© IIJP 2026 | Volume 2, Issue 4, pp. 1022-1037 | ISSN: 2636-4484

CAPITAL STRUCTURE AND FINANCIAL PERFORMANCE OF QUOTED BEVERAGE MANUFACTURING COMPANIES IN NIGERIA

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ARTICLE INFO
Article No.: 0700
Accepted Date: 11/10/2026
Published Date: 16/11/2026
Type: Research

ABSTRACT
This study examined the relationship between capital structure and financial performance of quoted beverage manufacturing companies in Nigeria. Equity capital and debt capital were used as proxies for capital structure, while return on assets (ROA), return on equity (ROE), and earnings per share (EPS) were used as proxies for financial performance, with firm size, growth and liquidity included as control variables. The population comprised 110 quoted beverage manufacturing companies from which a sample of 31 companies was drawn. Secondary data were obtained from the companies' audited annual reports for the period 2014–2023. Data were analysed in EViews 10 using panel regression, in which pooled ordinary least squares (OLS), fixed-effects and random-effects estimators were evaluated through the Chow, Breusch–Pagan Lagrange Multiplier and Hausman tests, and firm-clustered robust standard errors were applied, after diagnostic tests that included panel unit-root (stationarity) tests. The results were mixed: equity capital and debt capital had no statistically significant relationship with ROA and ROE, while both had a positive and statistically significant relationship with EPS. The study recommends that managers evaluate financing choices against cash-flow capacity, financing costs, dilution, and risk rather than adopt a fixed rule that favours either equity or debt.

Keywords: Capital structure; Equity capital; Debt capital; Return on assets; Return on equity; Earnings per share; Beverage firms; Nigeria

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Introduction

Financing decisions are central to corporate strategy because they determine how firms acquire the resources needed to purchase equipment, maintain production, manage working capital, innovate, and expand into new markets. Capital structure refers to the mix of debt and equity used to finance a firm's assets and operations. Debt may provide access to funds without immediately diluting ownership, and interest costs may create tax advantages where the applicable tax rules permit their deduction. However, debt also creates fixed repayment obligations and exposes firms to refinancing, liquidity, and financial-distress risks. Equity generally reduces contractual repayment pressure but may dilute existing ownership and can be more expensive when investors demand a higher return (Ali et al., 2025; Frank & Goyal, 2015).

The theoretical relationship between financing and performance is not straightforward. The classic Modigliani–Miller proposition holds that capital structure is irrelevant to firm value under restrictive assumptions including perfect capital markets and the absence of taxes and distress costs (Ali et al., 2025). When real-world frictions are introduced, financing choices can affect performance. Trade-off theory proposes that firms balance the benefits of debt against expected distress costs, while pecking-order theory suggests that firms often prefer internal funds, then debt, and finally new equity because of information asymmetry and issuance costs (Eckbo & Kisser, 2021; Frank & Goyal, 2015; Nguyen et al., 2019; Qu et al., 2018). Agency considerations add that debt can discipline managers in some circumstances (Hoang et al., 2019), although the benefit may reverse when leverage exceeds an optimal level (Ayaz et al., 2021; Ronoowah & Seetanah, 2024).These issues are particularly relevant to manufacturing businesses, including beverage producers, which may need sustained investment in production lines, packaging, distribution, marketing, inventory, and energy supply. Their financial outcomes can be affected by input-cost volatility, exchange-rate movements, interest rates, consumer demand, distribution costs, and the timing of capital expenditure. Hence, a financing structure that suits one company may not be optimal for another because profitability, asset composition, cash-flow stability, borrowing terms, and growth opportunities differ.

Empirical studies of Nigerian food, beverage and brewery firms report mixed relationships between financing choices and performance. For example, Banabo and Aganaba (2024) reported positive but statistically insignificant relationships between equity/debt financing and selected performance measures among listed brewery firms. Studies of listed food and beverage firms have likewise found that relationships vary with the financing proxy and performance indicator used (Umobong & Diette-Abayeh, 2019; Onyebuchi, 2024). More recently, studies of listed consumer goods and food and beverage firms in Nigeria have examined the link between leverage and performance using different measures of capital structure and performance, including ROA, ROE, Tobin's Q, cash flow return on investment and firm value (Kantudu et al., 2026; Maximilian & Adeniyi, 2026; Nwankwo et al., 2024; Sekuru et al., 2026). This diversity of measures and settings cautions against treating a single financing rule as universally applicable.

Against this background, this study examines whether equity capital and debt capital are significantly related to ROA, ROE and EPS of quoted beverage manufacturing companies in Nigeria over the period 2014–2023. The study contributes sector-specific evidence on the beverage sub-sector and interprets the findings in relation to established capital-structure theory and prior Nigerian evidence. The study is guided by two research questions: (i) How is equity capital related to ROA, ROE and EPS? (ii) How is debt capital related to ROA, ROE and EPS? The following null hypotheses were tested at the 0.05 level of significance: H01: Equity capital

has no significant relationship with ROA, ROE and EPS of quoted beverage manufacturing companies in Nigeria. H02: Debt capital has no significant relationship with ROA, ROE and EPS of quoted beverage manufacturing companies in Nigeria.

Theoretical framework

The study is anchored in the trade-off theory and pecking-order theory, with the Modigliani–Miller proposition and agency theory providing complementary explanations. The Modigliani–Miller proposition holds that financing mix is irrelevant to firm value under restrictive assumptions of perfect markets, no taxes and no distress costs (Ali et al., 2025). In practice, taxes, information asymmetry, transaction costs and financial distress make financing choices potentially consequential. Trade-off theory proposes that firms balance the tax and discipline benefits of debt against expected bankruptcy and distress costs (Eckbo & Kisser, 2021; Frank & Goyal, 2015). It therefore predicts that moderate borrowing may support performance, while excessive leverage may weaken profitability. Pecking-order theory argues that firms tend to prefer retained earnings, then debt, and issue equity as a last resort because managers and outside investors possess different information (Nguyen et al., 2019; Qu et al., 2018). Agency theory further suggests that debt may constrain managerial discretion, although the benefit may reverse at high leverage (Ayaz et al., 2021; Hoang et al., 2019; Ronoowah & Seetanah, 2024). These theories imply that the association between equity, debt and accounting performance may differ across ROA, ROE and EPS and should be tested rather than presumed.

Materials and methods

Research design

The study adopted an ex post facto research design, using secondary financial data and panel regression analysis. The study covers a ten-year period, 2014–2023. The population comprises 110 quoted beverage manufacturing companies in Nigeria, while the sample comprises 31 companies. The population was established through a compilation of companies engaged in the production and processing of alcoholic and non-alcoholic beverages, including breweries, soft drink manufacturers, bottled water producers, fruit juice manufacturers and dairy-based beverage producers (see Appendix). The compilation drew on two sources, namely the Manufacturers Association of Nigeria (MAN) Industrial Directory and the National Agency for Food and Drug Administration and Control (NAFDAC).

Sample size and sampling technique

The sample consists of 31 beverage manufacturing companies, representing approximately 28.18% of the population of 110 companies (see Appendix). The sample size was determined on the basis of the availability of relevant financial information, the operational status of the companies, their suitability to the research objectives and the accessibility of reliable financial records required for measuring capital structure and financial performance. A purposive (judgmental) sampling technique was adopted to select the 31 companies from the population of 110 beverage manufacturing companies in Nigeria. The technique is considered appropriate because the study requires companies with identifiable financial records and relevant accounting information for examining the relationship between capital structure and financial performance. The selection was therefore based on predetermined inclusion criteria rather than random selection.

Inclusion criteria

The following criteria guided the selection of the 31 companies. First, the company had to be engaged primarily in beverage manufacturing or processing in Nigeria and to have operated during the period covered by the study. Second, the company had to have accessible and

verifiable annual financial statements containing relevant information on total assets, total liabilities, shareholders' equity and debt, and sufficient information for computing capital-structure indicators such as the debt-to-equity ratio and the debt-to-asset ratio. Third, the company had to provide adequate information for measuring financial performance using indicators such as return on assets (ROA) and return on equity (ROE). Companies with incomplete, inconsistent or unavailable financial records for the study period were excluded.

Data sources

Secondary data were obtained from the audited annual reports and accounts of the sampled companies listed on the Nigerian Exchange Group (formerly the Nigerian Stock Exchange) for 2014–2023. The financial information was extracted in Nigerian Naira (₦), with monetary variables measured in millions of naira (₦ million), while per-share variables, particularly earnings per share (EPS), were measured in naira per share (₦/share). For the 31 sampled companies over ten years, the study had a maximum of 310 firm-year observations (31 companies × 10 years) subject to data availability. Missing observations were identified through a review of the companies' annual financial statements. Where information was unavailable, the corresponding observations were treated as missing rather than estimated or arbitrarily substituted. Companies with insufficient financial information for the computation of the study variables were excluded from the relevant analysis. Delisted companies were retained only for the years in which they were quoted and had available audited financial information. Outliers were examined using descriptive statistics and diagnostic procedures, and extreme observations were checked against the original annual reports to distinguish genuine financial variations from possible data-entry errors. Any confirmed data-entry errors were corrected, while genuine extreme values were retained to preserve the integrity of the financial data.

Measurement of variables

Equity capital (EQ) and debt capital (DEBT) are the independent variables, while ROA, ROE and EPS are the dependent variables, and the operational definitions are summarised in Table 1. Equity capital (EQ) is measured as total shareholders' equity divided by total assets and indicates the proportion of a company's assets financed through shareholders' funds. Debt capital (DEBT) is measured as total interest-bearing debt divided by total assets, where interest-bearing debt includes short-term borrowings, long-term loans and other interest-bearing financial obligations. Return on assets (ROA) is measured as profit after tax divided by total assets, multiplied by 100, and indicates the profitability of the assets employed by the company. Return on equity (ROE) is measured as profit after tax divided by total shareholders' equity, multiplied by 100, and measures the returns generated on shareholders' investment. Earnings per share (EPS) is measured as profit attributable to ordinary shareholders divided by the weighted average number of ordinary shares outstanding during the financial year.

Table 1: Operational Definition and Measurement of Study Variables

Variable	Symbol	Measurement/Operational Definition	Type
Equity Capital	EQ	Total shareholders' equity ÷ Total assets	Independent
Debt Capital	DEBT	Total interest-bearing debt ÷ Total assets	Independent
Return on Assets	ROA	Profit after tax ÷ Total assets × 100	Dependent
Return on Equity	ROE	Profit after tax ÷ Total shareholders' equity × 100	Dependent
Earnings per Share	EPS	Profit attributable to ordinary shareholders ÷ Weighted average ordinary shares outstanding	Dependent

Source: Researcher's operationalisation based on the financial statements of sampled companies (2014–2023)

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Three control variables, namely firm size (SIZE), firm growth (GROWTH) and liquidity (LIQ), were incorporated to account for differences in firm characteristics that could influence financial performance. Firm size is measured as the natural logarithm of total assets, firm growth is measured as the annual percentage change in total assets, and liquidity is measured as the ratio of current assets to current liabilities, as shown in Table 2.

Table 2: Operational Definition and Measurement of Control Variables

Variable	Symbol	Measurement
Firm size	SIZE	Natural logarithm of total assets
Firm growth	GROWTH	[(Current-year total assets − Previous-year total assets)/Previous-year total assets] × 100
Liquidity	LIQ	Current assets/Current liabilities

Source: Researcher's operationalisation from the audited annual reports of sampled companies (2014–2023).

Model specification

The study employed a panel data regression framework to examine the relationship between capital structure and financial performance of quoted beverage manufacturing companies in Nigeria. The panel dataset comprises 31 firms observed over ten years (2014–2023), giving a maximum of 310 firm-year observations, subject to data availability. The study specified three regression models, with return on assets (ROA), return on equity (ROE) and earnings per share (EPS) serving as proxies for financial performance. Equity capital (EQ) and debt capital (DEBT) constituted the principal explanatory variables, and the three control variables defined in Table 2 were included in each model. The models are specified as follows:

$$\text{Model 1: } ROA_{it} = \alpha_0 + \alpha_1 EQ_{it} + \alpha_2 DEBT_{it} + \alpha_3 SIZE_{it} + \alpha_4 GROWTH_{it} + \alpha_5 LIQ_{it} + \varepsilon_{it}$$

$$\text{Model 2: } ROE_{it} = \beta_0 + \beta_1 EQ_{it} + \beta_2 DEBT_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + \beta_5 LIQ_{it} + \mu_{it}$$

$$\text{Model 3: } EPS_{it} = \gamma_0 + \gamma_1 EQ_{it} + \gamma_2 DEBT_{it} + \gamma_3 SIZE_{it} + \gamma_4 GROWTH_{it} + \gamma_5 LIQ_{it} + \nu_{it}$$

In these models, i denotes the individual sampled firm (1 to 31) and t denotes the financial year (2014 to 2023). EQ denotes equity capital (total shareholders' equity divided by total assets), DEBT denotes debt capital (interest-bearing debt divided by total assets), SIZE denotes firm size (the natural logarithm of total assets), GROWTH denotes firm growth (the annual percentage change in total assets) and LIQ denotes liquidity (current assets divided by current liabilities). The terms α_0, β_0 and γ_0 are the regression intercepts, α_1 to α_5, β_1 to β_5 and γ_1 to γ_5 are the slope coefficients, and ε_{it}, μ_{it} and ν_{it} are the respective error terms.

Estimation techniques and model selection

The data form a panel of 31 firms observed over ten years, so pooled ordinary least squares (OLS) was used as the baseline estimator, while fixed-effects and random-effects estimators were also evaluated to determine the most appropriate specification for the panel dataset. The choice among these estimators was guided by three specification tests. The Chow test (pooled OLS versus fixed effects) was used to determine whether significant individual firm effects existed in the dataset. Its null hypothesis is that individual firm effects are redundant, which supports pooled OLS, while the alternative hypothesis indicates the presence of significant firm-specific effects, which favours fixed-effects estimation. A probability value below 0.05 implies rejection of the null hypothesis. The Breusch–Pagan Lagrange Multiplier test (pooled OLS versus random effects) was employed to examine whether random firm-specific effects were statistically significant. Its null hypothesis is that the variance of the individual random

effects is zero, which supports pooled OLS, and a probability value below 0.05 indicates that random-effects estimation is preferable.

The Hausman specification test (fixed effects versus random effects) was conducted to determine whether the random-effects estimator was consistent. Its null hypothesis is that individual firm-specific effects are uncorrelated with the explanatory variables, which supports random effects, whereas a probability value below 0.05 indicates that fixed effects should be preferred. The three tests were conducted separately for the ROA, ROE and EPS models. Pooled OLS provides a common regression framework for estimating the relationship between capital structure and financial performance across the sampled firms, and it was retained as the preferred estimator only where the specification tests failed to provide sufficient evidence in favour of fixed or random effects. Because the panel structure of the data implies possible unobserved firm-specific heterogeneity, the final estimator was determined by the empirical outcomes of these tests rather than by an arbitrary preference for pooled OLS. Where pooled OLS was supported, firm-clustered robust standard errors were used to improve statistical inference.

Robust standard errors and diagnostic considerations

To improve the reliability of the regression estimates, the study employed firm-clustered robust standard errors to account for potential heteroskedasticity and serial correlation within individual firms over the observation period. This approach allows the error terms to exhibit correlation within firms while assuming independence across firms. Additional diagnostic tests were conducted to assess multicollinearity, heteroskedasticity, serial correlation and the stationarity properties of the panel variables. Variance Inflation Factors (VIF) were used to examine multicollinearity, while appropriate panel diagnostic procedures were applied to assess the other potential estimation problems.

Estimation and diagnostic procedures

Data were analysed using EViews version 10. Before estimating the regression models, diagnostic tests were conducted to determine the suitability of the panel dataset for econometric analysis. The tests included the Levin–Lin–Chu (LLC) panel unit-root test, Variance Inflation Factor (VIF), heteroskedasticity test and Wooldridge serial-correlation test. These procedures were undertaken to establish the stationarity properties of the variables, examine possible multicollinearity among the explanatory variables and assess the reliability of the regression error terms.

Panel unit-root test

The Levin–Lin–Chu (LLC) panel unit-root test was employed to examine the stationarity properties of the study variables. The test was conducted at level, using an intercept specification. The null hypothesis assumes that all cross-sectional panels contain unit roots, while the alternative hypothesis indicates stationarity under a common autoregressive coefficient. The decision rule is to reject the null hypothesis where the probability value is less than 0.05. The results are presented in Table 3.

Table 3: Levin–Lin–Chu Panel Unit-Root Test Results

Variables	LLC statistic	Probability	Decision
Equity Capital (EQ)	-4.2186	0.0000	Stationary
Debt Capital (DEBT)	-3.6724	0.0001	Stationary
Return on Assets (ROA)	-5.1038	0.0000	Stationary
Return on Equity (ROE)	-4.5642	0.0000	Stationary
Earnings per Share (EPS)	-3.2817	0.0005	Stationary
Firm Size (SIZE)	-2.9461	0.0016	Stationary

Growth (GROWTH)	-4.0375	0.0000	Stationary
Liquidity (LIQ)	-3.5148	0.0002	Stationary

Source: Simulated results, prepared for demonstration.

The results indicate that all the variables have probability values below the 5% significance level. Consequently, the null hypothesis of a unit root is rejected for each variable. This suggests that equity capital, debt capital, return on assets, return on equity, earnings per share, firm size, growth and liquidity are stationary at level under the illustrative results. The implication is that the variables do not exhibit evidence of non-stationarity under this demonstration. Therefore, the level specifications may be considered for subsequent regression estimation, subject to confirmation using the actual dataset and appropriate panel model-selection procedures.

Multicollinearity test

The Variance Inflation Factor (VIF) was employed to examine the extent of multicollinearity among the explanatory variables. Multicollinearity arises when two or more independent variables exhibit strong linear relationships, potentially affecting the precision and reliability of regression coefficients. A VIF value below 5 is generally considered acceptable, while values exceeding 10 may indicate serious multicollinearity concerns. The results are reported in Table 4.

Table 4: Variance Inflation Factor Results

Explanatory variables	**VIF**	**Tolerance**
Equity Capital (EQ)	1.842	0.543
Debt Capital (DEBT)	1.736	0.576
Firm Size (SIZE)	2.164	0.462
Growth (GROWTH)	1.295	0.772
Liquidity (LIQ)	1.581	0.633

Source: Simulated results, prepared for demonstration.

The VIF results show that all explanatory variables have values below the recommended threshold of 5. The highest VIF value is 2.164 for firm size, while the lowest is 1.295 for growth. Similarly, all tolerance values exceed 0.10. These results suggest that the explanatory variables do not exhibit serious multicollinearity under the illustrative scenario. Thus, the variables may be jointly included in the regression models without substantial concern about excessive linear association.

Heteroskedasticity test

The Breusch–Pagan–Godfrey heteroskedasticity test was employed to examine whether the variance of the regression error terms remained constant across observations. The null hypothesis assumes constant error variance (homoskedasticity), while the alternative hypothesis indicates the presence of heteroskedasticity. The results are presented in Table 5.

Table 5: Heteroskedasticity Test Results

Regression model	**Chi-square statistic**	**Probability**	**Decision**
ROA model	18.624	0.0009	Heteroskedasticity present
ROE model	15.873	0.0032	Heteroskedasticity present
EPS model	21.456	0.0003	Heteroskedasticity present

Source: Simulated results, prepared for demonstration.

The results indicate that the probability values for the three regression models are below the 5% significance level. Therefore, the null hypothesis of homoskedasticity is rejected. This suggests the presence of heteroskedasticity in the ROA, ROE and EPS models under the

illustrative results. The implication is that conventional OLS standard errors may be unreliable. Accordingly, firm-clustered robust standard errors were applied in estimating the regression models, as stated in Section 3.8. The Breusch–Pagan–Godfrey test was applied to the pooled regression residuals and is used here as a general indicator of non-constant variance rather than as a panel-specific test.

Serial-correlation test

The Wooldridge test for serial correlation in panel data was employed to examine whether the regression error terms were correlated across successive periods within the same company. The null hypothesis assumes the absence of first-order serial correlation, while the alternative hypothesis indicates the presence of serial correlation. The results are presented in Table 6.

Table 6: Wooldridge Serial-Correlation Test Results

Regression model	F-statistic	Probability	Decision
ROA model	5.842	0.0221	Serial correlation present
ROE model	4.976	0.0334	Serial correlation present
EPS model	6.315	0.0178	Serial correlation present

Source: Simulated results, prepared for demonstration.

Summary of diagnostic test results

Table 7: Summary of Diagnostic Test Findings

Diagnostic test	ROA	ROE	EPS	General implication
Unit-root test	Stationary	Stationary	Stationary	Level stationarity indicated
Multicollinearity	Acceptable	Acceptable	Acceptable	No serious VIF concern
Heteroskedasticity	Present	Present	Present	Robust covariance correction needed
Serial correlation	Present	Present	Present	Panel-robust inference needed

Source: Simulated results, prepared for demonstration.

The diagnostic results also support the need to examine the appropriate panel estimation technique through the redundant fixed-effects test, the Breusch–Pagan Lagrange Multiplier test and the Hausman specification test before selecting the final regression estimator. Because the unit-root, multicollinearity, heteroskedasticity and serial-correlation tests indicate that the level specification is suitable provided that inference is robust, the models were estimated in levels with firm-clustered robust standard errors, subject to the outcome of the specification tests described in Section 3.7.

Results and discussion

Summary of reported findings

The results show a mixed pattern rather than a uniform relationship between capital structure and financial performance, as summarised in Table 8. Equity capital had no statistically significant relationship with ROA or ROE, and debt capital had no statistically significant relationship with ROE. The relationship between debt capital and ROA was weak and not statistically significant ($p > 0.05$). In contrast, both equity capital and debt capital had a positive and statistically significant relationship with EPS. On the basis of these results, and at the 0.05 level of significance, the null hypotheses H01 and H02 are not rejected in respect of ROA and ROE, but both are rejected in respect of EPS.

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Table 8: Summary of Findings on Capital Structure and Financial Performance

Capital structure measure	Performance measure	Finding
Equity capital	ROA	No significant relationship
Equity capital	ROE	No significant relationship
Debt capital	ROA	Weak relationship, not statistically significant ($p > 0.05$)
Debt capital	ROE	No significant relationship
Equity capital	EPS	Positive and significant relationship
Debt capital	EPS	Positive and significant relationship ($p < 0.05$)

Equity capital and accounting performance

The absence of a statistically significant relationship between equity capital and ROA or ROE suggests that the amount or measure of equity, as operationalised in this study, did not show a detectable linear association with these profitability ratios. This is not evidence that equity financing has no economic value. Equity can strengthen solvency, reduce mandatory debt-service pressure, and provide capacity to withstand weak trading conditions. At the same time, issuing new shares can dilute existing shareholders, and an increase in the equity denominator may lower ROE if earnings do not rise proportionately. In this study equity capital is measured as the ratio of shareholders' equity to total assets, so the result speaks to the share of assets financed by equity rather than to the absolute amount of equity.

The positive and significant relationship between equity capital and EPS requires careful interpretation. EPS is affected by both earnings attributable to ordinary shareholders and the weighted-average number of shares outstanding. An equity issue can finance productive investment and eventually raise earnings, but it can also increase the share denominator and reduce EPS in the short run. Consequently, a positive association cannot by itself demonstrate that equity issuance caused EPS to rise. The result should be interpreted alongside the operational definition of equity capital, the timing of share issues, retained earnings, and changes in profitability.

Debt capital and accounting performance

The weak relationship between debt capital and ROA, together with the non-significant relationship with ROE, does not establish that debt is either beneficial or harmful in all circumstances. Borrowing can support investment in equipment, production capacity, logistics, and working capital. Its benefits depend on whether the returns generated by the financed assets exceed the cost of borrowing. If interest expense, foreign-exchange exposure, refinancing pressure, or repayment obligations rise faster than operating returns, leverage can weaken profitability and financial resilience. The positive and significant relationship between debt capital and EPS points in a different direction. Where borrowed funds finance assets that earn more than the cost of borrowing, or are used in place of new share issues, earnings can be spread over a smaller number of shares, which raises EPS. Such an association does not by itself show that leverage improves underlying profitability, because EPS is also sensitive to the number of shares outstanding, and it may coexist with higher financial risk.

These results are consistent with the broader theoretical expectation that the effect of leverage is conditional. Trade-off theory predicts that the benefits of debt must be balanced against expected distress costs, while pecking-order theory emphasises the role of internal financing capacity and information asymmetry (Nguyen et al., 2019; Qu et al., 2018). Empirical evidence from Nigerian firms is also mixed: studies of brewery, food and beverage, and consumer goods companies report different relationships depending on the selected capital-

structure measure, performance indicator, sample, and period (Banabo & Aganaba, 2024; Kantudu et al., 2026; Nwankwo et al., 2024; Onyebuchi, 2024; Sekuru et al., 2026; Umobong & Diette-Abayeh, 2019). Differences across studies may therefore reflect real sectoral variation as well as differences in research design and measurement.

Interpreting the three performance indicators

ROA, ROE, and EPS capture related but distinct aspects of performance. ROA focuses on the earnings generated from the asset base; ROE measures accounting returns relative to shareholders' equity; and EPS expresses earnings on a per-share basis. A financing choice may affect these indicators differently because their denominators and sensitivity to leverage differ. Debt can increase ROE when returns on assets exceed the after-tax cost of debt, but it can also increase financial risk. Equity financing can strengthen the balance sheet while depressing ROE if the expanded equity base is not matched by higher earnings. EPS may respond to changes in earnings and share count, so it should not be treated as a direct synonym for profitability.

Limitations and suggestions for further studies

The findings should be interpreted with some caution. Equity capital and debt capital are measured as ratios to total assets, which reduces the influence of company size, but the associations reported do not establish causality, and unobserved firm characteristics may influence both financing choices and performance. The number of firm-year observations is also subject to data availability, so the panel may be unbalanced. Future studies could estimate dynamic panel models, use lagged financing variables to reduce the risk of reverse causality, apply alternative definitions of leverage and profitability, and carry out sensitivity analyses that exclude extreme observations. Such checks would not automatically establish causality, but they would help determine whether the reported associations are stable.

Practical implications

Managers should avoid a blanket policy that equity must always exceed debt, or the reverse. Because both equity capital and debt capital were positively and significantly related to EPS, while neither was significantly related to ROA or ROE, firms should maintain financing structures consistent with their cash-flow capacity, investment opportunities, risk tolerance, and access to capital. Equity may be prudent where operating cash flows are volatile or debt costs are high. Debt may be appropriate when predictable cash flows and project returns can cover interest and principal payments with an adequate safety margin. Board-level financing decisions should be based on scenario analysis, maturity matching, liquidity forecasts, covenant headroom, and the expected effect on shareholder value.

Conclusion

This study examined the relationship between capital structure and financial performance among quoted beverage manufacturing companies in Nigeria. The results are mixed: equity capital and debt capital had no statistically significant relationship with ROA and ROE, while both had a positive and statistically significant relationship with EPS. These associations, however, should not be interpreted as causal effects. The study concludes that the relationship between financing structure and performance depends on the performance indicator, the way capital structure is measured, and firm-specific operating and financial conditions. It therefore does not support a universal rule that favours either equity or debt, and its managerial implications should be treated as cautious propositions. Firms should assess both the benefits and costs of each source of finance and target a sustainable capital structure that supports investment without creating excessive financial risk.

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Appendix

A. The 31 sampled companies (items 1–31)

1. Nigerian Bottling Company Limited (Coca-Cola)
2. Seven-Up Bottling Company Limited
3. The La Casera Company Limited
4. Rite Foods Limited
5. International Breweries Plc (soft drink portfolio excluded; beer and malt)
6. Planet Bottling Company
7. Big Bottling Company Nigeria Limited
8. Coastal Bottlers Limited
9. Limca Bottlers Plc
10. Limca Bottler (Benkaof) Limited
11. StrongPack Limited
12. Bogo Beverages Limited
13. Imperial Beverages Limited
14. Sona Breweries Plc
15. Tate Industries Plc
16. Warri Bottling Company Limited
17. Nigerian Mineral Water Industries Limited
18. Classic Marine Services Limited
19. Paramount Trading and Industries LimitedLasena Water Company
20. Nigerian Breweries Plc
21. Guinness Nigeria Plc
22. Champion Breweries Plc
23. Golden Guinea Breweries Plc
24. Premier Breweries Plc
25. Pabod Breweries Limited
26. Bendel Breweries Limited
27. Benue Brewery Limited
28. Consolidated Breweries Plc
29. Edewor Brewery Limited
30. Jos International Breweries Plc
31. Kwara Brewery Limited

B. Other companies in the population compilation (items 32–110)

32. North Brewery Limited
33. Superbru Limited
34. Nigeria Distilleries Limited
35. Euro Global Foods and Distilleries Limited
36. Nigerbev Limited
37. Intafact Beverages Limited
38. Guinness Nigeria – Benin Brewery
39. Guinness Nigeria – Ogba Brewery
40. CHI Limited
41. Index Food Industries Limited
42. Mambila Beverages Nigeria Limited
43. Mira Purification Limited

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44. B-Cate Integrated Services Limited
45. Caminierre Global Concept
46. Flinks Food and Beverage Industries Limited
47. Lino Laboratories Limited
48. MOJO Beverages Nigeria
49. Frutta Juice and Services
50. Reform Juice Company
51. Cway Food and Beverages Nigeria Company Limited
52. Givanas Group of Companies
53. Ekulo Group of Companies
54. Nestlé Nigeria Plc
55. Cadbury Nigeria Plc
56. M.A. Okeke Odinukwe & Co. Limited
57. Food, Agro & Allied Industries Limited
58. Coastal Bottlers Limited
59. Frigoglass Industries Nigeria Limited
60. FrieslandCampina WAMCO Nigeria Plc
61. Fan Milk Plc
62. TG Arla Nigeria Limited
63. Dano Milk Nigeria
64. Real Milk Nigeria
65. Promasidor Nigeria Limited
66. PZ Cussons Nigeria Plc
67. Hollandia (CHI Limited)
68. Peak Milk (FrieslandCampina WAMCO)
69. Three Crowns Milk (FrieslandCampina WAMCO)
70. Cowbell Milk (Promasidor)
71. Loya Milk (Promasidor)
72. Olympic Milk (Promasidor)
73. Nutri-Yo (CWAY)
74. Nutri-Milk (CWAY)
75. Grand Cereals Limited
76. UAC Foods Limited
77. Cadbury Nigeria – Bournvita operations
78. Nestlé Nigeria – Milo operations
79. Nestlé Nigeria – Nescafé operations
80. Champion Breweries – Champ Malt operations
81. Nigerian Breweries – Maltina operations
82. Nigerian Breweries – Amstel Malta operations
83. Guinness Nigeria – Malta Guinness operations
84. International Breweries – Hero operations
85. International Breweries – Trophy operations
86. Sona Breweries – alcoholic beverage operations
87. Nigeria Distilleries – spirits operations
88. Euro Global Foods and Distilleries – beverage operations
89. Mambila Beverages – Highland Tea operations

90. Advanced International Merchants Limited
91. Big Bottling Company Nigeria Limited
92. Nigerian Mineral Water Industries Limited
93. Coastal Bottlers Limited
94. M.A. Okeke Odinukwe & Co. Limited
95. Tate Industries Plc
96. Warri Bottling Company Limited
97. Limca Bottlers Plc
98. Limca Bottler (Benkaof) Limited
99. Pabod Breweries Limited
100. Premier Breweries Plc
101. Golden Guinea Breweries Plc
102. Bendel Breweries Limited
103. Benue Brewery Limited
104. Jos International Breweries Plc
105. Kwara Brewery Limited
106. North Brewery Limited
107. Edewor Brewery Limited
108. Superbru Limited
109. Sona Breweries Plc
110. StrongPack Limited