interest rate by providing lenders with the security of these tangible assets. According to Frank and Goyal (2009), the tangibility of assets has a significant impact on the costs of financial distress. They claim that tangible assets are easier to collateralize and suffer less value loss when enterprises fail, implying that firms with more tangible assets will use more debt in their capital structure. Similarly, Rajan and Zingales (2015) observe that if a high proportion of a firm's assets are tangible, then those assets should serve as collateral, reducing the danger of the lender incurring debt agency costs (risk shifting). Assets should also hold higher value when liquidated. As a result, the bigger the share of physical assets on the balance sheet, the

more ready lenders should be to make loans, and leverage should be higher. Consequently, the company would be attractive to shareholders in terms of bankruptcy, there are assets that could be sold off to settle part of their capitals.

#### 2.12.4 Market Value

Salvatore (2005) asserts that the main goal of a firm is to increase the shareholder's welfare by increasing the value of a firm. Maximizing Market Value is essential for a company because it means increasing the prosperity of shareholders as well, which becomes the company's main goal. However, a good Market Value is able to attract other parties' interest to join the company. In other words, performance on the stock market is an index or indicator of corporate success. Any corporate entity experiencing a rise in the market price of its stocks is considered a good company by the investors. Modigliani and Millier (1958) stated that Market Value is determined by company's assets earnings power. If the company predicted good prospects in the future, the value of the stock will be higher. Otherwise, if the company has fewer prospects the stock price will be low.

Market Value is an economic measure which reflect the market value of a business. In the view of Emeka-Nwokeji (2019), firm's market value is influenced by investors' perceptions of its managers' ability to anticipate and respond to future changes in the firm's economic environment. The forward-looking, capital market-based measure of the value of a firm used in this study is Tobin's q. Tobin's q was first introduced by Kaldor (1996) as a ratio between a physical assets market value and its replacement cost. In 1968, it was reintroduced by William and Tobin. The letter "Q" did not appear until Tobin published an article titled a general equilibrium approach to monetary theory in the journal of money, credit and banking in 1969. Tobin's Q, is the ratio of the market value of equity (fiscal year-end price times number of shares outstanding) plus book value of debt (total assets less book value of equity) to total assets (Albuquerque *et al.*, 2013). It reflects the market's expectation of future earnings and thus a good proxy for Market Value (Campbell and Minquez-

Vera, 2008). Tobin's q has gained wide acceptance as a measure of a Market Value.

### 2.1.3 Financial leverage

Financial Leverage refers to the debt financing percentage in a company's capital structure. It is a measure of the use of debt versus the use of equity to finance the assets and activities of an organization (Audax, 2018). It is one of the financing decisions that firms have to make. Debt financing is mainly in the form of loan and bond but other form such as securing goods on credit also exist. High usage of debt financing leads to an increase in financial leverage and is associated with greater risk of bankruptcy. However, it is also associated with various advantages such as maintaining company ownership intact, tax deductions, and low transactional costs (Mboi, Muturi & Wanjare, 2018). On the other hand, equity financing entails raising money by selling of company shares to investors who acquire ownership in the company (Audax, 2018). Equity financing may also come in the form of reinvesting the company's profits.

The capital structure decision is essential to many other corporate finance decisions. Management decisions like as dividend policy, merger and acquisition finance, capital budgeting, and so on are all linked to capital structure decisions. The factors that impact management's decision to include more or less debt in their capital structure has piqued the interest of both finance experts and practitioners. However, the main problem associated with the decisions of capital mix is the discovery of the optimal capital structure for a company; considering that each companies have their distinguished characteristics. The optimal capital structure represents the ideal mix of debt and equity that maximizes the value of the company and minimizes the cost of capital. Finding the optimal capital structure involves considering factors such as the company's risk profile, industry norms, tax considerations, financial flexibility, etc.

The cost of equity is usually the claim on earnings provided to shareholders for their ownership stake. Although equity financing is associated with lower risks of bankruptcy, it is an expensive source of financing as investor demand a higher rate of return.

Companies can use leverage to finance their assets; instead of issuing stock to raise capital, companies can use debt financing to invest in business operations in an attempt to increase shareholder value (Kenton, 2021). The financial leverage of a company depends on the choice made by the management to either use debt or equity to fund the operations of the company. Financial leverage is often gauged using the debt ratio, equity ratio, and debt to equity ratio (Enekwe et al., 2014).

### 2.1.3.1 Debt-equity ratio

The debt-equity ratio is a leverage ratio that calculates the weight of total debt and financial liabilities against total shareholders' equity. It indicates the relative proportion of shareholders' equity and debt used to finance a company's assets (Okoye et al., 2016). The debt-to-equity ratio is a financial as well as liquidity ratio that compares a company's total debt to total equity. The debt-to-equity ratio shows the percentage of company financing that comes from creditors and investors. It is expressed as x%. A debt equity ratio of below 100% is low while a debt-equity ratio of above 100% is higher. And a debt equity ratio of 100% means that half of the business assets are financed with debt (Kanwal & Nadeem, 2013). Debt-to- equity ratio is calculated as;

$$\text{Debt-equity ratio} = \frac{\text{Total debt}}{\text{Equity share} + \text{reserve}} \times 100$$

## 2.2 Theoretical framework

This study anchored on trade-off theory to explain the relationship between capital structure and financial leverage.

### 2.2.1 Trade-off theory by Modigliani and Miller (1958)

Trade-off theory is one of the most relevant theories of capital structure. Following the dispute on Modigliani-Miller's theorem, the trade-off theory was carefully considered (Iqbal et al., 2012). The initial version of trade-off theory emerged during the Modigliani-Miller theorem discussion. When the irrelevance theory was combined with the corporate income tax, it resulted in a favourable benefit for debt, i.e., it shields earnings from taxation. Trade-off theory is further divided into two namely; static

trade-off theory and dynamic trade-off theory. Static trade-off theory according to Iqbal *et al.* (2012) presupposes that the firm's capital structure is optimal. This means that the costs and advantages of debt and equity are estimated in an ideal environment. Firms profit from a tax shelter by doing so, but the disadvantage is that if a corporation has too much debt, it might cause future catastrophic damage to the firm's capital structure. As a result, in a nutshell, it gives tax benefits as well as substantial financial difficulties if too much debt is incurred. Another factor to consider is the cost of the agency. Agency costs may be the result of many conflicts of interest among the firm's various stakeholders as a result of ex post-unbalanced information.

Trade-off theory is anchor theory for this research and is relevant to this work because it tends to explain that firms have optimal capital structure and also take into consideration some factors before choosing between equity and debt. Factors like benefits derived especially in terms of taxation and other costs and also taking their characteristics into consideration.

#### 2.2.2. Dynamic capability theory

The study was also based on the dynamic capabilities theory which is an extension of their source-based view (RBV) theory of the firm. The theory discusses the flaws of the resource-based view theory. The RBV theory has been critiqued for failing to account for environmental dynamism and how firms should react when faced with obsolescing resources.

The dynamic capabilities theory asserts that the core of dynamic capabilities line of attack is that competitive attainment ascends from the unceasing growth, alignment and reconfiguration of firm's specific characteristics (Farinas & Moreno, 2000). The dynamic capabilities enable firms to create, develop and protect those characteristics that lead to sustainability of the firm. The dynamic capabilities theory argues that resources and capabilities are constantly being developed inside the firm. Subsequently, Barney (1991) that firms resources are all possessions, competences, organizational practices, business features, information knowledge among others controlled by the business that allow the business to comprehend and apply tactics that

progress its competence and effectiveness. Relationships generally are deliberated to be the resources of the firm (Palestrini, 2007) and hence firm characteristics, in particular, can similarly be regarded as a weighty resource which can significantly influence the performance of the firm above competitors in the industry. Capabilities that deliver ways of adjusting to the changes in the business environment include consumer demands, advent of novel markets and competitive variations (Greiner, 1972).

#### 2.2.3 The Signaling theory

This theory refers to the idea that the agents send information to the principal in order credible relationship. Managers have more first-hand information about the firm than firm's investors do but they are always reluctant to provide transparent information to the shareholders. So, the financial characteristics of a firm can be used for information purpose and it also act as a signal for the firm's future projection proficiently. Information signaling model developed by (Miller and Rock 1985) suggest that financial data convey information to individual and institutional investors regarding the firm's future prospects. Indeed, when a company listed on the Stock Exchange makes pronouncement about its trading in regards to its financial performance, the expectations of the public especially speculators tend to rise (Abuaja & Ukpong, 2022). This theory refers to the idea that the agents send information to the principal in order to create credible relationship. Managers have more first-hand information about the firm than firm's investors do but they are always reluctant to provide transparent information to the shareholders. So, firms' financial characteristics of a firm can be used for information purpose and it also act as a signal for the firm's future projection proficiently.

#### 2.3 Empirical framework

Fagbemi *et al.* (2022) scrutinized the relationship between C-suite bias, firm characteristics, and capital structure decisions in quoted industrial goods firms in Nigeria. The research design employed was ex-post-facto, utilizing data from 2002 to 2020. Pooled Ordinary Least Squares (OLS) regression analysis was applied for data analysis. The findings indicated that C-suite tenure positively impacts capital

structure decisions, suggesting that a longer tenure of C-suite executives in governing a company's affairs contributes to favourable capital structure choices. As a result, the study recommended that corporations should consider allowing C-suite members to serve for an extended period, as it can enhance the quality of their capital structure decisions.

Benvolio and Ironkwe (2022) examined the impact of board compositions on firm performance but focused on the banking sub-sector. They claimed to have sampled a total of fourteen (14) quoted commercial banks in Nigeria for eleven (11) financial years of 2011 to 2021. They measure performance using market value of shares and used only two board composition (board size and board independence) variables as independent variables. Relying on the outcome of their fixed effect result, it shows that board size has a significant negative impact on firm value while board independence is positive and non-significant. They recommend a strong compliance with laid-down corporate governance principles of a higher proportion of independent directors. There are numerous ways to critique their study. Firstly, the number of listed commercial banks as at 2021 is thirteen (13) and not fourteen (14), as banks like Polaris is not listed on the Nigerian Exchange Group (NGX). Secondly, despite stating a wrong target population, one wonders where they got the data for 2021 because the banks have 90 days after year-end to release their audited reports meaning that the full 2021 financial reports of the Nigerian commercial banks are expected to be available from March 30th 2022. Thirdly, a look at their regression results showed they actually regressed 15 cross-sections for 10 periods (meaning 15 banks for 10 years) which is at variance with the wrong population and impossible time-frame (14 banks for 11 years) they claim to have studied.

Onyekwere and Babangida (2022) investigated the impact of board diversity on firm performance of twelve (12) banks for five years (2015-2019). The selected three board composition variables of size, independence and gender diversity and also used two control variables of firm size and age. They adopted two proxies for firm performance; ROA and ROE. They employed the panel regression technique and found that board gender diversity has a significant

positive impact both the two performance proxies, while board independence has a significant negative impact on both ROA and ROE. They recommend the need to increase the number of female directors and independent directors on the boards of banking institutions. Their recommendation concerning increasing the number of independent directors on the board is against the run of their results which shows that board independence reduced both ROA and ROE measures of performance in the context of their study which is at variance with theory.

Etukudo et al., (2022). focused on firm characteristics and financial performance of listed consumer goods firms. To achieve the objectives of the study, ex-post facto research design was adopted. The source of data collection was secondary data. Data were generated from annual reports and accounts of the selected firms. The data collected were analyzed using multiple regression analysis. The finding revealed that (i) Firm characteristics (leverage, firm size, liquidity and operating expenses) have a significant effect on profit after tax of listed consumer goods firms in Nigeria (ii) Firm characteristics (leverage, firm size, liquidity and operating expenses) have a significant effect on return on asset of listed consumer goods firms in Nigeria (iii) Firm characteristics (leverage, firm size, liquidity and operating expenses) have no significant effect on return on equity of listed consumer goods firms in Nigeria. The study recommends that the management of manufacturing firms in Nigeria should increase the level of leverage in their capital structure. This is because leverage has positive significant effect on their financial performance. The study also recommends that the management of manufacturing firms should increase their assets and reduce the scope of their activities by building more branches in order to increase their size. This is in line with the findings of this study that the size influences their financial performance positively.

Jibril and Idris (2022) examined the effect of firms specific attributes and financial performance of quoted conglomerates companies in Nigeria. Secondary data were sourced through the published annual reports of the sampled companies for the period under review 2015-2021. Panel data extracted were analysed using multiple regression technique



after conducting series of robustness checks to ascertain validity. Findings from the study reveal that firm size has a positive and significant effect on financial performance. While liquidity has positive and insignificantly effect on financial performance, on the other hand leverage has a negative but insignificantly effect on financial performance. The study recommends that management should try as much as possible to increase their total asset level as this will serve as a guarantee in generating future economic benefit. Management should also watch out for their leverage level so as to keep it at optimum point, because leverage level negatively influence performance for conglomerate firms in Nigeria based on the findings of these study, within the period under review.

Diriyai and korolo (2023) examined the relationship between firm characteristics structure and the quality of financial reporting of publicly traded industrial goods companies. The specific objectives of the study were to determine whether the characteristics of corporate structure - company size, liquidity, company age, and debt - have an impact on the quality of financial reporting of publicly traded industrial goods companies. An ex post facto research design was used and the study used secondary data from the annual accounts and business reports of the listed industrial goods companies for the relevant years considered (2015-2020). Ordinary least squares (OLS) regression techniques were used to examine the relationship between the variables. The study found that company size and liquidity are significantly positively associated with the quality of financial reporting by publicly traded industrial goods companies in Nigeria, while there is an insignificant positive association between firm age and the quality of financial reporting by publicly traded industrial goods companies in Nigeria and there is an insignificant negative association between Leverage and quality of financial reporting of listed industrial goods companies in Nigeria. Overall, the study concluded that there is a significant correlation between the characteristics of firm structure and the quality of financial reporting of publicly traded industrial goods companies. The study, therefore, recommended amongst others that firms should strive to improve the overall level of their assets since firms

whose total assets are large seems to produce more quality reports.

Kinyua & Ochieng (2022), established the effects of firm characteristics, corporate governance (CG), firm performance, and macroeconomic environment on financial leverage. The methodology used reviewed various empirical literature, articles, publications, and conceptual studies where descriptive and quantitative analysis were applied. According to various publications reviewed, there are positive, negative, and contradictory outcomes between firm characteristics, CG, firm performance and macroeconomic environment on financial leverage. Besides, the findings from a different strand of studies in the literature suggest that board ownership and audit quality negatively influence financial leverage. Other research gaps emerging in the literature review include; firm characteristics regarded as a moderating variable between corporate governance and financial leverage.

### III. METHODOLOGY

**Research design:** This work adopted an *ex-post facto* research design. This was because it established a cause-effect relationship and the researcher had no control over the variables under study. This design was very appropriate because the researcher could not directly manipulate the variables.

**Population of the study:** The population of this study comprised of 13 industrial goods firms quoted on the floor of the Nigerian Stock Exchange as at the end of year 2022.

**Sample size and sampling technique:** In other to have a homogenous sample size, those companies that were listed after the study period of 2013 were deselected. And based on this Bua cement was deselected and the final sample size of this study was 12 listed industrial goods firms. Thus, the sampling technique employed was purposive sampling technique.

**Source of data and method of data collection:** The data used in this study were secondary and were obtained from the annual report of the sampled

companies extracted from the Nigeria Exchange Factbook for the period under study.

**Data analysis technique:** The data analysis technique adopted for this study was the pool ordinary least square regression. The rationale for its usage was based on the following justifications: the data that was collected have time and cross-sectional attributes as well as across the sampled firms (cross-section); panel data regression provides better results since it uses large observation and reduces the problem of degree of freedom, it avoids the problem of multicollinearity and help to capture the individual cross-sectional (or firm-specific) effects that the various pools may exhibit with respect to the dependent variable in the model.

**Decision rule:** The decision rule for accepting or rejecting the null hypotheses was based on the probability values (p-Values). The null hypotheses should be accepted if the p-values are more than 0.05 and rejected if the p-values are less than 0.05.

**Model specification:** The model used in establishing the econometric relationship between firm attributes and financial leverage was adopted from the study of Rokhayati, Nirmala and Oktaviani (2021) and modified to fit this study as presented below:

Financial leverage = f(Firm characteristics) - (1)

Financial leverage = f(firm size, profitability, asset tangibility) - (2)

$LF_{it} = B_0 + B_1LF_{it} + B_2LPROF_{it} + B_3LASTA_{it} + B_4LMV_{it} + e_{it}$  (3)

Where: FILE = Financial leverage, FIMZ = Firm size, PROF = firm

profitability, ASTA = Asset tangibility, MV = Market Value, L = Logarithm,  $B_0$  = Constant Term,  $B_1 - B_3$  = Coefficient to be determined from the results of analyses, " $i$ " = Cross section (sampled industrial goods), " $t$ " = Time frame (2013 to 2022),  $e_{it}$  = Stochastic error term

**Operationalization of variables:** The variables used in this study are measured as presented in the table below

Table 3.1: Operationalization of Variables

Variables	Measurement	Source
Financial leverage (Dependent variable)	Ratio of long-term debt to total equity	Rokhayati <i>et al.</i> , (2021)
Firm size (Independent Variable)	Natural Log of firms' total asset	Rokhayati <i>et al.</i> , (2021)
Profitability (independent variable)	Net profit margin = PBIT/Revenue	Rokhayati <i>et al.</i> , (2021)
Asset tangibility (Independent variable)	Ratio of tangible fixed assets to total assets	Rokhayati <i>et al.</i> , (2021)
Market Value	Market Capitalisation	Rokhayati <i>et al.</i> , (2021)

Source: Researcher's Compilation 2023

#### IV. DATA ANALYSIS

##### 4.1 Tests of normality distribution of the cross sectional and idiosyncratic identifiers

Table 4.1 Tests of normality distribution

	FILE	FIMZ	ASTA	MV	PROF
Mean	0.73293	1.50E+1	0.56050	1.33E+1	2801.02
	0	2	0	2	7
Median	0.09250	5.60E+1	0.50000	6.08E+1	1.41831
	5	1	0	1	7
Maximum	20.2043	9.66E+1	0.95000	8.79E+1	61646.2
	8	2	0	2	3
Minimum	0.00366	102017.	0.24000	67059.0	-
	4	0	0	0	2.619093
Std. Dev.	2.84850	2.01E+1	0.19633	1.80E+1	9996.13
	9	2	6	2	3
Skewness	5.36237	1.65004	0.42090	1.74498	4.38557
	1	3	1	9	9
Kurtosis	32.3383	5.62850	2.39239	5.99291	22.1725
	9	1	1	6	3
Jarque-Bera	4878.80	88.9979	5.38910	105.687	2222.59
	7	0	1	5	6
Probabilit	0.00000	0.00000	0.06757	0.00000	0.00000
y	0	0	3	0	0
	87.9515	1.81E+1	67.2600	1.60E+1	336123.
Sum	5	4	0	4	2
Sum Sq.	965.566	4.79E+2	4.58717	3.85E+2	1.19E+1

Dev.	5	6	0	6	0
Observations	120	120	120	120	120

Source: Author's analysis using e-view 10 output with data in Appendix One.

The descriptive statistics which generally explore the characteristics of the data include: the mean, median, maximum, minimum, standard deviation as well as number of observations per each variable. The results indicated that the mean return on financial leverage (FILE) of the sampled industrial goods firms in Nigeria was 0.73. The results indicated that on the average, 73% of total equity of industrial goods firm were made up of long-term debt, a minimum and maximum FILE of 0.003 and 20.2, respectively. An average firm size (total asset) of 1.5 revealed the volume and size of industrial goods firms in Nigeria, the maximum and minimum firm size stood at 9.66 and 0.012, respectively. Average asset tangibility of 0.56 shows that about 56% of assets of industrial goods firms were considered tangible, it had a maximum and minimum of 0.95 and 0.24. The

deviations from the averages of these magnitudes signify that industrial good firms do not generate the same return on equity and do not also employ similar capital structure ratios in their operations within the period under review. The results further suggest that about 73.2 per cent of total equity employed by industrial good firms in Nigeria were represented by long term debt while the remaining 16.8 per cent was represented by shareholders' fund, confirming the hypothesis that most firms are highly geared companies.

The null and alternate hypotheses relating to the effect of composite firm characteristics on the financial leverage of industrial goods firms are stated below:

Ho: There is no significant effect of firm characteristics on financial leverage of listed industrial goods firms in Nigeria.

The results of analyses of data relating to the hypothesis five above are indicated thus;

Table 4.2 - Table of panel least square showing FILE and FIMC in Nigeria

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.497721	4	0.0215

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LASTA	-0.083098	0.125781	0.045557	0.3278
LFIMZ	0.035938	0.181644	0.004328	0.0268
LMV	-0.063601	-0.057945	0.006096	0.9423
LPROF	0.235156	0.162559	0.001004	0.0220

Cross-section random effects test equation:

Dependent Variable: LFILE

Method: Panel Least Squares

Date: 11/04/23 Time: 02:03

Sample: 2013 2022

Periods included: 10

Cross-sections included: 12

Total panel (unbalanced) observations: 117

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.521996	3.468711	-0.727070	0.4689
LASTA	-0.083098	0.560753	-0.148191	0.8825
LFIMZ	0.035938	0.105464	0.340765	0.7340
LMV	-0.063601	0.112623	-0.564719	0.5735
LPROF	0.235156	0.092188	2.550821	0.0122
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.838858	Mean dependent var	-2.564281	
Adjusted R-squared	0.814926	S.D. dependent var	1.821003	
S.E. of regression	0.783399	Akaike info criterion	2.476103	
Sum squared resid	61.98517	Schwarz criterion	2.853836	
Log likelihood	-128.8520	Hannan-Quinn criter.	2.629458	
F-statistic	35.05179	Durbin-Watson stat	0.989023	
Prob(F-statistic)	0.000000			

Source: Author's analysis using e-view 10 output with data in Appendix One

- Decision criteria

Accept  $H_0$  if the F-statistics of the coefficients is greater than 0.005 at 5% level of significance, otherwise reject  $H_0$  and accept  $H_1$  when the F-statistics of the coefficient of the parameter estimates greater than 0.005 at 5% level of significance.

The result of data analysis in table 4.2 above reveals that the F-statistics of the coefficient of firm characteristics is less than 0.005 at 5% level of significance (0.0000), therefore the null hypothesis was accepted and the alternate hypothesis rejected. This indicates that the firm characteristics has no significant effect on financial leverage of industrial good firms in Nigeria.

- Discussion of findings

The discussion of findings of the study are made under the various hypotheses postulated and tested as above.

- The effect of firm size on financial leverage listed industrial goods firms in Nigeria.

From the Panel Least Squares regression result shown in table 4.2 above, we used the Correlated Random Effects – Hausmann Test. The Hausmann test value of 0.035 and its corresponding p-value of 0.026 suggest that we accept the null hypothesis at 5% level of significance that random effect model is appropriate for this study and deduce that differences in coefficients are not systematic, therefore we accept and interpret the random effect model. In an attempt to know the most reliable estimation model between the fixed effect estimation model and the random effect estimation model, Hausmann test was conducted to test if there is a substantial difference between the estimates of the fixed effect estimator and that of the random effect estimator. Result reveals that random effect hypotheses is acceptable because the probability value is non-significant; Considering the random effect model, coefficient of about 3.5% as well as the is an indication that the model is weakly represented. That is the independent variables explained 3.5% variations in the dependent variable while the remaining 96.5% may be explained by variables not included in the model. The t statistic value of 0.34 (P=0.734) indicated that the

independent variables impacted on financial leverage of industrial goods firms and that the overall model is a good fit.

A keen observation of the result shows that, firm size had a positive and non-significant impact on financial leverage of industrial goods firms, such that a percent increase in firm size would bring about a 3.5% decrease in financial leverage.

- The effect of firm profitability on financial leverage of listed industrial goods firms in Nigeria.

From the Panel Least Squares regression result shown in table 4.2 above, we used the Correlated Random Effects – Hausmann Test. The Hausmann test value of 0.235 and its corresponding p-value of 0.0220 suggest that we fail to accept the null hypothesis at 5% level of significance that random effect model is appropriate for this study and deduce that differences in coefficients are not systematic, therefore we accept and interpret the fixed effect model. In an attempt to know the most reliable estimation model between the fixed effect estimation model and the random effect estimation model, Hausmann test was conducted to test if there is a substantial difference between the estimates of the fixed effect estimator and that of the random effect estimator. Result reveals that fixed effect hypotheses is acceptable because the probability value is significant;

Considering the fixed effect model, coefficient of 23.5% is an indication that the model is strongly represented. That is the independent variables explained 83% variations in the dependent variable while the remaining 76.5% may be explained by variables not included in the model. The t statistic value of 2.55 ( $P=0.0122$ ) indicated that the independent variables jointly impacted on financial leverage of industrial good firms in Nigeria and that the overall model is a good fit.

A keen observation of the result shows that, firm profitability had a positive and significant impact on financial leverage of industrial good firms, such that a percent increase in firm profitability would bring about a 23.5 per cent increase in firm leverage.

The effect of firm asset tangibility on financial leverage of listed industrial goods firms in Nigeria.

From the Panel Least Squares regression result shown in table 4.2 above, we used the Correlated Random Effects – Hausmann Test. The Hausmann test value of -0.083 and its corresponding p-value of 0.468 suggest that we accept the null hypothesis at 5% level of significance that random effect model is appropriate for this study and deduce that differences in coefficients are not systematic, therefore we accept and interpret the random effect model. In an attempt to know the most reliable estimation model between the fixed effect estimation model and the random effect estimation model, Hausmann test was conducted to test if there is a substantial difference between the estimates of the fixed effect estimator and that of the random effect estimator. Result reveals that random effect hypotheses is acceptable because the probability value is non-significant;

Considering the random effect model, coefficient of -8.3% is an indication that the model is not strongly represented. That is the independent variables explained -8.3% variations in the dependent variable while the remaining 91.7% may be explained by variables not included in the model. The t statistic value of -0.727 ( $P=0.468$ ) indicated that the independent variables impacted on financial leverage of industrial good firms in Nigeria and that the overall model is a good fit.

A keen observation of the result shows that, firm asset tangibility had a negative and non-significant impact on financial leverage of industrial good firms, such that a percent increase in firm asset tangibility would bring about a 44 per cent increase in firm leverage.

The effect of market value on financial leverage of listed industrial goods firms in Nigeria.

LASTA	-0.083098	0.125781	0.045557	0.3278
LFIMZ	0.035938	0.181644	0.004328	0.0268
LMV	-0.063601	-0.057945	0.006096	0.9423
LPROF	0.235156	0.162559	0.001004	0.0220
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.521996	3.468711	-0.727070	0.4689
LASTA	-0.083098	0.560753	-0.148191	0.8825
LFIMZ	0.035938	0.105464	0.340765	0.7340
LMV	-0.063601	0.112623	-0.564719	0.5735
LPROF	0.235156	0.092188	2.550821	0.0122

From the Panel Least Squares regression result shown in table 4.2 above, we used the Correlated Random Effects – Hausmann Test. The Hausmann test value of -0.063 and its corresponding p-value of 0.573 suggest that we accept the null hypothesis at 5% level of significance that random effect model is appropriate for this study and deduce that differences in coefficients are not systematic, therefore we accept and interpret the random effect model. In an attempt to know the most reliable estimation model between the fixed effect estimation model and the random effect estimation model, Hausmann test was conducted to test if there is a substantial difference between the estimates of the fixed effect estimator and that of the random effect estimator. Result reveals that random effect hypotheses is acceptable because the probability value is non-significant; Considering the random effect model, coefficient of -6.3% is an indication that the model is strongly represented. That is the independent variables explained -6.3% variations in the dependent variable while the remaining 93.7% may be explained by variables not included in the model. The t statistic value of -0.564 (P=0.5763) indicated that the independent variables impacted on financial leverage of industrial good firms in Nigeria and that the overall model is a good fit.

A keen observation of the result shows that, market value had a negative and non-significant impact on financial leverage of industrial good firms, such that a percent increase in market value would bring about a 6.3 per cent decrease in firm leverage.

## V. CONCLUSION AND RECOMMENDATIONS

### 5.1 Conclusion

This study was carried out to examine the effect of firm characteristics on financial leverage of industrial good firms in Nigeria. It further used firm size, firm profitability, firm asset tangibility, market value and composite effect of firm characteristics as measure of firm characteristics, which also make up the independent variables in this study. Financial leverage was used as the dependent variable. This research covered a ten-year period (2013–2022) made use of secondary data sourced from published annual reports and accounts of 12 purposively selected listed industrial good firms. The Correlated Random Effects – Hausmann Test was employed in analyzing the data obtained. Findings from the study revealed that only firm profitability had a significant effect on financial leverage while firm size, firm asset tangibility and market value all had non-significant effect on financial leverage of industrial good firms in Nigeria. The study found out that profitability of industrial good firms was significant in influencing financial leverage of industrial good firms in Nigeria within the period under review.

### 5.2 Recommendations

Based on the findings of this study, the study recommended the following policy measures that industrial good firms in Nigeria should implement in order to maintain healthy financial leverage.

1. Reduction of firm size, in this case total asset will be critical to the success and survival of industrial good firms in Nigeria. Firms should also increase their scales of operations through increase in liquidity and put these to efficient use in order to enjoy economies of scale. The size of the assets of the firm must not be too large compared to the investment of the firm's businesses so that it can be managed effectively and efficiently.
2. Profitability of the firm should be prioritised since it had a significant positive effect on financial leverage of industrial good firms in Nigeria. When a firm is profitable, it lead to efficiency of their capital structure mix.
3. Asset tangibility recorded a non-significant effect on financial leverage of industrial good firms in Nigeria, hence, industrial good firms have to keep quality tangible of fixed asset that has value in their capital structure so as to enable managers of firms to have enough assets to be able to adjust financial leverage level from time to time until an optimal financial leverage level in arrived at.
4. If industrial good firms are to enjoy and effective optimal financial leverage level, managers of these firms have to ensure that there is increase sales and increase revenue which will in turn increase the market value of the firm which will also lead to the attainment of optimal financial leverage level.

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