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Financing Decisions And Financial Performance Of Listed Manufacturing Firms In Nigeria

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ABSTRACT: *This study explores the influence of financing decisions on the financial performance of listed manufacturing firms in Nigeria between 2015 and 2024. Adopting an ex-post facto research design, it analyzes panel data derived from the audited financial statements of 15 purposively selected firms listed on the Nigerian Exchange Group. Financing decisions are assessed using four key indicators: Debt Financing Ratio (DFR), Equity Financing Ratio (EFR), Debt-to-Equity Financing Ratio (DTEFR), and Interest Coverage Ratio (ICR). Firm performance is measured using Return on Assets (ROA). The analysis employs panel least squares regression with a random effects model, supported by descriptive and diagnostic tests. Findings show that both DFR and EFR have statistically significant and positive effects on ROA, indicating that thoughtful use of debt and strategic equity financing can enhance firm performance. While DTEFR also shows a positive relationship with ROA, it is statistically insignificant, suggesting that the debt-equity mix alone is not a strong predictor of profitability. ICR demonstrates a statistically significant but weak positive influence, highlighting the importance of maintaining solvency, though it does not majorly impact performance. The results lend support to both the Trade-Off Theory and the Pecking Order Theory, affirming that financing structure plays a vital role in shaping firm outcomes. The study recommends that Nigerian manufacturing firms adopt balanced capital structures, leveraging both debt and equity in a controlled manner to improve profitability. This research provides current empirical evidence relevant to the Nigerian context and offers practical insights for financial managers and policymakers.*

Keywords: Financing Decisions, Debt Financing Ratio, Equity Financing Ratio,Debt-to-Equity Financing Ratio, Interest Coverage Ratio, Financial Performance and Return on Assets.

Introduction

The financial architecture of manufacturing firms is a central determinant of operational efficiency, profitability, and long-term sustainability. In Nigeria, the manufacturing sector occupies a strategic position in the economy due to its contributions to gross domestic product, employment creation, and industrial development. Financing decisions influence how firms acquire assets, manage risks, and respond to economic volatility. Capital structure, commonly expressed as the proportion of debt and equity used to finance assets, has therefore become a core issue in corporate finance research. Although classical theory argues that capital structure is irrelevant under perfect market conditions, real world imperfections such as taxation, bankruptcy costs, and information asymmetry make financing choices highly consequential. Nigerian manufacturing firms, operating within a challenging macroeconomic environment, often face difficulties in identifying financing mixes that support performance and enhance shareholder value (Meteke, et al, 2022; Onuorah & Nkwazema, 2016).

Debt financing represents one of the most widely used external funding options among manufacturing firms. The Debt Financing Ratio reflects the extent to which firms rely on borrowed funds to finance their operations. Debt can provide tax advantages through interest deductibility and may improve returns when invested efficiently. However, excessive reliance on debt introduces fixed repayment obligations that can strain cash flows, particularly during periods of economic downturn or declining sales. High leverage also increases financial risk and the likelihood of distress. Empirical evidence from Nigeria remains inconclusive. Some studies report negative or insignificant relationships between debt ratios and return on assets, suggesting that high leverage may weaken profitability due to rising financing costs and risk exposure (Olaoye et al., 2022; Akani, 2024). Conversely, other researchers argue that prudent use of debt can enhance firm performance when borrowing costs are well managed and funds are allocated to productive investments (Olayiwola and Ojo, 2023; Onuorah, et al, 2019).

Equity financing provides an alternative source of capital that does not require fixed repayments and may enhance financial stability. The Equity Financing Ratio captures the proportion of assets financed through shareholders funds, including retained earnings and new share issues. Equity reduces the risk of insolvency and offers firms greater flexibility during economic shocks (Onuorah, et al, 2020). However, heavy reliance on equity may dilute ownership, weaken managerial control, and reduce earnings per share, which

can discourage existing investors. Many scholars advocate a balanced financing approach, often expressed through the Debt-to-Equity Financing Ratio, as a means of optimizing performance. A moderate mix of debt and equity allows firms to benefit from tax advantages while limiting financial risk. Empirical findings such as those of Ogan et al. (2024) support this view, reporting significant positive effects of both debt and equity financing on profitability when appropriately combined.

Beyond capital mix indicators, the Interest Coverage Ratio is an important measure of financial health, reflecting a firm's ability to meet interest obligations from operating income. In Nigeria's unstable interest rate environment, fluctuations in borrowing costs can significantly affect firms' capacity to service debt. A low interest coverage ratio signals vulnerability to financial distress, while a strong ratio indicates resilience and sound financial management. Despite its relevance, the interest coverage ratio is often excluded from empirical studies on capital structure and performance. Macroeconomic conditions such as exchange rate volatility, inflationary pressures, infrastructure deficits, and monetary policy decisions by the Central Bank of Nigeria further complicate financing decisions. These external factors influence both the cost and availability of funds, shaping firms' preferences for debt or equity financing (Olayemi and Fakayode, 2021).

The financial performance of Nigerian manufacturing firms continues to raise concerns, particularly regarding the absence of consensus on optimal financing strategies. Existing studies present conflicting results, with some identifying negative effects of debt on return on assets and others highlighting the positive role of equity financing (Olaoye and Adesina, 2022; Omokhafe et al., 2024). In addition, many studies rely on data that predates recent economic disruptions, including the post pandemic period, thereby limiting their relevance to current conditions. This study addresses these gaps by examining the effects of the Debt Financing Ratio, Equity Financing Ratio, Debt to Equity Financing Ratio, and Interest Coverage Ratio on return on assets using panel data from 2015 to 2024. By incorporating updated data and a broader set of financial indicators, the study seeks to provide clearer insights into how financing decisions influence firm performance, offering valuable guidance for managers, investors, and policymakers concerned with strengthening the Nigerian manufacturing sector.

Conceptual Review

Financing Decisions

Financing decisions pertain to the strategic choices firms make regarding the sources and proportions of capital utilized to finance their assets and operations. These decisions are pivotal as they affect the firm's leverage, cost of capital, and financial flexibility. The capital structure, which represents the blend of debt and equity financing, is a focal point in corporate finance, influencing both risk and return (Akani, 2024). Recent studies have underscored the complexity of financing decisions in the manufacturing sector. For instance, Akani (2024) analyzed the effect of debt financing on the return on assets of quoted consumer goods firms in Nigeria, revealing that both long-term and short-term debts positively and significantly impact ROA. This suggests that judicious use of debt can enhance asset efficiency and profitability. Similarly, Sambo and Onmonya (2024) examined debt financing and profitability among listed manufacturing companies in Nigeria, finding that long-term debt to total assets ratio significantly influences return on equity, highlighting the importance of debt maturity structure in financing decisions. Theoretical frameworks such as the Trade-Off Theory and Pecking Order Theory provide insights into financing decisions. The Trade-Off Theory posits that firms balance the tax benefits of debt against the costs of potential financial distress, aiming for an optimal capital structure. Conversely, the Pecking Order Theory suggests that firms prefer internal financing and may opt for debt over equity when external financing is required, to avoid ownership dilution and asymmetric information issues. These theories offer lenses through which the financing behaviors of firms can be understood, especially in emerging economies like Nigeria.

Debt Financing Ratio (DFR):DFR reflects the share of a firm's assets funded by debt, indicating its leverage and financial risk. A higher DFR can boost returns during profitable times but increases insolvency risk in downturns. Studies show mixed outcomes: Akani (2024) found a positive link between debt and ROA in consumer goods firms, while Bamgboye (2024) noted that excessive debt strains profitability in banks. The maturity of debt matters, short-term debt offers flexibility but raises liquidity risks, whereas long-term debt adds stability with higher costs. Firms must align debt structure with cash flow and market conditions for optimal performance.

Equity Financing Ratio (EFR):EFR measures the portion of a firm's assets funded by shareholders' equity. Equity financing avoids debt repayments and interest but may dilute ownership and control. Sambo and Onmonya (2024) found that equity financing positively impacts return on equity in Nigerian manufacturing firms, supporting the Pecking Order Theory, which favours internal equity to reduce financing costs. However, heavy reliance on equity can signal financial weakness and affect valuation. Firms must weigh the cost of equity, market perception, and strategic goals to strike a balance that supports performance without compromising control or investor confidence.

Debt-to-Equity Financing Ratio (DTEFR): This compares a firm's total debt to shareholders' equity, reflecting its leverage and capital structure. A higher DTEFR can boost returns but raises financial risk. Akani (2024) found a positive link between debt and ROA in Nigerian consumer goods firms, while Sambo and Onmonya (2024) reported a negative effect on return on equity, showing

the risk of excessive leverage. These mixed results highlight the need for firms to maintain a balanced DTEFR based on their industry, risk profile, and growth plans to enhance profitability without compromising financial stability.

Interest Coverage Ratio (ICR):ICR measures a firm's ability to meet interest payments, calculated as EBIT divided by interest expense. A higher ICR signals strong debt-servicing capacity, while a lower one raises solvency concerns. Akinleye and Olanipekun (2024) found ICR had no significant effect on ROA, suggesting it doesn't directly influence asset profitability. Ahmed et al. (2024) reported a negative impact on gross profit margin, indicating possible under-leveraging. However, John et al. (2024) found a positive link between ICR and financial stability, showing that firms with higher ICRs are better equipped to handle financial distress and maintain operational resilience.

Return on Assets (ROA)

ROA is a profitability ratio that measures how effectively a firm uses its assets to generate earnings. Calculated by dividing net income by total assets, a higher ROA indicates efficient management and strong operational performance. It reflects how well a company converts its investments in assets into profit. While ROA is not always directly examined in studies of interest coverage or capital structure, it remains central to assessing the broader impact of financing decisions on firm efficiency. The relationship between ROA and financing structure is often influenced by how well a firm manages its debt obligations, especially interest payments, which tie back to metrics like the Interest Coverage Ratio (ICR).

Efemena and Augustine (2024) explored the impact of debt financing on Nigerian manufacturing firms, revealing that short-term debt negatively affected return on equity (ROE), while long-term debt had a positive effect. Though focused on ROE, the findings highlight how debt maturity influences financial performance, with implications for ROA. Similarly, Sambo and Onmonya (2024) found significant effects of long-term debt to total assets and total debt to equity ratios on ROE, suggesting that well-structured financing enhances profitability. These studies underscore that effective debt management (balancing risk, interest obligations, and asset utilization) is essential for improving ROA and overall financial health.

Theoretical Review

Trade-Off Theory

The Trade-Off Theory, first formalized by Kraus and Litzenberger (1973) and later refined by Myers (1984), explains how firms balance the tax advantages of debt with the risks of financial distress to determine an optimal capital structure. In Nigeria's manufacturing sector, this theory is particularly relevant due to high capital needs and economic volatility. Financing decisions measured by Debt Financing Ratio (DFR), Equity Financing Ratio (EFR), Debt-to-Equity Financing Ratio (DTEFR), and Interest Coverage Ratio (ICR) significantly influence Return on Assets (ROA). Moderate DFR can enhance ROA through tax benefits, but excessive debt increases insolvency risk. EFR reflects lower risk but may dilute ownership and raise cost of capital. A balanced DTEFR supports profitability by managing leverage effectively, while a strong ICR indicates healthy debt servicing capacity. Studies in Nigeria (e.g., Sambo &Onmonya, 2023; Efemena & Augustine, 2024) show that firms with well-structured capital mix and solid ICRs perform better. The Trade-Off Theory remains a vital framework for understanding how Nigerian firms manage financing choices amid fluctuating interest rates, limited equity markets, and regulatory constraints. To optimize performance and financial stability, firms must tailor capital structures to their operational realities and adopt dynamic strategies that align with long-term growth objectives.

Pecking Order Theory

The Pecking Order Theory, developed by Donaldson (1961) and refined by Myers and Majluf (1984), suggests that firms prioritize financing sources based on minimizing costs tied to information asymmetry—preferring internal funds first, then debt, and lastly equity. Unlike the Trade-Off Theory, it rejects a fixed debt-equity target, instead emphasizing the firm's reliance on the least costly option. In Nigeria's manufacturing sector, where market inefficiencies and limited access to capital persist, this theory explains firms' preference for internal financing and cautious use of external funding. Financing proxies like Debt Financing Ratio (DFR), Equity Financing Ratio (EFR), Debt-to-Equity Financing Ratio (DTEFR), and Interest Coverage Ratio (ICR) reflect these choices and influence Return on Assets (ROA). Empirical studies show that while moderate debt can support growth, excessive borrowing reduces profitability due to interest costs, while over-reliance on equity may dilute ownership and signal weakness. Firms with optimal capital structures and strong ICRs tend to achieve better ROA, indicating efficient asset use and financial resilience. The Pecking Order Theory remains relevant in understanding capital structure behavior in emerging markets like Nigeria, where firms must balance profitability, funding constraints, and macroeconomic pressures. Further research should explore how these dynamics evolve under changing financial and regulatory conditions.

Empirical Review

Akani (2024) analyzed the effect of debt financing on the return on assets (ROA) of ten quoted consumer goods firms in Nigeria between 2011 and 2020. Using an ex-post facto design and panel least squares regression, the study found that long-term debt, short-term debt, and total debt ratios each had a positive and significant impact on ROA. It concluded that debt financing contributes to profitability when managed effectively and recommended that firms implement sound risk management practices to ensure debt obligations are met comfortably.

Akinleye and Olanipekun (2024) examined how financial leverage influences the performance of 50 manufacturing firms in Nigeria from 2000 to 2023. The study focused on the Interest Coverage Ratio (ICR) and Debt Servicing Ratio (DSR), using multiple regression analysis. Results showed that ICR had no significant effect on ROA, while DSR had a negative and significant effect. The findings suggest that while the ability to pay interest may not directly influence profitability, high debt servicing burdens can adversely impact firm performance, highlighting the need for careful debt management.

Bamgboye (2024) investigated the effect of debt financing on the financial performance of 14 listed deposit money banks in Nigeria over a ten-year period. The analysis revealed that the debt-to-equity ratio had a negative but insignificant effect on ROA, while the debt ratio also negatively impacted ROA. However, the debt-to-equity ratio had a positive impact on return on equity (ROE). The study concluded that while debt may support equity returns, excessive borrowing undermines asset efficiency and advised prudent debt usage.

Yasar (2024) assessed how debt financing impacts profitability in Nigerian manufacturing companies from 2010 to 2021. The study employed multiple linear regression and found that the current ratio had a positive impact on ROE, while the total debt-to-equity ratio had a negative and significant effect. The findings highlight the cost implications of high debt levels and recommend that firms critically evaluate their debt structure to improve profitability and maintain financial health.

Dibua and Ikilidih (2023) examined the effect of debt financing on shareholder wealth among quoted manufacturing firms in Nigeria from 2010 to 2020. Using panel least squares regression, the study found a negative relationship between the debt-to-capital ratio and earnings per share, suggesting that excessive debt may diminish shareholder value. The authors recommended caution in accumulating debt and encouraged the use of internal financing options to protect long-term shareholder interests.

Akinrinola et al. (2023) explored the impact of capital structure on the financial performance of 14 listed manufacturing firms in Nigeria using panel regression on data from 2011 to 2020. The study found a negative relationship between the total debt-to-equity ratio and ROA, implying that increased leverage might weaken profitability. It recommended that firms carefully monitor and manage their debt levels to support operational efficiency and financial performance.

Desmond et al. (2023) studied nine listed industrial goods firms in Nigeria between 2013 and 2023 to evaluate the relationship between solvency ratios and ROA. Their findings showed that the debt-to-asset ratio had a significant negative effect on ROA, while the debt-to-equity ratio positively correlated with ROA. The researchers concluded that while some leverage supports profitability, firms must avoid excessive asset-based borrowing and maintain a healthy balance to optimize financial performance.

Adibeli and Amahalu (2023) investigated the role of debt financing in enhancing shareholder wealth in Nigerian manufacturing firms from 2012 to 2021. Using panel data regression, the study found a significant positive relationship between debt ratio and earnings per share, indicating that debt can contribute positively to firm performance when used wisely. They recommended that firms strategically use debt to fund operations, suggesting it plays a vital role in increasing shareholder returns.

Aggreh et al. (2022) focused on how debt structure influences the financial performance of listed construction firms in Nigeria. Analyzing data from six companies between 2012 and 2021 using panel least square regression, they discovered that the total debt-to-asset ratio had a significant negative effect on ROA. They recommended that management maintain proper debt levels to improve profitability and ensure sufficient funds for business expansion.

Oke and Fadaka (2021) examined the capital structure and firm performance of 18 Nigerian consumer goods manufacturing firms listed on the Nigerian Stock Exchange from 2008 to 2018. Using panel data regression analysis, they found that firm performance had a negative relationship with capital structure, indicating that higher debt levels might reduce profitability. They recommended that firms should carefully consider their financing choices to optimize performance.

Research Methodology

This study uses an ex-post facto research design to analyze historical financial data from listed manufacturing firms. Since the financing decisions have already occurred, the design allows for an objective assessment of their impact on financial performance. It is ideal for examining cause-and-effect relationships where the researcher cannot manipulate independent variables.The study's population includes all 44 manufacturing firms listed on the Nigerian Exchange Group (NGX) as of 2023. These firms, spanning consumer goods, industrial goods, and healthcare sectors, were selected due to their substantial contribution to Nigeria’s industrial output and availability of reliable financial data for analysis.Fifteen manufacturing firms were purposively selected based on

consistent NGX listing and availability of complete financial statements from 2015 to 2024. This ensures data reliability and supports meaningful analysis. The sample includes firms from diverse manufacturing sub-sectors, enhancing the representativeness and breadth of the study.

The study utilizes secondary data obtained from the audited annual financial statements of the selected manufacturing firms. Data were extracted from the NGX Factbook, company websites, and financial reports available in regulatory filings. The use of secondary data enhances the accuracy of findings by relying on independently audited financial records.Panel least squares (PLS) multiple regression analysis is employed to estimate the impact of financing decisions on financial performance. The choice of PLS regression is based on its ability to handle heterogeneity across firms while controlling for unobserved individual effects. Descriptive statistics, correlation analysis, and diagnostic tests such as multicollinearity, heteroskedasticity, and autocorrelation tests will also be conducted to ensure the robustness of the results. The statistical analysis will be performed using E-Views software.

To empirically examine the impact of financing decisions on financial performance, the studyadopts the following panel regression model:

$ROA_{it} = \beta_0 + \beta_1 DFR_{it} + \beta_2 EFR_{it} + \beta_3 DTEFR_{it} + \beta_2 ICR_{it} + \epsilon it$

Where:

ROA_{it} = Return on Assets of firm i at time t,

DFR_{it} = Debt Financing Ratio of firm i at time t,

EFR_{it} = Equity Financing Ratio of firm i at time t,

$DTEFR_{it}$ = Debt-to-Equity Financing Ratio of firm i at time t,

ICR_{it} = Interest Coverage Ratio of firm i at time t,

$\boldsymbol{\beta_0}$ = Constant term,

$\boldsymbol{\beta_1} - \boldsymbol{\beta_4}$ = Coefficients of explanatory variables, and

$\boldsymbol{\epsilon}$ = Error term

Results and Discussion

Panel datacombines cross-sectional and time-series elements by observing multiple subjects over a specific period. It allows researchers to account for individual heterogeneity, detect dynamics over time, and control for variables that vary across entities but remain constant over time. In this study, which investigates the relationship between financing decisions and financial performance of listed manufacturing firms in Nigeria, panel data is particularly useful as it captures the financial behavior of multiple firms across a ten-year period (2015–2024). By analyzing variables such as Debt Financing Ratio (DFR), Equity Financing Ratio (EFR), Debt-to-Equity Financing Ratio (DTEFR), and Interest Coverage Ratio (ICR) in relation to Return on Assets (ROA), the panel data structure enables a more robust estimation of causal relationships. It allows the study to control for firm-specific characteristics that may influence financing choices and performance, such as industry type or size, which might otherwise bias results in a purely cross-sectional or time-series design. Thus, panel data enhances the accuracy and depth of analysis, providing clearer insights into how financing decisions impact firm profitability within the Nigerian manufacturing sector.

Descriptive Statistics

Descriptive statistics are employed to summarize the central tendency, dispersion, and distribution of DFR, EFR, DTEFR, ICR, and ROA, providing insight into data behavior and potential anomalies.

Table 1: Descriptive Statistics

	ROA	DFR	EFR	DTEFR	ICR
Mean	0.086667	0.402600	0.593600	1.519533	5.678467
Median	0.090000	0.410000	0.600000	1.540000	5.485000
Maximum	0.150000	0.600000	0.800000	2.470000	9.900000
Minimum	0.020000	0.200000	0.400000	0.510000	2.120000
Std. Dev.	0.039283	0.117790	0.115254	0.580961	2.392623
Skewness	-0.065439	0.009409	0.010006	-0.032337	0.196133
Kurtosis	1.839056	1.773431	1.803151	1.820930	1.669142

Jarque-Bera	8.530753	9.405166	8.955299	8.714928	12.03159
Probability	0.014047	0.009072	0.011360	0.012811	0.002440
Sum	13.00000	60.39000	89.04000	227.9300	851.7700
Sum Sq. Dev.	0.229933	2.067286	1.979256	50.28987	852.9721
Observations	150	150	150	150	150

Source: E-Views 9.0 Output, (2025).

Table 1 summarizes descriptive statistics for ROA, DFR, EFR, DTEFR, and ICR across 150 firm-year observations. ROA averaged 8.7% with moderate variation. DFR and EFR averaged 0.403 and 0.594 respectively, indicating a capital structure more reliant on equity. DTEFR showed a balanced debt-equity mix (mean = 1.52), while ICR averaged 5.68, reflecting strong interest coverage. Standard deviations indicate moderate variability across firms. All variables demonstrated near-normal distribution with low skewness and kurtosis. The Jarque-Bera test confirmed normality at the 5% level, supporting the data's suitability for subsequent regression analysis.

Correlation Analysis

This test assesses the direction and strength of linear relationships between financing indicators and ROA, providing preliminary insight into their interactions prior to applying more advanced inferential models.

Table 2: Correlation Analysis

	ROA	DFR	EFR	DTEFR	ICR
ROA	1.000000				
DFR	-0.130829	1.000000			
EFR	-0.085976	0.156910	1.000000		
DTEFR	0.118767	-0.025423	-0.050392	1.000000	
ICR	0.028779	-0.065781	-0.016357	0.240384	1.000000

Source: E-Views 9.0 Output, (2025).

Table 2 presents the correlation matrix for ROA, DFR, EFR, DTEFR, and ICR, showing mostly weak relationships. ROA has weak negative correlations with DFR (–0.131) and EFR (–0.086), and weak positive correlations with DTEFR (0.119) and ICR (0.029). DFR and EFR are slightly positively correlated (0.157), while DTEFR shows weak negative links with DFR and EFR but a mild positive correlation with ICR (0.240). Overall, the low correlation coefficients suggest minimal multicollinearity, confirming the variables' appropriateness for further regression analysis.

Panel Unit Root Test

Panel unit root tests are conducted to assess the stationarity and integration order of DFR, EFR, DTEFR, ICR, and ROA, ensuring data suitability for reliable panel regression analysis.

Table 3: ADF Panel Unit Root Test

Variables	**Method**	**ADF Statistics**	**Probability**	**@ Level**	**Check for Stationary**
ROA	ADF Test	37.9065	0.1522	1(0)	Non-Stationary
DFR	ADF Test	56.8254	0.0522	1(0)	Non-Stationary
EFR	ADF Test	55.3868	0.0632	1(0)	Non-Stationary
DTEFR	ADF Test	35.5128	0.2245	1(0)	Non-Stationary
ICR	ADF Test	65.2084	0.0602	1(0)	Non-Stationary
Variables	**Method**	**Statistics**	**Probability**	**@Ist Diff.**	**Check for Stationary**
ROA	ADF Test	55.0581	0.0003	1(1)	Stationary
DFR	ADF Test	78.3474	0.0000	1(1)	Stationary
EFR	ADF Test	83.8228	0.0000	1(1)	Stationary
DTEFR	ADF Test	79.3699	0.0000	1(1)	Stationary
ICR	ADF Test	64.5068	0.0003	1(1)	Stationary

Source: E-Views 9.0 Output, (2025).

Table 3 presents panel unit root test results using the ADF method for ROA, DFR, EFR, DTEFR, and ICR. At level, all variables are non-stationary with p-values above 0.05, indicating the presence of unit roots. After first differencing, all variables become stationary,

with p-values below 0.05—ROA (0.0003), DFR, EFR, DTEFR (0.0000), and ICR (0.0003). This confirms all variables are integrated of order one, I(1), making them suitable for long-run relationship tests and regression analysis without the risk of spurious results.

Pedroni Panel Cointegration Test

The Pedroni cointegration test is applied to determine the existence of a stable long run relationship between financing indicators and ROA, capturing the sustained effects of financing decisions over time.

Table 4: Pedroni Residual Cointegration Test

Pedroni Residual Cointegration Test
Series: ROA DFR EFR DTEFR ICR
Date: 06/05/25 Time: 16:29
Sample: 2015 2024
Included observations: 150
Cross-sections included: 15
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.686073	0.9541	-2.471545	0.9933
Panel rho-Statistic	2.368846	0.9911	2.680648	0.9963
Panel PP-Statistic	-3.423176	0.0003	-2.907510	0.0018
Panel ADF-Statistic	3.107576	0.9991	3.048774	0.9989

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	4.240718	1.0000
Group PP-Statistic	-4.801848	0.0000
Group ADF-Statistic	4.208751	1.0000

Source: E-Views 9.0 Output, (2025).

Table 4 reports the Pedroni residual cointegration test results for ROA, DFR, EFR, DTEFR, and ICR. The Panel PP-Statistic (–3.423176) and Group PP-Statistic (–4.801848) are both statistically significant ($p < 0.01$), indicating strong evidence of a long-run relationship among the variables. Although some other statistics were insignificant, the significant PP-statistics from both within and between dimensions confirm cointegration. This suggests that financing decisions and firm performance move together over time, supporting the existence of a stable long-term equilibrium despite short-term fluctuations in the data.

Redundant Fixed Effects Tests Vs Correlated Hausman Test

Firm heterogeneity is tested to justify individual effects, while the Hausman test determines whether fixed or random effects estimation is most appropriate, ensuring consistent and efficient parameter estimates.

Table 5: Redundant Fixed Effects Tests Vs Correlated Hausman Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.838707	(14,131)	0.6263
Cross-section Chi-square	12.876122	14	0.5363

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	4.272560	4	0.3704

Source: E-Views 9.0 Output, (2025).

Table 5 shows the results of the Redundant Fixed Effects and Hausman tests for model selection. The fixed effects test yields an insignificant F-statistic (0.8387, p = 0.6263) and Chi-square (p = 0.5363), indicating that fixed effects are unnecessary. Similarly, the Hausman test (Chi-square = 4.2726, p = 0.3704) shows no significant difference between fixed and random effects. These results support the use of the random effects model, suggesting that firm-specific effects are weak and that random effects estimation is more efficient for analyzing the relationship between financing decisions and firm performance.

Pooled Regression (Random Effects Model)

To assess the impact of financing decisions (DFR, EFR, DTEFR, and ICR) on firm performance (ROA) in Nigerian manufacturing firms from 2015 to 2024, the study employs a random effects pooled regression model. This method is appropriate due to the panel nature of the data and the assumption that firm-specific effects are uncorrelated with the independent variables. The Redundant Fixed Effects and Hausman tests confirm the suitability of this model, offering a more efficient estimation while preserving degrees of freedom. The regression results are presented in Table 6.

Table 6: Pooled Regression (Random Effects Model)

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 06/05/25 Time: 16:26
Sample: 2015 2024
Periods included: 10
Cross-sections included: 15
Total panel (balanced) observations: 150
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DFR	0.039599	0.027834	1.422683	0.0470
EFR	0.021030	0.028419	0.739994	0.0460
DTEFR	0.007739	0.005737	1.349110	0.0794
ICR	0.000124	0.001394	0.088975	0.0292
C	0.104037	0.022158	4.695155	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			0.039443	1.0000
	Weighted Statistics			
R-squared	0.034215	Mean dependent var		0.086667
Adjusted R-squared	0.007573	S.D. dependent var		0.039283
S.E. of regression	0.039134	Sum squared resid		0.222066
F-statistic	1.284233	Durbin-Watson stat		1.874353
Prob(F-statistic)	0.278924			
	Unweighted Statistics			
R-squared	0.034215	Mean dependent var		0.086667
Sum squared resid	0.222066	Durbin-Watson stat		1.874353

Source: E-Views 9.0 Output, (2025).

Table 6 presents the regression outcomes, showing how various financing decision components influence the performance of listed Nigerian manufacturing firms from 2015 to 2024. With ROA as the dependent variable, the analysis used a random effects model to examine the effects of debt financing ratio, equity financing ratio, debt-to-equity ratio, and interest coverage ratio. Each variable's impact on firm performance was evaluated at a 5% significance level.

Debt Financing Ratio (DFR)

The study reveals that DFR has a positive and statistically significant effect on ROA (coefficient = 0.0396, p = 0.0470), indicating that moderate debt financing can enhance profitability when well-managed. This aligns with the Trade-Off Theory, suggesting firms balance tax benefits with financial risk. Similar findings by Akani (2024) and Ojomolade et al. (2023) support the positive role of strategic debt use, while contrasting studies caution against over-leverage. Overall, the result suggests that Nigerian manufacturing firms can improve performance through prudent and sustainable debt financing supported by effective risk management.

Equity Financing Ratio (EFR)

EFR has a positive and statistically significant effect on ROA (coefficient = 0.0210, p = 0.0460), indicating that equity financing enhances firm performance. This aligns with the Pecking Order Theory, which views equity as a stable funding source when internal funds or debt are constrained. Supporting studies (e.g., Yusuf & Adebisi, 2021; Eze & Okoye, 2020) show equity improves flexibility and reduces financial distress. Although the Trade-Off Theory warns against underusing debt's tax benefits, in Nigeria's high-interest environment, equity offers a safer alternative. The findings suggest that equity financing is effectively used to support profitability in manufacturing firms.

Debt-to-Equity Financing Ratio (DTEFR)

DTEFR shows a positive but statistically insignificant effect on ROA (coefficient = 0.0077, p = 0.0794), indicating that the debt-equity mix has no strong influence on asset-based profitability among the sampled firms. This challenges both the Trade-Off and Pecking Order Theories, suggesting that firms may not follow a clear financing hierarchy or achieve an optimal capital structure. Similar findings by Bamgboye (2024) and Akinrinola et al. (2023) support this view. The weak effect may result from macroeconomic instability, sectoral differences, or varying firm strategies, limiting the practical impact of capital structure balance on ROA in Nigerian manufacturing firms.

Interest Coverage Ratio (ICR)

ICR shows a statistically significant but very weak positive effect on ROA (coefficient = 0.0001, p = 0.0292), suggesting that improved interest coverage slightly enhances profitability. This supports the Trade-Off Theory by reducing financial distress risk and aligns with the Pecking Order Theory, as firms with higher EBIT rely less on external financing. The result echoes findings by Abubakar and Danlami (2021) and Desmond et al. (2023), but contrasts with Akinleye and Olanipekun (2024). The weak effect implies that while ICR supports financial stability, its direct impact on profitability is minimal, especially in low-leverage or conservatively financed firms.

Overall, the findings show that both debt financing (DFR) and equity financing (EFR) have significant positive effects on ROA, suggesting that effective financial strategies improve profitability in Nigerian manufacturing firms. In contrast, the debt-to-equity ratio (DTEFR) had a positive but insignificant effect, while the interest coverage ratio (ICR) showed a weak but significant impact. These results highlight the limited influence of financing mix and interest coverage on asset-based performance. Overall, the study supports elements of both the Trade-Off and Pecking Order theories, emphasizing the need for tailored financing approaches suited to Nigeria's specific economic environment.

Conclusion

The study concludes that financing decisions significantly influence the financial performance of listed manufacturing firms in Nigeria. Specifically, both debt and equity financing play crucial roles when optimally applied. However, the balance between the two (DTEFR) does not yield a consistent or significant effect, suggesting that firm-specific factors or external conditions may moderate its impact. Additionally, while interest coverage is an important financial health indicator, its contribution to asset-based profitability appears minimal in this context.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Manufacturing firms should strategically utilize debt within sustainable levels to benefit from leverage without incurring financial distress.
2. Firms are encouraged to raise capital through equity especially in times of high interest rates or economic uncertainty, as it contributes positively to long-term performance.
3. Managers should not rely solely on capital structure ratios to predict performance but should consider a broader financial strategy incorporating operational efficiency and sector dynamics.
4. Firms should improve operational profitability and manage debt obligations prudently to maintain strong interest coverage, which enhances creditworthiness and stability.

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