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LONG-TERM DEBT FINANCING AND OPERATING PERFORMANCE OF LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA

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ABSTRACT

The study examined the effect of long-term debt financing on the operating performance of listed industrial goods firms in Nigeria. The specific objective was to ascertain the effect of long-term debt to equity ratio and long-term debt to asset ratio on the operating cashflow margin of listed industrial goods firms in Nigeria. Ex-post facto research design was used in the study. Thirteen listed industrial goods firms made up the population of the study from which a sample size of nine was selected using purposive sampling technique. Secondary data were sourced from the annual reports of the firms for thirteen, spanning 2012-2024. Test of hypotheses was carried out using panel estimated generalised least squares, which revealed that long-term debt to equity ratio has a significant and negative effect on operating cashflow margin of listed industrial goods firms in Nigeria (β = –0.043294, p = 0.0433); long-term debt to asset ratio has a positive and significant effect on operating cashflow margin of listed industrial goods firms in Nigeria (β = 0.283497, p = 0.0051). In conclusion, firms able to channel long-term borrowings into asset-backed investments or productive resources are more likely to generate sufficient cash flows to cover their operational needs. The study recommends that financial managers of listed industrial goods firms in Nigeria should reduce excessive reliance on long-term debt relative to equity as maintaining a balanced debt–equity mix will help prevent the erosion of operating cash flow margins caused by high debt servicing obligations, thereby improving the firm's ability to fund day-to-day operations without undue strain.

Key words: *Long-Term Debt Financing, Long-Term Debt to Asset Ratio, Long-Term Debt to Equity Ratio, Operating Performance.*

INTRODUCTION

In the contemporary corporate domain, many firms grapple with the challenge of achieving an optimal balance in managing total liabilities, which comprise both long-term and short-term debt. For industrial goods firms in Nigeria, this challenge is particularly pronounced due to the sector's high capital intensity, long project gestation periods, and heavy reliance on external financing for expansion (Adamu & Hamidah, 2024). The central dilemma lies in

leveraging debt, especially long-term debt, to fuel growth, innovation, and operational efficiency, while simultaneously safeguarding financial stability (Alaaraj, Mulla, John & Abdalla, 2024). When debt levels, particularly long-term obligations, are poorly managed, they can exert significant pressure on operating performance, reducing the ability of firms to generate adequate cash flows to meet interest and principal repayments, reinvest in productive assets, and deliver sustainable value to stakeholders. This imbalance not only threatens the day-to-day operational efficiency of firms but can also undermine long-term economic sustainability, potentially leading to severe financial distress (Aderemi, 2024). Worse still, recurring negative operating margins reflect a weakened ability to convert revenues into positive cash flows. Such a trend hampers competitiveness in a rapidly evolving business environment, constraining firms' capacity to invest in modernization, scale operations, and respond to market shifts. When long-term debt commitments are high and operating performance is weak, the firm's financial health and long-term viability are both jeopardized (Ikwuo, Nwite, Nworie & Nworie, 2025). This creates a persistent challenge in balancing growth aspirations with the need for profitability and financial stability: a balancing act that is crucial for sustainable economic performance.

For listed industrial goods firms in Nigeria, the management of the debt structure presents unique challenges shaped by the macroeconomic environment (Shehu, 2025). The Nigerian economy is characterized by cyclical volatility, with recurring periods of high inflation, currency depreciation, and fluctuating interest rates. These conditions significantly influence the cost and risk of long-term borrowing. Many Nigerian listed firms face constraints in raising equity capital due to underdeveloped capital markets and investor risk aversion. As a result, they often rely heavily on long-term debt financing to fund expansion, modernize production facilities, or diversify product lines. However, without a careful alignment between debt obligations and operating cash flows, this reliance can lead to unsustainable leverage levels (Alaaraj, Mulla, John & Abdalla, 2024). In practice, financial leverage in the Nigerian industrial goods sector is often skewed, with total debt relative to equity and assets exceeding optimal thresholds (Abubakar, 2017). Such imbalances intensify the debt servicing burden, increasing vulnerability to interest rate shocks and revenue downturns. For firms whose revenues are significantly influenced by both domestic demand and export markets, exchange rate volatility further compounds the problem. High leverage, particularly from long-term debt, can constrain liquidity, limit reinvestment in plant and machinery, and reduce agility in responding to competitive pressures. This has direct implications for operating

performance, as constrained investment in operational improvements can erode efficiency and reduce profit margins over time.

Excessive reliance on long-term debt can also strain operating cash flows, as a larger proportion of earnings must be directed toward interest and principal repayments. This crowding-out effect leaves less available for research and development, technology upgrades, and market expansion: key drivers of operational competitiveness. In a volatile economy, such financial rigidity increases the likelihood of distress, thereby undermining long-term sustainability (Finishtya, 2019). While the potential benefits of long-term debt financing such as the tax deductibility of interest and the availability of capital without diluting ownership are well recognized, many industrial goods firms in Nigeria fail to fully realize these benefits due to weak alignment between financing strategies and operational realities (Bappah, Mohammed, Saleh & Taiwo, 2024). The inability to optimize financial leverage often results in diminished competitiveness, reduced investor confidence, and in extreme cases, long-term financial instability. The academic literature on financial leverage and firm performance provides useful hints but reveals notable gaps in the context of Nigerian industrial goods firms. Studies by Aderemi (2024), Olulu-Briggs (2024), and Adeyemi, Lawal, and Olorede (2024) have examined the relationship between leverage and performance indicators such as profitability, return on assets, and firm value across various sectors in Nigeria. These studies confirm that high leverage can adversely affect financial performance, but they often treat all debt as a single aggregate measure, overlooking the distinct characteristics and implications of long-term debt financing.

Similarly, research by Razaq, Alhassan, and Ame (2023) and Adekanmi (2022) has explored the interaction between leverage and sustainability reporting, emphasizing the importance of transparency in debt management for long-term investor confidence. However, these works primarily focus on broader measures of financial performance and corporate social responsibility, neglecting operating cash flow margins—a critical indicator of a firm's ability to service long-term debt without compromising operational efficiency. Moreover, much of the existing research relies on older datasets, often ending before 2024, which limits their relevance in light of recent macroeconomic developments such as post-COVID-19 recovery patterns, exchange rate liberalization, and tightening monetary policy in Nigeria. The limited attention to sector-specific dynamics also presents a gap. Industrial goods firms operate under unique conditions compared to service-oriented sectors, including higher fixed capital requirements, longer asset replacement cycles, and more rigid production schedules. These

factors make the implications of long-term debt financing on operating performance particularly distinct. For example, delays in infrastructure projects, supply chain disruptions, and regulatory bottlenecks can all exacerbate the risks of long-term debt obligations for industrial goods manufacturers. This study addresses these gaps by specifically focusing on the effect of long-term debt financing on the operating performance of listed industrial goods firms in Nigeria. It examines the period from 2012 to 2024, a timeframe marked by significant economic shifts, including oil price volatility, foreign exchange policy reforms, inflationary pressures, and an increasing global emphasis on sustainability accountability. By analyzing key leverage ratios such as long-term debt to total assets, total debt to equity, and interest coverage, alongside operating performance measures like operating profit margin and operating cash flow margin, this research aims to provide nuanced insights into how long-term debt shapes operational outcomes in this sector. In doing so, the study not only evaluates the financial implications of long-term debt financing but also explores how these financing decisions influence the broader sustainability and competitiveness of Nigeria's industrial goods firms. The findings will contribute to a more informed understanding of optimal debt management practices in emerging market contexts, offering practical recommendations for corporate managers, policymakers, and investors seeking to balance growth, profitability, and financial stability in a challenging economic environment.

Objectives

The main objective of the study is to examine the effect of long-term debt financing on the operating performance of listed industrial goods firms in Nigeria. The specific objectives are as follows:

1. to ascertain the effect of long-term debt to equity ratio on the operating cashflow margin of listed industrial goods firms in Nigeria.
2. to determine the effect of long-term debt to asset ratio on the operating cashflow margin of listed industrial goods firms in Nigeria.

LITERATURE REVIEW

Long-term Debt Financing

Long-term debt financing can be defined as the process through which a firm obtains funds from external sources with the agreement to repay over a period exceeding one year (Ikwuo et al., 2025). Long-term debt financing refers to the deliberate choice by a business to secure capital that will remain in use for an extended period before the principal is due for repayment

(Vermoesen, Deloof & Laveren, 2013). It is a means of transferring future repayment obligations into present financial capability, enabling the pursuit of investments that take time to generate returns. In this sense, it embodies the relationship between a borrower's present ambitions and their willingness to bind future resources to meet agreed repayments. This financing form is significant because it gives firms the ability to carry out large-scale or strategic initiatives without depleting current liquidity (Hoffmann, Siddiqui & Nguyen, 2023). While it creates a binding financial obligation, it also extends repayment over a manageable horizon, allowing the benefits of the financed activity to be realized before repayment is complete. In practical meaning, it represents both access to substantial funding and a test of financial discipline, since the commitment spans multiple accounting periods and economic cycles. It is a concept that reflects stability, planning, and endurance, as the firm not only acquires the means to expand or modernize but also accepts the responsibility to manage those funds in a way that ensures repayment without jeopardizing operational continuity (Vermoesen, Deloof & Laveren, 2013). Thus, the meaning of long-term debt financing extends beyond a contractual arrangement, embodying the strategic intent of using borrowed capital for sustainable value creation over time.

Long-term Debt to Equity Ratio

The long-term debt to equity ratio is a financial metric that measures the proportion of a company's long-term debt relative to its equity capital (Sukma, Nurtina & Nainggolan, 2022). This ratio provides hint into how much of the company's long-term financing is sourced from debt versus equity (Farah, Amin & Pramudianto, 2021). Long-term debt typically refers to obligations that are due beyond one year, such as bonds, term loans, and other forms of debt financing with extended repayment periods (Thao, 2023). Companies use long-term debt to fund major capital expenditures or expansion initiatives, allowing them to spread the repayment burden over a longer period and potentially take advantage of lower interest rates compared to short-term borrowing. The long-term debt to equity ratio is important for assessing the level of financial leverage and the associated risk a company faces from its long-term debt commitments (Farah, Amin & Pramudianto, 2021).

A higher long-term debt to equity ratio suggests that the company is using more debt relative to equity to finance its operations and investments (Sukma, Nurtina & Nainggolan, 2022). While leveraging through long-term debt can enable a company to grow and undertake large projects, it also increases the company's financial obligations and exposes it to the risk of

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default if it fails to generate enough cash flow to service its debt. For example, if a company with a high long-term debt ratio experiences a downturn in its revenue, it might struggle to meet its debt repayments, which can have long-term negative consequences for its financial health. On the other hand, using long-term debt allows companies to avoid diluting shareholders' equity, which can be attractive when market conditions are favorable.

The long-term debt to equity ratio can also indicate the company's overall financial strategy and its stance on risk (Farah, Amin & Pramudianto, 2021). Companies in industries that require large upfront capital investments, such as utilities, infrastructure, or telecommunications, often have higher long-term debt to equity ratios, as their assets are stable, long-lived, and generate predictable cash flows. Conversely, businesses with higher levels of innovation or shorter product life cycles, such as technology firms, may prefer to keep their long-term debt levels lower, to retain more flexibility and reduce their exposure to debt risks. The ratio also provides valuable information to investors and creditors about the company's capital structure and financial stability, and they may adjust their expectations or decisions based on the level of debt relative to equity. Thus, the long-term debt to equity ratio is a vital tool for understanding a company's use of long-term financing and its financial leverage. A high ratio can indicate a greater reliance on debt to fund operations and investments (Sukma, Nurtina & Nainggolan, 2022), which carries risks but can also be a strategic move to avoid equity dilution and fund large projects. The ratio reflects both the company's risk appetite and its ability to manage long-term debt obligations.

H_{01}: *Long-term debt to equity ratio has no significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.*

Long-term Debt to Asset Ratio

The Long-term Debt to Asset Ratio is a financial metric that measures the extent to which a firm relies on long-term debt to finance its assets (Aderemi, 2024). Unlike short-term debt, which must be repaid within a year, long-term debt typically has a maturity of more than one year and includes instruments such as bonds, long-term loans, and mortgages. This ratio compares the firm's long-term obligations to its total assets, offering hints into how much of the company's asset base is supported by long-term borrowing. The ratio provides a more understanding of a firm's financial structure, particularly its capital structure, and is often used to assess a company's long-term financial stability and risk.

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A high Long-term Debt to Asset Ratio suggests that the company is heavily reliant on long-term debt financing (Anozie, Muritala, Ininm & Yisau, 2023). This may be the result of large capital expenditures, expansion plans, or other significant investments that require substantial financing. While this can indicate that the company is leveraging debt to fuel growth, it also implies a greater level of financial risk, especially if the company's cash flows or profitability are not sufficient to service the debt over time. The higher the proportion of long-term debt in relation to assets, the greater the long-term interest burden the company will face, which can limit its financial flexibility and increase its vulnerability to economic downturns or shifts in market conditions. On the other hand, a lower ratio suggests that the firm relies less on external debt to fund its assets (Anozie, Muritala, Ininm & Yisau, 2023), which could be a sign of financial conservatism or a more stable capital structure. However, a lower reliance on long-term debt could also indicate under-utilization of leverage, potentially leading to slower growth opportunities or inefficient capital deployment. A balanced approach, where the company uses long-term debt to finance long-term investments without overextending its obligations, is often seen as optimal. This ratio is especially important for investors and lenders because it gives them a sense of the firm's ability to manage debt over an extended period and the risks associated with its long-term financial commitments.

For capital-intensive industries like utilities, energy, or infrastructure, a higher Long-term Debt to Asset Ratio may be more common, as these sectors often require significant upfront investment, and long-term debt is used to spread the cost over many years. In contrast, industries with shorter business cycles, such as technology or consumer goods, might aim to maintain a lower ratio to ensure they can respond quickly to market changes or opportunities.

> H_{02}: *Long-term debt to asset ratio has no significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.*

Operating Performance

Operating performance can be defined as the measurable outcome of a firm's normal business activities in generating revenue and managing operational costs (Nworie, Anaike & Onyeka, 2023). It can also be described as the effectiveness with which an organization conducts its routine activities to produce goods or services and sustain profitability. Operating performance refers to the effectiveness and efficiency with which an organization carries out its primary activities to achieve desired business results (Downar et al., 2021). It captures the

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actual output of ongoing operations and the firm's capacity to generate income from its principal line of business. This concept is not concerned with financing or investment activities but with the day-to-day processes that define a firm's existence. In meaning, it conveys the organization's ability to manage resources, align processes, and maintain productivity in a manner that yields sustainable results. It serves as a mirror of operational capability, revealing whether strategic objectives are being achieved through ordinary activities. A strong operating performance suggests that the business can consistently meet market demands, adapt to changes, and produce returns from its primary functions without undue strain (Nworie & Nwoye, 2023). A weak operating performance signals inefficiencies or disruptions in the regular flow of business that could undermine long-term viability. The concept therefore carries a sense of ongoing evaluation, as it embodies the continuous link between process execution and business outcomes. In essence, operating performance is the lived reality of a business's competence, reflected in its ability to perform effectively in its chosen field and to do so in a way that sustains relevance, profitability, and stability over time.

Operating Cashflow Margin

The Operating Cashflow Margin is a financial ratio that measures the proportion of a firm's cash flow from operating activities relative to its total revenue (Rahman, 2024). It provides a clear indication of how efficiently a company converts its sales into actual cash, reflecting the firm's ability to generate cash from its core business operations (Bhandari & Iyer, 2013). Unlike net income, which includes non-cash items such as depreciation, taxes, and interest expenses, operating cash flow focuses purely on the cash generated by the day-to-day activities of the business, such as selling products or providing services. The Operating Cashflow Margin is calculated by dividing operating cash flow by total revenue, and it is expressed as a percentage.

This ratio is crucial because it highlights a company's ability to generate liquidity from its operations, which is essential for maintaining daily operations, paying down debt, reinvesting in the business, and rewarding shareholders. A high Operating Cashflow Margin indicates that a firm is efficient at converting sales into actual cash (Rahman, 2024), which is particularly important for sustaining operations without having to rely on external financing or credit (Elahi, Ahmad, Shamas & Saleem, 2021). Companies with strong operating cash flows are better positioned to weather financial stress, as they can meet obligations and fund growth initiatives from internal resources (Akpan & Uwakmfonabasi, 2021).

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Theoretical Review

The study was anchored on Resource-Based View (RBV) theory which originated from the works of Birger Wernerfelt in 1984, later expanded by scholars such as Jay Barney in the early 1990s (Frances & Nworie, 2025). It emerged as a response to strategy frameworks that focused mainly on external market positioning by shifting attention to the internal resources and capabilities of firms as sources of sustainable competitive advantage. Over time, the RBV has become one of the most widely used perspectives in strategic management research because of its emphasis on how unique, valuable, and difficult-to-imitate resources drive superior performance. The theory postulates that firms achieve and maintain superior performance by acquiring, developing, and effectively utilizing resources that are valuable, rare, imperfectly imitable, and non-substitutable (Putra, Wiagustini, Ramantha & Sedana, 2021). These resources can be tangible, such as financial capital and physical assets, or intangible, such as managerial expertise, brand reputation, and organizational culture. The RBV asserts that differences in performance among firms can often be explained by variations in the quality and deployment of these strategic resources rather than by external factors alone.

In relation to the topic, the RBV provides a useful lens for examining the link between long-term debt financing and the operating performance of listed industrial goods firms in Nigeria. Long-term debt can serve as a critical financial resource that enables firms to invest in productive assets, expand operations, and enhance efficiency (Ikwuo et al., 2025). When managed effectively, it can strengthen a firm's competitive position by providing the capital needed to exploit unique capabilities and pursue growth opportunities. However, the RBV also implies that merely having access to long-term financing is not enough; the way a firm allocates and manages these funds determines whether they translate into sustained operating performance.

Empirical Review

The empirical evidence on leverage and firm performance presents a varied but instructive pattern, with a substantial number of studies finding that higher debt levels can weaken operational and financial outcomes. Boshnak (2023) provides a clear example, showing that short-term debt, long-term debt, total debt and debt-to-equity ratios significantly reduced return on assets, return on equity and market performance in Saudi non-financial firms. Similar adverse links appear in the Nigerian context where Anozie et al. (2023) report that

long-term debt to total assets significantly reduced ROA for oil and gas firms, and Oranefo and Egbunike (2023) find negative effects of capital and income gearing on operating cash flow among Nigerian manufacturing firms. Muhammed (2023) also documents an adverse relationship between capital structure and profitability during a financial crisis, underscoring how macroeconomic stress can turn leverage from a tool of growth into a drag on performance. Collectively these studies underline the classic trade-off argument that excessive debt raises financial burden and constrains operational flexibility, especially where recovery and risk management are weak.

Counterbalancing those negative findings, a number of studies report neutral, mixed or even positive outcomes depending on measurement, debt composition and context. Ukwueze and Ajibo (2024) find significant effects of operating and consumer leverage on financial performance in selected Nigerian manufacturers using survey data, suggesting certain leverage types can be operationally important. Igwe (2024) shows that while a simple debt ratio had a non-significant negative association with market capitalization for listed ICT firms, debt-to-equity and debt-to-capital ratios positively and significantly influenced firm value, implying that a balanced capital mix can create value.

Harris and Mawardi (2023) observed a positive and significant relationship between gearing and ROA in Indonesian firms and note the relationship changed across pre- and during-COVID periods. Irungu (2024) highlighted another dimension by demonstrating that leverage promotes income smoothing among Nairobi-listed firms, a managerial response that affects reported performance without necessarily improving fundamental operations. These studies indicate that leverage's effect may be conditional on how debt is structured, the firm's objectives, and the economic environment.

Differences in industry, period, method and sample explain much of the divergence across the literature and point to why results cannot be simply generalised. Akmalia (2023) and Oktrima and Sutrisno (2023) both found no significant impact of capital structure or debt-to-equity on firm value in manufacturing settings, which suggests sector-specific investment needs and capital intensity can offset leverage effects. Methodological choices also matter: Boshnak (2023) used GMM to address endogeneity, Muhammed (2023) applied FMOLS and ARDL to capture crisis dynamics, and Ukwueze and Ajibo (2024) used survey-based chi-square tests, each approach yielding different inferences. Time-specific shocks and regulatory environments further moderate outcomes, as seen in Muhammed's (2023) crisis period

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findings and Harris and Mawardi's (2023) COVID comparisons. Taking these studies together, the literature implies that the impact of long-term debt on operating performance is not uniform; it depends on debt type, firm governance and strategy, sector characteristics, macroeconomic conditions and the empirical lens through which the relationship is examined.

MATERIALS AND METHOD

The research adopted an ex-post facto research design, which is most suitable for examining the effect of long-term debt financing on the operating performance of listed industrial goods firms in Nigeria. *Ex-post facto* designs are used when the researcher does not have control over the independent variables (Nworie, Okafor & John-Akamelu, 2022), as is the case in this study, where the data on financial leverage and economic sustainability disclosure are historical and beyond the researcher's influence. The population for this study comprised all the industrial goods firms listed on the Nigerian Exchange Group (NGX) as of 2024. As of December 31, 2024, there were 13 such firms actively traded on the NGX. These firms represent the entire population of industrial goods firms in Nigeria's capital market. However, purposive sampling technique was used to select a sample of nine (9) firms for the study. This technique is suitable because the sample needed to meet specific criteria, such as being listed on the NGX from 2012 and having available financial data (secondary data) for the period 2012–2024. Two firms, Bua Cement and Notore Chemical Industries Plc., were excluded because they were listed in 2020 and 2018, respectively, that is, after 2014. This makes their financial data for the entire period under study (2012 to 2024) not to be available. In addition, Greif Plc and Premier Paints Plc. were yet to upload their 2023 and 2024 annual report to their website and to the website of the Nigerian Exchange Group as at May 2, 2025. Consequently, the sampled nine firms that met the criteria, Austin Laz & Company Plc, Berger Paints Plc, Beta Glass Plc, Cap Plc, Cutix Plc, Dangote Cement Plc, Lafarge Africa Plc, Meyer Plc and the Tripple Gee & Company Plc.

Table 1 Measurement of Variables

Variable	Measurement	Source
Operating Cash Flow Margin	Net Operating cash flow/Net revenue	Rahman, 2024
Long-term Debt to Equity Ratio (LTDER)	Long-term debt/Total equity	Sukma, Nurtina & Nainggolan, 2022
Long-term Debt to Asset Ratio (LTDAR)	Long-term debt/Total assets	Aderemi, 2024

Source: Author's Compilation (2025)

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To test the hypotheses of the study, a linear regression model was adapted from the study by Abubakar (2020) whose model is:

$FPERF_{it} = \alpha_0 + \beta_1 STDR_{it} + \beta_2 LTDR_{it} + \beta_3 TDR_{it} + \beta_4 TDER_{it} + C_{it} + \mu_{it}$ …… Eqn 1.

Where:

FPERF = financial performance (ROE, ROA & Tobin's Q),

α_0 = intercept,

β_1- β_4 = coefficient

STDR = short-term debt ratio,

LTDR = long-term debt ratio,

TDR = total-debt ratio,

TDER = total-debt equity ratio,

subscript i and t refer to each bank i in year t,

C = unit-specific error component,

μ = the remaining error component.

The above model was modified thus:

$OCM_{it} = \alpha_0 + \beta_1 LTDER_{it} + \beta_2 LTDAR_{it} + \epsilon_{it}$ …… Eqn 2.

Where:

OCM_{it} = Operating Cash Flow Margin for firm i at time t

$LTDER_{it}$ = Long-term Debt to Equity Ratio for firm i at time t

$LTDAR_{it}$ = Long-term Debt to Asset Ratio for firm i at time t

α = Constant term

β_1-β_3 = Regression coefficients for each proxy of long-term debt financing

ϵ_{it} = Error term

i = Firm

t = Time (year)

The model assessed how each debt ratio impacts the operating cash flow margin, controlling for other variables.

Descriptive statistics included a measure of central tendency (mean) and measures of variability (standard deviation, range), which helped summarize the data and identify trends and patterns across the firms over time. These statistics provided an initial understanding of the distribution and characteristics of the variables under study. Panel estimated generalised

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least squares regression was used to test the hypotheses at 5% significance level. This panel data regression approach is suitable for this study because it accounts for both cross-sectional and time-series data, allowing the researcher to examine the dynamics of financial leverage and firm performance over time while controlling for individual heterogeneity across firms (Islam, 2022).

RESULT AND DISCUSSIONS

Descriptive Analysis

Table 2 Descriptive Statistics

	OCM	LTDER	LTDAR
Mean	0.188420	0.315919	0.122208
Median	0.159584	0.143269	0.091560
Maximum	2.059169	3.628154	0.501650
Minimum	-2.828987	0.000000	0.000000
Std. Dev.	0.414123	0.541365	0.114848
Skewness	-1.995491	3.615967	1.676317
Kurtosis	30.19774	17.57457	5.511816
Jarque-Bera	3683.769	1290.505	85.55318
Probability	0.000000	0.000000	0.000000
Sum	22.04515	36.96252	14.29839
Sum Sq. Dev.	19.89379	33.99679	1.530045
Observations	117	117	117

Source: E-Views 10.0 Descriptive Output, 2024

As shown in Table 2 above, the mean value of operating cash flow margin (OCM) is 0.1884, indicating that on average, the listed industrial goods firms in Nigeria generated 18.84% of their revenue as operating cash flow between 2012 and 2024. The median value is slightly lower at 0.1596, suggesting a left-skewed distribution where a few firms had significantly lower margins. This is confirmed by the negative skewness of -1.9955, showing that the distribution of OCM is heavily skewed to the left. The standard deviation of 0.4141 reveals a moderate spread around the mean, but the wide range between the maximum (2.0592) and minimum (-2.8290) indicates substantial variability across firms and time. The extremely high kurtosis value of 30.1977 implies the presence of outliers or extreme values, while the Jarque-Bera probability of 0.0000 confirms that the OCM data is not normally distributed.

As per long-term Debt to Equity Ratio (LTDER) that has a mean of 0.3159, the average firm had long-term debt equivalent to approximately 31.59% of its equity. The median is much lower at 0.1433, highlighting a distribution skewed heavily to the right, as evidenced by the high skewness of 3.6160. The maximum ratio of 3.6282 shows that some firms heavily relied

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on long-term borrowing compared to equity, whereas the minimum value of 0.0000 indicates firms that had no long-term debt. The standard deviation (0.5414) reflects high variability among firms in terms of long-term debt usage. The kurtosis value of 17.5746, along with a Jarque-Bera p-value of 0.0000, confirms a non-normal distribution with extreme values concentrated in a few firms.

The mean LTDAR is 0.1222, showing that long-term debt constituted only about 12.22% of total assets on average, reflecting a relatively conservative long-term financing policy. The median is close at 0.0916, but the skewness of 1.6763 suggests a moderate right skew, with some firms using relatively high levels of long-term debt. The maximum of 0.5017 and minimum of 0.0000 show a wide range of financing structures. The standard deviation of 0.1148 indicates moderate dispersion, while the kurtosis value of 5.5118 points to a peaked distribution with some extreme values. The Jarque-Bera test p-value of 0.0000 signifies significant departure from normality.

Test of Hypotheses

Table 2: Panel Regression Analysis

Dependent Variable: OCM
Method: Panel EGLS (Cross-section SUR)
Date: 08/04/25 Time: 05:37
Sample: 2012 2024
Periods included: 13
Cross-sections included: 9
Total panel (balanced) observations: 117
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTDER	-0.043294	0.021184	-2.043717	0.0433
LTDAR	0.283497	0.099264	2.856000	0.0051
C	0.168389	0.011440	14.71965	0.0000
	Weighted Statistics			
R-squared	0.065108	Mean dependent var		1.909416
Adjusted R-squared	0.048706	S.D. dependent var		4.406518
S.E. of regression	1.002629	Sum squared resid		114.6002
F-statistic	3.969598	Durbin-Watson stat		2.062378
Prob(F-statistic)	0.021548			

Source: E-Views 10.0 Regression Output, 2025

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Table 2 presents the results of the panel regression analysis, with operating cash flow margin (OCM) as the dependent variable. The model validity statistics show an Adjusted R-squared of 0.048706, which indicates that about 4.87% of the variations in operating cash flow margin among the listed industrial goods firms over the study period are explained by the explanatory variables in the model. Although this percentage is relatively small, it is not unusual in financial panel data studies where firm performance is influenced by many factors beyond capital structure. The Prob(F-statistic) of 0.021548 is less than the 5% significance level, meaning that the overall model is statistically significant; in other words, the explanatory variables collectively have a statistically significant effect on operating cash flow margin. The Durbin–Watson statistic of 2.062378 is close to the ideal value of 2, suggesting that the model does not suffer from significant autocorrelation problems.

The constant term (C = 0.168389, p = 0.0000) is positive and statistically significant at the 5% level. This implies that, holding all other variables constant, the average operating cash flow margin of the listed industrial goods firms in Nigeria is 16.84%. This provides a baseline performance level before accounting for variations due to long-term debt financing.

Hypotheses One

H_0: Long-term debt to equity ratio has no significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.

H_i: Long-term debt to equity ratio has significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.

The coefficient for LTDER is –0.043294 with a p-value of 0.0433, which is below the 5% significance threshold. This means that the long-term debt to equity ratio has a statistically significant negative effect on operating cash flow margin. The marginal effect interpretation is that for every one-unit increase in LTDER, the operating cash flow margin decreases by approximately 4.33%, holding other factors constant. The significance of this effect means we reject the null hypothesis (H01) and conclude that LTDER significantly affects operating cash flow margin in the sampled firms. The negative direction suggests that higher reliance on long-term debt relative to equity reduces operational liquidity efficiency, possibly due to higher interest obligations and repayment commitments that constrain cash flow from core operations.

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This outcome suggests that when listed industrial goods firms in Nigeria increase their proportion of long-term debt relative to equity, they experience a contraction in the margin of cash flows generated from operations or high financing costs. This may be attributed to the persistent and often substantial interest obligations attached to long-term borrowing, which can consume a considerable portion of operational cash inflows. In the industrial goods sector—where capital projects are often capital-intensive and have long gestation periods—the lag between borrowing and cash-generating capacity of investments can intensify the strain on liquidity. Furthermore, reliance on debt over equity exposes firms to higher financial risk, potentially restricting their operational flexibility and prompting more conservative operational spending, thereby reducing cash flow margins. This result aligns closely with several studies in the empirical review that document adverse consequences of higher leverage ratios. Boshnak (2023) found that long-term debt and debt-to-equity ratios significantly reduced both operational and market performance in Saudi firms, a dynamic mirrored by Anozie et al. (2023), who observed that long-term debt to total assets negatively impacted ROA in Nigerian oil and gas companies. Similarly, Oranefo and Egbunike (2023) reported negative effects of capital gearing on operating cash flows among Nigerian manufacturing firms, reinforcing the vulnerability of cash flow margins to excessive debt burdens. Muhammed (2023) adds a macroeconomic perspective, showing that during financial crises, capital structure negatively affects profitability, which underscores that in stressed environments, high debt magnifies cash flow constraints. Together, these findings suggest that the negative effect in the present study is consistent with documented evidence across different sectors and countries, particularly in contexts with economic volatility

Hypotheses Two

H_0: Long-term debt to asset ratio has no significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.

H_i: Long-term debt to asset ratio has no significant effect on the operating cashflow margin of listed industrial goods firms in Nigeria.

The coefficient for LTDAR is 0.283497 with a p-value of 0.0051, which is also below the 5% significance level. This indicates that LTDAR has a statistically significant positive effect on operating cash flow margin. The marginal effect is that a one-unit increase in LTDAR leads to an increase of about 28.35% in operating cash flow margin, ceteris paribus. Given this result, the null hypothesis (H02) is rejected, meaning LTDAR significantly influences operating cash flow margin in listed industrial goods firms in Nigeria. The positive sign

implies that when long-term debt is measured relative to total assets, it can enhance operational liquidity—possibly because such debt is tied to productive investments that improve operational cash generation.

This implies that when listed industrial goods firms allocate long-term debt toward asset acquisition, they tend to enhance their operating cash flow margins. The outcome can be explained by the asset-backing nature of such debt—when borrowed funds are channelled into productive, revenue-generating assets (such as machinery, plants, or technology upgrades), the firm's capacity to generate operational revenues improves. In capital-intensive industries like industrial goods, productive assets are crucial drivers of operational efficiency and economies of scale, meaning that financing these assets with long-term debt can boost operational margins once the assets are operational. The matching of debt maturity with the lifespan of assets also spreads repayment obligations over time, easing liquidity pressures. This positive effect finds support in studies showing that the composition and utilisation of debt can lead to beneficial operational outcomes. Igwe (2024) reported that both debt-to-equity and debt-to-capital ratios significantly increased firm value for listed ICT firms in Nigeria, underscoring the value-creating potential of balanced debt-financed investments. Harris and Mawardi (2023) similarly found that gearing ratios positively and significantly influenced ROA in Indonesian financing companies, indicating operational benefits from leveraging. Ukwueze and Ajibo (2024) also found significant effects of operating and consumer leverage on financial performance in Nigerian manufacturing firms, suggesting that specific types of leverage can strengthen operational performance. Even Irungu (2024), while focusing on income smoothing, demonstrated that leverage could play a functional role in strategic financial outcomes. Collectively, these studies highlight that when long-term debt is asset-backed and strategically deployed, its effect on operational cash flow can be positive—precisely as observed in the present study.

CONCLUSION AND RECOMMENDATIONS

The findings indicate that the composition and structure of long-term debt relative to equity and assets play a significant role in shaping the operational liquidity of listed industrial goods firms in Nigeria. The contrasting effects observed suggest that the way long-term debt is proportioned in relation to equity versus assets can alter its influence on cash flow generation. This points to the importance of how firms balance financing sources in order to sustain efficient operational cash flow. In contexts where debt levels relative to equity are high, the burden of repayment and interest obligations may outweigh any benefits from leveraging,

thereby straining operational liquidity. The results further suggest that when long-term debt is evaluated in relation to total assets, it may contribute positively to operational cash flow margin. This could imply that firms able to channel long-term borrowings into asset-backed investments or productive resources are more likely to generate sufficient cash flows to cover their operational needs. It reflects a potential efficiency in debt utilization where long-term liabilities are matched with productive assets that enhance operational capacity and cash generation. The findings thus highlight that the structure of capital, rather than the mere presence of debt, is critical in influencing operational outcomes.

From a broader perspective, these outcomes underline the nuanced nature of debt financing effects in the industrial goods sector. While debt in certain proportions and structures can be supportive of operational performance, in other configurations it may act as a constraint. This complexity means that capital structure decisions in the sector are not one-dimensional but rather require a careful balance between the financing mix and the nature of the firm's assets and operations. The observed effects also signal that operational liquidity in this sector is sensitive to long-term financing strategies, with significant implications for both short-term cash flow stability and long-term financial sustainability.

In view of these, the study therefore recommended that:

a. Financial managers of listed industrial goods firms in Nigeria should reduce excessive reliance on long-term debt relative to equity as maintaining a balanced debt–equity mix will help prevent the erosion of operating cash flow margins caused by high debt servicing obligations, thereby improving the firm's ability to fund day-to-day operations without undue strain.
b. Board of directors of listed industrial goods firms in Nigeria should prioritize the use of long-term debt for acquiring or financing productive assets that directly enhance operational capacity. Allocating borrowed funds to asset-backed investments will increase the likelihood of generating higher operating cash flow margins, ensuring that the debt contributes positively to operational performance.

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