

Firms' efficiency and financial leverage of the listed consumer goods companies in Nigeria, 2015-2024

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Abstract

Purpose: The ongoing academic debate over whether efficient firms use more leverage motivated this study. In Nigeria, consumer goods firms use less long-term debt to finance their operations, and their efficiency has been low. Could this be due to a lack of long-term debt financing? Therefore, this study examined the effect of firm efficiency on the financing leverage of listed consumer goods companies in Nigeria from 2015 to 2024.

Methodology: Panel data were extracted from the financial statements of all 17 listed consumer goods companies in Nigeria. To control for endogeneity, the generalized method of moments was employed. Additionally, Kao co-integration and the Granger causality test were also conducted.

Results and Conclusion: Findings showed that firm efficiency exerted a negative and significant effect on the financial leverage of the selected consumer goods companies in Nigeria. The study concluded that there is a statistically significant effect of firm efficiency (OPE and MKE) on the financial leverage of the selected consumer goods companies in Nigeria.

Recommendations: The study recommends that management should employ intensive growth strategies (product development, market penetration, and market development) to improve their efficiency levels, as this would increase their capacity to accommodate more debt for the growth of the firm in the long run. This study contributes to the literature from Nigeria, particularly in the area of firm efficiency and its role in enhancing the capacity of firms to use more long-term debt in their financing decisions.

Keywords: Firm efficiency, financial leverage, efficiency risk hypothesis, long term-debt industrial firms.

1. Introduction

Firms often face the economic reality of having funds as a limiting factor; hence, financial leverage (the extent of the use of debt) offers a bailout. However, the detrimental effects of this financial strategy create the fear-of-debt syndrome, making risk-averse management shy away from its use. The firm risks winding up if it defaults on capital repayments and interest payments. In recent times, there has been a paradigm shift from the fear of debt to the view that debt is good, based on efficiency-risk theory, which expects high-efficiency firms to employ more debt in their capital structure and low-efficiency firms to employ less debt (Brigham & Gapenski, 1990; Van Hone, 2002; Pandey, 2015). This notion is justified on the ground that efficient firms generate higher earnings, with growth potential to repay the long-term creditors. Also, they do have higher reserves that could be used to counteract possible adverse effects of financial leverage in the firm's capital structure, such as fluctuations in market conditions or unexpected downturns in revenue. Thus, high efficiency reduces the possibility of financial distress and bankruptcy costs (Ayodeji *et al.*, 2020; Berger & Mester, 1997; Berger & Bonaccorsi, 2006; Dahiru, 2015; Van Hone, 2002).

Following this paradigm shift, other arguments in favor of financial leverage include the provision of a tax shield to the firm, as interest payments are allowable deductions (i.e., allowable expenses from the computation of a company's assessable profits). As such, debt finance appears to be a very cheap source

of finance (Ayodeji, 2011; Ayodeji *et al.*, 2020; Olowe, 1997; Oloyede, 2000; Pandey, 2015). Furthermore, if debt finance is optimally used, it could bring about an increase in profit potential and facilitate growth in net profit to sales, return on equity, return on capital employed, return on net assets, earnings per share, and dividend per share (Pandey, 2015; Ayodeji, 2011). Furthermore, it is in the best interest of the existing shareholders to go for financial leverage instead of a public offer of shares so as to avoid dilution in ownership, control, and earnings (Ayodeji, 2011; Pandey, 2015).

Despite all that efficient firms stand to gain, the use of debt among the consumer goods companies is very low, even at a close to zero level, which could affect their investment level and ability to finance long-term NPV projects that could add value to the company's net worth. But in recent time, the use of debt has been vehemently criticized by some recent scholars who are in support of the franchise-value theory from the standpoint of agency cost. They argue that, if leverage is not kept at a zero or low level, management will be wasteful and inefficient in the use of capital resources at their disposal. Conversely, if leverage is kept at a zero or low level, management would be forced to make optimal use of available capital resources by concentrating their effort, resources, and attention on what is available to achieve optimality from capital utilisation (Jensen & Meckling, 1976; Brigham & Gapenski, 1990; Ayodeji, 2011).

Given these contrary opinions by existing studies, there is a need for further empirical scrutiny to determine how firm efficiency can accommodate financial leverage to enhance the firm's contribution to sustainable development. This hypothesis assumes that profitability, stakeholder satisfaction, corporation tax, and corporate social responsibility depend on the firm's growth, which is defined as the net output of the firm.

Considering the perspectives of the two theories, the study found that there are limited research efforts, particularly from Nigeria, regarding the effect of firm efficiency on financial leverage. However, the literature is replete with studies on how financial leverage influences performance, such as Igbिनovia and Ogbeide (2019), Ibrahim and Isiaka (2020), and Richard *et al.*, (2025), or how financial leverage affects firms' values, such as Omokere *et al.*, (2024) and Akintunde *et al.*, (2021). The few studies on this research interest, however, are from other emerging economies and are not recent; these studies include Legesse and Guo (2019). Therefore, there is a need to replicate this research idea among Nigerian listed companies by unravelling whether the efficiency level of Nigerian consumer companies sufficiently attracts the use of long-term debt or not. As a result, this study is positioned to address this gap by examining the interactions between firm efficiency and financial leverage in Nigerian consumer goods companies between 2015 and 2024.

2. Literature review

Theoretical Framework

The study adopted as its theoretical framework the efficiency risk hypothesis credited to David Durand in 1952. The theory asserted that a firm's efficiency in the utilisation of assets or capital employed at its disposal in generating sales and profits over and over again would determine its ability to carry debt or financial risk in its capital structure. In this, the higher the firm's efficiency level, the higher its ability to take financial risk, and vice versa. This suggestion is based on the idea that higher efficiency in asset utilisation and/or capital in generating returns reduces the possibility of financial distress and bankruptcy costs. This is because, while higher efficiency firms generate enough earnings to pay debt

holders to the extent of not being susceptible to financial distress, low efficiency firms may not be able to pay their debt holders, thereby subjecting such a firm to financial distress (Berger & Bonaccorsi, 2006).

Empirical Review

Efficiency has been widely conceptualised by the existing studies. One of the prominent concepts as given by Farrell (1957) is that firm efficiency is a firm's success in producing the largest output from a given input, provided all inputs and outputs are adequately measured. It has been categorised into different dimensions such as technical, economic, market, allocative and productive efficiency (Debreu 1951; Onipede & Ayodeji 2005; Ouattara, 2020; Rastogi, 2011). Likewise, financial leverage defined as the use of fixed-charge sources of funds, such as debt and preferred capital along with the owners' equity in the firm's capital structure (Ayodeji, 2011; Obamuyi, 2010; Pandey, 2015).

Importantly, while the use of fixed interest capital is beneficial in terms of tax benefits to companies that uses it, the use of debt comes with the risk of ownership change, as continuous use of debt leads to financial decisions where the company has to raise more equity funds to manage their debt (Garba, 2026). This brings about ownership change or dilution of ownership in finance balance. Also, Olufemi (2025) pointed at the riskiness of being over exposed by firms to the use of long-term debt, even when it is an important long-term source of funds capable of boosting returns on assets. Likewise, Laka *et al.*, (2025) emphasized the fact that a relationship exists between long term debt higher returns when it is optimally used, but increase in the use of debt, especially with company being less efficient, increase the financial exposure of companies and the problem of bankruptcy in the long run. All these affirm the benefits and problems of debt usage in a firm especially in a less efficient firms.

As such different empirical research have been conducted by scholars to unravel their relationship and as well contribute to knowledge. Accordingly, Harelimana (2017) conducted a comparative analysis of debt financing and business performance in two similar sectors from 2010 to 2015. Five models were specified, in which the dependent variable, business performance was proxied by return on assets, loan to deposit ratio, loan to asset ratio, return on equity, sustainable growth and internal growth rate while debt ratio and debt equity ratio were measures of debt financing. By extracting data from the selected firms and analysing it using panel regression, the study found a positive relationship between debt levels and profitability for both I&M Bank and Bank of Kigali, emphasising that debt financing is beneficial and can be increased at relatively low interest rates, which could lead to higher profit levels.

Njagi, *et al.*, (2017) empirically examined the influence of firm efficiency on the relationship between capital structure and firm value in Kenya between 2008 and 2013. Capital structure was defined by the ratios of retained earnings to total capital, debt to total capital, and equity to total capital; efficiency was measured in terms of operational efficiency, cost efficiency, and profit efficiency; and firm value was represented by the firm's inputs (which include financing costs, distribution costs, tax liability, and administrative expenses) and outputs (earnings per share and the share price). The data were estimated using fixed panel regression, which revealed that capital structure has a statistically significant direct effect on firm value, but firm efficiency does not significantly influence the relationship between capital structure and firm value.

Legesse and Guo (2019) tested whether firm efficiency matters for debt financing decisions. In doing so, they focused on large manufacturing firms in China, Japan, India, and Germany, covering the period from 2007 to 2017. The study specified three models to test each debt financing method. Debt financing

metrics were total debt ratio, short-term debt ratio and long-term debt ratio while firm efficiency metrics were input and output factors of firms. The input factors used are capital invested and effort committed by labour, while the output factor is total revenue generated by the firms, which was controlled for size, tangibility, investment, and industry. Using cross-sectional data analysed through the generalised method of moments, a positive relationship was found between firms' efficiency and short-term financing, while a negative relationship was observed between firms' efficiency and long-term debt financing. Additionally, they argue that companies with high productivity are likely to generate high cash flows and possess greater capacity for short-term financing; conversely, high efficiency diminishes the need for long-term borrowing because short-term and internal financing serve as substitutes for external long-term capital.

Rahim and Shah (2019), in their study, "corporate financing and firm efficiency in Pakistan between 2002 and 2012" employed Data Envelopment Analysis (DEA) method to estimate firm efficiency metrics firm performance while corporate financing metrics leverage, other variables in the model are firm age, firm size, board size, asset structure, institutional investors, board composition, growth and firm risk etc. Data were sourced from 136 non-financial firms and estimated using the 2SLS regression method, and they revealed that leverage has a significant positive effect on firm efficiency. Additionally, firm risk, growth rate, size, board size, and board composition positively impact firm efficiency, while firm efficiency significantly negatively affects leverage. This indicates that higher leverage improves firm efficiency, whereas higher firm efficiency leads to reduced leverage.

In Nigeria, Igbinovia and Ogbeide (2019) examined the relationship between capital structure and firm value in the quoted manufacturing firms between 2012 and 2017. They specified that firm value, represented by stock value, depends on leverage, which is defined as capital structure, along with other control variables such as tangibility, profitability, firm size, and age. They used cross-sectional data from the annual financial reports of 15 randomly selected companies across five sub-sectors, including the Industrial Goods segment, Consumer Goods segment (food and beverages), Insurance, and Oil and Gas segment, and estimated the results using panel regression. The research revealed that leverage, asset tangibility, profitability, and age substantially influence firm value, whereas size exhibits a negative and insignificant correlation with the firm value of selected quoted manufacturing firms in Nigeria.

In Nigeria, Ibrahim and Isiaka (2020) studied "financial leverage relationship with firm value, spanning 2014 and 2018". They specified firm value (Tobin's q) as a function of assets, leverage (ratio of long-term debt to equity), and return on assets, the explanatory variables. Panel data from 18 quoted firms were sourced and estimated using panel regression, and they arrived at the position that financial leverage significantly and indirectly affected firm value. The pairwise correlation also found no significant relationship between leverage and firm value.

Nze and Oshim (2020) studied the relationship between corporate finance sources and economic value added of pharmaceutical firms in Nigeria, spanning 2007 to 2016. Net operating profit-cost of capital represented Economic value added while debt, equity and retained earnings represented finance sources. Cross sectional data from the selected firms were estimated using correlation and regression, with the empirical finding that equity capital has a positive and significant effect on economic value added, while debt and retained earnings had a positive and insignificant effect on it.

Tikasari and Surjandari (2020) examined the effect of economic value added and financial performance

on stock returns of mining companies in Indonesia, covering a period between 2012 and 2018. The study proxied the independent variables using EVA and financial performance, such as current ratio, debt to equity ratio, net profit margin, and earnings per share, while the dependent variable was measured by Stock Returns. Cross-sectional data from a sample of the mining sector were sourced from financial statements and estimated using panel regression. The study revealed that economic value added and net profit margin (financial performance) have positive and significant effects on stock returns, while the current ratio, debt-to-equity ratio, and earnings per share have significant effects on stock returns. This study actually used economic value added as a measure of the independent variable, and it was linked to stock return. This differs from the work at hand that used economic value added as a dependent variable.

Akintunde, *et al.*, (2021) studied the effect of financing decisions on shareholders' wealth maximization of Nigeria-listed companies from 2008 to 2017. In their study, the market value of debt and equity was used to proxy the dependent variable, shareholders' wealth maximization, while operating cash flow to total assets, ratio of short term and long term debt and redeemable preference shares to total assets and ratio of equity shares irredeemable preference shares and irredeemable debentures to total assets were the proxies for financing decision, and size as a control variable. Cross-section data from the annual reports of 35 sampled firms were analysed using the panel regression method. The study revealed that financing decisions had a significant effect on market value added; self-financing had a positive and significant effect on market value added, equity-financing negatively and significantly affected market value added while debt financing (DFD) had an insignificant negative effect on market value added. This study looked at the value added from the wealth maximization of shareholders i.e capital structure, which differs from the economic value added of firms which is also seen as a measure of performance from the value creation of the firm to society.

Guo *et al.*, (2021), in their study "The mediating role of cash holding in the leverage and efficiency relationship, measured efficiency by Data Envelopment Analysis, and leverage by the ratio of total debt to total assets". They used two-stage Least Squares (2SLS) and Generalized Method of Moments (GMM) as estimation methods, with findings revealing an inverted U-shaped relationship, indicating that a moderate level of leverage could influence efficiency by reducing agency costs, while excessive leverage could create financial distress capable of affecting the operational efficiency of the companies.

In their study titled "The Moderating Role of Performance on the Relationship between Governance and Leverage in Selected Developed and Emerging Markets," Kijkasiwat *et al.*, (2022) used Tobin's Q and ROA to measure performance, the debt-to-equity ratio to measure leverage, and board size and independence to measure governance. The study used multivariate regression and panel data analysis, and it revealed that leverage mediated the governance-performance relationship in both regions. However, governance indirectly affected performance through excessive leverage.

Omokere *et al.*, (2024), in their study titled "Capital Structure in the Nigerian Health Sector," used ROE and ROA as measures of performance, while short-term and long-term debts were designated as measures of leverage, with size and growth serving as control variables. The study estimated the data using ordinary least squares and found that the Nigerian health sector relied on short-term leverage because of a positive relationship, while higher leverage was found to be harmful due to its negative effect on the sector's performance in Nigeria.

Likewise, Arhinfu *et al.*, (2025) examined optimal capital structure and its impact on financial performance using selected companies in the USA. ROA and ROE were used as measures of performance, while the capital structure was designated as debt to equity. 750 non-financial institutions across 17 sectors between 2003 and 2020 were employed, and panel data were sourced and analysed using the Generalised Method of moments. They found that equity financing of 30% and 50% determined impact performance, specifically from return on assets, but declined ROE. It was also found that leverage financing between 50% and 70% positively impacted both performances.

3. Methodology

Research Design

This study employed a quantitative methodology approach to provide answer to the research question and solved the research problem. It relied on time series data covering a span of 10 years, between 2015 and 2024, and were extracted from the selected companies annual and audited financial statement. The efficiency in this study is an independent variable measured as operating, production and market efficiency, financial leverage was measured by the ratio of debt to equity (DER), while taxation income and corporate social responsibility controlled the model. In analyzing the datasets, the study ensures the usage of estimation method capable of achieving robustness, specifically, generalized method of moments method.

Model Specification

The study adapted the model specification of Legesse and Guo (2019), whose functional form was stated as:

$$Debt = f(Eff, Roa, Cashflow, Cash\ ratio, size, Tang, Investment)$$

This study replaced debt with the debt-to-equity ratio (DER), which is a relative measure of financial leverage. It also split efficiency into three major specifics: operating efficiency, production efficiency, and market efficiency (i.e., price-earning efficiency). It further employed firm-specific variables such as tax income expenses and corporate social responsibility as controls.

Therefore, the model was specified in a functional form as

$$DER = f(OPE, PRE, MKT, TAX, CSR) \text{ --- 1}$$

In a linearised form, the model was restated as:

$$DER_{it} = \alpha_0 + \alpha_1 OPE_{it} + \alpha_2 PRE_{it} + \alpha_3 MKT_{it} + \alpha_4 TAX_{it} + \alpha_5 CSR_{it} + \varepsilon_{it} \text{ --- 2}$$

The model, therefore, specifies that financial leverage is a function of firm efficiency and firm-specific variables. In other words, the debt-to-equity ratio is a function of operating efficiency, production efficiency, and market efficiency as well as company tax and corporate social responsibility.

Definition of Variables

DER=Debt equity ratio, OPE=Operating efficiency, PRE=Production efficiency, MKT=Market efficiency, TAX=Tax income expenses, CSR=Corporate social responsibility, i=number of companies, t=time coverage, α_i --- α_2 =parameters to be estimated, ε_{it} = error term

A priori expectation

In line with the efficiency risk hypothesis assumptions, this study empirically expected that the efficiency

level of the selected consumer goods companies should increase their ability to use more of long-term debt in their business operations. Therefore, a positive relationship is expected between efficiency, (OPE, PRE and MKE) and DER. Mathematically, this study expected positive (+) coefficients from efficiency variables on DER, i.e., $OPE > 0$; $PRE > 0$; and $MKE > 0$.

Estimation Techniques

The study employed the Kao Residual Co-integration test, Generalized Method of Moments (GMM), and the Granger Causality test.

4. Results and discussion

Descriptive Statistics

Table 1 categorically displayed the summary of the descriptive statistics. The mean value revealed that operating efficiency (OPE) of 30.7976 had the highest mean value; followed by the log of corporate social responsibility (LCSR) of 16.3133, and the lowest average mean was recorded by the debt-to-equity ratio (DER) of 2.7990. The standard deviation measured the degree of dispersion from the mean values, and was found that OPE of 73.6161 had the highest volatility value, followed by market efficiency (MKE) with a value of 61.9874, while production efficiency (PRE) had the least volatility with a value of 1.2591.

Further findings revealed that all the variables examined in the model exhibit both positive and negative skewness, indicating that the distribution has both a long left and long right tail. The kurtosis statistics, revealed that most of the variables have a kurtosis value that exceeds 3.0, except for the log of company tax (LTAX) of 2.1035. This indicates that data distribution are both peaked and flattened, i.e., the distribution is both leptokurtic and platykurtic relative to normal distribution.

The Jarque-Bera statistics showed that the p-values of all the variables are below the 5% level of significance. Since the p-values of all the variables are below 0.05, the study rejected the null hypothesis of the Jarque-Bera statistics, which states that the series is normally distributed, and accepted the alternate hypothesis, which states that the series are not normally distributed. However, in all, the total number of observations was 170.

Table 1: Descriptive Statistics

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Obs
DER	2.799058	0.108147	13.42013	5.789821	36.65038	8917.820	0.000000	170
OPE	30.79762	0.220000	73.61618	0.491614	6.157400	76.55136	0.000000	170
PRE	1.535453	1.119969	1.259101	2.985366	16.61546	1565.632	0.000000	170
MKE	12.64519	8.171622	61.98741	-2.7783	50.20896	16005.23	0.000000	170
LTAX	9.933570	8.690896	3.614094	0.414209	2.103544	10.42936	0.005436	170
LCSR	16.31336	16.77415	2.399783	-1.0185	4.496376	33.53995	0.000000	170

Source: Author's computations from EViews 10, 2025

The correlation table provide an initial insight into the association between firm efficiency and financial leverage. are presented in Table 2. It was revealed that operating efficiency ($OPE = 0.1107$), market efficiency ($MKE = 0.0408$), and the log of corporate social responsibility ($LCSR = 0.0713$) exhibit weak positive associations with financial leverage, represented by the debt-equity ratio (DER). Conversely, production efficiency ($PRE = -0.0410$) and the log of company tax ($LTAX = -0.0201$) display a weak negative association with DER. These results indicate a generally weak association between firm

efficiency and financial leverage in the sampled companies. Specifically, OPE, MKE, and LCSR move in the same direction as DER, while PRE and LTAX move in the opposite direction. This suggests that firms with efficient operating systems, effective stock management, diversified investments, and strong commitment to societal responsibilities are more likely to attract creditors and secure external funding. On the other hand, production efficiency (PRE) and income tax move in an opposite direction, indicating that firms that could not minimise cost of production and high income tax limit their ability to embrace the use of debt.

Additionally, the study found no severe multicollinearity between explanatory variables because their coefficients fall well below a benchmark range of 70%, indicating that the explanatory and control variables are distinct enough to be included in a model simultaneously.

Table 2: Correlation Matrix

	DER	OPE	PRE	MKE	LTAX	LCSR
DER	1					
OPE	0.1107	1				
PRE	-0.0410	-0.2419	1			
MKE	0.0408	0.0122	0.3613	1		
LTAX	-0.0201	-0.0435	0.2851	0.1584	1	
LCSR	0.0713	0.0476	-0.0848	0.0019	0.1245	1

Source: Author's computations from EViews 10, 2025

Kao Residual Co-Integration

The study employed Kao's residual cointegration tests to examine the long-run relationship between firm efficiency and financial leverage in listed consumer goods companies in Nigeria. The results are presented in Table 3.

Table 3: Kao Co-Integration Test Results

	t-Statistic	Prob.
ADF	1.418255	0.0781
Residual variance	27.26153	
HAC variance	28.84172	

Source: Author's computations from EViews 10, 2025

The result showed a t-statistic of 1.4182 with a corresponding p-value of 0.0781, which is higher than 0.05, that is, a 5% level of significance. Since the p-value is higher than 0.05, there is no long-term relationship between firm efficiency and the financial leverage of listed consumer goods companies in Nigeria.

Generalized Method of Moments

The effects of firm efficiency on financial leverage of listed consumer goods companies in Nigeria were estimated using the generalized method of moments (GMM). This method is particularly useful where there is an endogeneity problem, such that the independent variable is correlated with the error term. The study separated the GMM into the difference GMM and the system GMM. The results of the different GMMs are presented in Table 4.

The results of the difference GMM showed that a debt-equity ratio (DER) of 0.9460 exerted a significant positive effect on it. This indicates that, when other variables are held constant, the previous debt-equity ratio (DER) would contribute 94.6% to its current value. Furthermore, the study found that all the efficiency variables exhibited negative effects on financial leverage. This is indicated by the coefficients of operating efficiency (OPE) of -0.0124, production efficiency (PRE) of -0.0166 and market efficiency (MKE) of -0.0097. However, a log of company tax (LTAX) of 0.2000 and a log of corporate social responsibility (LCSR) of 0.4320 exerted positive effects on financial leverage.

Table 4: Difference GMM Results

Dependent Variable: DER

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER(-1)	0.9460	0.0081	116.5765	0.0000
OPE	-0.0125	0.0006	-19.9112	0.0000
PRE	-0.0166	0.3026	-0.0550	0.9563
MKE	-0.0098	0.0018	-5.3945	0.0000
LTAX	0.2000	0.0215	9.3179	0.0000
LCSR	0.4321	0.1112	3.8872	0.0002
J-Stat=6.9900		Prob=0.6381		

Source: Author's computations from EViews 10, 2025

The implication of this is that a unit increase in OPE, PRE, and MKE would, respectively, bring about a 1.24%, 1.66%, and 0.97% reduction in financial leverage. Also, a unit increase in LTAX and LCSR would, respectively, bring about a 20% and 43.20% increase in financial leverage. Checking the significance level of each of the variables, the study revealed that the variables, with the exception of production efficiency (PRE), significantly influenced financial leverage. This implies that OPE, MKE, LTAX, and LCSR have highly significant effects on financial leverage.

This result can also be viewed in terms of the contributions of each explanatory variable to the dependent variable. The implication of this is that, out of all the efficiency and firm-specific socio-economic variables, it was one lagged value of corporate social responsibility (LCSR) that positively and significantly influenced financial leverage, and this was followed by LTAX, emphasizing that a firm that is socially and economically responsible is attractive to creditors for external funding.

In addition, the J-statistic (also known as the F-statistic) of 6.990, which explains the significance of the whole model, with a p-value of 0.6381, which is greater than 0.05, that is, 5% level of significance, was suggestive, indicating that the instruments used in the GMM estimation are valid. This strengthens the reliability of the model results.

Table 5: Orthogonal/ System GMM Results
Dependent Variable: DER

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER (-1)	0.9422	0.0035	265.8934	0.0000
OPE	-0.0110	0.0007	-16.4709	0.0000
PRE	0.0577	0.0871	0.6624	0.5095
MKE	-0.0094	0.0011	-8.6320	0.0000
LTAX	0.1576	0.0065	24.1780	0.0000
LCSR	0.4828	0.0681	7.0919	0.0000
J-Stat=0.4544	Prob=0.9999			

Source: Author's computations from e-views 10, 2025

Similarly, the results of the system GMM or Orthogonal GMM, are presented in Table 5. Just as in the Difference GMM, the results of the system GMM or Orthogonal GMM showed that the one lag in debt-equity ratio (DER (-1) of 0.9421 exerted a significant positive effect on current value. This indicates that, holding other variables constant, lagged 1 of DER would always add value to its own innovation to the tune of 94.21%. Likewise, the study found that operating efficiency (OPE) of -0.0110 and market efficiency (MKE) of -0.0093 exhibited negative effects on financial leverage, while production efficiency (PRE) of 0.0577, log of company tax (LTAX) of 0.1576 and log of corporate social responsibility (LCSR) of 0.4827 exerted positive effects on it.

This result implies that a one percent increase in OPE and MKE would respectively bring about a 1.10% and 0.93% reduction in financial leverage, while a one percent increase in PRE, LTAX and LCSR would respectively bring about a 5.77%, 15.76%, and 48.27% increase in financial leverage. Checking the significance level of each of the variables, the study revealed that these variables, except production efficiency, significantly influenced financial leverage. This implies that, OPE, MKE, LTAX, and LCSR exerted significant effects on financial leverage.

This result can also be viewed from the contributions of each explanatory variable to the dependent variable. The implication of this is that, out of all these variables, log value of corporate social responsibility (LCSR) positively and significantly influenced financial leverage, and this was followed by LTAX and PRE. In addition, the J-statistic (also known as the F-statistic) of 0.4544, which explains the significance of the whole model, with a p-value of 0.9999, which is greater than 0.05, that is, the 5% level of significance, indicates that the instruments used in the GMM estimation are valid and also strengthens the reliability of the model results.

Since the difference GMM and system GMM have been used to estimate the effects of firm efficiency on financial leverage, the better estimate must be chosen. As provided by Arellano and Bond (2001), when the lag value of the dependent variable from either one-step or two-step GMM is greater than that of fixed effects and very close to pooled OLS, difference GMM would be more beneficial. But, when the difference in GMM coefficients from the lagged value of the dependent variable is lower, system GMM will be better for the estimation.

As shown in Table 6, both the one-step and two-step Difference GMM were found to be greater than the fixed effects and very close to pooled OLS. As a result, using a difference GMM for the analysis is preferable.

Table 7: Decision on GMM Estimation

Estimators	Coefficients
Pooled OLS	0.8870
Fixed Effects	0.8299
One-Step Diff GMM	0.9421
2nd Step Diff GMM	0.9460

Source: Author's computations from EViews 10, 2025

Arellano and Bond Serial Correlation Test

Table 8 presents Arellano and Bond serial correlation (ARB serial correlation) test results. The null hypothesis of this parameter states that, at 5%, a probability value that is greater than 5% indicates no problem of serial correlation; hence, the model is significant and free from serial correlation problems. On the other hand, a value that is below 5% shows that the model has a serial correlation problem, and hence, it is insignificant. Since the value of the probability of AR (2) is above the 5% level of significance, the test shows that the model is free from serial correlation problems. The test of causality between firm efficiency and financial leverage of consumer goods companies in Nigeria was carried out using the Granger causality test. The results of this test are presented in Table 9. The results revealed that uni-directional causality, at lag 1, only occurred between DER and MKE. The causality therefore moves from the debt-equity ratio (DER) to market efficiency (MKE). This implies that the previous value of DER can be used in predicting market efficiency, i.e., the extent to which firms use leverage for financing purposes to be better positioned and strengthen their competitiveness in the market. It further revealed that market efficiency improves the use of debt for financing purposes among the manufacturing firms.

Table 8: ARB Serial Correlation Test

Test order	m-Statistic	rho	SE (rho)	Prob.
AR (1)	NA	-39.341966	NA	NA
AR(2)	-0.000474	-704.527266	1485403.459	0.9996

Source: Author's computations from EViews 10, 2025

Table 9: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
MKE does not Granger Cause DER	152	0.7073	0.4017	No Causality
DER does not Granger Cause MKE		3.6996	0.0509	Uni-Directional

Source: Author's Computations from EViews, 10, 2025

Hypothesis Testing

H₀₁: Financial efficiency has no statistical significance on the financial leverage of the selected listed companies in Nigeria.

The study used the p-values of each efficiency measure in Table 4. It was revealed that the p-values of these variables, OPE (p=0.0000) and MKE (p=0.0000), were below the threshold of 5%, while PRE (p=0.9563) was above 5% LOS. Since two of the efficiency measures were below 5% LOS, the study, therefore, rejected the null hypothesis and accepted the alternate, which states firm efficiency has a statistical significance on the financial leverage of the selected listed consumer goods companies in Nigeria.

Summary and Discussion of Findings

The study examined the effect of a firm's efficiency on the financial leverage of the listed consumer goods companies in Nigeria spanning 2015 to 2024. Operating efficiency, production efficiency, and market efficiency were measures of firm efficiency; the ratio of debt to equity was the measure for financial leverage, while tax income expenses and corporate social responsibility were the control variables. Data were sourced from 17 listed consumer goods companies and were estimated using the generalized method of moments (GMM). The study revealed a weak correlation between firm efficiency measures and financial leverage variables for listed consumer goods companies in Nigeria. Further findings revealed that all the firm efficiency variables exhibited negative effects on financial leverage, but corporate social responsibility positively and significantly influenced it. Regarding causality, it was also found that causality only runs from debt-equity ratio to market efficiency.

These findings deviated significantly from the theoretical expectations outlined in the study, which anticipated a strong positive and long-run relationship between firm efficiency measures and financial leverage variables. The reasons attributable to this are; first, listed consumer goods companies in Nigeria had a fear of debt, and as such, despite their efficiency levels, their financial leverage (i.e., the use of debt) is pretty low. Also, the non-existence of a long-run relationship between firm efficiency and financial leverage of these listed consumer goods companies is a direct confirmation of their fear of debt. Moreover, the negative effects exhibited by all the firm efficiency variables on financial leverage are a strong indication of the fear of debt and its avoidance. As such, the higher the efficiency levels of these firms, the farther away they are from the use of debt instead of taking the benefits thereof. Ultimately, the causality that runs from debt-equity ratio to market efficiency is a confirmation of the possibility of the firm's market efficiency to accommodate debt (financial leverage) in its capital structure (i.e., debt-equity mix), which was one of the expectations of the study.

Essentially, the findings of this study are in line with those of Harelimana (2017), who found negative relationships between financial leverage or capital structure and firm efficiency. However, Harelimana (2017) found the opposite of the findings this study presents. Contrarily, the findings of this study are not consistent with those of Legesse and Guo (2019), who found a positive link between firm efficiency and financial leverage in Asian countries.

5. Conclusion

It was therefore concluded that firm efficiency negatively influenced the financial leverage of listed consumer goods companies in Nigeria. Arising from the findings emanating from this study and the conclusions drawn therefrom, the following recommendations were made:

- i. The management should employ intensive growth strategies (product development, product differentiation, market penetration, and market development) to improve the Efficiency levels. This would increase their capacity to take on more debt to achieve a target firm growth in the long run.
- ii. The board of directors of Nigerian industrial companies should consider alternatives, based on fear of debt rather than belief that debt can be beneficial. They can do this by expanding their firms' borrowing capabilities which would facilitate increased utilisation of debt for company growth. Simultaneously, regulators in the capital market should prioritise policies that foster the development of Nigeria's debt market. This would enable companies to access

long-term funding options for financing their operations effectively.

- iii. Third, an appraisal of managerial efficiency by the board of directors should not only be based on turnover and absolute profit; rather, it should be based on the triple bottom of efficiency- production efficiency, profit efficiency (operating efficiency) and price-earnings (market efficiency). This would direct managerial efforts, resources, and attention towards enhancing value added.

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