

LEVERAGE AND PROFITABILITY OF LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA

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Abstract

The study examines the effect of leverage on profitability of listed industrial goods firms in Nigeria for the period of 2012-2022. The sample size is 11 industrial goods firms out of the 13 industrial goods firms listed on the floor of Nigeria Exchange Group. It uses balance panel the secondary data are extracted from the financial reports and accounts of the companies that are used as the sample of the study. It employs Generalized Least Square Random Effect as the best estimator of the regression model. The study reveals that long term debt has significant and negative impact on profitability of listed industrial goods firms in Nigeria. It also finds that debt to equity ratio has positive but insignificant effect on profitability. The paper recommends that industrial goods firms in Nigeria should use long-term debt with low interest rate to finance long term project and explore alternative financing sources such as equity financing. Financial institutions should develop innovative financial products tailored to the needs of industrial goods firms, by providing competitive interest rates.

Keywords: Leverage, long term debt, profitability, industrial goods firms

Introduction

Leverage refers to the use of borrowed funds to finance the acquisition of assets or investments with the hope of increasing returns to the owners of the firm (Tanko et al., 2022). Firms can finance their operations through equity, debt or a combination of both. The use of debt as a source of finance, which is known as financial leverage, is an important aspect of corporate finance. Financial leverage has both positive and negative effects on the profitability of a

firm. While it can increase the returns to the owners of the firm, it can also increase the risk of bankruptcy in case of financial distress (Yaseen & Al-amarneh, 2015).

Consequently, leverage is an important financial decision that firms undertake to finance their operations and growth. It refers to the use of debt to finance a company's assets or operations, and it can have a significant impact on the profitability of the company. In the context of the Nigerian industrial sector, leverage has been widely

used by companies to finance their investments and operations. This is due to the limited availability of equity financing in the Nigerian capital market (Ojo, 2018).

Profitability, on the other hand, is a critical measure of a company's financial performance. It is a reflection of the company's ability to generate income and create value for its shareholders. Profitability is affected by various factors, including leverage (Tanko, 2020). The effect of leverage on profitability is, therefore, an important issue that receives significant attention in the review.

Leverage is viewed as a result of events that determines companies' source of financing to run the business. Modigliani and Miller (1958), are the pioneers of the theory assumed that a business's value is distinct from its debt and equity mix of financing but ignoring issues that play a positive role in determining the best capital structure such as corporate taxes. Consequently, corporate taxes are significant characteristic in of capital structure. This depends on the contention that the weighted average cost of capital stays constant as leverage changes. Companies that possess high level of leverage in their capital structure are able to decrease their free cash flow.

Companies through utilizing the additional leverage; the free cash flow as an alternative of being inadequately employed by the management given instantly to the debtors and is withdrawn from the company as interest expenses. Company's capital structure that includes a large amount of debt/equity tends to increase the risk of bankruptcy; that is when company's total

debts equal to total assets. Free cash flow denotes the cash that a company is capable of generating after putting aside the cash required to preserve their assets. Free cash flow also permits a company to track investment prospects as they arise to improve shareholder wealth. Capital structure decisions rely on two major sets of theories namely, the trade-off theory and the pecking order theory.

The relationship between leverage and profitability has been a topic of interest in finance and accounting literature. Leverage refers to the use of debt to finance a company's operations, while profitability refers to the ability of a company to generate higher income relative to its expenses. This relationship is critical because debt financing affects a firm's cost of capital, which can ultimately impact its profitability.

The use of financial leverage has been a subject of debate among scholars and practitioners. While some argue that financial leverage can increase the profitability of a firm, others contend that it can lead to financial distress and ultimately reduce the profitability of a firm. The Nigerian industrial sector has been experiencing challenges in recent years, including low productivity, high cost of production, and inadequate infrastructure. The Nigerian industrial sector has experienced significant growth in recent years. However, despite the growth, the sector has faced several challenges, including a lack of access to long-term financing. Companies in the sector have, therefore, resorted to leverage to finance their operations and investments. The use of

leverage, however, may have implications for the profitability of these companies.

Studies on the effect of leverage on profitability in Nigeria have produced mixed results. Some studies find a positive relationship between leverage and profitability (Ogunmuyiwa & Ekundayo, 2015; Tanko et al., 2021), while others find a negative relationship (Abdulkadir & Jibril, 2016; Chadha & Sharma, 2015). There is, therefore, a need to investigate the effect of leverage on profitability in the Nigerian industrial sector, specifically among listed companies. Based on these assertions, this study examines the effect of leverage on the profitability of listed industrial firms in Nigeria.

Many researches investigate the relationship between leverage and profitability in various countries and industries. However, there is a paucity of research in the context of Nigeria's listed industrial goods firms. The Nigerian industrial goods sector is vital to the economy, contributing significantly to the country's Gross Domestic Product (GDP) (Tanko et al., 2021). Therefore, understanding the relationship between leverage and profitability in this sector is critical for policymakers and investors.

Literature Review

There are numerous studies on the effect of leverage on profitability. However, these studies documented mixed findings such as Allahham (2015), examines the relationship between capital structure and bank financial performance of AL- AHLI Banks in Saudi Arabia. The study employed ordinary least square (OLS). The research had found the existence of several negative relationships

between capital structure (accumulated capital and annual investments) and strategic financial performance, still finding mixed results for the relationship between capital structure (accumulated capital and annual investments) and profitability. However, the study is limited to generalizability of findings. Different industries and economic conditions may yield varied results

Anafo et al. (2015), study the relationship between capital structure or leverage on profitability of listed banks on Ghana stock exchange between 2007-2013. The study employs OLS to analyse the data obtained from the selected firms' financial statements. The result shows that financial leverage measured by short term debt to total assets (STDTA) had significant positive relationship with profitability measured by return on assets (ROA), return on equity (ROE) and earnings per share (EPS). Long Term Debt to Total Asset (LTDTA) also has a significant positive relationship with ROA and ROE, however, has a negative and insignificant relationship with EPS. Asset growth rate has a negative and insignificant relationship with profitability measured by ROA, ROE and EPS. Firm size also shows positive and significant relation with all the profitability measures such as ROA, ROE and EPS. Furthermore, the study may not account for factors such as company size, industry dynamics, or the management's ability to use debt strategically, which can impact the observed relationship.

Ihejirika and Anyanwu (2015) examine the effect of leverage on financial performance of deposit money banks (DMB) in Nigeria

from 2010 to 2014. The study employs Generalised Least Square (GLS) random effect. The study finds that leverage has a negative impact on firm performance in Nigeria. Maintaining an optimal level of financial leverage that balances the benefits of debt with the risks of financial distress is crucial for maximizing financial performance. However, the study cannot be generalized since the domain is DMBs and the scope is too small which is from 2010 to 2014.

Ogunmuyiwa and Ekundayo (2015), investigate the effect of capital structure on the profitability of Nigerian firms. study utilizes panel data from a diverse set of publicly traded companies across different industries. It employs regression analysis to assess the relationship between financial leverage (measured by debt-to-equity ratio) and financial performance metrics such as ROA, ROE, and earnings per share (EPS) over a five-year period. The study finds a positive relationship between leverage and profitability. However, the period of five years is small and the study was conducted since 2015 while there are changes in recent time.

Adesina et al. (2015) examine the impact of post-consolidation capital structure in the financial performance of Nigeria quoted banks. A sample of 10 banks is used for the period of 8 years. Profit before tax is used as a dependent variable and two capital structure variables (equity and debt) as independent variables. Ordinary least square regression was adopted to analyse the data. The shows that capital structure has a significant positive relationship with the

financial performance of Nigeria quoted banks. One potential critique of this study could be related to the use of historical financial data. Market conditions and firm-specific factors may change over time, potentially affecting the observed relationship between financial leverage and financial performance.

In a similar vein, Uchechukwu and Kingsley (2016), study 15 quoted banks in Nigeria for 29 year period. Debt and equity capital are used to surrogate the capital structure and performance was measured by return on investment. The OLS results indicate a negative and significant relationship between debt capital and return on investment, while there is positive relationship between equity capital and return on investment. Using return on assets (ROA), return on equity (ROE) and earning per share (EPS). Based on the findings, the study suggests that companies should exercise caution when resorting to high levels of debt financing. However, the study might not account for other factors such as firm size, industry dynamics, or macroeconomic conditions, which could influence the results.

Abdulkadir and Jibril (2016) study the relationship of capital structure decisions with the firm's performance using 36 engineering firms in Pakistan listed on the Keysians Stock Exchange (KSE) as sample for the period 2003 -2009 using the panel Pooled Ordinary Least Square regression. Findings show that financial leverage measured by short term debt to total assets (STDTA) and total debt to total assets (TDTA) has a significant negative

relationship with the firm's performance measured by Return on Assets (ROA), Gross profit margin (GM) and Tobin's Q. The study period is small of generalisation and time for the study which is 2016, this required need for further study.

Adeniji and Oladejo (2016), investigate the impact of capital structure on the financial performance of Nigerian listed DMBs. The study adopts a quantitative approach, using financial data from a sample of companies over a specific period 2011 to 2015. The study uses regression analysis to examine the relationship between financial leverage and find a negative relationship between leverage and profitability. Different industries and economic conditions may yield varied results. Afolabi and Ogunbiyi (2016) evaluate the relationship between leverage and profitability of listed consumer goods firms from 2003 to 2012. The study uses correlation and regression analysis to examine the relationship between financial leverage (measured by the debt-to-equity ratio) and financial performance metrics return on assets (ROA). It finds a negative relationship between leverage and profitability in their study of Nigerian manufacturing firms. The study focuses on consumer goods firms and the period ends at 2012.

Kaur and Kaur (2017) examine the impact of capital structure on the financial performance of Companies listed on the Tehran Stock Exchange. For this purpose, they tested a sample of 400 firm-years among Companies Listed on the Tehran Stock Exchange in the form of 12 industrial groups during the years 2006 to 2010.

Variables used to measure the financial performance of companies are return on assets ratio (ROA) and return on equity ratio (ROE). The study employed OLS to analyse the data obtained from the sampled firms' financial statement and accounts. The results indicate that there is a significant negative relationship between debt ratio and financial performance of companies, and a significant positive relationship between asset turnover, firm size, asset tangibility ratio, and growth opportunities with financial performance measures. However, the relationship between ROA and ROE measures with the firm age is not significant. However, the study use of OLS without employing GLS may results to bias results.

Ahmed et al. (2017), examine the effect of leverage on profitability of listed manufacturing firms in Malaysia. The study used secondary data, the study employed GLS to analyse the data generated from the annual reports and accounts of the sampled firms from 2011 to 2016. The study found a positive relationship between leverage and profitability. However, the period covered by the study is small which cannot give room for generalisation to all firms and recent happening in the world economy. Kachollom et al. (2017) study the effect of capital structure on the performance of Deposit Money Banks in Nigeria. The objective is to examine the effect of capital structure on the financial performance of Deposit Money Banks in Nigeria. Secondary data is obtained from the financial statements of Deposit Money Banks listed in the Nigerian Stock Exchange. Four banks were selected as samples and data from their financial statements for a period of 10 years

(2006 to 2015). The study employs the use of Pearson correlation coefficient and general least squares (GLS) regression model to analyse the effect of capital structure on the performance of some selected banks. The performance variables used in the study were, ROA, ROE and ROCE.

The findings show that capital structure has positive and significant effect on the financial performance of listed deposit money banks in Nigeria. However, the study might not account for other factors such as firm size, industry dynamics, or macroeconomic conditions, which could influence the results.

Anafor (2017), investigates the impact of capital structure on the profitability of banks in Africa using dynamic panel regression robust analysis and data from 37 countries in SSA, the study employed the Debt Ratio (DR) as a measure of capital structure; whereas banks profitability was measured using Risk Adjusted Return on Asset (RAROA), Risk Adjusted Return on Equity (RAROE) and Net Interest Margin (NIM). The study employs regression analysis to assess the relationship between financial leverage. The findings suggest that, banks capital structure is a driver of profitability. Other variables that significantly influence banks profitability are size, tangible asset, growth, taxes and interest rate. Though, the findings can be bias because the study do not employ post estimation tests such as multicollinearity test and heteroscedasticity.

Nwude and Anyalechi (2018), study the impact of capital structure on performance of commercial Banks in Nigeria. The study

evaluates the influence of financing mix on the performance of commercial banks, and the causal link between debt-equity ratios. Data collated are analysed using correlation analysis, ordinary least squares regression analysis, fixed effect panel analysis, random effect panel analysis, granger causality analysis, as well as post estimation test such as restricted f-test of heterogeneity and Hausman test. The findings show that while debt finance exert negative and significant impact on return on asset, the debt-equity ratio has positive and significant influence on return on equity. However, the study fails to account for other industry specific variations and external economic factors such as interest rate, size of firm, inflation rate that could influence the relationship.

Bello et al. (2020), which assesses the impact of capital structure on the financial performance of deposit money banks in Nigeria. The study adopts an ex-post facto research design and it considers variables such as long-term debt to Asset (LTD/TA), Short term debt to total Asset (STD/TA) and Total debt to total Asset (TD/TA) of capital structure and financial performance which was proxied by Return on Asset (ROA). The data obtained from annual financial report of the five sampled Deposit Money Banks in Nigeria covering a period of 2009 -2018, were analysed using descriptive statistic (i.e. mean and standard deviation) and inferential statistic (i.e. Pearson correlation and regression analysis).

The results of the analysis reveal that STD/TA and TD/TA have significant positive impact on ROA. While LTD/TA has insignificant positive impact on ROA. The

study recommends for the use of long-term debt when formulating policies related to debt financing by firms. The study does not focus on diverse sample size and other industries which would hinder generalisation of the findings and recommendations

Also, (Tanko et al., 2021) examine the moderating effect of board financial literacy on the relationship between capital structure and firm financial performance of listed non-financial companies in Nigeria. Capital structure was measured by long term debts to total assets, short term debts to total assets equity to total debt ratio and board financial literacy was measured by ratio of board members that have professional and academic qualification in accounting, finance and economics. Meanwhile financial performance was measured by return on assets. Secondary data is extracted from the sampled firms annual report and accounts and analysed using Panel Least Square. The study revealed a positive and significant relationship between long term debt, short term debt and ROA. It also shows that board financial literacy moderate capital structure significantly and increase firm performance.

Methodology

This study uses a quantitative research design, which involves the collection of numerical data through annual reports and accounts of sampled firms and the use of statistical techniques to analyse the data. The data are obtained from secondary source, the data were extracted from the financial statements of listed industrial goods firms on the Nigerian Exchange Group (NGX). The financial statements were obtained from the annual reports of the

firms for the years 2012-2022. The financial statements are analysed to obtain data on the study's variables: leverage and profitability.

The target population of study consists of all the industrial goods firms listed on the floor of Nigerian Exchange Group (NGX) as at 2023. Going by records extracted from the NGX website and facts books; there were 13 listed industrial goods firms on the floor of the NGX. The sample for this study consists of 11 listed industrial goods firms on the NGX. The study employs two points filters to select the sampled firms. The inclusion criteria for the sample are as follows: The firm must be listed on the NGX as an industrial goods firm before 2012. Secondly, the firm must have financial statements available for the years 2012-2022 that the firm must have data for the variables of interest. Based on these criteria, a sample of 11 listed industrial goods firms will be selected, while BUA Cement Plc and Notore Chemical Plc are listed in 2020 and 2018 respectively, so they are eliminated from the working population. Since the working population is reasonably small and represents a substantial portion of the population, the study would choose to use census sampling and include the entire working population in the study.

Variables and their Measurement

The variables used in studies on the effect of leverage on profitability of listed industrial goods firms in Nigeria include leverage, profitability, size, liquidity, and growth opportunities. The variables of the study comprise of dependent, explanatory (independent), and control variables. The independent variables are long-term debt

and debt to equity, while the dependent variable is firm profitability. The control

variables are firm size and firm age. Table 1 shows the measurement of the variables.

Table 1 Measurement of Variables

Variable	Variable Type	Measurement
ROA	Dependent	Measured as income after interest and tax divided by total assets (Basit & Irwan, 2017; Uremadu & Onyekachi, 2018; Tanko, et al., 2021)
Long Term Debt to equity	Independent	Measured as long-term debt divided by equity (Uremadu & Onyekachi, 2018; Ganiyu, et al., 2019; Tanko, et al., 2021)
Debt to Equity	Independent	Total debts divided by total equity (Avci, 2016; Eniola, Adewunmi & Akinselure, 2017)
Firm size	Control	Logarithm of total asset (Tanko, et al., 2021)
Firm Age	Control	Lifespan of company since from date of listing (Tanko, et al., 2021)

Source: Author's Compilation (2023).

The data collected for this study are analysed using descriptive statistics, correlation analysis, and regression analysis. Descriptive statistics was used to summarize the data and provide an overview of the variables of interest. Correlation analysis will be used to examine the relationships between the variables. Regression analysis is used to investigate the effect of leverage on profitability, while controlling for other relevant variables. The study employs regression model adapts from previous study (Bello et al., 2020).

Model Specification

$$ROA = \beta_0 + \beta_1 LTD_{it} + \beta_2 DER_{it} + \beta_3 FS_{it} + \beta_4 Fage_{it} + \varepsilon_{it}$$

Where:

ROA = return on assets

LTD = long term debt

DER = debt to equity

FS= firm size;

Fage = firm age;

i = firms 1 – 11;

t = the financial years 2012 – 2022;

β_0 = the intercept;

β_1-4 = the slope coefficient of explanatory variables; and

ε_{it} = error term.

Results and Discussion

Multicollinearity

The multicollinearity check involves calculating Variance Inflation Factors (VIFs) for each independent variable, which quantify how much the variance of a regression coefficient is inflated due to multicollinearity. In table 2, variables such

as LTD, DER, Fage, and FS exhibit VIF values ranging from 1.10 to 1.71, well below the thresholds of 5 or 10, which typically

indicate absence of problematic multicollinearity.

Table 2 Multicollinearity Test

Variable	VIF	1/VIF
LTD	1.71	0.5840
DER	1.32	0.7553
FS	1.10	0.9105
FAGE	1.15	0.8703

Source: Stata 14 output based on data extracted from listed industrial goods companies.

Homoscedasticity of the Residuals:

Heteroskedasticity, the uneven distribution of residuals or error terms across the predicted values in a regression model, violates the assumption of constant variance in standard ordinary least squares (OLS) regression. The Breusch-Pagan test, employed in this analysis, aims to detect the presence of heteroskedasticity in a linear regression model.

In this test, the null hypothesis posits that the residuals' variance is constant (homoskedasticity), while the alternative hypothesis suggests that the variance of residuals varies across the values of the independent variables (heteroskedasticity). The test involves regressing squared

residuals against the independent variables, and a significant relationship indicates the presence of heteroskedasticity. The test statistics, following a chi-squared distribution with 1 degree of freedom, yielded a highly significant value of 69.68, with a p-value < 0.05 (Table 3).

Consequently, rejecting the null hypothesis implies that heteroskedasticity is likely present in the model, indicating that the assumption of constant variance in the residuals is not met. This finding has implications for the reliability of standard OLS regression assumptions and may necessitate further consideration or adjustments in the analysis. The use the robust standard error regression to correct the absence of heteroscedasticity.

Table 3 Homoscedasticity Test

	Chi 2(1)	P-value
Model	69.68	0.0000

Source: Stata 14 output based on data extracted from listed industrial goods companies.

Normality

The Shapiro-Wilk test is a statistical test used to assess whether a given sample comes from a normally distributed population. In this case, the test is applied to the variables ROA, LTD, DER, FS, and Fage. The results include the observed values (Obs), the calculated W statistic, the variance (V), the z-value, and the probability (Prob>z) associates with the test.

For all variables (ROA, LTD, DER, FS, Fage), the W statistic is provided along with

corresponding values for variance, z, and probability. The p-values (Prob>z) are all very close to zero (0.00000), suggesting significant evidence to reject the null hypothesis that the data follows a normal distribution. Therefore, it seems that none of these variables exhibit a normal distribution based on the Shapiro-Wilk test. Consequently, the study concludes that the residuals are close to a normal distribution which can be accepted.

Table 4 Shapiro-Wilk W test for Normal Data

Variables	Obs	W	V	Z	Prob>Z
ROA	121	0.68492	28.176	7.444	0.0000
LTD	121	0.89815	9.108	4.926	0.0000
DER	121	0.78018	19.657	6.642	0.0000
FS	121	0.89654	9.252	4.961	0.0000
FAGE	121	0.89438	9.445	5.007	0.0000

Note. Stata 14 output based on data extracted from listed industrial goods firms.

Hausman Specification Test

The study uses the Hausman Specification Test to examine the presence of endogenous explanatory variables in the model because of its potential to cause the OLS estimators to fail. The Hausman Specification tests were carried out on the model of the study in order to choose a more consistent estimator between the GLS fixed effect and random effect. The results are presented on Table 7 shows that in model has chi-square probability is 0.1559 which is insignificant. Based on the Hausman test with an insignificant p-value above 0.05 for the model, the study concluded that random effects estimation was appropriate and the

results were robust to the effects of potential endogeneity for this model specification.

Breusch-Pagan Lagrange multiplier test for Random Effects

The Breusch and Pagan Lagrangian multiplier test is performed to determine whether a random effects model is necessary. The null hypothesis in this test is that the variance of the random effects term (u) is equal to 0 ($\text{Var}(u) = 0$). A significant test result indicates that the random effects model is appropriate and preferred over a standard OLS regression model.

The test statistic obtained is $\text{chibar2}(01) = 23.63$, which is highly statistically

significant with a p-value < 0.0000. Therefore, the study rejects the null hypothesis and concludes that the variation across entities is significant, evidenced by the significant variance of the random effects term u . This provides evidence that a random effects specification would be more appropriate compared to a simple OLS regression model without entity effects. The significant test result implies that there are omitted unobserved effects unique to each entity that should be controlled for through a random effects model specification.

Descriptive Statistics

This sub-section discusses the descriptive statistics of the data generated on the dependent and explanatory variables of the study. It provides the summary statistics relating to the measure of central tendency, such as the mean, the measures of dispersion, such as the standard deviation, the minimum and the maximum values of the study variables.

Table 5 Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
ROA (%)	121	0.1577	0.1829	-0.060	1.28
LTD (%)	121	0.1936	0.1963	0	0.97
DER (%)	121	0.1903	0.2472	0	1.12
FS (₦)	121	196,000,000	511,000,000	173,542	2,660,000,000
FAGE (No.)	121	29.7	13.537	1	48

Note. Stata 14 output based on data extracted from listed industrial goods firms.

Table 5 displays the calculated values for the mean, the standard deviation, the minimum and the maximum for each of the research variables for the 11 listed industrial goods firms among during the period of the study from 2012 to 2022. The Table also shows that the study uses 121 firm year observations for firm performance, long term debt and debt to equity ratio.

Table 5 presents descriptive statistics summarizing the key variables used in the analysis based on a sample of 121 observations. The dependent variable return on assets (ROA) has a mean value of 0.1577 or 15.77%. The mean ROA is 0.1577 or 15.77%. This indicates that on average, the

firms are generating a profit of 15.77 cents for every dollar of assets invested. However, ROA ranges widely between -6% to 128%. The sizeable standard deviation of 0.1829 relative to the mean shows substantial variability in profitability across the sampled firms. A few firms are losing money while some are extremely profitable relative to their asset base. Considering the broad mix of consumer goods companies, this variation is not surprising. The minimum ROA indicates that some firms have fairly weak or even negative return on assets. Meanwhile the maximum reflects outliers with exceptionally high returns, well exceeding their asset investment.

Among the independent variables, the average LTD ratio of 19.36% reflects that most firms have some long-term liability obligations, but overall long-term debt levels remain reasonably low. With values spanning from 0 to 97% across firms. Together with a maximum of 97%, this suggests most consumer goods firms have conservatively leveraged balance sheets although some make extensive use of long-term funding sources. The distribution is right skewed indicating most observations seem concentrated towards the lower end. While useful for funding growth in moderation, high long-term debt can be financially risky.

Furthermore, the average DER of 0.1903 reflects shareholder equity exceeds long term capital among most firms. However maximum DER exceeding 100% indicates some companies have riskier debt levels surpassing shareholder stakes. Still, the distribution seems skewed towards reasonably lower risk positions based on median DER. Conservatively managing financial leverage is prudent for consumer goods firms dealing with potentially discretionary product demand.

In addition to this, the mean firm size of ₦196,000,000. However, the size distribution spans from around ₦173,542 to ₦2,660,000,000 billion in assets, evidencing companies of quite varying scale. The standard deviation of ₦511,000,000 indicates material dispersion relative to the central tendency. Reasonably large firms may benefit from economies of scale in production, bargaining power, and financial stability. However, smaller niche players can also adeptly serve target segments despite resource constraints.

Finally, the average firm age of 29.7 years indicates most sampled companies are reasonably well established, giving them time to different brand products and institutional knowledge. However, firm age ranges widely from startups under a year old to 48 years in business. Younger firms may embrace innovative technologies and have recently tapped growing consumer segments. The oldest companies likely have proven product lines but could face threats of disruption or lagging connect with contemporary buyers. The distribution leans towards mature firms but also represents emerging players.

Correlation Analysis

Table 6. Correlation Matrix for Leverage and Firm performance

VAR.	ROA	LTD	DER	FS	FAGE
ROA	1.0000				
LTD	-0.0574	1.0000			
DER	0.0520	0.6353	1.0000		
FS	-0.1281	-0.1927	0.0404	1.0000	
FAGE	-0.0347	-0.2976	-0.2990	0.0037	1.0000

Note. Stata 14 output based on data extracted from listed industrial goods firms.

Table 6 shows the diagonal elements, situated on the main diagonal, signify the correlation of each variable with itself, consistently registering a value of 1.0000. Off-diagonal elements offer correlation coefficients between pairs of variables. Notably, correlation coefficients range from -1 to 1, where -1 denotes a perfect negative linear relationship, 1 signifies a perfect positive linear relationship, and 0 indicates no linear relationship.

Examining specific correlations, the correlation between Return on Assets (ROA) and Long-Term Debt (LTD) is -0.0574, indicating a weak negative linear relationship. This implies that as ROA increases, there is a tendency for Long-Term Debt to decrease, and vice versa, though the correlation is weak, suggesting a lack of robustness in this relationship. Moving to the correlation between ROA and Debt-to-Equity Ratio (DER) is 0.0520, indicating a very weak positive linear relationship. This implies that as ROA increases, there is a

slight tendency for the Debt-to-Equity Ratio to increase, and vice versa, with the correlation close to zero, signifying a very weak association. Turning to the correlation between ROA and Financial Stability (FS), which is -0.1281, a weak negative linear relationship is present. As ROA increases, there is a tendency for Financial Stability to decrease, and vice versa, though the correlation is weak, indicating a lack of strong correlation. Lastly, the correlation between ROA and Firm Age (FAGE) is -0.0347, revealing a very weak negative linear relationship. As ROA increases, there is a slight tendency for Firm Age to decrease, and vice versa, with the correlation close to zero, suggesting a very weak association.

Regression Results on Leverage and Profitability

Table 7 displays the result of estimated coefficients, z-statistic, probability, coefficient of determination of research models

Table 7. GLS Regression Results for Leverage and Profitability

Variables	Coef.	Z	P> z
Constants	0.5623	1.68	0.092***
LTD	-0.1383	-5.27	0.000*
DER	0.0564	1.53	0.125
FS	-0.0524	-1.23	0.217
FAGE	0.0000	0.02	0.988
Overall R ²	0.1438		
Wild chi	22.63		
Prob>chi2.	0.0004		
Hausman	0.1559		

Note. Stata 14 output based on data extracted from listed industrial goods firms.

*, and *** indicate 1% and 10% level of significance respectively.

Table 7 shows the regression coefficients and z-statistics of random effect for the study. The results show that the overall R^2 is about 0.1438 which is 14% which expresses the percentage of the total variation in the dependent variable explained by the capital structure mechanisms (long term debt, and debt to equity). It indicates that short term debt, long term debt and debt to equity constitute 14% variation in the performance of listed industrial goods companies while the remaining 86% are factors not included in this study model.

The model has wald chi2 of 22.82 with significant probability value of 0.0000 which is significant at 1%. This indicates that the model is fit and the explanatory variables are well selected. More so, the selection is not by any chance. In addition, it significantly shows that this finding provides the model is fit and the selected independent variables have the explanatory power to explain the variation in ROA.

The result of the Random Effect in the first model reveals that 1% increase of long-term debt will lead to -13.83% decrease of firm performance because the coefficient value is -0.1383 which is negative value and shows verse relationship. It also revealed significant relationship between long term debt and profitability because p-value of 0.000 which is less than 0.05 level of significance. The finding is in line with Nazir et al. (2021) who find that debt is negatively associated with performance of firm. The result is however in contrast with the finding of Bello et al. (2020); Tanko, et al (2021), who find positive relationship

between long term debt and profitability. This result is also in line with agency cost hypothesis. It is also consistent with Trade-off theory which believed that firm should use more of debt in order to take advantage of tax shield, which will increase profitability.

Furthermore, the result in table 7 shows that debt equity has positive but insignificant impact on profitability at coefficient and probability value of 0.0564 and 0.125 respectively. This implies that 1% increase of debt to equity will lead to 5% increase in profitability. Also, the influence is statistically insignificant at 5% level of significance. The finding is not in line with Modigliani and Miller theory of capital structure irrelevance, the theory believed that firm performance can be increased when firms effectively use their resources and it is irrelevant for originating funds from internal capital or external capital. The finding disagree with findings of Afolabi and Ogunbiyi (2016), who finds that debt to equity, is negatively associated with profitability. While it agreed with the findings of Ogunmuyiwa and Ekundayo (2015), who find a positive relationship between equity firm and profitability.

Table 7 shows that firm size has negative but insignificant impact on profitability at coefficient and probability value of -0.0524 and 0.217 respectively. This implies that 1% increase of firm size will lead to 5% decrease in profitability. Also, the influence is statistically insignificant at 5% level of significance. The finding is not in line with Modigliani and Miller theory of capital

structure irrelevance, the theory believes that firm performance can be increased when firms effectively use their resources and it is irrelevant for originating funds from internal capital or external capital. The finding disagrees with findings of Anafo et al. (2015), who find that firm size is positively associated with profitability. While it agrees with Kaur and Kaur (2017), who find a negatively insignificant relationship between firm size and profitability.

Finally, table 7 shows that firm age has positive but insignificant impact on firm performance at coefficient and probability value of 0.0000 and 0.988 respectively. This implies that 1% increase of firm age will lead to 0% increase in profitability. Also, the influence is statistically insignificant at 5% level of significance. The finding is not in line with Modigliani and Miller theory of capital structure irrelevance, the theory believed that profitability can be increased when firms effectively use their resources and it is irrelevant for originating funds from internal capital or external capital. The finding disagreed with findings of Haykir and Çelik (2018) who found that firm age is

negatively associated with profitability, while it agreed with the findings of Kaur and Kaur (2017) who find an insignificant relationship between firm age and profitability.

Conclusion and Recommendations

The relationship between leverage and profitability in the Nigerian industrial sector is complex and depends on the type of debt financing used. Short-term debt can negatively impact the profitability of industrial goods firms in Nigeria, due to higher financial risks and uncertainty. Long-term debt may not be an effective tool for enhancing profitability in the Nigerian industrial sector, especially with high interest rates.

The study recommends that industrial goods firms in Nigeria should use long-term debt with low interest rate to financed long term project and explore alternative financing sources such as equity financing. Financial institutions should develop innovative financial products tailored to the needs of industrial goods firms, by providing competitive interest rates.

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