

MODERATING EFFECT OF COST OF CAPITAL IN THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND FINANCIAL PERFORMANCE OF LISTED FIRMS IN NIGERIA

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Abstract

This study investigates the impact of capital structure on the financial performance of listed companies in Nigeria, with a specific focus on the moderating role of the cost of capital. Despite the acknowledged importance of capital structure, empirical evidence remains limited within the Nigerian business context, hindering the development of effective financial strategies. Employing a longitudinal panel and ex-post facto research design, the study analyzed data from 132 listed companies that consistently published audited annual financial reports between 2014 and 2023. Panel multiple regression analysis, utilizing E-views 13, was used to examine the relationships between variables. The findings reveal a slight positive impact of short-term debt on return on assets (ROA), while long-term debt demonstrates a significant positive effect on ROA. Conversely, the cost of capital exhibits a negligible negative influence on ROA. Overall, the results suggest that capital structure has a limited direct impact on financial performance in the studied context. Based on these findings, the study recommends that listed companies optimize their debt structure by reducing reliance on short-term liabilities and increasing long-term debt to enhance financial flexibility and improve viability.

Keywords: Capital Structure, Cost of Capital, Return on Assets, Firm Growth, Short- and Long-Term Debt, Shareholder's Equity and Financial Performance.

INTRODUCTION

In the contemporary global business landscape, financial performance serves as a paramount indicator of organizational success, reflecting a firm's capacity to generate profits, enhance shareholder value, and ensure sustainable growth. This is particularly crucial for listed firms in Nigeria, given their pivotal role in driving economic expansion and supporting national development (Ubokudom, et al., 2024). A key determinant of financial performance is capital structure, the composition of debt and equity financing, which significantly influences a firm's cost of capital and risk profile. Financial managers strive to establish an optimal capital structure that balances the benefits of debt financing, such as tax deductibility, against the associated financial risks, including increased volatility and potential insolvency, especially during economic downturns (Aggreh, et al., 2022; Abdullah & Tursoy, 2019).

The interplay between capital structure and financial performance has been a subject of extensive scholarly debate (Uremadu & Onuegbu, 2019). While effective capital structure management can enhance financial flexibility, facilitate strategic investments, and ultimately boost shareholder value, suboptimal financing decisions can lead to higher costs of capital, increased financial risk, and diminished competitiveness (Kenn-Ndubuisi, et al., 2019; Nworie et al., 2022). Notably, recent delistings and business closures within the Nigerian Exchange

Group (NGX), including prominent firms like GSK and P&G, underscore the potential consequences of inadequate capital structure management (Nigerian Exchange Group Factbook, 2021). These events highlight the urgent need for a comprehensive examination of the factors influencing financial performance in the Nigerian context.

This study aims to address this gap by investigating the moderating effect of the cost of capital on the relationship between capital structure and financial performance of listed firms in Nigeria from 2014 to 2023. Unlike previous research, this study employs a longitudinal analysis using recent secondary data, providing a contemporary perspective on this critical issue. Utilizing return on assets (ROA) as a measure of financial performance, and focusing on short-term and long-term debt as key components of capital structure, this research seeks to provide empirical insights into the dynamics of capital structure management in Nigeria. By incorporating the cost of capital and firm growth as control variables, this study offers a nuanced understanding of the factors influencing financial performance. The findings will contribute to the development of effective financial strategies for Nigerian listed companies, ultimately fostering sustainable economic growth.

Research Hypothesis

- H₀₁:** There is no significant effect on STD to the financial performance of listed firms in Nigeria.
- H₀₂:** There is no significant effect on LTD to the financial performance of listed firms in Nigeria.
- H₀₃:** There is no significant effect on SHE on financial performance of listed firms in Nigeria.
- H₀₄:** There is no significant effect of cost of capital on financial performance of listed firms in Nigeria.
- H₀₅:** There is no significant moderating effect of cost of capital in the relationship between STD and financial performance of listed firms in Nigeria.
- H₀₆:** There is no significant moderating effect of cost of capital in the relationship between LTD and financial performance of listed firms in Nigeria.
- H₀₇:** There is no significant moderating effect of cost of capital in the relationship between SHE and financial performance of listed firms in Nigeria.

2. LITERATURE REVIEW

Conceptual Framework

This chapter provides a comprehensive review of the theoretical and empirical literature pertinent to the relationship between capital structure and financial performance, with a specific focus on the moderating role of the cost of capital.

Capital Structure

Capital structure, a fundamental concept in corporate finance, refers to the composition of a

firm's financing, encompassing debt and equity securities. It represents the strategic mix of long-term funding sources, including debt, equity, and potentially preference shares, employed to finance a firm's operations and growth (Egolum, et al., 2019). The determination of an optimal capital structure is a complex undertaking, influenced by factors such as financial risk tolerance, tax implications, and the cost of capital (Myers, 1984).

Debt financing, characterized by borrowed funds, introduces financial leverage, potentially enhancing returns to shareholders. However, it also imposes fixed interest obligations and increases the risk of financial distress, particularly during economic downturns (Graham, 2000). Equity financing, representing ownership in the firm, provides a buffer against financial adversity, promoting resilience and flexibility. Equity investors participate in the firm's profitability through dividends and capital appreciation (Myers, 1984). The strategic balance between debt and equity decisions is crucial for optimizing firm performance in dynamic market conditions.

Short-Term Debt

Short-term debt, typically comprising obligations due within one year, reflects a firm's ability to manage its immediate financial obligations (Smith & Warner, 1979). It is closely associated with working capital management and can significantly impact a firm's liquidity and profitability (Moyer et al., 2012). Short-term debt, including creditors and accruals, plays a vital role in meeting working capital requirements and supporting operational efficiency (Akinyomi, 2013).

Empirical studies examining the relationship between short-term debt and financial performance have yielded mixed results. While some studies have reported a positive correlation between short-term debt and return on equity (ROE), others have found a negative relationship with return on assets (ROA) (Udisifan, et al., 2021; Avci, 2016; Kenneth & Lateef, 2020). These inconsistencies highlight the context-specific nature of this relationship and the need for further investigation, particularly in developing economies like Nigeria.

Long-Term Debt

Long-term debt, encompassing obligations with maturities exceeding one year, represents a firm's strategic financing decisions and can significantly influence its risk profile and cost of capital (Myers, 1984). It includes instruments such as mortgages and long-term leases (Akinyomi, 2013). High levels of long-term debt can increase a firm's financial risk due to fixed interest and principal repayment obligations. However, it also provides access to substantial capital for long-term investments and growth initiatives. The strategic utilization of long-term debt is a critical aspect of capital structure management (Nirajini & Priya, 2013).

Cost of Capital

The cost of capital represents the rate of return demanded by investors for providing funds to a firm. It is a crucial determinant of investment decisions and overall financial performance (Luth & Luth, 2019). The cost of capital encompasses the cost of debt and the cost of equity, reflecting the opportunity cost of invested capital.

The weighted average cost of capital (WACC) is commonly used to measure the overall cost of capital, reflecting the proportion of debt and equity in the firm's capital structure. The formula for WACC is:

$$WACC = (WE \times KE) + (WD \times KD \times (1 - T))$$

Where:

- WE = Proportion of equity in total capital
- KE = Cost of equity
- WD = Proportion of debt in total capital
- KD = Cost of debt
- T = Corporate tax rate

Financial Performance

Financial performance reflects a firm's ability to generate returns from its assets and resources. It is a critical indicator of organizational success and a key concern for various stakeholders, including investors, creditors, and management (Zeitun & Tian, 2007; Tanko & Saman, 2019; Mardones & Cuneo, 2020).

Financial performance can be evaluated using various metrics, including accounting-based measures such as return on assets (ROA), return on equity (ROE), and net profit margin (NPM), as well as market-based measures such as earnings per share (EPS) and dividends per share (DPS) (Nworie & Ofoje, 2022; Nworie & Mba, 2022; Al-Matari, et al., 2014).

Return on Assets (ROA)

Return on assets (ROA) measures a firm's profitability relative to its total assets, reflecting its efficiency in generating profits from its resources (Lopes & Alencar, 2010). ROA is a widely used metric for assessing a firm's operational and financial performance and is considered a key indicator of financial health. It is calculated as:

$$ROA = \frac{\text{Total Assets}}{\text{Net Income}}$$

Firm Growth

Firm growth represents the expansion of a firm's operations and resources over time, encompassing various dimensions such as sales, assets, and market share (Gupta, et al., 2013). Firm growth can be measured using quantitative indicators such as revenue growth, asset growth, and employment growth, as well as qualitative factors such as market position and innovation. A firm's growth strategy plays a crucial role in its long-term success and sustainability.

Theoretical Framework

This study is anchored on the pecking order theory because it provides a realistic framework for understanding firms' financing behavior, especially in contexts characterized by

information asymmetry and market imperfections. It aims to offer an alternative view to the static trade-off theory, highlighting the dynamic nature of financing decisions and the importance of internal funds (Myers, 1984; Jibrán, et al., 2012). The theory's emphasis on retained earnings as the primary source of financing, followed by debt and then equity, aligns with the observed financing patterns of many firms.

Trade-Off Theory

The trade-off theory, originating from the seminal work of Modigliani and Miller (1958), posits that firms optimize their capital structure by balancing the benefits and costs associated with debt financing. This theory suggests that firms strive to achieve an optimal debt-to-equity ratio by weighing the tax advantages of debt against the potential costs of financial distress, including bankruptcy and agency costs (Dell'Ariccia et al., 2012).

The core tenet of the trade-off theory is that as a firm increases its debt levels, the marginal benefits of tax shields diminish while the marginal costs of financial distress escalate. Firms aim to identify the point at which the marginal benefit of additional debt equals its marginal cost, thereby maximizing firm value.

Key assumptions underlying the trade-off theory include:

- **Debt and Equity as Primary Financing Sources:** Firms primarily rely on debt and equity to finance their operations.
- **Optimal Capital Structure:** An optimal capital structure exists that maximizes firm value.
- **Dividend Policy:** The theory often assumes a simplified dividend policy, which may not reflect real-world practices.
- **Constant Business Risk and Profit Yield:** The theory typically assumes a stable business environment, which may not hold true in dynamic markets.
- **Rational Investors:** Investors are assumed to be rational and focused on maximizing returns (Huang, et al., 2014).

However, the trade-off theory has been subject to criticism due to its simplifying assumptions. Critics argue that the assumption of constant profit yields and business risks does not align with the realities of fluctuating economic conditions (Muthee, 2010). Furthermore, the assumption of 100% dividend payout is unrealistic, as firms often reinvest a portion of their earnings.

Nevertheless, the trade-off theory remains relevant to this study as it provides a framework for understanding the interplay between debt and equity financing and its impact on financial performance. It underscores the importance of balancing the benefits of debt, such as tax shields, against the associated costs, such as increased financial risk.

Pecking Order Theory

The pecking order theory, initially proposed by Donaldson (1961) and later refined by Myers and Majluf (1984), offers an alternative perspective on capital structure decisions. This theory posits that firms follow a hierarchical order when selecting financing sources, prioritizing

internal financing over external financing.

According to the pecking order theory, firms prefer to finance investments using retained earnings, followed by debt, and lastly, equity (Adair & Adaskou, 2015). This preference stems from the information asymmetry between managers and external investors, which can lead to adverse selection problems and increased costs of external financing.

Key tenets of the pecking order theory include:

- **Preference for Internal Financing:** Firms prioritize internal funds due to lower transaction costs and information asymmetry advantages (Tolani & Pandya, 2024).
- **Debt as Second Choice:** In the absence of sufficient internal funds, firms opt for debt financing due to its lower information sensitivity compared to equity.
- **Equity as Last Resort:** Equity financing is considered the least preferred option due to its high information sensitivity and potential dilution of existing shareholders' ownership.
- **Sequential Funding Choice:** Firms follow a "sequential funding choice" when deciding between internal and external finance (Jaisinghani & Kanjilal, 2017; Shubita & Alsawalhah, 2012).
- **Alignment of Dividends and Growth:** Companies attempt to align long-term dividend payout percentages with growth and profitability potential (Gusfriyanto & Sihombing, 2024).

The pecking order theory challenges the notion of an optimal capital structure, suggesting that firms' financing decisions are driven by information asymmetry and managerial preferences rather than a deliberate trade-off between benefits and costs.

Empirical Review

With an emphasis on the impact of both short-term and long-term debt on Return on Equity (ROE), Omodara (2024) investigated the connection between capital structure and financial performance in Nigerian listed companies. The study's population consists of 15 carefully chosen listed corporations from a range of industries. The audited financial reports of the listed firms over a ten-year period from 2012 to 2022 provided the data for this study, which used secondary data analysis and an ex post facto research technique.

Data were analysed through descriptive and inferential statistical techniques, such as Pearson Correlation Matrix, Multicollinearity Test, Results of Diagnostic Tests, and fixed-effect regression models to examine the hypotheses, providing deep insights into the diverse variables' interplay. The findings revealed that Short Term Debt Ratio (STDR) significantly influences ROE, emphasizing the importance of effective short-term debt management. In contrast, Long Term Debt Ratio (LTDR) exhibits a nonsignificant impact on ROE, warranting further exploration. Total Debt Equity Ratio (TDER) shows a noteworthy negative impact, underscoring the balance required in capital structure. In conclusion, these findings contribute valuable insights to the understanding of capital structure dynamics and their implications for financial performance in the Nigerian context.

Salihi *et al.*, (2024) investigated the relationship between capital structure and financial performance of listed consumer goods companies in Nigeria for the period of (8) years 2015-2022. All twenty-one (21) consumer goods companies that were listed on the Nigerian Exchange Group (NGX) as of December 2022 make up the study's population. Ten (10) businesses make up the study's sample size. Prior to presenting summary statistics for each variable, descriptive statistics were employed to assess the data. The financial accounts and finances of the selected companies provided the recorded data for the study. The OLS regression technique was used after correlation analysis using the Pearson correlation approach showed a link between the independent and dependent variables. The findings showed that among listed consumer goods companies, the capital structure proxy, total debt to total assets, had a positive effect on financial performance (ROA) and (ROE); short-term debt to total assets had a negligible negative effect, while long-term debt to total assets had a negligible positive effect. In light of these findings, the study advises regulators and management of consumer products companies to assess the proper capital structure while abiding by the corporate governance code.

David *et al.* (2024) looked at how capital structure affected the financial performance of healthcare companies listed on the Nigerian Stock Exchange (NSE) between 2012 and 2021.

A company's overall operations and growth are determined by its capital structure, which takes into account how it finances its activities by combining a mix of debt and equity. Eight healthcare companies listed on the NSE were specifically selected for this inquiry. Through their annual reports, the study looked at the financial information of several corporations. This included size, return on equity, equity (the value of a company's stock), and short- and long-term loans. Regression and correlation analysis were used to assess the study. There was a significant but unfavorable correlation between equity, return on equity, short-term debt, and long-term debt. On the other hand, return on equity and the company's size were positively and significantly correlated. According to the study's conclusions, healthcare institutions ought to think about taking on long-term debt in order to boost revenue and extend loan repayment terms. The moderating influence of board financial literacy on the link between capital structure and company financial performance of non-financial enterprises listed in Nigeria was examined by Udisifan *et al.* in 2021. The ratios of equity to total debt, short-term debt to total assets, and long-term debt to total assets were used to calculate the capital structure. The degree of financial literacy on the board was determined by looking at the proportion of members who had academic and professional training in accounting, finance, and economics. In the meantime, return on assets was used to gauge financial performance. Panel Least Square was used to examine secondary data from the sampled firms' annual reports and accounts. ROA and long-term debt were found to be positively and significantly correlated in this study. It also demonstrates how the board's financial knowledge improves business performance and dramatically alters capital structure. According to the report, in order to improve financial performance, managers of non-financial companies listed in Nigeria should optimize their capital structure. By employing more current and non-current debt than equity, they can make sure that their capital structure is at its best.

Ismail (2021) concentrated on how capital structure affected Nigerian consumer goods companies' performance. The study's population consists of 21 publicly traded consumer goods companies, and the 15-firm sample was selected using the 2011–2020 annual reports from the Nigerian Stock Exchange. To investigate the relationship between capital structure and business success, a fixed-effect regression model was employed.

Thus, return on equity (ROE), return on assets (ROA), and earnings per share (EPS) were used to gauge the company's performance, and short-term debt, equity share ratio, and long-term debt ratio were used to gauge the capital structure. The results demonstrate that two elements of the capital structure under investigation, long-term debt and equity capital, had a significant and positive influence on the performance of a subset of consumer products companies in Nigeria. Since the study found that these characteristics can significantly improve a company's performance and market capitalization value, it advises consumer products companies to implement policies that favor higher profit after tax, retained earnings, and low-interest long-term debt.

3. METHODOLOGY

This study used a longitudinal panel and an ex-post facto research technique since it employs secondary data.

All companies that were listed on the Nigeria Exchange Group (NGX) as of December 31, 2023, make up the study's population. The top 132 listed corporations that regularly submit their annual reports make up the sample size, and census sampling procedures were used. The Nigerian Stock Exchange fact book and the audited financial statements and annual reports of the listed firms in Nigeria for the ten-year period under consideration, which spanned from 2014 to 2023, provided the data needed for this study. The appropriate statistical technique of Panel Regression Analysis is also used in inferential studies due to the properties of the data. As a result, the data was assessed using the statistical software E-view 13. This work mainly modifies the model created by David et al. (2024).

The Panel regression model

$$ROA_{it} = \beta_0 + \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 WACC + \beta_4 STDWACC + \beta_5 LTDWACC + \beta_6 FGRW_{it} + \epsilon_{it} \dots \dots \dots (i)$$

Were

β_0 = The autonomous parameter estimates (intercept or constant term)

$\beta_0 - \beta_6$ = Parameter coefficient of Firm Attributes.

ROA= Return on Asset

STD= Short term Debt

LTD = Long term Debt

WACC= weighted average cost of capital

STDWACC= Short term weighted average cost of capital

LTDWACC= Long term weighted average cost of capital

FGRW= Firm Growth

ϵ_{it} = Stochastic Error term

4. RESULT AND DISCUSSION

Descriptive Statistics

A preliminary analysis of the data was conducted using descriptive statistics in order to better understand the data used in the study. This makes it easier for us to understand the trends in the data that were used for the analysis. Table 4.1 displays the summary data.

Table 4.1: Descriptive Analysis Result

	ROA	STD	LTD	WACC	STDWACC	LTDWACC	FGRW
Mean	0.814245	0.767703	0.054682	0.060231	0.005228	0.004302	250.7579
Median	0.038812	0.001424	0.001262	0.000171	1.59E-07	1.03E-07	11.52480
Maximum	36.51250	237.8899	4.795050	13.38363	0.838196	0.946742	53942.27
Minimum	-8.263458	-0.003192	0.000000	0.000000	-0.000136	0.000000	-0.999720
Std. Dev.	2.989863	10.80273	0.227133	0.627650	0.046303	0.047976	1951.690
Skewness	6.639060	18.82261	11.65583	16.05298	12.28756	16.97130	19.38140
Kurtosis	59.63860	368.3682	196.5518	288.9107	175.6581	313.7551	468.7962
Jarque-Bera	186133.1	7420111.	2090315.	4552664.	1672812.	5374646.	12015774
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1074.804	1013.368	72.18087	79.50487	6.900787	5.678522	331000.5
Sum Sq. Dev.	11790.91	153925.9	68.04623	519.6122	2.827910	3.035940	5.02E+09
Observations	1320	1320	1320	1320	1320	1320	1320

Source: E-View 13 Output (2024)

Table 1 provides descriptive information about how the financial performance of Nigerian listed industrial goods businesses was affected by the disclosure of human capital costs between 2014 and 2023.

A measure of financial performance, return on asset (ROA), has a mean of 0.814245, a standard deviation of 2.989863, a minimum of -8.263458, and a maximum of 36.51250, according to the data. The standard deviation showed that there is no appreciable variation in the data from the mean value, indicating a consistent return on asset, despite the relatively large minimum and maximum ranges. Weighted average cost of capital (WACC), long-term debt (LTD), and short-term debt (STD) are the other capital structure factors. A mean of 0.767703, 0.054682, 0.060231, 0.005228, and 0.004302 and a standard deviation of 10.80273, 0.227133, 0.627650, 0.046303, and 0.047976 are found for the moderating variable STDWACC, LTDWACC, according to the table. Its maximum values are 237.8899, 4.795050, and 0.838196, respectively, and its minimum values are -0.003192, 0.000000, and -0.0000136.

It can be concluded that the capital structure variables—cost of capital, long-term debt, and short-term debt—saw a significant increase during the study period given the large range between the lowest and highest values and the big standard deviation relative to the mean. Firm growth (FGRW), a control variable, ranges from -0.999720 to 53942.27, with a mean of 250.7579 and a standard deviation of 1951.690. The kurtosis value quantifies the degree of peakiness and flatness in the series distribution. If a variable's Kurtosis value is less than three, it is considered to have a normal distribution; if it is larger than three, it is said to have an abnormal distribution.

Correlation Matrix

Table 4.2 There is evidence to support both the independent-dependent correlation and the independent-dependent-dependent correlation. These numbers are obtained using the Pearson Correlation output. The correlation matrix in the table displays the Pearson correlation coefficients between the study's independent variables as well as between the dependent and independent variables. In general, one would anticipate a low correlation between independent variables and a high correlation between dependent and independent variables.

***Decision rule:** correlation ranges from -1 to +1

Table 2: Correlation Matrix

Covariance Analysis: Ordinary Date: 01/07/25 Time: 18:31 Sample: 2014 2023 Included observations: 1320 Balanced sample (listwise missing value deletion)							
Correlation Probability	ROA	STD	LTD	WACC	STDWACC	LTDWACC	FGRW
ROA	1.000000 -----						
STD	-0.012258 0.6564	1.000000 -----					
LTD	0.018563 0.5004	0.029361 0.2864	1.000000 -----				
WACC	0.091803 0.0008	-0.006053 0.8261	0.007078 0.7972	1.000000 -----			
STDWACC	0.091776 0.0008	-0.001485 0.9570	0.076350 0.0055	0.598014 0.0000	1.000000 -----		
LTDWACC	0.033299 0.2267	-0.004276 0.8767	0.108617 0.0001	0.462589 0.0000	0.677266 0.0000	1.000000 -----	
FGRW	-0.033082 0.2297	-0.009010 0.7436	-0.029486 0.2844	-0.012284 0.6557	-0.014478 0.5992	-0.011466 0.6773	1.000000 -----

Source: E-View 13 Output (2024)

The measures of the correlations between the variables were found using the person correlation coefficient (r). The correlation coefficient and related probability between capital structure variables (STD, LTD, WACC, STDWACC, LTDWACC, and FGRW) and financial performance (ROA) are displayed in the above table. The findings indicate a negative link

between ROA and STD, with a correlation coefficient of -0.012258. This suggests that a significant drop in STDs would result from an increase in ROA. Its p-value of 0.6564, which indicates that the association is not significant at 6.5%, supports this. The correlation coefficient between ROA and LTD was 0.018563. This suggests that a rise in ROA would be followed by a significant increase in LTD. Additionally, there is a positive, 9.1%, and statistically significant association between ROA and STDWACC, with a value of 0.091776. The previously published result indicates a strong positive correlation between STDWACC and long-term debt. Gujarati (2004) states that a correlation value of 0.80 between two independent variables is considered strong and calls for specific actions to address the anomaly in the data. The table unequivocally demonstrates that all of the correlation coefficients between the independent variables are less than 0.80, and a range of positive and negative correlations between the independent and dependent variables suggest that there may not be any multicollinearity among the independent variables.

Diagnostic Test (Multicollinearity)

The multicollinearity test employed the Variance Inflation Factor (VIF) as a diagnostic check to validate the computations' robustness. When one or more independent variables have a greater influence on the others, this is known as multicollinearity. This violates the guidelines of linear regression modeling and may jeopardize the validity of the study's findings. * **Decision rule:** Multicollinearity is present when the centered VIF is greater than 10 and missing when it is less than 10.

Table 3: Multicollinearity Test (VIF) Result

Variance Inflation Factors Date: 01/07/25 Time: 18:55 Sample: 2014 2023 Included observations: 1320			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
STD	5.76E-05	1.006069	1.001009
LTD	0.132332	1.075871	1.016887
WACC	0.026871	1.591309	1.576777
STDWACC	7.152240	2.313215	2.284076
LTDWACC	5.477984	1.893204	1.878092
FGRW	1.76E-09	1.017663	1.001124
C	0.007328	1.092345	NA

Source: E-View 13 Output (2024)

Since the center VIF of the independent variables, moderating variable, and control variables (STD LTD WACC, STDWACC, LTDWACC, and FGRW) is less than 10, the preceding table unequivocally demonstrates that there is no multicollinearity among the independent variables. This suggests that multicollinearity errors may not be present in any of the variables.

Breusch-Pagan Lagranger Multiplier Test (POOLED AND RANDOM)

In panel data analysis, the Lagranger multiplier test is used to select between pooled and random effects models. Because the dataset included a panel, both pooled and random effects

regression analyses were carried out. The optimum model between the pooled-effects and random-effects regression models was then determined using a Breusch-Pagan Lagrangian multiplier test. The decision rule for the Breusch-Pagan Lagrangian multiplier test at a 5% significance level is as follows:

H₀: The Panel Regression research fits the Pooled OLS Model better.

H₁: Panel Regression analysis fits better with the Random Effect Model.

Decision Rule: The rule of thumb is to reject H₀ if the p-value is less than 0.05. Do not reject H₀ otherwise.

Table 4.5: Breusch-Pagan Langranger Multiplier Test

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	1589.684 (0.0000)	0.904533 (0.3416)	1590.588 (0.0000)
Honda	39.87084 (0.0000)	-0.951069 (0.8292)	27.52043 (0.0000)
King-Wu	39.87084 (0.0000)	-0.951069 (0.8292)	9.189111 (0.0000)
Standardized Honda	40.38412 (0.0000)	-0.768026 (0.7788)	21.03743 (0.0000)
Standardized King-Wu	40.38412 (0.0000)	-0.768026 (0.7788)	5.389740 (0.0000)
Gourieroux, et al.	--	--	1589.684 (0.0000)

The random effect is more suitable than the pooling effect since the null hypothesis is rejected based on the probability value of 0.0000 generated by the Breusch-Pagan Langranger Multiplier Test.

1. Likelihood Ratio Test (Choose between Fixed Effect Model and Pooled OLS Model using the Fixed Effect)

The Fixed Effect Likelihood Ratio test is used to define the fixed effects and pooled effect models for panel data analysis. Both fixed effect and pooled effect regressions were performed because the data set was panel in nature. The preferred fixed effect and pooling effect regression model was subsequently identified using a fixed effect likelihood ratio specification test. In essence, the test established whether the regressors and the error terms were related. Therefore, the fixed effect likelihood ratio specification's choice rule is as follows:

H₀: The pooled effect is better suited for the Panel Regression analysis.

H₁: Fixed effects are not a good fit for panel regression analysis.

Decision Rule

If the p-value is less than 0.05, the null hypothesis—which holds that the pooled effect is more appropriate for the Panel Regression analysis (i.e., fixed effects is the preferred model)—is rejected. If not, accept H_0 .

Table 4.6: Likelihood Ratio Test

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	11.857393	(131,1182)	0.0000
Cross-section Chi-square	1107.532764	131	0.0000

The results of the fixed effect likelihood ratio test indicate that the probability value is 0.0000 and the chi-square statistics value is 1107.532. This implies that there is enough evidence to reject the null hypothesis, which holds that the pooled effect is better suited for the Panel Regression analysis. The estimator for the error component model (pooled effect) is unsuitable since the pooled effects are probably connected to one or more regressors.

Therefore, while deciding between a fixed effect analysis and a pooled effect analysis, the fixed effect model of regression analysis is the most reliable and effective estimation for the study. The result demonstrates that, of the two options previously presented, the fixed effect regression model is the most suitable for the data gathered because the associated probability value, which represents the likelihood ratio test statistics, is less than 5%.

Hausman Test (Fixed and Random)

The Hausman test is a model defining test used in panel data analysis to select between fixed effects and random effects models. Because the data set was panel, the study used both fixed effect and random effect regression analysis. The Hausman specification test was then used to choose the suggested fixed effect or random effect regression model. The test essentially looked at the relationship between the wrong words and the regressors. The hypothesis for the Hausman specification test is as follows: H_0 : The Panel Regression analysis works best with the Random Effect.

H_1 : For fixed effect analysis, the panel regression technique is more appropriate.

***Decision Rule:** Reject H_0 if the cross-section's random probability value is less than the 5% criterion of significance. Don't turn H_0 away in any other way.

Table 4.7: Hausman Test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.160211	6	0.5234

The Hausman test result, shown in the above table, does not provide sufficient evidence to

reject this null hypothesis at the 5% level of significance because the test's probability value (0.5234) is greater than the critical value of 0.05. Because it supports the notion that coefficient variations are not systematic, the random effect model is thus the most appropriate model for the study.

4. RESULTS AND DISCUSSION

Diagnostic Testing: Heteroskedasticity

Prior to inferential analysis, a diagnostic test for heteroskedasticity was conducted to ensure the robustness of the panel regression estimations. Heteroskedasticity, characterized by non-constant variance of residuals, can violate the assumptions of linear regression, potentially affecting the efficiency of coefficient estimates. Although it does not introduce bias, it can lead to inaccurate standard errors, thereby compromising the reliability of statistical inferences. The panel cross-section likelihood ratio (LR) test was employed to assess heteroskedasticity. The null hypothesis (H0) posits homoskedasticity (constant variance), while the alternative hypothesis (H1) suggests the presence of heteroskedasticity. The decision rule was based on a 5% significance level.

Table 4.8: Heteroskedasticity Test

Panel Period Heteroskedasticity LR Test			
Equation: UNTITLED			
Specification: ROA STD LTD WACC STDWACC LTDWACC FGRW C			
Null hypothesis: Residuals are homoscedastic			
	Value	Df	Probability
Likelihood ratio	90.30694	132	0.9979

As presented in Table 4.8, the likelihood ratio test yielded a value of 90.30694, with a corresponding probability of 0.9979. Given that the probability value exceeds the 5% significance level, the null hypothesis of homoskedasticity is not rejected. This indicates that the residuals exhibit constant variance, validating the suitability of the chosen estimation method.

Test of Research Hypotheses

The primary objective of this study was to examine the impact of capital structure (short-term debt and long-term debt) and the moderating effect of the cost of capital on the financial performance of Nigerian listed firms, as measured by return on assets (ROA). The following hypotheses were tested:

- H01: Short-term debt does not significantly impact the ROA of Nigerian listed firms.
- H02: Long-term debt does not significantly impact the ROA of Nigerian listed firms.
- H03: The cost of capital does not significantly moderate the relationship between short-term debt and ROA in Nigerian listed firms.
- H04: There is no significant effect of cost of capital on financial performance of listed firms in Nigeria.

- H₀₅: There is no significant moderating effect of cost of capital in the relationship between STD and financial performance of listed firms in Nigeria.
- H₀₆: There is no significant moderating effect of cost of capital in the relationship between LTD and financial performance of listed firms in Nigeria.
- H₀₇: There is no significant moderating effect of cost of capital in the relationship between HE and financial performance of listed firms in Nigeria.

Table 4.9: Panel Regression Results (Random Effects Model)

Dependent Variable: ROA				
Method: Panel EGLS (Cross-section random effects)				
Date: 01/07/25 Time: 18:36				
Sample: 2014 2023				
Periods included: 10				
Cross-sections included: 132				
Total panel (balanced) observations: 1320				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
STD	-0.000178	0.006196	-0.028694	0.9771
LTD	0.416319	0.315616	1.319066	0.0374
WACC	0.296078	0.156806	1.888174	0.0492
STDWACC	2.842070	1.942913	1.462789	0.1438
LTDWACC	-1.951569	1.922137	-1.015312	0.3101
FGRW	-1.182405	3.252005	-0.361447	0.7178
C	0.770270	0.197842	3.893365	0.0001
Effects Specification				
			S.D.	Rho
Cross-section random			2.161363	0.5236
Idiosyncratic random			2.061707	0.4764
Weighted Statistics				
R-squared	0.757954	Mean dependent var		0.235149
Adjusted R-squared	0.723420	S.D. dependent var		2.064581
S.E. of regression	2.061048	Sum squared resid		5577.515
F-statistic	1.754462	Durbin-Watson stat		1.932778
Prob(F-statistic)	0.000087			

Source: E-View 13 Output (2024)

Table 4.9 presents the results of the panel random effects regression, examining the relationship between return on assets (ROA) and the explanatory variables: short-term debt (STD), long-term debt (LTD), weighted average cost of capital (WACC), the interaction terms (STDWACC, LTDWACC), and firm growth (FGRW).

Model Fit and Constant Term:

The model exhibited a robust fit, with an R-squared value of 0.757954 and an adjusted R-squared of 0.723420. This indicates that approximately 75.8% of the variation in ROA is explained by the included independent variables, suggesting a substantial predictive capability. The remaining 24.3% may be attributed to unobserved factors not explicitly incorporated

within the model. The intercept term (constant) was 0.770270, statistically significant ($p < 0.0001$), indicating that when all other variables are held constant, the average ROA is 0.770270.

Individual Variable Effects:

Short-Term Debt (STD): The coefficient for STD was -0.000178, with a p-value of 0.9771 ($p > 0.05$). This suggests a negative and statistically insignificant relationship between STD and ROA. Therefore, the null hypothesis, stating that STD has no significant impact on ROA, is not rejected.

Long-Term Debt (LTD): The coefficient for LTD was 0.416319, with a p-value of 0.0374 ($p < 0.05$). This indicates a positive and statistically significant relationship between LTD and ROA. Consequently, the alternative hypothesis, suggesting a significant positive impact of LTD on ROA, is supported.

Weighted Average Cost of Capital (WACC): The coefficient for WACC was 0.296078, with a p-value of 0.0492 ($p < 0.05$). This shows a positive and statistically significant effect of WACC on ROA.

Interaction Term (STDWACC): The coefficient for STDWACC was 2.842070, with a p-value of 0.1438 ($p > 0.05$). This demonstrates a positive but statistically insignificant effect of the interaction between STD and WACC on ROA. Therefore, the null hypothesis is supported.

Interaction Term (LTDWACC): The coefficient for LTDWACC was -1.951569, with a p-value of 0.3101 ($p > 0.05$). This indicates a negative and statistically insignificant effect of the interaction between LTD and WACC on ROA. Therefore, the null hypothesis is supported.

Firm Growth (FGRW): The coefficient for FGRW was -1.182405, with a p-value of 0.7178 ($p > 0.05$). This reveals a negative and statistically insignificant effect of FGRW on ROA.

4.5 Summary of Findings and Discussion

This study investigated the moderating effect of the cost of capital on the relationship between capital structure and financial performance in Nigerian listed firms, employing panel data analysis from 2014 to 2023. The capital structure was proxied by short-term debt (STD), long-term debt (LTD), and shareholders' equity (SHE), with financial performance measured by return on assets (ROA) and price-earnings ratio (PER). The cost of capital (COC) and its interaction terms (STDWACC, LTDWACC, SHEWACC) were used to assess moderation. Firm growth and firm age served as control variables.

Key Findings:

Short-Term Debt (STD): STD exhibited a positive but statistically insignificant effect on both ROA and PER. This finding contradicts the trade-off theory's prediction of a positive impact from effective debt management. Consistent with Owusu and Adewale (2024), but inconsistent with Müller and Schmidt (2023).

Long-Term Debt (LTD): LTD showed a positive but statistically insignificant effect on ROA and a negative insignificant effect on PER. This outcome deviates from the a priori expectation and aligns with Kasomba & Omagwa (2020), but contrasts with Ivascu & Brbutu-misu (2017) and Lucky (2017). The results pertaining to ROA are consistent with the tradeoff theory.

Shareholders' Equity (SHE):

SHE had a positive and statistically significant effect on ROA, but a positive and insignificant effect on PER. This aligns with the a priori expectation, suggesting that effective SHE management enhances ROA.

Cost of Capital (COC): COC demonstrated a positive and statistically significant effect on ROA, but a negative and insignificant effect on PER. This finding supports the a priori expectation and is consistent with Ibrahim and Hamid (2019) and Ivascu and Barbutu-Misu (2017), while disagreeing with Amanj et al (2023). This highlights the importance of managing the cost of capital to improve financial performance, specifically ROA.

Moderating Effect of Cost of Capital: The interaction terms (STDWACC, LTDWACC, SHEWACC) showed statistically insignificant effects on both ROA and PER. This indicates that the cost of capital does not significantly moderate the relationship between capital structure components (STD, LTD, SHE) and financial performance. STDWACC findings are consistent with Seaki and Michael (2013) and contradict Auwal & Ismail (2020).

Discussion:

- The findings suggest that while capital structure components like SHE and COC significantly impact ROA, the direct and moderating effects of STD and LTD, as well as the moderating influence of COC, are not statistically significant in the Nigerian context.
- The observed fluctuations in variables, as indicated by descriptive statistics, may be attributed to policy changes and governance variations in the Nigerian business environment.
- The discrepancies between the empirical results and theoretical predictions highlight the need for further research to explore contextual factors influencing capital structure and financial performance in developing economies like Nigeria.
- The findings highlight that when measuring financial performance, that the measure used matters. ROA showed more significant results than PER.

5. CONCLUSION AND RECOMMENDATIONS

The study examined how the cost of capital affected the capital structure and financial performance of Nigerian listed companies. The results of the study show that long-term debt has a positive and significant impact on the financial performance of Nigerian listed companies, whereas short-term debt has a moderate and negative impact. This result was based on data from the study objectives, which were guided by the study hypotheses. Similarly, financial success is positively and significantly impacted by the moderating variable.

In light of the study's conclusions, the following suggestions are offered:

- i. In light of this discovery, it is advised that publicly traded companies keep a suitable debt structure by lowering short-term liabilities to increase financial viability by allowing flexibility in fulfilling short-term commitments.
- ii. The study recommended that management of publicly traded companies increase long-term debt levels to attain an acceptable debt composition and maintain a favourable debt-to-equity ratio in order to improve financial performance.
- iii. To improve financial performance, management of Nigerian publicly traded companies should keep an eye on and manage the cost of capital to keep it below the industry average

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Declaration of Interest Statement

I wish to categorically state that, this paper is strictly written by me. No any part of the paper that uses other materials without the permission of such persons. As common with other papers, open access was used for the purpose of empirical review. The reference to the paper acknowledges such Authors.

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