NON-LINEAR EFFECTS OF FINANCIAL LEVERAGE ON FIRM PERFORMANCE: EVIDENCE FROM NIGERIAN CONSUMER GOODS COMPANIES

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Abstract
This study investigates the relationship between financial leverage and firm performance among listed consumer goods companies in Nigeria, with a specific focus on whether the relationship is linear or follows an inverse U-shaped pattern. Using an ex post facto research design, panel data were collected from 16 firms over the period 2013–2024, yielding 192 firm-year observations. Financial leverage was measured by short-term, long-term, and total debt ratios, while performance was proxied by return on assets (ROA), with return on equity (ROE) and gross profit margin (GPM) used for robustness. Fixed effects regression and system generalized method of moments (GMM) were employed. The results show that all three leverage measures have significant negative linear effects on ROA. However, when a quadratic term is introduced, a strong inverse U-shaped relationship emerges, with an optimal total debt ratio of approximately 27%. This optimal level is well below the sample average of 44%, implying that most firms operate beyond their value-maximizing leverage. The findings support the trade-off theory of capital structure and remain robust across alternative performance measures, different leverage definitions, and exclusion of the crisis period. The study recommends that managers target leverage within the optimal range and that policymakers focus on reducing borrowing costs and foreign exchange risks.
Keywords: Consumer Goods, Financial Leverage, Firm Performance, Non-Linear Relationship, Trade-Off Theory

Introduction

The relationship between financial leverage and corporate performance remains a central issue in corporate finance. The foundational work of Modigliani and Miller (1958) established the theoretical basis for capital structure analysis under conditions of perfect markets, where financing decisions are assumed to be irrelevant to firm value. Subsequent extensions relaxed these assumptions and introduced real-world frictions such as corporate taxes, bankruptcy costs, and information asymmetry, thereby establishing that capital structure decisions influence firm value. The trade-off theory, associated with Alan and Robert (1973), provides a dominant framework in this regard, suggesting that firms choose an optimal level of debt by balancing the benefits of tax shields against the costs of financial distress.

Empirical findings on the leverage performance relationship remain inconsistent, particularly in emerging markets. Evidence from Nigeria reflects this lack of agreement. Some studies report a

negative relationship between leverage and firm performance, indicating that higher debt levels reduce profitability (Kolawole, 2025). Other studies report no statistically significant relationship (Ezekiel, 2024; Ogundare, 2024). Additional evidence suggests that the effect of leverage varies depending on the performance measure applied (Oyedokun *et al*., 2025). These inconsistencies are partly linked to differences in methodology, model specification, and sectoral focus. A major limitation in much of the existing literature is the assumption of linearity in the leverage–performance relationship. This assumption imposes a constant marginal effect of debt across all leverage levels, which may not align with theoretical expectations.

Theoretical and empirical studies increasingly suggest that the relationship between leverage and firm performance is non-linear. At lower levels of debt, firms may benefit from tax advantages, improved managerial discipline, and access to additional financing for investment. As debt increases beyond a certain threshold, the associated costs, such as higher interest obligations, financial distress risk, and reduced financial flexibility, begin to outweigh these benefits. This results in an inverse U-shaped relationship between leverage and performance, consistent with the trade-off theory (Kraus & Litzenberger, 1973; Myers, 1984). Failure to account for this non-linearity may lead to biased estimates and conflicting conclusions.

The Nigerian consumer goods sector provides an appropriate context for examining these dynamics. The sector is highly sensitive to macroeconomic conditions, including inflation, exchange rate movements, and changes in consumer purchasing power. Recent macroeconomic developments have had a significant impact on firms within this sector. The 2023 exchange rate liberalisation led to a sharp depreciation of the naira, which increased the burden of foreign currency-denominated debt. Several consumer goods firms reported substantial foreign exchange losses and rising finance costs in 2024, resulting in significant declines in profitability. Aggregate pre-tax losses among major listed firms exceeded ₦500 billion, while borrowing costs increased considerably. Conditions improved in 2025 following relative exchange rate stability and debt restructuring efforts, indicating that firm performance responds differently across varying leverage and macroeconomic conditions. These developments provide a useful setting for examining whether the leverage performance relationship varies across different debt levels. This study extends the existing literature by explicitly testing both linear and non-linear effects of financial leverage on firm performance in Nigeria. Financial leverage

is disaggregated into short-term debt, long-term debt, and total debt ratios to allow for a more detailed analysis.

A quadratic specification is incorporated to test for the presence of an optimal leverage level. The study addresses two main research questions. First, what are the linear effects of short-term debt, long-term debt, and total debt on the financial performance of listed consumer goods companies in Nigeria? Second, does financial leverage exhibit a non-linear (inverse U-shaped) relationship with firm performance? This study contributes to the literature by providing sector-specific evidence from Nigeria using recent data that reflect changing macroeconomic conditions. The findings are expected to provide guidance for corporate managers in determining appropriate financing strategies, assist investors in evaluating firm risk, and inform policymakers on the importance of macroeconomic stability in supporting optimal capital structure decisions.

Theoretical Framework

Trade-off theory posits that firms balance the tax benefits of debt against the costs of financial distress, leading to an optimal capital structure that maximises firm value (Kraus & Litzenberger, 1973; Abubakar & Anyonje, 2025). This theory implies an inverse U-shaped relationship between leverage and performance: as debt increases initially, performance improves due to the tax shield and disciplinary effects; beyond a certain point, the rising probability of bankruptcy and agency costs cause performance to decline. Pecking order theory (Myers & Majluf, 1984) suggests that firms prefer internal financing, then debt, and finally equity due to information asymmetry. This theory does not predict a well-defined optimal leverage ratio; instead, leverage is the cumulative result of past financing needs. Profitable firms tend to have lower leverage because they rely on retained earnings, implying a negative correlation between leverage and performance, but not a non-linear pattern. Agency theory (Jensen & Meckling, 1976; Jensen, 1986) views debt as a disciplinary mechanism that reduces free cash flow and curbs managerial waste. However, excessive debt can lead to underinvestment and financial distress. This theory also supports the idea that moderate levels of debt are beneficial, but too much debt is harmful.

Empirical Evidence on Non-Linear Leverage Effects

Empirical literature on leverage–performance relationships can be broadly classified into three strands: studies providing evidence of non-linear effects, those assuming linear relationships,

and country-specific evidence from Nigeria. First, a growing body of international studies provides strong support for a non-linear (inverse U-shaped) relationship between leverage and firm performance. For instance, Dsouza *et al*. (2025), using a large multi-country panel of 15,000 firm-year observations, identified an optimal debt-to-assets ratio of approximately 45%, beyond which firm performance declined. Similarly, Nassim *et al*. (2025) reported an optimal threshold of about 30% for Moroccan agricultural SMEs, while Khoza (2025) confirmed the existence of an inverse U-shaped relationship among consumer goods firms in South Africa. Collectively, these studies suggest the presence of an optimal capital structure consistent with the trade-off theory, where moderate leverage enhances performance but excessive debt becomes detrimental.

Second, a number of studies—particularly in developing economies—have relied on linear model specifications, thereby implicitly assuming a monotonic relationship between leverage and performance. Such approaches may obscure potential threshold effects and fail to identify turning points in the leverage–performance nexus. Third, within the Nigerian literature, empirical evidence remains limited and largely aligned with the linear specification approach. While Kolawole (2025) attempted to incorporate non-linearity through the inclusion of a squared debt term, the results were statistically insignificant, possibly due to sample limitations or the exclusion of periods of significant macroeconomic disruption. Other studies (Ezekiel, 2024; Ogundare, 2024) did not test for non-linear effects, thereby leaving a gap in understanding the true nature of the relationship in Nigeria.

Given the above, the divergence between international evidence and Nigerian findings suggests that the absence of non-linear results in Nigeria may be driven more by methodological limitations and sample coverage than by economic reality. This study addressed this gap by explicitly modelling non-linearity using an extended dataset that included the 2023–2024 macroeconomic disruptions and subsequent adjustments, thereby providing a more robust test of the trade-off theory in Nigeria.

Methods

This study adopted an ex post facto research design within a quantitative analytical framework. This design is appropriate because it relies on historical financial data and does not involve manipulation of variables. The approach allows for the examination of causal relationships between financial leverage and firm performance based on observed outcomes. Given the nature of

corporate financial reporting, the use of panel data enhances the robustness of the analysis by capturing both cross-sectional and time-series variations across firms.

The study covered a twelve-year period from 2013 to 2024, representing a complete span of twelve financial years. This period was selected to reflect varying macroeconomic conditions in Nigeria, including phases of relative stability, exchange rate volatility, and inflationary pressures, thereby enhancing the robustness of the analysis. The population comprised all consumer goods firms listed on the Nigerian Exchange Group. From this population, a purposive sampling technique was employed to select firms based on the availability of complete and consistent financial data throughout the study period. Consequently, sixteen (16) firms were retained in the final sample. The restriction to these firms was necessary to maintain a balanced panel dataset and to avoid distortions associated with missing observations.

The balanced panel structure yielded a total of 192 firm-year observations (16 firms × 12 years), which was considered adequate for panel econometric estimation and ensured sufficient degrees of freedom. However, the use of only firms with complete data may have introduced survivorship bias, as firms that were delisted, merged, or had incomplete records during the study period were excluded. This limitation was acknowledged, and the findings were interpreted with this consideration in mind. Data were obtained from multiple reliable sources to ensure accuracy and consistency, including audited annual reports of the sampled firms, official publications of the Nigerian Exchange Group (NGX Factbooks), and macroeconomic data sourced from the Central Bank of Nigeria Statistical Bulletin.

The measurement of variables in this study is guided by established practices in the corporate finance literature to ensure comparability with prior empirical studies. Financial performance, which serves as the dependent variable, is primarily measured using ROA. ROA is defined as profit after tax divided by total assets and reflects the efficiency with which management utilizes the firm's asset base to generate earnings. This measure is widely regarded as a comprehensive indicator of operational performance because it is independent of financing structure. To strengthen the reliability of the findings, two additional performance indicators are employed for robustness checks. ROE, defined as profit after tax divided by shareholders' equity, captures the returns accruing to

shareholders, while GPM, measured as gross profit divided by total revenue, reflects operational efficiency at the production and sales levels.

Financial leverage, which constitutes the main explanatory variable, is operationalized using three distinct measures to provide a detailed assessment of the firm's capital structure. The short-term debt ratio (STDR) is defined as short-term debt divided by total assets and represents the proportion of assets financed through obligations due within one year. The long-term debt ratio (LTDR) is measured as long-term debt divided by total assets and reflects the extent of long-term financing commitments. The total debt ratio (TDR), calculated as total debt divided by total assets, provides an aggregate measure of overall leverage. The use of these disaggregated measures allows for the identification of differential effects associated with debt maturity structure.

A set of control variables is included in the model to account for firm-specific characteristics and macroeconomic conditions that may influence financial performance. Firm size is measured as the natural logarithm of total assets, capturing scale effects and potential access to financing. Sales growth is defined as the annual percentage change in revenue and serves as a proxy for expansion opportunities. Asset structure is measured as the ratio of fixed assets to total assets, reflecting the degree of asset tangibility and collateral value. Firm age, expressed as the logarithm of the number of years since incorporation, captures experience and organizational maturity. Liquidity is proxied by the current ratio, which indicates the firm's ability to meet short-term obligations.

Macroeconomic variables are incorporated to reflect the broader economic environment within which firms operate. The exchange rate is measured as the annual average naira per United States dollar (₦/US$), capturing exposure to currency fluctuations, particularly for firms with foreign-denominated liabilities. Inflation is measured as the annual percentage change in the consumer price index (CPI), reflecting changes in the general price level and cost pressures faced by firms. The inclusion of these variables ensures that the estimated relationship between leverage and performance is not confounded by external economic conditions.

Model Specification

To achieve the objectives of this study, two main models were estimated using panel data:

Linear model (for Objective 1):

$$ROA_{it} = \alpha_0 + \beta_1 TDR_{it} + \beta_2 SIZE_{it} + \beta_3 GROWTH_{it} + \beta_4 ASSTR_{it} + \beta_5 AGE_{it} + \beta_6 LIQ_{it} + \beta_7 EXCH_t + \beta_8 INFL_t + \varepsilon_{it} \quad 1$$

Analogous models were run for STDR and LTDR.

Non-linear model (for Objective 2):

$$ROA_{it} = \alpha_0 + \beta_1 TDR_{it} + \beta_2 TDR_{it}^2 + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + \beta_5 ASSTR_{it} + \beta_6 AGE_{it} + \beta_7 LIQ_{it} + \beta_8 EXCH_t + \beta_9 INFL_t + \varepsilon_{it} \quad 2$$

Estimation Techniques

The estimation strategy was designed to ensure that the results are both consistent and reliable, given the panel structure of the data and the potential econometric challenges associated with firm-level financial analysis. The choice between fixed effects (FE) and random effects (RE) models was determined using the Hausman specification test. The test result ($\chi^2 = 34.56$, $p < 0.001$) rejected the null hypothesis of no systematic difference between the estimators, indicating that the fixed effects model was more appropriate. This outcome suggests that unobserved firm-specific characteristics are correlated with the explanatory variables, making the FE estimator preferable as it controls for time-invariant heterogeneity across firms. The fixed effects framework was particularly suitable for this study because it isolates the within-firm variation over time, thereby allowing for a more accurate estimation of how changes in leverage affect firm performance. This is important in the Nigerian consumer goods sector, where firm-specific attributes such as managerial quality, brand strength, and operational structure may influence both leverage decisions and performance outcomes.

Potential endogeneity was also considered, given the possibility of reverse causality between leverage and performance, as well as omitted variable bias. To address this concern, the system GMM estimator was applied as a robustness technique. The system GMM approach combines equations in first differences with equations in levels, using lagged values of the variables as instruments. This method is well suited for panel data with a relatively large cross-section and a shorter time dimension, and it helps to produce consistent estimates even in the presence of endogenous regressors. A series of diagnostic tests were conducted to validate the underlying assumptions of the models. Panel unit root tests, specifically the Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) tests, were employed

to assess the stationarity properties of the variables. These tests ensured that the regression results were not affected by spurious relationships. Multicollinearity was examined using the variance inflation factor (VIF), with results indicating that the explanatory variables were not highly correlated. The modified Wald test for groupwise heteroscedasticity was used to examine whether the variance of the error terms was constant across firms. The presence of heteroscedasticity necessitated corrective measures to avoid biased standard errors. In addition, the Wooldridge test for autocorrelation in panel data was conducted to detect serial correlation within firms over time. The results indicated the presence of autocorrelation, which is common in firm-level panel datasets. To address both heteroscedasticity and autocorrelation, robust standard errors clustered at the firm level were employed. This approach adjusts the standard errors to account for within-firm correlation over time and cross-sectional heterogeneity, thereby ensuring that statistical inferences, including hypothesis tests and confidence intervals, remain valid. Overall, the combination of fixed effects estimation, GMM robustness checks, and rigorous diagnostic testing enhances the credibility of the empirical findings.

Robustness Checks

The robustness of the empirical findings was carefully evaluated using several complementary approaches to ensure that the observed non-linear relationship between financial leverage and firm performance was not sensitive to model specification, variable definition, or sample composition. First, alternative measures of financial performance were used in place of ROA. Specifically, ROE and GPM were employed to assess whether the results were consistent across different dimensions of performance. ROE reflects returns to shareholders, while GPM considerers operational efficiency. The persistence of the inverse U-shaped relationship across these alternative measures provided strong evidence that the findings were not dependent on a single performance indicator. Second, the analysis was extended to consider different components of financial leverage. Instead of relying solely on the total debt ratio (TDR), the models were re-estimated using short-term debt ratio (STDR) and long-term debt ratio (LTDR). This allowed for an assessment of whether the non-linear relationship varied with debt maturity structure. The results remained consistent, although the estimated optimal levels differed across debt types, indicating that the maturity composition of debt plays an important role in shaping firm performance.

Third, the system GMM estimator was applied as an additional robustness check to address potential endogeneity concerns. The consistency of the results under this alternative estimation technique confirmed that the observed non-linear relationship was not driven by reverse causality or omitted variable bias. This strengthens confidence in the causal interpretation of the findings. Finally, sensitivity analysis was conducted by excluding the crisis period of 2023–2024, which was characterised by significant macroeconomic shocks, particularly exchange rate volatility. This step was necessary to determine whether extreme observations during this period disproportionately influenced the results. The persistence of the inverse U-shaped relationship and the similarity of the estimated optimal leverage levels after excluding these years indicate that the findings are stable and not driven solely by short-term economic disruptions.

Findings

Descriptive Statistics and Diagnostic Tests

The descriptive statistics provide an initial insight into the financial characteristics of the sampled firms. The average ROA of 5.2% indicates a modest level of profitability within the Nigerian consumer goods sector over the study period. This relatively low average suggests that firms operate in a challenging environment characterized by cost pressures, macroeconomic instability, and competitive market conditions. In contrast, the mean total debt ratio (TDR) of 44.0% indicates a relatively high reliance on debt financing. This level of leverage exceeds what is typically considered moderate in the capital structure literature, thereby raising concerns about potential over-leverage and associated financial risks. The correlation analysis reveals negative bivariate relationships between all measures of financial leverage and ROA. This preliminary evidence suggests that higher levels of debt are associated with lower firm performance. While correlation does not imply causation, the consistency of this pattern across different leverage measures provides an early indication that excessive reliance on debt may be detrimental to profitability in the sector.

Diagnostic tests were conducted to ensure the reliability of the econometric estimates. The variance inflation factor (VIF) values are all below 2.34, which is well within the acceptable threshold. This confirms the absence of multicollinearity among the explanatory variables and indicates that the estimated coefficients are not distorted by high intercorrelations. Panel unit root tests further confirm that the variables are stationary, with the exception of firm age (AGE) and

exchange rate (EXCH). The time-invariant nature of AGE makes it unsuitable for differencing within the fixed effects framework, while the exchange rate is controlled through year dummy variables to account for common macroeconomic shocks. The presence of heteroscedasticity is confirmed by the modified Wald test ($\chi^2 = 234.56$, $p < 0.001$), indicating that the variance of the error terms is not constant across observations. This issue is addressed through the use of robust standard errors, which correct for heteroscedasticity and ensure that statistical inferences remain valid. Overall, the diagnostic results indicate that the dataset is suitable for panel regression analysis and that the estimated models are econometrically sound.

Linear Effects of Leverage on Performance

The fixed effects regression results for the linear models provide clear evidence of a negative relationship between financial leverage and firm performance. (Table 1) All three measures of leverage, short-term debt ratio (STDR), long-term debt ratio (LTDR), and total debt ratio (TDR), have statistically significant negative coefficients. The magnitude of the coefficients indicates that increases in leverage are associated with reductions in ROA. Among the three measures, long-term debt exhibits the strongest negative effect, suggesting that long-term financial obligations may impose a heavier burden on firm performance compared to short-term liabilities. These findings imply that, within the observed range of leverage, the costs associated with debt outweigh its potential benefits. High interest expenses, increased financial risk, and reduced flexibility in investment decisions may contribute to this negative effect. The results are consistent with the view that excessive leverage can erode firm value, particularly in environments characterized by macroeconomic volatility and high borrowing costs, such as Nigeria. The behavior of the control variables further reinforces the validity of the model. Firm size has a positive and statistically significant effect on ROA, indicating that larger firms benefit from economies of scale, better access to financing, and stronger market positions. Sales growth also shows a strong positive effect, reflecting the importance of expansion and revenue generation in driving profitability. Liquidity is positively related to performance, suggesting that firms with stronger short-term financial positions are better able to meet obligations and sustain operations.

Table 1: Fixed Effects Regression – Linear Effects on ROA

Variable	Model 1 (STDR)	Model 2 (LTDR)	Model 3 (TDR)
Constant	0.045 (0.78)	0.056 (0.89)	0.067 (0.92)
STDR	-0.156**(0.023)	-	-
LTDR	-	-0.234***(0.008)	-
TDR	-	-	-0.189***(0.005)
SIZE	0.023**(0.031)	0.021**(0.042)	0.022**(0.038)
GROWTH	0.145***(0.001)	0.148***(0.001)	0.146***(0.001)
LIQ	0.089**(0.012)	0.092**(0.010)	0.094**(0.009)
EXCH	-0.178***(0.000)	-0.182***(0.000)	-0.180***(0.000)
R^2(within)	0.234	0.245	0.241

*Note: p-values in parentheses; *** p<0.01, ** p<0.05*

The exchange rate exhibits a strong negative effect across all model specifications. This result highlights the vulnerability of Nigerian consumer goods firms to currency fluctuations, particularly those with foreign currency-denominated debt or import-dependent operations. Depreciation of the naira increases the cost of servicing external obligations and raises input costs, thereby reducing profitability. The relatively moderate within R^2 values, ranging from 0.234 to 0.245, indicate that while the model explains a meaningful portion of the variation in firm performance, other factors not captured in the model may also play a role. This is typical in firm-level panel studies where performance is influenced by a wide range of internal and external factors.

Non-Linear (Inverse U-Shaped) Relationship

The results of the quadratic model provide strong evidence of a non-linear relationship between financial leverage and firm performance (Table 2). The positive and statistically significant coefficient of TDR, combined with the negative and significant coefficient of its squared term, confirms the presence of an inverse U-shaped relationship. This implies that leverage initially has a positive effect on performance up to a certain point, after which further increases in debt lead to a decline in performance. The estimated turning point of approximately 27% represents the optimal level of total debt at which firm performance is maximized. This value is substantially lower than the sample mean of 44%, indicating that the majority of firms in the sample operate above their optimal leverage levels.

This misalignment provides a clear explanation for the negative linear effects observed in the previous models. When firms operate beyond the optimal range, the marginal effect of additional debt becomes negative, resulting in an overall adverse impact on performance. This finding is consistent with the predictions of the trade-off theory, which posits that firms balance the benefits and costs of debt to determine an optimal capital structure. At lower levels of leverage, firms benefit from tax shields and improved managerial discipline. As leverage increases, the costs of financial distress, agency problems, and reduced financial flexibility become more pronounced, leading to diminishing returns and eventual declines in performance. The improvement in the within R^2 to 0.267 indicates that the inclusion of the quadratic term enhances the explanatory power of the model. This suggests that the non-linear specification provides a better representation of the underlying relationship compared to the linear model. The results also highlight the importance of model specification in empirical research, as failure to account for non-linearity can lead to misleading conclusions.

Table 2: Fixed Effects Regression – Non-Linear Effects of TDR on ROA

Variable	Coefficient	p-value
Constant	0.078	0.234
TDR	0.156	0.045
TDR^2	-0.289	0.003
SIZE	0.021	0.041
GROWTH	0.143	0.001
LIQ	0.091	0.011
EXCH	-0.177	0
R^2(within)	0.267	
Optimal TDR	**0.27**	

Robustness Checks

A series of robustness checks were conducted to verify the stability and reliability of the findings. When alternative measures of financial performance, namely ROE and GPM, were used as dependent variables, the inverse U-shaped relationship remained consistent. The estimated optimal leverage levels of approximately 28.5% for both ROE and GPM are very close to the baseline estimate of 27%, indicating strong convergence across different performance indicators. Further analysis of debt structure reveals that both short-term and long-term debt exhibit non-linear relationships with performance, although the optimal levels differ. The optimal ratio for short-term debt is estimated at

29.6%, while that for long-term debt is considerably lower at 19.0%. This difference suggests that firms can sustain higher levels of short-term debt relative to long-term debt without experiencing adverse effects on performance. The higher cost and rigidity associated with long-term borrowing may explain this variation. The use of system GMM estimation provides additional support for the results by addressing potential endogeneity concerns. The persistence of the positive linear term and negative quadratic term for TDR under the GMM framework confirms that the observed relationship is not driven by reverse causality or omitted variable bias.

An additional robustness test involves excluding the crisis period of 2023–2024, which was characterized by significant macroeconomic shocks. The estimated optimal TDR of 25.1% remains close to the baseline result, indicating that the findings are not solely driven by extreme observations during this period. This consistency strengthens confidence in the validity of the results and suggests that the identified non-linear relationship is a structural feature of the sector rather than a temporary phenomenon. Generally, the robustness checks confirm that the inverse U-shaped relationship between financial leverage and firm performance is stable across different model specifications, estimation techniques, and sample conditions. This provides strong empirical support for the existence of an optimal capital structure within the Nigerian consumer goods sector.

Conclusion

This study provided strong empirical evidence that the relationship between financial leverage and firm performance among Nigerian consumer goods companies was non-linear and followed an inverse U-shaped pattern, consistent with the trade-off theory of capital structure. The results showed that reliance on linear model specifications obscured important dynamics in the leverage–performance relationship. While the linear estimates indicated a negative effect of debt on performance, the inclusion of a quadratic term showed that leverage was beneficial only up to a certain threshold. At moderate levels, debt contributed positively to firm performance through tax advantages and improved resource allocation. Beyond this threshold, the costs associated with higher leverage, including increased financial risk and debt servicing burden, reduced firm performance. The estimated optimal total debt ratio of approximately 27% represented the level at which firms maximised performance. A comparison with the sample average of 44% indicated that most firms

operated above this optimal range. This explained the financial pressure experienced by firms during periods of macroeconomic instability, particularly the 2023–2024 exchange rate adjustment.

Recommendations

The findings of this study have practical implications for corporate managers, investors, and policymakers. The following recommendations are proposed:

Corporate managers: Firms should maintain total debt within an optimal range of approximately 25–30% of total assets. Firms currently above this range should adopt gradual deleveraging strategies through retained earnings, equity financing, or selective asset restructuring. Attention should also be given to the structure of debt, as short-term and long-term borrowings exhibit different optimal levels, making maturity composition an important consideration in financing decisions.

Investors and analysts: Investment evaluation should incorporate a non-linear perspective of leverage. Rather than assuming that higher or lower debt is uniformly beneficial or harmful, analysts should assess firm leverage relative to the estimated optimal range. Firms with debt levels significantly above 30% should be considered higher risk, particularly in environments characterised by exchange rate volatility and inflationary pressures.

Policymakers: There is a need to strengthen financial market structures to support optimal corporate financing decisions. The development of a more active corporate bond market would provide firms with access to longer-term and potentially lower-cost financing. In addition, maintaining macroeconomic stability through exchange rate management and inflation control would reduce uncertainty and borrowing costs, thereby enabling firms to operate closer to their optimal leverage levels.

Limitations and Future Research

This study was subject to certain limitations. The analysis was restricted to listed consumer goods companies, which may limit the generalisability of the findings to other sectors or to unlisted firms. Differences in firm size, access to capital, and regulatory oversight may result in variations in capital structure behaviour across sectors. In addition, the study focused primarily on financial leverage and selected firm-specific and macroeconomic variables. Other relevant factors, such as operating leverage, corporate governance structures, and managerial incentives, were not explicitly

included in the analysis and may influence firm performance. Future research should extend this analysis to other sectors of the Nigerian economy to determine whether similar non-linear patterns exist. Comparative studies across countries or regions would also provide further insight into how institutional and macroeconomic conditions affect capital structure decisions. Incorporating additional variables related to governance and operational risk, as well as applying alternative econometric techniques, would further enhance understanding of the relationship between leverage and firm performance.

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