JOURNAL OF DEVELOPMENT ECONOMICS AND FINANCE
Vol. 5, No. 1, 2024, pp. 187-210

URL : www.arfjournals.com
https://DOI:10.47509/JDEF.2024.v05i01.09

Effect of Capital Structure on the Performance of Selected Quoted Consumer Goods Firms in Nigeria

Sebil Olalekan Oshota
Economic and Business Policy Department, Nigerian Institute of Social and Economic Research (NISER), Ibadan
E-mail: oshota4real@yahoo.com

Article History

Received : 22 April 2024

Revised : 29 May 2024

Accepted : 11 June 2024

Published : 27 June 2024

To cite this article

Sebil Olalekan Oshota (2024). Effect of Capital Structure on the Performance of Selected Quoted Consumer Goods Firms in Nigeria. *Journal of Development Economics and Finance,* Vol. 5, No. 1, pp. 187-210. https://DOI:10.47509/JDEF.2023.v05i01.09

Abstract: This study investigates the relationship between capital structure and the performance of 10 selected consumer goods in Nigeria. The research utilizes a quantitative design and data was sourced from annual reports of the firms with complete financial records. The correlation analysis indicates a negative relationship between all independent variables total debt (TD),age(AGE), debt to equity ratio (DE), and long-term debt to capital employed (LDCE) and return on investment (ROI), while only return on assets (ROA), TD, and DE exhibit significant associations with firm performance. TD and DE negatively impact firm performance, emphasizing the intricate dynamics of capital structure decisions. Multiple regression results reveal a positive but statistically insignificant effect of DE on ROI. Conversely, DE significantly positively influences ROA, underlining the importance of an optimal debt-equity mix for enhanced financial outcomes. These findings offer valuable insights for policymakers, firms, and financial professionals, aiding efforts to bolster the financial health and competitiveness of consumer goods manufacturers in Nigeria's evolving economic landscape.

Keywords: Capital Structure, Firm Performance, Equity, Debt, ROA, ROI

1. Introduction

The question of how the capital structure choices of consumer goods firms in Nigeria influence their financial performance remains a critical concern (Seckanovic, 2021; Olusola *et al.* 2022; Anozie, *et al.*, 2023). The significance of this endeavour is multifaceted. While ample research exists on capital structure and firm performance, there is a notable gap in our understanding of how these decisions specifically affect publicly quoted manufacturing firms. The manufacturing sector particularly those in the consumer goods constitutes a cornerstone of the global economy, contributing significantly to industrial output, employment generation, and economic growth (UNIDO, 2016; 2020). With a population of over 200 million, Nigeria boasts of a significant consumer market that demands a wide range of goods, from food products to household items. As companies in this sector aim to meet consumer demands and expand their operations, the question of how they finance their activities becomes critical (ITA, 2023).

Capital structure decisions for manufacturing firms are not mere financial transactions; they are strategic determinants of their ability to invest in innovation, expand their operations, maintain competitiveness, and navigate economic uncertainties. Furthermore, in an era marked by financial market volatility global shocks and evolving regulatory landscapes, the ramifications of these choices extend beyond the firm itself, impacting broader economic stability and growth. Between 2019 and 2023 the world experienced unprecedented economic events, including the COVID-19 pandemic and its aftermath. These events have had profound effects on businesses worldwide, prompting questions about the resilience of different capital structures during times of crisis and recovery. Different sectors, such as consumer goods manufacturing, exhibit unique characteristics that influence capital structure decisions. Companies operating within the Nigerian consumer goods manufacturing sector, for instance, face market-specific challenges and opportunities. More also, regulatory changes and government policies have continued to evolve, impacting the financing options available to firms.

While extensive research has explored the relationship between capital structure and manufacturing firms' performance globally, limited attention has been paid to the specific context of the Nigeria. Addressing this gap is essential to equip these companies with the knowledge needed to make informed capital structure decisions that contribute to their sustained growth, financial health, and competitiveness in the Nigerian consumer goods market. Hence, focusing on a specific context, such as quoted consumer goods manufacturers in Nigeria, this research aims to provide insights that can assist businesses in navigating a rapidly changing financial landscape.

One of the fundamental financial decisions confronting these firms is the determination of the appropriate mix of their capital structure – the mix of debt and equity used to finance their operations and investments (Hariem and Turgut, 2019). The capital structure choices made by manufacturing firms have far-reaching implications. The manner in which a manufacturing firm balances debt and equity not only influences its cost of capital but also shapes its risk profile and financial stability. The capital structure choices made by manufacturing firms have far-reaching implications. The manner in which a manufacturing firm balances debt and equity not only influences its cost of capital but also shapes its risk profile and financial stability. These decisions resonate not only within the confines of the firm but also resonate throughout the broader economy, impacting stakeholders, including shareholders, creditors, employees, and the communities in which these firms operate (Abdullahi, Dachomo, Jibril and Duniya, 2020).

Consequently, this study seeks to provide further empirical investigate of the relationship between capital structure and the performance of some selected quoted consumer good firms in Nigeria. Aside the introduction, the paper is structured as follows. Section 2 comprises of the empirical literature review, while section three addresses the issues of methodology. Section 4 is devoted to results, analysis and interpretation and Section 5 concludes the paper.

2. Literature Review

Certainly, different empirical studies have explored the intricate relationship between capital structure and firm performance, shedding light on the dynamics in various contexts and with a range of findings. The outcomes are influenced by factors such as the industry, country-specific conditions, and the specific performance measures used. In a recent study, Olusola, Mengze, Chimezie and Chinedum (2022) examined the impact of capital structure on firm performance of some large companies in Hong-Kong stock exchange. However, the findings proved to be inconclusive. In another context, Luo and Jiang (2022) evaluated the impact of capital structure on financial performance based on convolutional neutral network model. The study revealed that a poor capital structure can negatively impact a company's finances. Alzomaia (2021)'s investigation in Saudi Arabia uncovered a notable positive relationship between leverage and firm performance, specifically in terms of return on assets (ROA) and return on equity (ROE), suggesting that increasing leverage can enhance firm performance in the Saudi Arabian context. Similarly, Mollah and Matin (2021)'s research in the pharmaceutical industry in Bangladesh revealed a U-shaped relationship between capital structure and firm performance, implying that firms in this sector can optimize their performance by maintaining a moderate level of leverage. Bhattacharyya and Bhattacharya (2020)'s study on Indian manufacturing companies reported a positive association between leverage and firm performance, emphasizing the potential for debt financing to improve financial performance within the Indian manufacturing sector.

Gupta and Jain (2021)'s examination of the Indian automobile industry also found a positive link between leverage and firm performance, particularly in terms of ROA and ROE, indicating that debt can positively impact firms in this industry. Conversely, Chen and Li (2021)'s study on Chinese listed companies (2020) identified a non-linear relationship between capital structure and firm performance, with an optimal level of leverage, while Öztekin (2021)'s global panel data analysis revealed a significant negative relationship between leverage and firm performance on a global scale, suggesting that excessive debt may have detrimental effects on firms across countries and industries. These diverse empirical findings contribute to a nuanced understanding of the complex interplay between capital structure choices and firm performance in various economic and geographic settings. Similarly, Cuevas-vargas et.al (2022) utilised a PLS-SEM approach to examine the impact of capital structure and innovation on firm performance of a small and medium-sized (SMEs) manufacturing firms in Mexico. The results of the study indicates that capital structure has a significant direct effect on innovation and an indirect effect on firm performance.

In another development, Frank and Goyal's meta-analysis (2021) synthesizes findings from multiple studies and suggests a negative association between leverage and firm performance. Ahmad, Ali, and Shah (2020) focused on emerging markets reaffirms this relationship, revealing a significant negative impact of leverage on firm performance. In a comparative study of Chinese and Indian firms, Agarwal and Tandon (2020) find contrasting patterns: Chinese firms exhibit a pronounced negative effect of high leverage on performance, while Indian firms display a weaker connection between capital structure and performance. Examining European companies, Dang and Vo (2019) discover a U-shaped relationship, indicating that firms with moderate debt levels tend to perform better than those with either very high or very low debt levels. Meanwhile, Hoang and Vo's study on Vietnamese firms (2019) highlights the detrimental impact of excessive debt on performance in developing economies, emphasizing the importance of understanding the contextual nuances in this relationship. These empirical studies collectively underscore the significance of capital structure decisions in shaping firm performance, with variations observed across different markets and economic environments.

Saad (2015) showed that total debt ratio and short -term debt to asset ratio as measures of capital structure has significant negative influence on the financial performance of firms in a study of 28listed firms in chemical sector of Pakistan at KSE with 2009 and 2013 period. Ebaid (2009) findings on the investigation of the effect of capital structure on firm performance in Egypt firms from 1997 to 2005 revealed that capital structure choice decisions, in general, has a weak-to-no impact on firm's performance. Mauwa, Namusongeand and Onyango (2016) sought to appraise the effect of capital structure on financial performance of firms listed on Rwanda Stock Exchange through correlational and regression analysis. The study concluded that the association between capital structure and measures of performance is negative and significant. In another vein, Emina (2021) investigated the effect of capital structure on the performance of British high-tech firms between 2018 and 2018 using OLS regression. The results showed a negative and significant impact of all measurements of capital structure on ROE, ROA and Tobin's Q. In contrast, Avci (2016) obtained a significant negative relationship in the examination of the impact of capital structure and firm performance of manufacturing firms in Borsa Istanbul during the period of 2003 and 2015.

In the context of Nigeria, a number of studies have provided insights into the relationship between capital structure and firm performance in the Nigerian context. Empirical literature on the effect of capital structure on firm performance has yielded varied findings. Ozoh and Okoye (2019) conducted a study on Nigerian listed manufacturing firms and found a significant positive relationship between leverage and firm performance, particularly in terms of return on assets (ROA) and return on equity (ROE), suggesting that debt financing can enhance financial performance in the Nigerian manufacturing sector. Conversely, Uwuigbe and Olatunji (2017), in their research across various Nigerian listed firms, reported a mixed relationship between capital structure and firm performance, highlighting the influence of industry-specific dynamics. Oyedokun, Olatunji and Sanyaolu (2018)'s study sought to examine the effect of capital structure on the financial performance of firms in 10 Nigerian listed manufacturing firms using a panel data analysis between 2007 and 2016. The study revealed that capital structure exerts both significant and insignificant influence on the performances of the firms. Onaolapo and Kajola (2020) employed panel data analysis and found a positive and significant association between debt and firm performance, implying that leverage can positively impact financial performance in Nigeria.

Akinlo and Emmanuel (2019) identified a positive relationship between leverage and firm performance, particularly in terms of ROA, but also noted a threshold level of debt beyond which further increases in leverage negatively impacted performance. Additionally, Nduka and Akinwumi (2017) reported a positive relationship between leverage and firm performance, particularly in terms of ROE, suggesting that debt financing can contribute to improved financial performance for Nigerian firms. These studies collectively offer insights into the intricate relationship between capital structure choices and firm performance in Nigeria, emphasizing the importance of considering industry dynamics and economic conditions in understanding this relationship. Ogebe and Ogebe (2013), in a comparative analysis of the impact of capital structure on the performance of some selected firms in Nigeria, revealed that a strong relationship exists between performance proxied by return on investment and leverage of the firms over a period of ten years. Table 2.1, specifically summarises few of the findings on the effects of capital structure on manufacturing firms in a literature table.

3. Methodology

3.1. Area of Study:

The study focuses on publicly listed manufacturing firms in Nigeria, with particular reference to consumer goods manufacturing firms. Following a thorough and exhaustive search for companies with consistent data on key variables from 2012 to 2021, the study focuses on ten prominent entities within the consumer goods manufacturing sector. These selected firms include Nestle Nigeria Plc, Nigerian Breweries Plc, Cadbury Nigeria Plc, Flour Mill, Dangote Sugar, Unilever Nigeria Plc, Nigeria Bottling Company, PZ Cussons, Honeywell, and Nascon Plc.

3.2. Research Design

The research design for this study is predominantly quantitative in nature. It involves the collection, analysis, and interpretation of numerical data from the companies' annual report and other secondary sources to identify patterns, trends and as well as investigate the relationship between capital structure and firm performance among the selected consumer goods manufacturing firms in Nigeria.

3.3. Population, Sample and Sampling Techniques

The study population consists of all quoted goods manufacturing firms on the Nigerian Stock Exchange. This study's sample was limited to publicly traded good manufacturing companies that had consistent data on capital structure and financial performance metrics between 2012 to 2021. These companies cut across the consumer and industrial firms that engage in the production and distribution of fast-moving consumer goods, including food, beverages, personal care items, and household products, within the Nigerian market goods manufacturing firms. Following a thorough investigation to identify listed firms with consistent data on the variables of interest between 2012 and 2021, the study's sample consists of 10 companies cutting across the listed consumer goods manufacturing sector. The companies include Nestle Nigeria Plc, Nigerian Breweries Plc, Cadbury Nigeria Plc, Flour mill, Dangote Sugar, Unilever Nigeria Plc, Nigeria bottling company, PZ Cusson, Honeywell and Nascon Plc.

3.4. Model Specification

This study applies a panel regression model to test the proposed hypotheses. Drawing from the work of Hajiha & Sarfaraz (2013); Kovermann (2018); Dewiyanti & Burhan (2020) and in fulfilment of the hypothesis of this study, which is to assess the effect of capital structure on the performance of Nigeria goods manufacturing firms, the following equation is specified:

$$ROA_{i,t} = \alpha_0 + \beta_1\, DER_{i,t} + \beta_2\, LTCE_{i,t} + \beta_3\, TDR_{i,t} + \beta_4\, AGE + \beta_5\, SIZE_{i.t} + \beta_6\, GTA_{i,t} + \varepsilon_{it} \quad 3.1$$

$$ROI_{i,t} = \alpha_0 + \beta_1\, DEQ_{i,t} + \beta_2\, LTCE_{i,t} + \beta_3\, TDR_{i,t} + \beta_4\, AGE + \beta_5\, SIZE_{i.t} + \beta_6\, GTA_{i,t} + \varepsilon_{it} \quad 3.2$$

Where:

ROA = return on asset

ROI = return on investment

DEQ = Debt to equity

LTDCE = Long term debt to capital employed

TDR = Total debt ratio

AGE = Firms' age

SIZE = Firms' Size

GTA = Growth of Asset

α_0 = constant term and

β_1, β_2, β_3, β_4 and β_5 = unknown parameters to be estimated.

i, and *t* = Cross section of firm *i* at time *t*,

ε = Error term.

3.5. Definition and Measurement of Variables

3.5.1. Dependent Variables – Firm performance variables

Return on asset (ROA): The ratio indicates how efficiently a company is using its assets to generate profits. A higher ROA percentage implies that the company is more efficient in generating profits from its assets. Conversely, a lower ROA percentage suggests that the company is less efficient in using its assets to generate profits. ROA is measured as net profit after tax divided by total asset.

$$ROA = \frac{Net\ Profit\ After\ Tax}{total\ asset}$$

Return on Investment (ROI). It is used to evaluate the profitability or efficiency of an investment. ROI measures the return, usually in terms of profit or gain, generated from an investment relative to the initial cost or investment amount. ROI is typically expressed as a percentage net profit after tax divided by shareholders' fund.

$$ROA = \frac{Net\ Profit\ After\ Tax}{shareholders\ fund}$$

3.5.2. Independent and Control Variables

Debt-equity ratio: The Debt-Equity Ratio, also known as the D/E ratio, measures the proportion of a company's financing that comes from debt compared to equity. It is an important indicator of a company's financial leverage and risk. The debt-equity ratio is calculated by dividing the total debt of a company by its total equity. The formula is as follows:

$$Debt - Equity\ ratio\,(DER) = \frac{Total\ Debt}{Total\ Equity}$$

Long term debt to capital employed ratio: Also known as the Long-Term Debt to Capitalization Ratio. It assesses the proportion of long-term debt in a company's capital structure. It is used to measure a company's financial leverage and its ability to meet its long-term debt obligations. The formula for calculating this ratio is as follows:

$$Long-Term\,Debt\,to\,Capital\,Employed\,Ratio\,(LDCE) = \frac{Long\,Term\,Debt}{Capital\,Employed}$$

Total debt ratio: Also known as the Debt to Assets Ratio measures the proportion of a company's total assets that are financed by debt. It provides insights into the company's financial leverage and risk exposure. The formula for calculating the Total Debt Ratio is as follows:

$$Total\,Debt\,Ratio\,(TDR) = \frac{Total\,Debt}{Total\,Asset}$$

Corporate social responsibility (CSR): The CSR covers the firms' CSR expenditures and other charitable donations. This approach of measurements has been adopted by a number of scholars in their studies (Hajiha & Sarfaraz, 2013; Bhuiyan& Nguyen, 2019; Gong, Huang, Wu, Tian & Li, 2021).

***Leverage (LEV)*:** This is the ratio of firms' total debt to total capital; sum of total debt capital and equity capital (Gong, Huang, Wu, Tian, & Li, 2021).

$$\frac{Total\,Debt}{Total\,Capital}$$

Return on asset (ROA): This is used to measure how much a company is able to earn from its assets. It is calculated as the ratio of profit before tax to total asset

$$\frac{Profit\,before\,Tax}{Total\,Asset}$$

Return on equity (ROE). ROE measures a company's capacity to generate income on investments of its shareholders. It is calculated by dividing profit after tax by total shareholder's equity.

$$\frac{Profit\,after\,Tax}{Shareholders'\,s\,Equity}$$

Firm Size (Size): Refers to the scale or magnitude of a company's operations, assets, revenues, or market capitalization. It is a fundamental measure used to categorize and compare businesses based on their relative size within an industry or economy. Firm size is a significant factor that can influence various aspects of a company's operations, financial performance, and strategic decisions. This is calculated as the natural logarithm of total assets.

Growth in assets (GTA): Also referred to as asset growth measures the increase in a company's total assets over a specific period. Total assets represent all the economic resources owned or controlled by the company, including cash, accounts receivable, inventory, property, plant, equipment, and investments. Asset growth is a critical indicator of a company's expansion, investment in its business operations, and overall financial health.

The formula for calculating asset growth is as follows:

$$\frac{Total\ Assets\ at\ the\ end\ of\ the\ period - Total\ Assets\ at\ the\ beginning\ of\ period}{Total\ Assets\ at\ the\ beginning\ of\ period} \times 100$$

Table 3.1 summarises the variables, their measurements and sources of data

Table 3.1: Variables Measurements and Sources

Variables	*Definitions/Measurements*	*Source*
Dependent		
Return of Asset	Ratio of PAT to Total Assets	Annual Reports
Return on Equity	Ratio of PAT to Total Equity	Annual Reports
Independent		
Debt-equity ratio	Ratio of the total debt to total equity	Annual Reports
Long term debt to capital employed ratio	Ratio of long-term debt to capital employed	Annual Reports
Total debt ratio	Ratio of total debt to total assets	Annual Reports
Control Variable		
Firm Size	Natural logarithm of total assets	Annual Reports
Growth in Asset	Percentage changes in total Assets	Annual Reports

3.6. Data and Sources

The data used in this study is obtained from the published financial statements of the selected manufacturing companies in consumer and industrial manufacturing goods industries. The study was carried out using data from the 10-year period from 2012 to 2021.

3.7. Data Analysis Techniques

This study employed panel data regression, which takes into account the dataset's cross-sectional and time-series dimensions. In addition, prior to testing panel data regression, a diagnostic test was performed using the Hausman test. The first step before running the Hausman test is to run the fixed and random effects to determine which of the models will be used for the analysis. If the Hausman test is not significant then the random model will be selected. Otherwise, fixed effect will be interpreted.

3.8. Model Estimation Techniques

The panel data methodology was used to examine the relationship between capital structure and the performance of goods manufacturing firms in Nigeria. This is due to the data's characteristics, which combine both time series and cross-sectional data. Panel data analysis is a useful method for analysing longitudinal data because it allows for a variety of regression analyses in both spatial (units) and temporal (time) dimensions. It also provides a significant means of longitudinally analysing data, particularly when the data are from multiple sources and the time series are too short for separate time series analysis, which is appropriate for this study's data description. According to Hsiao, Mountain, and Ho-Illman (1995), another advantage of using panel data sets is that they improve the efficiency of econometric estimates because panel data has more degrees of freedom and sample flexibility than cross-sectional data, which can be observed as a panel with T=1 or time series data with a panel of N=1. A typical panel data regression looks like this:

$$Y_{it} = c + \beta . X_{it} + \mu_{it}$$

$$Y_{it} = c + \beta . X_{it} + \mu_{it} \quad 3.3$$

where:

i- denotes entities or firms;

t - denotes time;

i - denotes the cross-section dimension;

t - denotes the time-series dimension;

c - is a scalar;

β - is *K x1*;

X_{it}- is the *i-th* observation on K explanatory variables;

μ_{it} - is the error.

In most applications that use pane data, errors have the following form:

$$\mu_{it} = \alpha_i + \varepsilon_{it}$$

where: α_i- is the error component specific to individual *i;*

ε_{it}- is the random component of error.

In the analysis of panel data there are two main approaches: the fixed effects model and the random effects model. The fixed effects model assumes that the characteristics of each individual unit can influence the dependent variable, and the effects of time-invariant characteristics are ignored. The regression equation in a fixed effect model can be written as follows:

$$Y_{it} = (C_0 + \theta_i . D_i) + \beta . X_{it} + \varepsilon_{it} \quad (3.4)$$

Where;

Y - is the dependent variable;

C_o - is a constant;

θ_i - is a country-specific value;

D_i - is dummy variable for each country in the group;

β - is the parameter of independent variable;

X_{it} - is the independent variable;

ε_{it}- is the error.

In the fixed effect model, the variation across entities or firms can be correlated with the independent variables. Therefore, given the dependent and independent variables, equations 3.1 and 3.2 takes the form:

$$ROA = c_0 + (\theta_i D_i) + \beta_1 DER_{i,t} + \beta_2 LTCE_{i,t} + \beta_3 TDR_{i,t} + \beta_4 AGE + \beta_5 SIZE_{i,t} + \beta_6 GTA_{i,t} + \varepsilon_{it} \quad (3.3)$$

$$ROI_{it} = c_0 + (\theta_i D_i) + \beta_1 \beta_1 DER_{i,t} + \beta_2 LTCE_{i,t} + \beta_3 TDR_{i,t} + \beta_4 AGE + \beta_5 SIZE_{i,t} + \beta_6 GTA_{i,t} + \varepsilon_{it} \quad (3.4)$$

Unlike the fixed effects model, the variation across countries in the random effects model is assumed to be random and uncorrelated with the predictor or independent variables (Greene, 2008).

In a random effects model, the regression equation is the following:

$$Y_{it} = C_0 + \beta . X_{it} + \varepsilon_{it} \quad (3.5)$$

Where:

$$\varepsilon_{it} = \lambda i_j + \gamma_{it} \quad 3.6$$

Substituting equation 3.5 to equation 3.6 gives:

$$Yit = C0 + \beta.X_{it} + \lambda i_j + \gamma_{it} \quad 3.7$$

Rearranging equation 3.7 gives:

$$Y_{it} = C_0 + \lambda i_j + \beta.X_{it} + \gamma_{it} \quad 3.8$$

With

Y - is the dependent variable;

C_o- is a constant;

β - is the parameter of independent variable;

X_{it}- is the independent variable;

λi_j - is the common white noise error;

γi_j - is the specific error term.

The error in random effects models is completely random and unrelated to the regressors (Baum, 2001).

Then, given the dependent variable and the independent variable, equation 3.1 – 3.2 becomes.

$$ROA_{it} = c_0 + \beta_1 DER_{i,t} + \beta 2LTCE_{i,t} + \beta_3 TDR_{i,t} + \beta_4 AGE + \beta_5 SIZE_{i,t} + \beta_6 GTA_{i,t} + \varepsilon_{it} \quad (3.9)$$

$$ROI_{it} = c_0 + \beta_1 DER_{i,t} + \beta_2 LTCE_{i,t} + \beta_3 TDR_{i,t} + \beta_4 AGE + \beta_5 SIZE_{i,t} + \beta_6 GTA_{i,t} + \varepsilon_{it} \quad (3.10)$$

The commonly used Hausman test must be performed to choose between fixed and random effects models. The Hausman test is intended to detect violations of the random effects assumption, which states that the explanatory variables must be orthogonal to the unit effects. If no correlation exists between the independent variables and the unit effects, the estimates of β in fixed effects model ($\hat{\beta}_{FE}$) should be similar to the estimation of β in random effects model ($\hat{\beta}_{RE}$). The Hausman statistic (H) is a measure of the difference between the two:

$$H = (\hat{\beta}_{RE} - \beta_{FE})[Var(\hat{\beta}_{FE}) - Var(\hat{\beta}_{RE})^{-1}(\hat{\beta}_{RE} - \hat{\beta}_{FE})$$

H is the chi-square distribution with degree of freedom equal to the number of regressors in the model under the null hypothesis of orthogonality. A p value less than 0.05 is interpreted as evidence that, at conventional levels of significance, the two models are sufficiently different to reject the null hypothesis and to reject the null hypothesis in favour of the fixed effects model. If the Hausman test does not reveal a significant difference (p>0.05), the null hypothesis is accepted, and the fixed effect model is replaced with the random effects model (Clark and Linzer, 2006).

4. Results

4.1. Descriptive Analysis

Table 4.1 provides a descriptive analysis of various variables, including Return on Investment (ROI), Return on Assets (ROA), Debt-equity (DE), Long term debt to capital employed (LDCE), company age, size, and growth rate. This analysis offers insights into the characteristics and distribution of these key metrics.

The analysis reveals that the average ROI and ROA in the manufacturing industry are both positive, with mean values of 0.16 and 0.15, respectively. This suggests an upward trend in profitability within the industry. The highest returns observed for shareholders are 0.43 for ROI and 2.36 for ROA, while the lowest returns are -0.18 and -0.10, respectively.

The capital structure is assessed in terms of debt-equity (DE), Long term debt to capital employed (LDCE), and total debt (TD). The proportions of these capital components are 0.93 (DE), 0.23 (LDCE), and 0.27 (TD), indicating that debt-equity is the predominant choice for financing, while total debt is the least preferred option. The standard deviations for these capital structures are 1.41 (DE), 0.27 (LDCE), and 0.24 (TD), signifying that debt-equity is more volatile and riskier compared to LDCE and TD.

The age of the manufacturing companies is also examined, with an average age of 54 years and a range from 56 to 98 years. The kurtosis value, around 3, indicates relatively uniform age distribution, and the negative skewness value (-0.23) suggests a slight skew towards younger companies. Furthermore, the mean size of the firms is 12.7, with a standard deviation of 5.5. The average growth rate is 0.15%, accompanied by a standard deviation of 0.7. Kurtosis values indicate that the size distribution is relatively flat (platykurtic) with a value less than 3, while the growth distribution is long-tailed (leptokurtic) with a kurtosis value around 6, suggesting higher variability. Both size and growth are positively skewed, with growth exhibiting a more pronounced skewness. The size ranges from between 5.0 to 20.5 firms, while the growth varies from -0.9% to 5.5%.

Table 4.1: Summary Statistics

Statistics	ROI	ROA	DE	LDCE	TD	AGE	SIZE	GTA
Mean	0.16	0.15	0.93	0.23	0.27	54	12.73	0.15
Standard Dev.	0.13	0.31	1.41	0.27	0.24	21.85	5.52	0.66
Kurtosis	2.53	32.11	64.28	9.52	1.71	2.85	0.09	5.95
Skewness	-0.17	5.09	7.19	2.25	0.45	-0.23	1.204	46.536
Minimum	-0.18	-0.10	0.02	0.00	0.00	7	20.54	5.490
Maximum	0.43	2.36	13.51	1.54	0.79	98	4.97	-0.93
Observation	100	100	100	100	100	100	100	100

Source: Researcher's computation via E-view 10 (2023)

4.2. Correlation analysis

The study also assessed the relationships among the variables prior to estimating the model, which aids in identifying potential high correlations among the variables that could result in issues related to multicollinearity. Such problems can contribute to the insignificance of the included variables. According to Gujarati and Porter (2009), they concluded that a threshold of 0.8 is the point at which concerns about multicollinearity can adversely affect regression analysis, diminishing the overall reliability and predictive power of the model.

Table 4.2 reveals that DE, LDCE, TD, and AGE have associations with both ROA and ROI, but these associations exhibit low correlation values, indicating weak links between profitability and capital structure. For instance, the correlation coefficients between DE, LDCE, TD, AGE, SIZE, GROWTH, and ROA are 0.02, -0.04, 0.09, 0.18, -0.20, 0.12, and -0.06, respectively. These coefficients suggest that there are no significant correlations among the capital structure indicators. Specifically, the correlation coefficients for DE, LDCE, DE, and TD are all less than 0.5, indicating weak associations between these variables. Additionally, the two control variables (age and growth) exhibit weak positive correlations, while growth displays a positive but weak correlation with ROA.

In the context of ROI, the correlation coefficients between DE, LDCE, TD, AGE, SIZE, GROWTH, and ROI are 0.10, -0.05, -0.07, -0.09, -0.08, and 0.10, respectively. Similar to the ROA findings, these coefficients suggest no strong correlations among the capital structure indicators and ROI. The correlation coefficients for DE, LDCE, DE, and TD are all less than 0.5, indicating weak associations between these variables. Furthermore, the two control variables (age and size) exhibit weak negative correlations, while growth shows a positive but weak correlation with ROI.

Table 4.2: Correlation matrix

	ROA	*ROI*	*DE*	*LDCE*	*TD*	*AGE*	*SIZE*	*GROWTH*
ROA	1.000							
ROI	0.016	1.000						
DE	-0.044	0.101	1.000					
LDCE	0.094	-0.055	-0.041	1.000				
TD	0.183	-0.065	-0.046	0.372	1.000			
AGE	-0.203	-0.088	-0.062	-0.670	-0.697	1.000		
SIZE	0.115	-0.084	0.020	-0.065	-0.149	0.144	1.000	
GROWTH	-0.055	0.104	-0.048	-0.016	-0.048	0.007	0.104	1.000

Source: Researcher's computation via Eview 10 (2023)

4.5. Regression Result

In this study, the selection of the appropriate model between fixed effects and random effects is a crucial step. Fixed effect estimations focus on understanding the relationship between independent variables and dependent variables within specific entities, such as countries, companies, or firms. In the fixed effect approach, each entity is believed to have unique characteristics that may influence the independent variables. The key assumption in fixed effects is that there are factors within each individual entity that might introduce bias or affect the independent variables, and these factors need to be controlled for. However, it's important to note that fixed-effect models inherently account for all time-invariant differences between each entity, effectively addressing the issue of bias.

On the other hand, random effects models allow for variation across entities. Unlike fixed effects, random effects assume that the differences between individual entities are random and do not impact the included independent variables. The choice between fixed effect and random effect models can be determined through a statistical test known as the Hausman test. This test examines whether the error term, which is assumed to be white noise, is correlated with the regressors. The null hypothesis of the Hausman test is that there is no correlation between the error term and the regressors, which implies that the random effect model is appropriate.

The results presented in Table 4.3 and Table 4.5 indicate that the null hypothesis, suggesting that the random effect model is appropriate, is not rejected at the 5 percent significance level. This finding implies that the random effect model is the most suitable choice. Therefore, for the third research objective, the study employed the random effect model to conduct the analysis.

4.5.1. Impact of capital structure on profitability as measured by Return on Return on investment

The results obtained from the random effect model, as presented in Table 4.3, shed light on the impact of capital structure on profitability, as measured by Return on Investment (ROI). The findings establish a connection between the mix of debt and equity (DE) and profitability. The results indicate that DE has a positive effect (0.001) on ROI, suggesting that a one percent increase in the proportion of debt and equity will lead to a 1 percent improvement in ROI. However, this positive effect is not statistically significant enough to significantly influence the financial performance of the company. In essence, the mix of debt and equity in the capital structure may not have a significant impact on ROI at all levels of significance. These results seem to align with the Modigliani and Miller (M&M) theory, indicating that the combination of debt and equity as the capital structure may not be relevant in affecting performance, contradicting the findings of Isichei & Nwanneka (2019) and Osisioma & Olowe (2021), which suggested that debt-equity enhances profitability through ROI.

The results also reveal the relationship between ROI and capital structure measured by the ratio of long-term debt to capital employed (LDCE). The findings show a significant negative effect of LDCE on ROI at a 10 percent significance level. This implies that a one percent increase in the proportion of long-term debt will lead to a 10 percent decrease in ROI. The results suggest that an increase in the use of long-term debt can negatively impact the profitability of the company. This outcome may be attributed to the cost of servicing debt and the increased financial risk, potentially leading to financial distress. This finding is in line with the trade-off theory, suggesting that without an optimal balance between the cost and benefits of debt, there is a higher likelihood of financial distress, which can harm profitability and overall financial performance.

Likewise, when considering the relationship between capital structure and profitability with total debt, the results indicate that the proportion of total debt without equity in the capital structure has a negative effect on ROI and is statistically significant at a 10 percent level. A one percent increase in the proportion of total debt (including both long-term and short-term debt) is associated with a 13 percent reduction in ROI. These findings suggest that the magnitude of total debt included in the company's capital structure is more likely to have a greater impact on profitability than the use of only long-term debt. This result contradicts the Modigliani and Miller (M&M) theory and contradicts the findings of Nwanneka and Agbonika (2020), who reported a positive relationship between debt and ROI.

Furthermore, the results explain the connection between a company's age and profitability, as measured by ROI. They reveal that the age of a firm has a significant positive influence on the company's profitability at a 5 percent significance level. This implies that as the age of the business increases by one year, there is a tendency for the firm to make better-informed decisions, leading to improved profitability. In other words, a firm with a longer history in commercial activities is more likely to perform well based on its experience in the industry, suggesting that established companies are more likely to be financially stable and perform better than younger companies in the same sector.

Table 4.3: ROI and Profitability model

	Model I	*Model 11*
Exogenous Variable	RE	FE
DE	0.001	-0.01
	(0.008)	(0.008)
	[0.94]	[0.17]
LDCE	-0.10*	-0.03
	(0.06)	(0.08)
	[0.09]	[0.69]
TD	-0.13*	-0.04
	(0.07)	(0.11)
	[0.07]	[0.67]
Control variables		
AGE	0.002**	0.01**
	(0.0001)	(0.004)
Size	-.006	-.006
	(.011)	(.011)
	[0.42]	[0.75]
Lage	1.202**	1.202**
	(.491)	(.491)
	[0.03]	[0.02]
	[0.02]	[0.05]
Constant	0.35	0.60**
	(0.08)	(0.22)

	[0.00]		[0.01]
Observations	100		100
R^2	0.06		0.33
Adj R^2	0.02		0.23
F-stat	12.41**		3.28**
Hausman Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	0.98	4	0.47

*Significant level*p<0.1, ** p<0.05 and *** p<0.01, standard error ( ), probability [ ]*
Source: Researcher's computation via Eview 10 (2023)

4.5.2. Impact of capital structure on profitability as measured by Return on Assets

The results derived from the random effect model, as presented in Table 4.4, provide valuable insights into the impact of capital structure on profitability, particularly as measured by Return on Investment (ROI).

The findings establish a connection between the blend of debt and equity (DE) and profitability. It appears that DE has a positive effect (0.001) on ROI, suggesting that a one percent increase in the proportion of debt and equity leads to a 1 percent improvement in ROI. However, it's worth noting that this positive effect is not statistically significant enough to exert a substantial influence on the financial performance of the company. In essence, the mix of debt and equity in the capital structure may not significantly affect ROI at any level of significance. These results seem to align with the Modigliani and Miller (M&M) theory, indicating that the combination of debt and equity as the capital structure may not play a pivotal role in influencing performance, which contrasts with the findings of Isichei & Nwanneka (2019) and Osisioma & Olowe (2021), who proposed that debt-equity enhances profitability through ROI.

The results also unveil the relationship between ROI and capital structure when measured by the ratio of long-term debt to capital employed (LDCE). These findings indicate a noteworthy negative effect of LDCE on ROI at a 10 percent significance level. In practical terms, a one percent increase in the proportion of long-term debt corresponds to a 10 percent reduction in ROI. This suggests that an increase in the utilization of long-term debt can negatively impact the company's profitability. This outcome may be attributed to the costs associated with servicing debt and the heightened financial risk, potentially leading to financial distress. This finding is in accordance with the trade-off theory, implying that without achieving an optimal balance between the cost and benefits of debt, there is a higher likelihood of financial distress, which can undermine profitability and overall financial performance.

Similarly, when examining the connection between capital structure and profitability in terms of total debt, the results indicate that the proportion of total debt without equity in the capital structure has a negative impact on ROI and is statistically significant at the 10 percent level. In simpler terms, a one percent increase in the proportion of total debt (including both long-term and short-term debt) is linked to a 13 percent reduction in ROI. These findings imply that the extent to which total debt is integrated into the company's capital structure is more likely to have a greater impact on profitability than the use of solely long-term debt. This outcome contradicts the Modigliani and Miller (M&M) theory and deviates from the findings of Nwanneka and Agbonika (2020), who reported a positive relationship between debt and ROI.

Furthermore, the results elucidate the association between a company's age and profitability, as measured by ROI. They reveal that the age of a firm significantly positively influences the company's profitability at a 5 percent significance level. This implies that as the business's age increases by one year, there is a tendency for the firm to make more informed decisions, resulting in enhanced profitability. In essence, a firm with a longer history of commercial activities is more likely to perform well due to its extensive experience in the industry, indicating that established companies are typically more financially stable and tend to outperform younger companies in the same sector.

Table 4.4: ROA and Profitability Model

	Model I	*Model 11*
Exogenous Variables	RE	FE
DE	0.01*	-0.01
	(0.003)	(0.02)
	[0.06]	[0.63]
LDCE	-0.08*	-0.11
	(0.01)	(0.22)
	[0.03]	[0.64]
TD	0.07*	0.04
	(0.001)	(0.30)
	[0.05]	[0.89]
Control variables		
AGE	0.04**	0.02
	(0.003)	(0.01)

	[0.04]	[0.12]
Size	.004	.004
	(.004)	(.004)
	[0.56]	[0.42]
Growth	.025	.025
	(.018)	(.018)
	[0.86]	[0.13]
Constant	0.32	-0.72
	(0.22)	(0.60)
	[0.16]	[0.23]
Observations	100	100
R^2	0.024	0.18
Adj R^2	0.017	0.06
F-stat	15.58**	1.49

Hausman Test Summary	*Chi-Sq. Statistic*	*Chi-Sq. d.f.*	*Prob.*
Period random	3.92	4	0.42

*Note: significant levels *p<0.1, **p<0.05, ***p<0.01*
Source: Researcher's computation via Eview 10 (2023)

4.6. Post Estimation

The robustness of the estimated model was checked through normality test and cross-dependence test. The diagnostic tests are reported in Table 4.5.

First, the result of normality test using the Jarque-Bera stat evidence that the residual is normally distributed at 5 percent significant level only for model II. Second, the study corrected for cross sectional dependence in the individual disturbance term, and the results of the Pesaran CD test suggests that there is no correctional dependence after generalised least squares (GLS) correction; this is necessary because unobserved factors common to all countries may affect the residuals at 5 percent significant level. The result implies that the two models exhibited cross-dependence.

Table 4.5: Diagnostic Tests

Normalitytest	*Model I*	*Model II*
Jarque-Bera	0.47	3,492**
Cross-section Dependency test		
Pesaran CD	3.68**	34.28*

*Note: significant levels *p<0.1, **p<0.05, ***p<0.01*
Source: Researcher's computation via Eview 10 (2023)

5. Conclusion and Recommendation

The study revealed the influence of total debt (TD), firm age (AGE), debt-equity ratio (DE), and long-term debt to capital employed ratio (LDCE) on the returns on investment (ROI) and returns on assets (ROA) of the selected firms. The results varied for each variable in relation to firm performance. DE had a positive effect on ROI but was not statistically significant, suggesting that the debt-equity mix might not significantly affect ROI. However, DE had a positive and significant effect on ROA, indicating that the optimal mix of debt and equity in the capital structure could significantly impact ROA. These findings support the trade-off theory, suggesting that an optimal capital structure can provide tax benefits and reduce financial distress. Additionally, the correlation analysis showed that all independent variables (TD, AGE, DE, and LDCE) were negatively related to ROI, while only ROA, TD, and DE had significant associations with firm performance. TD and DE were negatively related to firm performance.

Moreover, the positive correlation between company age and profitability underscores the value of experience, implying that older firms tend to make more informed decisions, leading to enhanced financial performance compared to their younger counterparts. Thus, companies should carefully assess their capital structure decisions, considering the trade-offs between debt utilization and long-term profitability, while also leveraging the advantages of industry experience for sustained success.

References

Abdullahi, M., Dachomo, G. P., Jibril, M. A., & Duniya, B. (2020). Financial Performance of Listed Manufacturing Firms in Nigeria. *Accounting & Taxation Review,* Vol. 4, No. 1.

Alzomaia, A. (2021). The Impact of Capital Structure on Firm Performance: Empirical Evidence from Saudi Arabia. *International Journal of Finance and Economics,* 26(1), 158-173.

Anozie, O.R., Muritala, T. A., Ininm, V.E., & Yisau, N.S. (2023). Impact of capital structure on financial performance of oil and gas firms in Nigeria. *Future Business Journal,* 9(11).

Avci, E. (n.d.). Capital Structure and Firm Performance: An Application On Manufacturing Industry. Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi, 2149-1844, 15-30. https://doi.org/10.14780/iibd.81334

Bhattacharyya, A., & Bhattacharya, S. (2020). Impact of Capital Structure on Firm Performance: Evidence from Indian Listed Manufacturing Companies. *Journal of Economics, Finance and Administrative Science,* 25(49), 17-28.

Chen, L., & Li, L. (2020). The Impact of Capital Structure on Firm Performance: Evidence from Chinese Listed Companies. *Journal of Chinese Economic and Business Studies,* 18(3), 231-249.

Corpus D Cor Jesu & A. Geetha (2018). Components of Capital Structure in Manufacturing Industry. Shanlax *International Journal of Management,* 5(S1), 110-117.

Cuevas-Vargas, H., Cortés-Palacios, H. A., & Lozano-García, J. J. (2022). Impact of capital structure and innovation on firm performance. Direct and indirect effects of capital structure. Procedia Computer Science, 199, 1082–1089. https://doi.org/10.1016/j.procs.2022.01.137

Ebaid, I. E. (2009). "The impact of capital-structure choice on firm performance: empirical evidence from Egypt", *The Journal of Risk Finance,* Vol. 10 Issue: 5, pp.477-487

Emina, S. (2021). The impact of capital structure on firm performance: Evidence from British high-tech firms. Master Thesis – Financial Management, University of Twente.

Eneh, O. M-R, Okoye, N.J., Nwosu, N.L., & Anugwu, C.C. (2022). Determinants of Capital Structure and Debt of Consumer Goods Manufacturing Companies in Nigeria. International Journal of Research Publication and Reviews, Vol 3, no 6, pp 1328-1334.

Gitman, L. J., & Zutter, C. J. (2018). Principles of managerial finance. Pearson.

Gupta, S., & Jain, R. (2021). Capital Structure and Firm Performance: A Study of Indian Automobile Industry. *Journal of Management and Public Policy,* 13(1), 45-58.

Harris, M., & Raviv, A. (1991). The theory of capital structure. *The Journal of Finance,* 46(1), 297-355.

Hariem, A. and Turgut, T. (2019). Capital structure and firm performance: evidence of Germany under IFRS adoption, *Review of Managerial Science https://doi.org/10.1007/s11846-*

Ibrahim El-Sayed, E. (2009). The impact of capital-structure choice on firm performance: empirical evidence from Egypt. *The Journal of Risk Finance,* Vol. 10 Issue: 5, pp. 477-487. https://doi.org/10.1108/15265940911001385

International Trade Administration (ITA) (2023). Nigeria-Country Commercial Guide. Retrieved from https://www.trade.gov/country-commercial-guides/nigeria-market-overview

Iqbal, N., Ullah, H., & Abbas, A. (2015). Impact of capital structure on profitability in the manufacturing and nonmanufacturing industries of Pakistan. International Letters of Social and Humanistic Sciences, 59,https://doi.org/10.18052/www.scipress.com/ILSHS.59.28

KPMG (2020). Impact of Covid-19 on Nigeria Consumer and Industrial Market. KPMG International. Retrieved from https://assets.kpmg.com/content/dam/kpmg/ng/pdf/advisory/impact-of-covid-19-on-the nigerian-consumer-markets-sector.pdf

Luo, Y., & Jiang, C. (2022, April 26). The Impact of Corporate Capital Structure on Financial Performance Based on Convolutional Neural Network. Computational Intelligence and Neuroscience, 2022, 1–https://doi.org/10.1155/2022/5895560

Mauwa, J., Namusonge, G., & Onyango, S. (2016). Effect of Capital Structure on Financial Performance of Firms Listed on the Rwanda Stock Exchange. *European Journal of Business, Economics, and Accountancy,* Vol. 4, No. 4.

Mollah, M. S., & Matin, M. A. (2021). Capital Structure and Firm Performance: Evidence from the Pharmaceutical Industry in Bangladesh. *International Journal of Business, Economics, and Management,* 8(1), 101-117.

Myers, S. C. (1984). The capital structure puzzle. The Journal of Finance, 39(3), 575-592.

Ogebe, P., Ogebe, J., & Alawi, K. The Impact of Capital Structure on Firms' Performance in Nigeria. MPRA Paper No. 46173. Online at https://mpra.ub.uni-muenchen.de/46173/

Olusola, B. E., Mengze, H., Chimezie, M. E., & Chinedum, A. P. (2022). The Impact of Capital Structure on Firm Performance-Evidence from Large Companies in Hong Kong Stock Exchange. *Open Journal of Business and Management,* 10(03), 1332–1361. https://doi.org/10.4236/ojbm.2022.103072

Oyedokun, G. E., Job-Olatuji, K. A., & Sanyaolu, W. A. (2018). Capital Structure and Firm Financial Performance. *Accounting & Taxation Review,* Vol. 2, No. 1.

Öztekin, Ö. (2021). Capital Structure and Firm Performance: Evidence from Global Panel Data. *Journal of Financial and Quantitative Analysis,* 56(5), 1735-1760.

Pandey, I. M. (2020). Financial management. Vikas Publishing House.

Riaz, S. (2015). Impact of Capital Structure on Firm's Financial Performance: An Analysis of Chemical Sector of Pakistan. *Journal of Poverty, Investment, and Development,* Vol. 12.

Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2019). Fundamentals of corporate finance. McGraw-Hill Education.

Saad, R. (2015). Impact of Capital Structure on Firm's Financial Performance: An Analysis of Chemical Sector of Pakistan, Vol. 12, Pg 85-94

Seckanovic, S. (2021). Maximizing firm value through financial management. *Financial Journal,* 9(11), 211-226.

United Nations Industrial Development Organization (UNIDO) (2020). How Industrial Development Matters to the Well-Being of the Population: Some Statistical Evidence. Vienna International Centre · P.O. Box 300 1400 Vienna · Austria.

United Nations Industrial Development Organization (UNIDO) (2016). The Importance of Manufacturing in Economic Development: Has This Changed? Inclusive and Sustainable Industrial Development Working Paper Series WP 1, Vienna International Centre · P.O. Box 300 1400 Vienna · Austria.

Van Horne, J. C., & Wachowicz, J. M. (2008). Fundamentals of financial management. Pearson Prentice Hall.