Capital Structure and Financial Performance: Evidence from Nigerian Food and Beverage Firms Using Panel Data

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ABSTRACT

The relationship between capital structure and performance of listed food and beverage firms in Nigeria, 2020 - 2024, is examined in this study. Specifically, the study explores the relationship of debt-to-equity ratio (DER), firm size and asset growth to performance, as measured by return on assets (ROA) and return on equity (ROE). Using panel analysis, fixed effects and random effects regression models were estimated, while Hausman specification test indicated that fixed effects model is most appropriate and a preferred model. Assumptions underlying the econometric analysis were tested and satisfied, thereby confirming the reliability and validity of the study's findings. The results show that DER significantly relates to firm performance, suggesting that high debt levels lead to lower profits. However, firm size and asset growthfound to have significant positive relationship, implying that larger firms and those that grow their assets perform better. The findings were consistent for both ROA and ROE, indicating stability. In view of the above, this study found that although capital structure decisions are important, excessive leverage is not healthy in Nigeria's high interest and unpredictable economic climate. Hence, it is recommended for firms to maintain an optimal debt-equity mix, while policies

should focus on reducing borrowing costs and strengthening the capital market. This research, above all, provides up-to-date empirical evidence and implications for policy and practice.

Keywords: Asset Growth; Capital Structure; Debt-to-Equity Ratio; Firm Performance; Firm Size; Panel Data.

1. INTRODUCTION

Capital structure choices have been among the key problems in corporate finance because of their effects on the performance of firms, risk exposure, and maximization of values. The decision between debt and equity funding is not only related to the cost of capital in a firm but also its operational efficiency and profitability (Stephen et al., 2019). It is even more imperative in emerging economies like Nigeria, where financial markets are less developed and macroeconomic variables tend to be turbulent, and establishing an optimal capital structure is even more important (World Bank, 2023). The food and beverage industry in Nigeria is an important contributor to the economy in terms of employment and industrial production (National Bureau of Statistics, 2024). Nonetheless, companies in this industry have difficulties with financing because of the fluctuating interest rates, inflation, and economic shocks, especially in the years 2020-2024.

Profitability indicators like Return on Assets (ROA) and Return on Equity (ROE) are generally used to measure financial performance and are typically used to evaluate how efficiently firms use their assets and funds supplied by shareholders to earn profits (Brigham & Joel 2021). Capital structure, represented by Debt-to-Equity Ratio (DER), is a measure of how firms depend on external debt financing as compared to internal equity. Although theoretical perspectives such as the trade-off theory and pecking order theory provide contrasting expectations regarding the relationship between leverage and firm performance, empirical evidence remains inconclusive (Stewart, 1984), as some studies report positive effects of debt financing while others find negative or insignificant relationships depending on the sector, economic conditions, and measurement of performance.

Besides leverage, other firm-specific factors like the size of the firm and asset growth are also significant drivers of the financial performance. The bigger firms are more likely to enjoy economies of scale and access to capital markets, and the firms with a greater increase in assets might perform better because they have more opportunities to expand (Damodaran, 2015). Persistent fluctuations in profitability, rising borrowing costs, and increasing dependence on debt financing have raised concerns about the financial sustainability of food and beverage firms in Nigeria. Despite the importance of the sector to economic growth, empirical evidence on the relationship between capital structure and firm performance remains inconclusive, especially within the post-COVID-19 period characterized by inflationary pressures and economic uncertainty. The limited recent sector-specific evidence therefore necessitates further

investigation. It is against this backdrop that this study examines the effect of capital structure on the performance of listed food and beverage companies in Nigeria from 2020 to 2024. Specifically, the study aims to:

(i) Determine the relationship between Debt-to-Equity Ratio and Return on Assets

(ii) Assess the relationship between debt-to-equity ratio (DER) and Return on Equity (ROE);

(iii) Establish how the size of a firm is related tofinancial performance; and

(iv) Investigate how asset growth relates to financial performance.

The following are the hypotheses stated in their null form:

H01. Debt-to-Equity Ratio (DER) does not significantly relates to ROA.

H02: There is no significant relationship betweendebt-to-equity ratio (DER) and ROE.

H03: There is no significant relationship betweenfirm size and financial performance.

H04: There is no significant relationship between asset growth and financial performance.

2. REVIEW OF LITERATURE

2.1 Conceptual Review

Capital structure is a mix of debt and equity financing that a firm employs in order to finance its activities and investments. This idea is core to corporate finance as it directly influences the cost of capital of the firm, the risk exposure of the company and the value of the company. Modigliani and Miller (1958) found that capital structure choices at ideal conditions do not impact firm value, but in a real life scenario where taxes, transaction costs and informational asymmetry are involved, the financing mix becomes very important. Practically, companies are constantly changing their capital structure based on economic conditions, market opportunities and internal requirements to finance.

The Debt-to-Equity Ratio (DER) is a widely used proxy for capital structure, representing the proportion of external debt relative to shareholders' equity (Modigliani&Miller, 1958). A higher DER indicates greater reliance on debt financing, which may increase returns through leverage but also exposes firms to higher financial risk. In the Nigerian context, DER remains particularly relevant because many firms rely heavily on debt financing due to limited access to equity markets, high equity costs, and underdeveloped financial systems (Akinlo, 2011).

Financial performance is a multidimensional concept that involves the capability of a firm in making profits and maximizes the wealth of shareholders. Return on Assets (ROA) is used to assess the efficiency of a company in using all its assets to generate profits, whereas Return on Equity (ROE) is used to assess the profitability of investments made by shareholders (Brigham & Joel 2021). Although ROA is concerned with the efficiency of operations regardless of financing choices, ROE takes into account the impacts of leverage hence it is a sensitive indicator to a change in capital structure. The combined application of ROA and ROE thus offers a more detailed evaluation of the performance of a firm.

Another important determinant of capital structure and performance is the firm size. The bigger companies tend to be more diversified, have reduced risk of bankruptcy and have a stronger access to capital markets. They also have the propensity to enjoy economies of scale and better bargaining with creditors. The size of firms is usually measured in terms of total assets or the natural logarithm of total assets (Damodaran, 2015). Conversely, smaller companies might have to pay a higher cost of borrowing and restricted financing facilities that can hinder their performance.

Asset growth refers to the rate at which a firm's total asset base increases over time and is commonly used as an indicator of growth prospects and investment opportunities. Firms with high asset growth are typically in expansion stages and often require additional external financing to support their operational and investment needs. While such expansion can enhance profitability through increased production capacity and market share, it may also place pressure on financial resources, particularly when growth is financed through debt, thereby increasing financial risk and leverage exposure (Ross, *et al*, 2019; Brigham & Ehrhardt, 2020).

2.2 Theoretical Review

There are a number of theories that explain the relationship between capital structure and firm performance.The Trade-off Theory assumes that companies pursue an efficient capital structure by weighing the advantages of debt financing, especially the tax shields, against the cost of financial distress and bankruptcy (Jensen, 1986). This theory holds that moderate levels of debt might be beneficial to firm performance, but past a certain point, marginal cost of debt exceeds marginal benefits, where the profitability is reduced.

The Pecking Order Theory is a theory that focuses on information asymmetry between the managers and outside investors by Myers and Majluf (1984). It implies that companies would use internal capital first because the cost of information is low and then debt and lastly the use of equity. The implication of this theory is that more profitable companies will tend to use less debt; hence, leverage will have a negative correlation with performance.

The capital structure theory is based on the Modigliani-Miller Proposition which was proposed by Franco Modigliani and Merton Miller (1958). Although the initial proposal presumes that the market is perfect, subsequent versions with taxes included and have been shown to show that debt can generate value due to tax benefits.

Besides this, Agency Theory offers more knowledge on the decisions of capital structure. It contends that debt may be used as a discipline mechanism to minimize the agency problems between the managers and the shareholders in order to restrict free cash flow (Jensen, 1986). Nevertheless, too much debt can pose tensions between stockholders and debt holders, which can be detrimental to the performance of firms.

The Trade-off Theory is the most appropriate underpinning for this study because it explains how firms balance the benefits of debt financing against the costs of financial distress in order to achieve an optimal capital structure that enhances firm performance (Jensen, 1986). The theory suggests that a proper mix of debt and equity can improve profitability and firm value, while excessive debt may increase financial risk and reduce performance. Other supporting theories include the Pecking Order Theory, Modigliani–Miller Proposition, and Agency Theory, which further explain financing preferences, capital structure foundations, and managerial behavior.

2.3 Empirical Review

Empirical evidence on how capital structure is related to the performance of firms is mixed across time, countries and industries. Initial research like that of Rajan and Luigi, (1995) revealed that firm-specific attributes like size, profitability and growth opportunities play a major role in capital structure decisions.

In Nigeria, Akinlo (2011), using regression analysis on panel data, discovered that leverage is a significant but negative determinant of firm performance, implying that excessive dependence on debt increases financial distress costs. Similarly, Salawu (2007), through descriptive and econometric analysis, documented that Nigerian firms rely heavily on short-term debt, which adversely affects profitability due to high interest costs.

More recent studies provide additional insights. For example, Onaolapo and Kajola (2010), using panel regression techniques, found negative relationships between debt ratios and profitability among Nigerian firms, whereas Ebaid (2009), through empirical analysis of emerging market firms, reported weak relationships between capital structure and firm performance. In contrast, Abor (2005), using regression analysis on listed Ghanaian firms, found a positive relationship between short-term debt and profitability, suggesting that the effect of leverage varies according to debt structure and maturity.

The dynamic nature of this relationship is further highlighted in recent Nigerian studies. For instance, Adesina, *et al* (2021), using panel data regression analysis, found that capital structure significantly influences firm performance, although negatively across sectors. Likewise, Okoye, et al (2022), through moderation regression analysis, established that firm size and growth opportunities positively moderate the relationship between leverage and profitability among Nigerian manufacturing firms.

Regarding the control variables, empirical research findings always indicate that firm size positively and significantly influences financial performance because of economies of scale and better access to financing (Damodaran, 2015). Asset growth is typically related to better performance, but its impact can vary based on the way growth is financed.

Despite these contributions, most existing studies focus on aggregated manufacturing sectors or rely on pre-2020 data, thereby failing to adequately capture recent economic realities, particularly the effects of the COVID-19 pandemic and the post-pandemic business environment.

2.4 Gap in Literature

Despite the wide range of empirical literature, there still are a number of gaps. First, most of the current research on capital structure and firm performance in Nigeria involves a general sectoral orientation, given that little emphasis is on the food and beverage subsector with its distinct features of operations and financing.

Second, the number of recent studies that focused on the years between 2020 and 2024 are so limited, a period that has seen major economic shocks, such as the COVID-19 pandemic, exchange rate fluctuations, and inflation. These aspects could have changed the financing behavior and performance of firms, hence necessitating new empirical research.

Third, most of the studies done on the relationship between leverage and performance have not properly implemented the control variables that are relevant in the study like size of the firm and growth of assets. Such variables are not included, and this can result in biased or incomplete findings.

Lastly, the available literature is usually narrowed to one performance indicator hence the limitation in strength of results. This study is more holistic in its financial performance because it combines the analysis of ROA and ROE.

This paper fills these gaps by providing industry-specific, more recent analysis of the effect of capital structure, measured as Debt-to-Equity Ratio (DER) on the financial performance of the listed food and beverage firms in Nigeria, conditioning on the size of the firm and its asset growth during the period of 2020 to 2024.

3. METHODOLOGY

3.1 Research Design

The research design adopted by this study is ex post facto research design, which is suitable in analyzing the relationship between variables using historical data that has not been manipulated. This design is used extensively in research studies of finance and accounting where the variables of leverage and profitability are seen based on existing records **(**Brigham & Joel, 2021**).** The research is based on secondary data collected in the form of annual reports of companies.

3.2 Population and Sample Size.

The population includes all the listed food and beverage companies on the Nigerian Exchange Group (NGX) as of 2024. The purposive sampling method is used to sample firms that have full financial information during the period 2020-2024. This guarantees uniformity and dependability of data.

3.3 Data collection Sources and Method.

The research is based on secondary data which is obtained at: Annual reports and accounts of chosen companies, Nigerian Exchange Group publications and corporate financial disclosures. The dataset covers 2020-2024, which reflects the recent changes in the macroeconomic environment and the impact of the pandemic.

3.4 Model Specification

The paper incorporates two panel regression models:

Model I: $ROAit = \beta_0 + \beta_1 DERit + \beta_2 FSIZEit + \beta_3 AGROWthit + \mu_{it} + \varepsilon_{it}$

Model II: $ROEit = \beta_0 + \beta_1 DERit + \beta_2 FSIZEit + \beta_3 AGROWthit + \mu_{it} + \varepsilon_{it}$

Where:

ROAit is the Return on Assets at time t.
ROEit is the Return on Equity at time t.
DERit is Debt-to-Equity Ratio in period t.
FSIZEit is the size of Firm in time t.
AGROWthit is the Asset Growth at time t.
β_0 represents the constant
β (1 -3) are coefficients of the explanatory variables.
μ_{it} indicates firm specific effects./ is the error term of the model equations.
ε_{it} represents the error term of the model equations

3.5 Measurement of Variables

Variable	Proxy	Measurement	Source/Justification	A Priori Expectation
Financial Performance	ROA	Net Income / Total Assets	Widely used measure of asset efficiency (Brigham & Joel 2021)	±
Financial Performance	ROE	Net Income / Shareholders' Equity	Measures return to shareholders (Brigham & Joel, 2021)	±
Capital Structure	DER	Total Debt / Total Equity	Standard proxy for leverage (Franco Modigliani & Merton Miller, 1958)	±
Firm Size	FSIZE	Natural Log of	Captures economies of scale	+

Variable	Proxy	Measurement	Source/Justification	A Priori Expectation
		Total Assets	(Damodaran, 2015)	
Asset Growth	AGROWTH	$(TA_t - TA_{t-1}) / TA_{t-1}$	Reflects expansion opportunities (RajanRaghuram G. & Luigi Zingales, 1995)	+

Source: Authors' Design 2026

3.6 Estimation Techniques

This paper uses panel data regression methods, which incorporates both cross-sectional (between firms) and time-series (between years) aspects of the data. The advantages of using panel data are that it is more effective in estimation, eliminates the unobserved heterogeneity, and provides dynamic innovation of firm behavior through the time. According to Gujarati and Porter (2009), panel data analysis enhances the accuracy of the empirical findings since the researcher is in a position to capture individual-level effects that cannot be observed yet, but have an impact on the dependent variable.

In order to estimate the association between capital structure and firm performance, this paper embraces three complementary panel estimation methods. The Pooled Ordinary Least Squares (OLS) is first used as a baseline model. This method presumes that the firms are homogenous and ignores individual specific effects and treats the panel data as a mere pooled data. Even though it gives an initial insight into the relations between variables, it can give biased results in the case of firm-specific features.

Secondly, Fixed Effects Model (FEM) is used to manage unobserved heterogeneity among firms. This model makes the assumption that the individual firm characteristics, which can affect performance are constant over time and are related to the explanatory variables. The fixed effects model can clean up the influence of the independent variables on the dependent variable by enabling firm-specific intercepts, thus giving more consistent and reliable estimates.

Thirdly, the Random Effects Model (REM) is also taken into consideration. The random effects model unlike the fixed effects model assumes that the individual-specific effects are randomly distributed and not correlated with the explanatory variables. This method is more effective than fixed effects under the same conditions as it exploits the within-group and between-group variability of the data.

Formal model selection tests are done to establish the most suitable model to use in the study. Decision made between pooled OLS and random effects estimation is made using Breusch Pagan

Lagrange Multiplier (LM) test. A major outcome of this test suggests that there are panel effects, and thus the application of panel model is justified as compared to pooled OLS. Then, the Hausman specifications test is used to decide between the fixed effects model and the random effects model. Hausman test is a test that is used to determine whether the unique errors are correlated with the regressors; should there be a correlation then the fixed effects model is used as it is more consistent than the random effects model, but when the test finds no correlation then the random effects model is used.

3.7 Decision Rule

A level of significance of 5% (= 0.05) is used to test the hypotheses developed in this research. The probability (p-value) of the estimated coefficients of the explanatory variables is used to accept or reject each null hypothesis.In particular, the null hypothesis can be rejected in case the p-value is less than 0.05, which means that the corresponding variable has a statistically significant impact on the dependent variable. On the other hand, the null hypothesis is not rejected with a p-value of 0.05 or above, which means that there is not enough statistical information to accept that the variable has a significant impact. This decision rule guarantees that the inferences made on the basis of the analysis are statistically sound and compliant with usual econometric criteria.

4. RESULTS AND DISCUSSION

4.1 Data Presentation and Cleaning

The analysis is based on panel data of ten listed food and beverage companies in Nigeria between the years 2020 and 2024, which give a total of fifty firm-year observations. The variables used are; Return on Assets (ROA), Return on Equity (ROE), Debt-to-Equity Ratio (DER), Firm Size (FSIZE), and Asset Growth (AGROWTH). The cleaning of the data involved minor inconsistencies. More specifically, some firm-year observations had missing values for Asset Growth. These missing values were excluded only where necessary, and their omission did not distort or significantly affect the reliability of the data analysis. The extreme values (especially in the Debt-to-Equity Ratio e.g. very high or negative values) were kept since they represent the real financial situation like negative equity and financial distress. Measurement of all variables was ensured to be constant among firms. The dataset thus offers a sound foundation on empirical analysis.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Minimum	Maximum
ROA	0.087	0.189	-0.192	0.620
ROE	0.182	0.566	-1.620	1.783

Variable	Mean	Std. Dev.	Minimum	Maximum
DER	5.214	22.481	-10.300	149.740
Firm Size	15.43	3.02	10.03	20.74
Asset Growth	0.247	0.298	-0.086	1.530

Source: Author's Computation (2026)

In table 4.1, the average Return on Assets (ROA) is 0.087, showing that on average, companies made returns of approximately 8.7 percent. The standard deviation implies that there is variation in the performance of the firms in the sample. Return on Equity (ROE) has a higher mean of 0.182, although with a large standard deviation. The standard deviation and maximum value of Debt-to-Equity Ratio (DER) is very high and indicates extreme leverage levels, which though may affect the results of regression. The Firm Size seems somewhat constant with moderate dispersion, indicating that the sampled firms are more or less similar in size. While Asset Growth shows moderate variability, indicating that there are variations in expansion strategies among firms.

4.3 Correlation Matrix

Table 4.2: Correlation Matrix

Variable	ROA	DER	Firm Size	Asset Growth
ROA	1.000			
DER	-0.312	1.000		
Firm Size	0.428	-0.215	1.000	
Asset Growth	0.367	-0.102	0.241	1.000

Source: Author's Computation (2026)

The correlation matrix reveals the level of association of the variables. Debt-to-Equity Ratio (DER) is negatively related to ROA (-0.312), meaning that more leverage indicates less performance of a firm. This is in line with the theoretical considerations that a high amount of debt escalates financial risk. There is a positive correlation between Firm Size and ROA (0.428) which shows that larger companies are expected to be better which is probably because of economies of scale and better access to resources. The positive relationship also exists between Asset Growth and ROA (0.367) indicating that expansion activities have a positive impact on profitability. Notably, the coefficients of the independent variables are not very high, which means that there are no issues of multicollinearity.

4.4 Model Selection (Hausman Test)

Table 4.3: Hausman Test Result

Test	Chi-Square	Prob.	Decision
Hausman	9.842	0.020	Fixed Effects

Source: Author's Computation (2026)

The Hausman test value shows that the Fixed Effects Model is the best choice because the probability value (0.020) is below 0.05. This implies that firm-specific effects are correlated with the explanatory variables, and thus need to be controlled in the estimation.

4.5 Diagnostic Tests

4.5.1: Multicolinearity, Heteroscedasticity, Autocorelation and Normality

Table 4.4: Diagnostic Tests Summary

Test	Statistic	Value	Decision
Multicollinearity (Mean VIF)	VIF	2.87	No multicollinearity
Heteroskedasticity (Breusch-Pagan)	Chi^2	6.214 (p = 0.102)	Homoscedastic
Serial Correlation (Durbin-Watson)	DW	1.89	No autocorrelation
Normality (Jarque-Bera)	JB	3.76 (p = 0.152)	Normally distributed

Source: Author's Computation (2026)

The results of diagnostic tests indicate that the regression model meets the major classical linear regression assumptions. The Variance Inflation Factor (VIF) is 2.87, which is much less than the critical value of 10, implying that multicollinearity is not an issue. The probability value of Breusch-Pagan test is more than 0.05, which means that the variance of the error terms is homoscedastic. The value of the Durbin-Watson of 1.89 is close to 2 indicating that there is no serial correlation between the residuals. Also, the Jarque-Bra statistic ensures that the residual is normally distributed since the probability value is more than 0.05. In general, these findings confirm the accuracy and strength of the regression estimates.

4.5.2 Model Selection Results (Hausman Test)

Both Fixed Effects and Random Effects models were conceptually compared to decide the panel estimation technique to be used by comparing the Hausman specification approach.

Table 4.5: Hausman Test Result

Test Summary	Chi-Square Statistic	d.f	Prob. Value	Decision
Hausman Test	9.842	3	0.020	Fixed Effects

Source: Author's Computation (2026)

The outcome of the Hausman test indicates that the Chi-square statistic is 9.842 with a probability value of 0.020 which is lower than the 5% level of significance. This causes a rejection of the null hypothesis that the Random Effects Model is suitable. As a result, the Fixed Effects Model becomes the most appropriate estimator to use in this study. This means that the explanatory variables (DER, Firm Size, and Asset Growth) are correlated with the firm-specific characteristics (managerial style, corporate governance, and firm structure), and thus have to be controlled to get unbiased estimates.

4.6 Panel Regression Results (Fixed Effects Model)

Model Specification: $ROA_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 FirmSize_{it} + \beta_3 AssetGrowth_{it} + \mu_i + \varepsilon_{it}$

Table 4.6: Fixed Effects Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.842	0.311	-2.71	0.009
DER	-0.0046	0.0019	-2.42	0.019
Firm Size	0.071	0.023	3.09	0.003
Asset Growth	0.052	0.021	2.48	0.016

$R^2 = 0.63$
Adjusted $R^2 = 0.58$
F-statistic = 12.47 (p = 0.000)

Source: Author's Computation (2026)

Regression outcome shows that capital structure statistically affects firm performance in food and beverage corporations in Nigeria. The coefficient of Debt-to-Equity Ratio (DER) is negative and significant (0.0046 = -0.0046, p = 0.05), indicating that an increase in leverage will decrease the profitability of the firm. This means that over dependence on debt financing adds to financial risks and interest payments, hence less asset returns. The relationship between Firm Size and ROA is positive and significant (= 0.071, $p < 0.01$) meaning that larger firms are likely to perform better. This is due to economies of scale, more powerful market, and accessibility to financial resources. Asset Growth has also a positive and significant effect on the performance (0.052, $p < 0.05$), which means that companies with effective growth in asset base will have a higher likelihood of enhancing profitability. The R2 value of 0.63 is an indication that about 63

percent of the change in the performance of firms is attributed by the explanatory variables. The F-statistic provides that the model is jointly significant at the 1 percent level.

4.7 Additional Model (ROE as Robustness Check)

Model Specification: $ROE_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 FirmSize_{it} + \beta_3 AssetGrowth_{it} + \mu_i + \varepsilon_{it}$

Table 4.7: Fixed Effects Regression Results (Dependent Variable: ROE)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-1.215	0.522	-2.33	0.024
DER	-0.012	0.004	-3.00	0.004
Firm Size	0.104	0.039	2.67	0.011
Asset Growth	0.081	0.034	2.38	0.021
$R^2 = 0.59$				
Adjusted $R^2 = 0.54$				
F-statistic = 10.18 (p = 0.000)				

Source: Author's Computation (2026)

The model statistics in table 4.7 further confirm the reliability of the results. The R^2 value of 0.59 indicates that 59% of the variations in ROE are explained by the explanatory variables, while the Adjusted R^2 of 0.54 shows strong explanatory power after adjustments. The F-statistic of 10.18 with a probability value of 0.000 confirms that the model is statistically significant overall. The results further reveal that Debt-to-Equity Ratio (DER) has a negative and significant effect on ROE, whereas Firm Size and Asset Growth exert positive and significant effects on firm performance. The consistency of the findings across both ROA and ROE models strengthens the validity and robustness of the study and confirms the importance of capital structure decisions in determining the performance of food and beverage firms in Nigeria.

4.8 Test of Hypotheses

The assumptions developed on the basis of the present research were applied to the outcomes of the Fixed Effects regression on the basis of the ROA model, and the results were further confirmed by the ROE robustness model. The rule of thumb is to reject the null hypothesis when the probability value is lower than 0.05.

Hypothesis One (H01): Debt-to-Equity Ratio does not have any significant influence on the performance of firms. The regression outcomes indicate that the coefficient of the Debt-to-Equity Ratio (DER) is negative and statistically significant (= -0.0046; = 0.019) in the ROA model. The ROE model also supports this observation because DER is negative and significant (= -0.012; = 0.004).

Decision: Do not accept the null hypothesis (H0). A high Debt-to-Equity Ratio has a strong negative impact on the firm performance. This means that the more a firm depends on debt financing, the lower the profitability of the sampled firms, probably because of the increase in financial risk and debt servicing expenses.

Hypothesis Two (H02): Firm size does not significantly influence firm performance. The findings show that Firm Size has a positive significant coefficient (β = 0.071; p = 0.003) in the ROA model. This is in line with the ROE model (ROE = 0.104; p = 0.011) in which Firm Size also has a positive and significant relationship with performance.

Verdict: Do not accept the null hypothesis (H 0 2). The positive impact of Firm Size on firm performance is significant. This is an indication that bigger firms are more efficient, and profitable, which may be because of economies of scale, access to more finance, and competitive positioning.

Hypothesis Three (H03): The effect of Asset Growth on firm performance is not significant. In the ROA model, the regression outcomes indicate that the regression coefficient (0.052; p = 0.016) of Asset Growth is positive and statistically significant. this relationship is also validated by the ROE model (β = 0.081; p = 0.021).

Verdict: Repudiate the null hypothesis (H 0 3). Asset Growth has a significant and positive impact on the performance of firms. This means that those companies that are successful in increasing their asset base are likely to increase their profitability representing efficient investment and growth policies.

Hypothesis Four (H04): The combined effects of capital structure variables are not significant in firm performance. The F-statistic of 12.47 (p = 0.000) of the ROA model means that the explanatory variables are significant together. On a similar note, the ROE model shows an F-statistic value of 10.18 (p = 0.000) which indicates the model significance.

Verdict: Do not accept the null hypothesis (H 0 4). The variables of the capital structure (DER, Firm Size, and Asset Growth) have a strong impact on firm performance when considered as a combination. This means that the decision to finance and the characteristics of firms have a combined effect on profitability within the Nigerian food and beverage industry.

4.9 Summary and Discussion of Findings

Based on the empirical analysis, the study identifies the following main findings:First, the outcome shows that capital structure in terms of Debt-to-Equity Ratio has a negative and statistically significant effect on the performance of firms. This implies that overdependence in debt financing has a negative impact on profitability, which is probably because of the high financial risk, interest rate, and even financial distress. This observation is similar in both ROA

and ROE models thus, affirming its strength. Second, Firm Size is observed to have a positive and significant impact on performance. It means that bigger companies are more likely to experience a higher level of profitability which could be explained by economies of scale, the promoted level of operational efficiency, better bargaining power, and the ability to access the financial markets. Third, Asset Growth has a positive and significant correlation with firm performance. This means that companies that engage in growth and have the ability to control the growth of assets have a higher chance of increasing their profit-making. It shows the role played by strategic investment decisions in performance of the firm.

Fourth, the combined importance of the explanatory variables proves that the decisions of capital structure and the firm-specific characteristics are important determinants of firm performance. The large F-statistics and the large probability values mean that the model has a great explanatory power. Also, the outcomes of the model selection can be used to justify the Fixed Effects Model, which emphasizes the need to account for the firm-specific heterogeneity. The diagnostic tests also justify that the model of analysis is statistically sound and it does not violate classical regression assumptions. On the whole, the results indicate that although firm growth and size positively impact performance, too much leverage negatively affects it. This highlights the importance of companies having an optimal capital structure where the benefits of debt are balanced with the risks involved.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This research investigates the effects of capital structure on the performance of listed food and beverage firms in Nigeria for 2020-2024. In particular, the research examines the impact of Debt-to-Equity Ratio (DER), Size and Asset Growth on firm performance, measured by Return on Assets (ROA) and Return on Equity (ROE). The method used is Panel data for the estimation of the Fixed Effects and Random Effects models. The Hausman specification test suggested that the Fixed Effects Model is the best fit, implying existence of firm-specific effects on performance. The model passed several diagnostic tests, ensuring that it met the assumptions of no multicollinearity, heteroskedasticity, autocorrelation and non-normality. The regression findings showed that the Debt-to-Equity Ratio has a negative and significant impact on performance, while Firm Size and Asset Growth have a positive and significant impact. These results were consistent for both ROA and ROE models, hence enhancing the reliability of the results.

This study draws a conclusion from the empirical results that the capital structure is an important factor in influencing performance of Nigerian food and beverage firms. In particular, the study confirms that high debt financing negatively impacts on firm performance, as shown by the negative coefficient on Debt-to-Equity Ratio. In contrast, Firm Size and Asset Growth were identified as factors that improve performance, suggesting that larger companies and firms with

sound growth strategies are more likely to improve their performance. This implies that economies of scale and growth management are key factors influencing performance in the Nigerian manufacturing industry. The results also suggest that although firms can benefit from debt financing, higher debt levels result in financial risk that exceeds the benefits. So, firms need to balance debt and equity financing to maximise performance. Above all, the study confirms that capital structure matters and affects firm performance especially in emerging markets such as Nigeria where financial constraints, macroeconomic instability and high cost of capital is common.

5.2 Policy Implications

This study provides valuable insights for Nigerian managers, investors and policymakers. The results underline the importance of leverage management for individual managers. Excessive leverage could lead to financial distress, particularly in a high interest rate and volatile economic environment. Corporate managers should, therefore, follow sound financing policies that balance risk and return.

These findings are consistent with the proposition that companies with lower leverage and greater growth opportunities have better performance. This knowledge can inform investment strategies and portfolio management in the food and beverage industry.For policymakers and regulators, the results highlight the need to establish a financial environment that facilitates sustainable corporate financing. This can be achieved through enhancing access to long-term finance, lowering the cost of finance and financial market development.

5.3 Recommendations

The findings of this study suggest four key recommendations aligned with the stated hypotheses. First, firms should pursue an optimal capital structure policy by maintaining a balanced debt–equity mix and avoiding excessive leverage, given the observed negative effect of high debt levels on performance, particularly ROE. Second, management should adopt an efficient asset growth strategy, ensuring that expansion decisions are driven by productivity and profitability rather than uncontrolled growth, since asset growth did not significantly translate into improved performance. Third, firms should strengthen financial management and governance practices, including risk management and prudent resource allocation, to enhance operational efficiency and overall financial outcomes. Finally, given the weak influence of firm size on performance, companies should focus less on mere expansion and more on value-driven scaling, where increases in size are accompanied by efficiency gains and improved utilization of assets.

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