

Managerial Ownership, Firm Performance, and Capital Structure of Listed Pharmaceutical Companies in Nigeria: The Moderating Role of Board Independence

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Abstract

Nigeria's pharmaceutical manufacturers, who are dependent on foreign exchange and importation for their production, face a special challenge in making decisions regarding their capital structure. The interaction between managerial ownership and firm performance with leverage and the moderating effect of board monitoring are less explored in this industry. This study examines the relationship between managerial ownership, firm performance and the capital structure of the listed pharmaceutical companies of Nigeria, with the board independence as moderator. It is based on agency theory, pecking order theory and trade-off theory, and is constructed based on 48 firm-year observations obtained from four purposive selected firms ex post facto. It is the ordinary least squares model with robustness in the form of random-effects and fixed-effects models. Diagnostics are all in favour of pooled OLS and there is no evidence of heteroskedasticity, serial correlation, nor cross sectional dependence. Board independence has a significant impact on leverage reduction, indicating that independent boards serve as a monitoring device in the place of debt. The leverage ratio has a negative effect on firm performance at the 10 percent level, which is consistent with the pecking order behaviour and managerial ownership has no significant impact. The results reject the both hypotheses because the effect of managerial ownership and firm performance is not significantly moderated by board independence. The financing decisions, in turn, are thus determined by board monitoring and internal funding capacity, not by inside interests. The only way to improve the quality of boards is through increased independence and a preference for retained earnings rather than the use of fresh capital, and the regulators should put the board composition rules in the Nigerian Code of Corporate Governance into practice.

Keywords

Managerial
Ownership, Firm
Performance, Capital
Structure, Board
Independence,
Pharmaceutical
Firms, Nigeria.

I. Introduction

Capital structure refers to the ratio of debt and equity financing that affects the cost of capital, risk profile and investment capacity of a firm (Frank & Goyal, 2009; Kumar et al., 2017). In pharmaceutical manufacturing, the decision is particularly challenging because of the high costs and limited availability of external financing due to the long production and regulatory cycles, knowledge-intensive assets, and uncertain returns of pharmaceutical products and services

(Brown et al., 2009; Hall, 2002). Pharma companies thus have a continuous dilemma between discipline and flexibility between debt and equity.

The tensions are exacerbated in Nigeria. Estimate imports cover approximately 70% of medicines used, and the majority of the active pharmaceutical ingredients and excipients used by local manufacturers are imported as well, with currency movements reflecting directly in the medicines production costs (Dataphyte, 2024). The pressure has been mounting on the local manufacturers (Dataphyte, 2024; Prime Business Africa, 2024) due to the devaluation of the naira and the departure of multinationals like GlaxoSmithKline. This is partly because of how listed companies have reacted to the market, with one top producer relying on debt to sustain its speedy growth and the other maintaining a more balanced financing mix (Nairametrics, 2025). That heterogeneity is amenable to systematic explanation especially as some of the listed pharmaceutical companies have shareholders that also sit on the boards or in management (Prime Business Africa, 2025).

A major candidate explanation is managerial ownership, which influences the extent to which managers are held accountable for financing decisions. Agency theory suggests that the greater the managerial stake, the more aligned the interests are between managers and outside shareholders and the more likely that the role of debt as a disciplining device will change (Jensen, 1986; Jensen & Meckling, 1976); conversely, the interest of outside shareholders may be lessened by entrenched managers, who may be less inclined to take on debt to discipline the manager because debt would reduce their undiversified wealth and positions (Berger et al., 1997; Friend & Lang, 1988). The issue is relevant in emerging markets, where the presence of concentrated ownership and low external monitoring is prevalent (Claessens & Yurtoglu, 2013).

The second factor in determining interest is the performance of the firm. However, Pecking order theory suggests that profitable firms use retained earnings and borrow less; trade-off theory suggests that they use more borrowed funds to take advantage of the tax benefits and to demonstrate their creditworthiness (Myers, 1984; Myers & Majluf, 1984). In the empirical literature, the leverage–performance relationship is found to be ambiguous and heterogeneous across contexts and proxies (Dao & Ta, 2020; Ibhagui & Olokoyo, 2018; Le & Phan, 2017), suggesting that there is ambiguity regarding the direction of causality and the possibility of reverse causality.

In the background of the above, the following research gaps motivate the study. First, Nigerian evidence is drawn largely from cross-industry samples (Obembe et al., 2016; Uwuigbe, 2014), which obscures sector-specific financing constraints; to our knowledge, no study isolates pharmaceutical manufacturers. Second, ownership and performance are typically examined separately, with ownership explaining leverage or performance and leverage explaining performance (Dao & Ta, 2020; Detthamrong et al., 2017), rather than both acting as joint determinants of capital structure. Third, findings on managerial ownership are inconsistent, from negative effects on leverage (Uwuigbe, 2014) to significant positive effects (Ferliana & Agustina, 2018) and no effect on performance (Obembe et al., 2016), while linear specifications may mask non-monotonic effects (Brailsford et al., 2002). Fourth, contingency approaches are thin: where moderators are tested, they are financial attributes such as profitability (Ferliana & Agustina, 2018; Hirdinis, 2019) rather than board-level monitoring, even though boards are the main internal mechanism for disciplining managers (Adams et al., 2010; Fama & Jensen, 1983). Fifth, available Nigerian evidence ends well before the COVID-19 disruption and recent currency shocks (Obembe et al., 2016; Uwuigbe, 2014), so the 2016–2025 decade remains unexamined for this sector.

Accordingly, the study addresses three questions. What is the effect of managerial ownership on the capital structure of listed Nigerian pharmaceutical companies? What is the effect of firm performance on that capital structure? Does board independence moderate these relationships? It contributes by (a) providing sector-specific evidence, (b) modelling ownership

and performance jointly, including non-linear ownership effects, (c) testing board independence as a contingency, and (d) covering 2016–2025 with estimators suited to a short, small-N panel (Beck & Katz, 1995). Section 2 reviews the literature and develops hypotheses; Section 3 presents the methodology.

II. Literature Review and Hypotheses Development

Theoretical Framework

The modern study of capital structure starts with Modigliani and Miller (1958) who showed that financing is irrelevant under perfect markets. Changing that assumption produced three different types of perspective. The trade-off theory states that firms compare the present value of the tax benefits and discipline that comes with debt against the present value of distress costs (Kraus & Litzenberger, 1973). The pecking order theory establishes that internal funds are preferred over debt because of information asymmetries and debt is preferred over new equity (Myers, 1984; Myers & Majluf, 1984). Agency theory stresses the presence of conflicts between managers and shareholders and between shareholders and creditors (Jensen & Meckling, 1976) while debt limits the managerial discretion over free cash flows (Jensen, 1986).

The ownership argument is also backed by agency theory. The convergence-of-interests logic argues that higher managerial ownership would create a lesser debt-based monitoring demand. The entrenchment logic suggests that managers with considerable control avoid leverage to escape market discipline (Berger et al., 1997; Morck et al., 1988). If both mechanisms coexist, these may follow a non-linear relationship, which can be masked by the linear specifications (Brailsford et al., 2002).

The framework is completed by the monitoring role of the board. Independent directors are expected to curb managerial opportunism and improve the credibility of financing decisions (Adams et al., 2010; Fama & Jensen, 1983), a rationale reflected in the Nigerian Code of Corporate Governance 2018 (Financial Reporting Council of Nigeria, 2018). Board independence is therefore treated as a contingency that conditions how ownership incentives and performance feedback translate into leverage.

Empirical Review

Managerial Ownership and Capital Structure

Early evidence associated managerial self-interest with lower debt (Friend & Lang, 1988) and showed that entrenched managers pursue conservative leverage (Berger et al., 1997). Brailsford et al. (2002) documented a non-linear relation between ownership structure and leverage. In Nigeria, Uwuigbe (2014) examined 40 listed firms over 2006–2011 and found that managerial ownership and board size had significant negative effects on capital structure, which he attributed to entrenchment-driven debt avoidance. Elsewhere, Ferliana and Agustina (2018) found that managerial ownership significantly influenced the capital structure of Indonesian firms, and Detthamrong et al. (2017) analysed governance, capital structure, and performance jointly for Thailand. The conflicting results indicate that impacts are contingent upon institutional context, ownership structure, and neglected factors.

Firm Performance and Capital Structure

Profitability is one of the classic determinants studies that include it as one of the leverage factors (Frank & Goyal, 2009; Titman & Wessels 1988). Evidence of the leverage-performance relationship in India, Germany, Romania, and Vietnam are mixed in sign and magnitude (Abdullah & Tursoy, 2021; Chadha & Sharma, 2015; Vătavu, 2015; Vo & Ellis, 2017), which is also confirmed by a meta-analysis (Dao & Ta, 2020). Ibhagui and Olokoyo (2018) reveal that the relationship is influenced by firm size in Nigeria, but country-specific factors are emphasized for Iran (Alipour et al., 2015) and Vietnam (Le & Phan, 2017). Most of these studies focus on performance being the result, thereby underutilizing the feedback from performance to

financing.

Governance and Contingency Effects

While board characteristics are found to be related to the performance of the firms in Nigeria (Ujunwa, 2012) and other emerging and developed countries (Afrifa & Tauringana, 2015; Ntim et al., 2015), the impact of managerial ownership on the performance of firms in Nigeria is inconclusive as Obembe et al., (2016) found no significant relationship between managerial ownership and performance in 63 non-financial firms between 1998 and 2010. Although there are some moderation designs, they focus on profitability and not on governance (Ferliana & Agustina, 2018; Hirdinis, 2019). The key studies and gaps that remain in the studies are summarized in Table 1.

Table 1: Summary of Selected Empirical Studies and Research Gaps

Study	Context and period	Main finding	Gap addressed here
Uwuigbe (2014)	40 Nigerian listed firms, 2006–2011	Managerial ownership and board size negatively affect capital structure	Cross-industry; pre-2012; no moderator; no performance
Obembe et al. (2016)	63 Nigerian non-financial firms, 1998–2010	Managerial ownership has no significant effect on performance (linear and non-linear)	Capital structure not modelled; pre-2011
Ferliana & Agustina (2018)	37 Indonesian firms (124 units)	Managerial ownership affects capital structure; profitability moderates	Non-Nigerian; not pharmaceutical; no board moderator
Ibhagui & Olokoyo (2018)	Nigerian non-financial firms	Leverage–performance link depends on firm size	Performance treated as outcome; ownership omitted
Detthamrong et al. (2017)	Thai listed firms	Governance, capital structure, and performance analysed jointly	Not sector-specific; no Nigerian evidence
Le & Phan (2017)	Vietnamese listed firms	Leverage negatively associated with performance	Ownership and board contingencies omitted

Source: Author's Computations (2026)

Hypotheses and Conceptual Framework

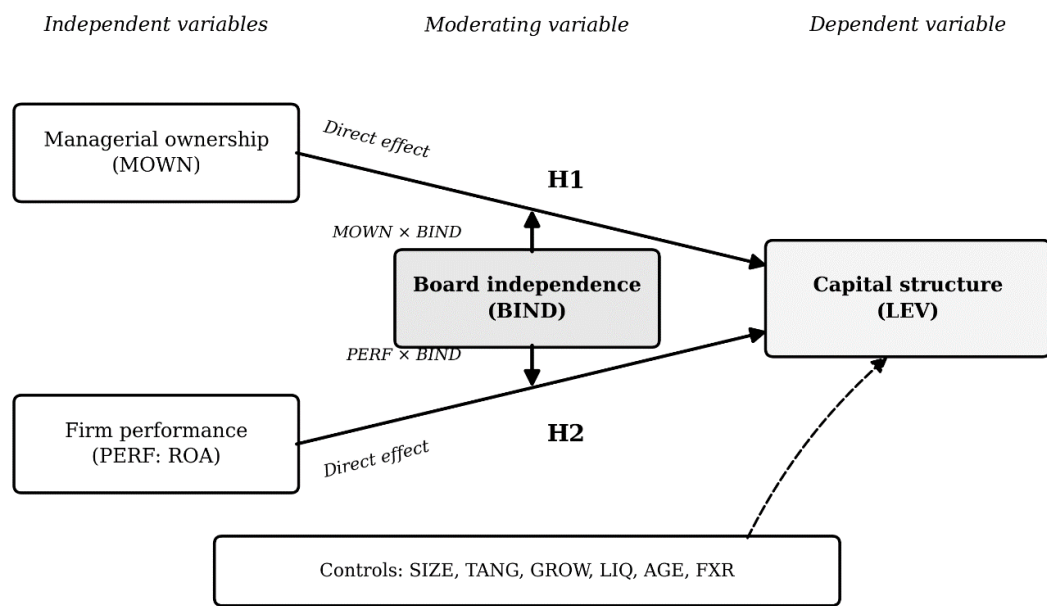
Drawing on agency theory and the mixed evidence above, managerial ownership is expected to influence leverage, possibly non-linearly (Berger et al., 1997; Brailsford et al., 2002; Uwuigbe, 2014). Pecking order and trade-off arguments imply that performance also affects leverage, with sign determined empirically (Myers & Majluf, 1984; Kraus & Litzenberger, 1973). Independent boards are expected to change how both factors operate (Adams et al., 2010; Fama & Jensen, 1983). The study therefore tests the following hypotheses, stated in alternative form:

H1: Board independence significantly moderates the relationship between managerial ownership and capital structure.

H2: Board independence significantly moderates the relationship between firm performance and capital structure.

Figure 1 presents the conceptual framework linking these constructs.

Figure 1: Conceptual Framework



H1: BIND moderates the MOWN-LEV relationship. H2: BIND moderates the PERF-LEV relationship.

Source: Author's Computations (2026)

III. Data and Methods

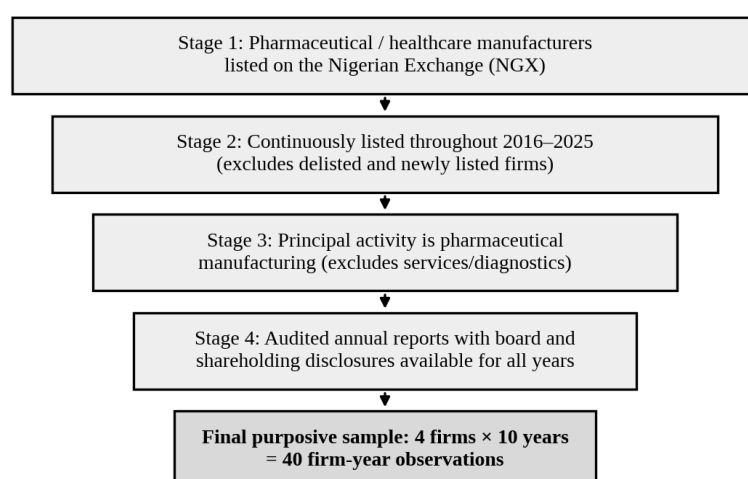
Research Design

The study adopts a positivist, quantitative, ex post facto design suited to testing theory-derived hypotheses with archival data (Ghuri et al., 2020; Saunders et al., 2019). A longitudinal panel combines cross-sectional and time-series variation, allowing control of unobserved firm heterogeneity (Baltagi, 2021).

Population, Purposive Sampling, and Sample

The population comprises pharmaceutical and healthcare manufacturers listed on the Nigerian Exchange (NGX). Purposive sampling is used because the research question targets a specific, information-rich and small population, and because the analysis requires complete multi-year disclosure on ownership and boards (Campbell et al., 2020; Etikan et al., 2016; Palinkas et al., 2015). Firms were retained if they (i) were continuously listed throughout 2016–2025; (ii) had pharmaceutical manufacturing as their principal activity; and (iii) published audited annual reports containing board composition and shareholding disclosures for every year. Firms delisted during the period, such as GlaxoSmithKline Consumer Nigeria Plc, whose delisting followed its 2023 exit (Prime Business Africa, 2024), or listed after 2016 were excluded. Figure 2 summarises the screening process, and Table 2 lists the resulting sample.

Figure 2: Purposive Sampling Procedure



Note. Developed by the authors.

Table 2: Purposively Selected Pharmaceutical Companies

Company	Inclusion rationale	Firm-years
Fidson Healthcare Plc	Listed throughout; founder-managing director is the majority shareholder (Prime Business Africa, 2025)	10
May & Baker Nigeria Plc	Listed throughout; ownership held largely through an investment company, offering contrast with director-held firms (Prime Business Africa, 2025)	10
Neimeth International Pharmaceuticals Plc	Listed throughout; majority shareholder is also a non-executive director (Prime Business Africa, 2025)	10
Morison Industries Plc	Listed throughout; majority shareholder is a non-executive director (Prime Business Africa, 2025); retained subject to verification of complete reports	10
Total	4 firms × 10 years	40

Note. Compiled by the authors from NGX listings and company disclosures. Final inclusion is subject to confirmation of complete annual reports for 2016–2025.

Data Sources and Measurement of Variables

Data were hand-collected from the audited annual reports and accounts and NGX price records for market-based measures. IFRS prepares the reports that enhance comparability between firms and years. The 1st and 99th percentiles of the continuous variables are winsorised. Table 3 defined variables in accordance with established practice (Frank & Goyal, 2009; Kumar et al., 2017; Obembe et al., 2016; Uwuigbe, 2014). Control variables follow best practice guidance of including only theoretically justified covariates (Bernerth & Aguinis, 2016).

Table 3: Variable Definitions and Measurement

Variable	Code	Measurement	Role and source
Leverage	LEV	Total debt ÷ total assets (robustness: long-term debt ÷ total assets; debt-to-equity)	Dependent; Frank & Goyal (2009)

Variable	Code	Measurement	Role and source
Managerial ownership	MOWN	Shares held by executive directors and key management ÷ total shares outstanding (%)	Independent; Uwuigbe (2014)
Firm performance	PERF	Return on assets: profit after tax ÷ total assets (robustness: ROE; Tobin's Q)	Independent; Obembe et al. (2016)
Board independence	BIND	Independent non-executive directors ÷ board size	Moderator; Adams et al. (2010)
Firm size	SIZE	Natural logarithm of total assets	Control; Titman & Wessels (1988)
Tangibility	TANG	Net fixed assets ÷ total assets	Control; Frank & Goyal (2009)
Growth	GROW	Annual percentage change in revenue	Control; Frank & Goyal (2009)
Liquidity	LIQ	Current assets ÷ current liabilities	Control; Alipour et al. (2015)
Firm age	AGE	Natural logarithm of years since incorporation	Control; Ibhagui & Olokoyo (2018)
FX reform dummy	FXR	1 for 2023–2025, 0 otherwise (post-devaluation period)	Control; Dataphyte (2024)

Source: Author's Computations (2026)

Model Specification

The equation is designed to test moderation (H1 and H2) for board independence and its interactions. Before forming interaction and squared terms to limit multicollinearity and ease interpretation, independent variables are mean-centred (Aiken and West, 1991; Hayes, 2022). The equation presented refers to the model for estimating firm value where various determinants of firm value have been incorporated within the model.

$$LEV_{it} = \alpha + \beta_1 \cdot MOWN_{it} + \beta_2 \cdot PERF_{it} + \beta_3 \cdot BIND_{it} + \beta_4 \cdot (MOWN \times BIND)_{it} + \beta_5 \cdot (PERF \times BIND)_{it} + \gamma'X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (i)$$

Here *i* indexes firms and *t* years; *X* is the vector of controls (SIZE, TANG, GROW, LIQ, AGE, FXR); μ_i captures unobserved firm effects; λ_t captures common time shocks; and ε_{it} is the error term.

Estimation Strategy and Diagnostics

Pooled OLS, fixed-effects and random-effects estimators are compared via Lagrange multiplier test of Breusch and Pagan (1980) and Hausman test (1978). Since the panel has more time periods (*T* = 10) than firms (*N* = 4), inference relies on panel-corrected standard errors robust to heteroskedasticity and contemporaneous correlation (Beck and Katz, 1995) with Driscoll–Kraay errors as a cross-check (Hoechle, 2007). Dynamic GMM estimators are not appropriate with so few cross-sectional units (Roodman, 2009).

Pre-estimation and post-estimation diagnostics include descriptive statistics, correlation matrices, and variance inflation factors, with values above 10 signalling collinearity (Hair et al., 2019); the Wooldridge (2010) test for serial correlation; a modified Wald test for groupwise heteroskedasticity (Greene, 2018); and the Pesaran (2021) test for cross-sectional dependence. Reverse causality between performance and leverage is mitigated by re-estimating with one-year lagged regressors, consistent with recommendations on endogeneity in corporate finance (Flannery & Hankins, 2013; Wintoki et al., 2012).

IV. Results and Discussion

This section reports the descriptive statistics, pre-estimation and post-estimation diagnostics, panel regression estimates, and the hypothesis tests. Results are reported to three decimal places for descriptive statistics and four for regression coefficients; p values and correlations omit the leading zero in line with APA (7th ed.) conventions.

Descriptive Statistics

Table 4: Descriptive Statistics of Study Variables

Variable	N	M	SD	Min	Max	Skewness	Kurtosis
LEV (leverage ratio)	48	0.452	0.062	0.268	0.633	0.039	4.476
MOWN (managerial ownership, %)	48	18.070	3.452	7.155	26.471	-0.472	4.848
PERF (return on assets)	48	0.077	0.018	0.039	0.111	-0.154	2.243
BIND (board independence)	48	0.454	0.064	0.270	0.590	-0.720	3.444
SIZE (log of total assets)	48	22.794	0.623	21.397	24.656	0.574	3.798
TANG (tangibility)	48	0.403	0.082	0.183	0.630	-0.021	3.575
GROW (revenue growth, %)	48	8.659	4.175	-0.096	20.100	0.806	3.945
LIQ (current ratio)	48	1.746	0.288	1.063	2.730	0.484	4.852
AGE (log of firm age)	48	3.609	0.271	3.045	4.043	-0.232	2.085
FXR (FX reform dummy)	48	0.417	0.498	0.000	1.000	0.338	1.114

Source: Author's Computations (2026)

As can be seen from Table 4, the average debt financing for the assets of the sampled pharmaceutical companies is 45.2% (SD = 6.2%), ranging from 26.8% to 63.3%. The average of managerial ownership was 18.07% (SD = 3.45), ranging from 7.16% to 26.47%, so managerial ownership was relatively moderate with no firm having a stake of almost 100%. Mean return on assets was 7.7% (SD = 1.8%), and an average of 45.4% of directors were independent (range = 27.0%–59.0%). The average of the growth in revenue was 8.66% (SD = 4.18), and the minimum growth was -0.10%, meaning that at least one firm-year experienced no growth. In the post-reform era (FXR = 1), about 41.7% of the observations. All variables are mildly skewed (range -1 to +1) and none of them is highly leptokurtic (range 1.11–4.85) and significantly deviant from the normal value of 3. LEV, MOWN, and LIQ are slightly leptokurtic.

Correlation Analysis and Multicollinearity

Table 5: Pearson Correlation Matrix and Variance Inflation Factors

Variable	1	2	3	4	5	6	7	8	VIF
1. LEV	—								—
2. MOWN	.447**	—							1.10
3. PERF	-.499***	.191	—						1.13
4. BIND	-.622***	-.003	.026	—					1.26
5. SIZE	-.066	.029	-.063	.312*	—				1.33
6. TANG	.110	-.233	-.293*	-.200	-.109	—			1.38
7. GROW	-.018	-.035	-.109	.093	.299*	.227	—		1.27
8. LIQ	-.150	.173	.132	.373**	.266	-.363*	-.144	—	1.44
9. AGE	-.037	-.039	.034	.002	-.103	.159	.121	.063	1.09

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5 shows that leverage is significantly and positively correlated with managerial ownership ($r = .447$, $p = .001$) and significantly and negatively correlated with firm performance ($r = -.499$, $p < .001$) and board independence ($r = -.622$, $p < .001$). The correlations of leverage with size, tangibility, growth, liquidity, and age are weak and non-significant. The largest correlation among predictors is between BIND and LIQ ($r = .373$), well below the .80 threshold that signals problematic collinearity. Consistently, all VIFs are below 1.50 (mean = 1.25), far under the cut-off of 10 (Hair et al., 2019), so the explanatory variables are not redundant.

Diagnostic Tests

Table 6: Model Specification and Post-Estimation Diagnostic Tests

Test	Null hypothesis	Statistic	p	Decision
Variance inflation factor	No harmful collinearity ($VIF < 10$)	Max = 1.44; M = 1.25	—	No collinearity
Breusch–Pagan LM	$Var(u) = 0$	$chibar^2(01) = 0.00$	1.000	Pooled OLS preferred to RE
F-test, effects	All $u = 0$	$F(11, 26) = 0.76$	.670	Pooled OLS preferred to FE
White	Homoskedasticity	$\chi^2(44) = 47.43$	.335	Not rejected
Wooldridge	No first-order autocorrelation	$F(1, 11) = 0.25$	.626	Not rejected
Pesaran CD	Cross-sectional independence	$CD = 0.50$	.617	Not rejected
Frees	Cross-sectional independence	$Q = -0.35$	$> .10^a$	Not rejected
Shapiro–Wilk	Normally distributed residuals	$W = 0.98$; $z = -0.74$	.770	Not rejected
Skewness–kurtosis	Normally distributed residuals	$\chi^2(2) = 3.41$	.182	Not rejected

Table 6 indicates that the Breusch–Pagan Lagrange multiplier test ($chibar^2(01) = 0.00$, $p = 1.000$) and the F test of group effects ($F(11, 26) = 0.76$, $p = .670$) both fail to reject the null of no group-specific effects. Pooled OLS is therefore the preferred specification, and the random-effects and fixed-effects models are retained as robustness checks. White's test shows no heteroskedasticity ($\chi^2(44) = 47.43$, $p = .335$), the Wooldridge test shows no first-order serial correlation ($F(1, 11) = 0.25$, $p = .626$), and both Pesaran's ($CD = 0.50$, $p = .617$) and Frees' tests show no cross-sectional dependence. Residuals are normally distributed according to the Shapiro–Wilk test ($W = 0.98$, $p = .770$) and the skewness–kurtosis test ($\chi^2(2) = 3.41$, $p = .182$). With no violation of the classical assumptions detected, the standard errors reported in Table 7 can be treated as reliable.

Panel Regression Results

Table 7: Regression Results for the Determinants of Leverage (Dependent Variable: LEV)

Variable	Pooled OLS	Random effects	Fixed effects ^a
MOWN	0.0089 (0.0062)	0.0089 (0.0062)	0.0073 (0.0077)
PERF	-2.0152†	-2.0152†	-1.4479

Variable	Pooled OLS	Random effects	Fixed effects ^a
	(1.0505)	(1.0505)	(1.2464)
BIND	−0.6465*	−0.6465*	−0.6376†
	(0.2886)	(0.2886)	(0.3429)
MOWN × BIND	0.0016	0.0016	0.0043
	(0.0130)	(0.0130)	(0.0163)
PERF × BIND	−0.1253	−0.1253	−1.4930
	(2.2622)	(2.2622)	(2.6914)
SIZE	0.0075	0.0075	0.0089
	(0.0052)	(0.0052)	(0.0057)
TANG	−0.0360	−0.0360	−0.0584
	(0.0392)	(0.0392)	(0.0445)
GROW	−0.0002	−0.0002	−0.0007
	(0.0007)	(0.0007)	(0.0011)
LIQ	0.0082	0.0082	0.0056
	(0.0117)	(0.0117)	(0.0138)
AGE	0.0040	0.0040	0.0093
	(0.0117)	(0.0117)	(0.0127)
FXR	0.0006	0.0006	Omitted
	(0.0063)	(0.0063)	
Constant	0.5476**	0.5476**	0.5225*
	(0.1896)	(0.1896)	(0.2211)
N	48	48	48
R ²	.930	.930 (overall)	.932 (within)
Adjusted R ²	.909	—	—
F / Wald χ^2	F(11, 36) = 43.62***	$\chi^2(11) = 479.81***$	F(10, 26) = 35.64***
σ_u, ρ	—	0, 0	0.009, .195

Table 7 shows that the pooled model explains 93.0% of the variance in leverage (adjusted R² = .909) and is jointly significant, F(11, 36) = 43.62, p < .001. Board independence has a significant negative direct effect on leverage (β = −0.647, SE = 0.289, p = .031). Evaluated at the sample means of MOWN and PERF (Table 4), the marginal effect of BIND is approximately −0.63, so a 10-percentage-point increase in independent directors is associated with a 6.3-percentage-point reduction in the leverage ratio. This result is consistent with the view that independent boards substitute for debt as a monitoring device (Fama & Jensen, 1983; Jensen, 1986) and with the negative governance–leverage association reported for Nigerian firms by Uwuigbe (2014).

Firm performance has a negative coefficient (β = −2.015, SE = 1.051) that is significant only at the 10% level (p = .063 in pooled OLS; p = .055 in random effects). Its direction supports the pecking order proposition that more profitable firms rely on retained earnings and borrow less (Myers, 1984; Myers & Majluf, 1984), and it agrees with the negative leverage–performance link in Le and Phan (2017). At mean board independence, a 1-percentage-point rise in ROA corresponds to a reduction of about 2.1 percentage points in leverage; given the marginal significance, this estimate should be read with caution. Managerial ownership has a positive but

non-significant effect ($\beta = 0.009$, $p = .159$), which provides no evidence for either the entrenchment-driven avoidance of debt (Berger et al., 1997) or a strong convergence-of-interests effect (Ferliana & Agustina, 2018) in this sample. None of the control variables (SIZE, TANG, GROW, LIQ, AGE, FXR) is significant, so the post-reform period did not shift leverage once the other factors were held constant. The fixed-effects estimates in the last column of Table 7 are similar in sign and magnitude, although less precisely estimated, and the group effects are jointly insignificant (Table 6).

Hypothesis Testing and Robustness

Table 8: Summary of Hypothesis Tests and Robustness Across Estimators

Effect	Pooled OLS	Random effects	Fixed effects	Conclusion
H1: MOWN × BIND	$\beta = 0.002$, $p = .904$	$\beta = 0.002$, $p = .904$	$\beta = 0.004$, $p = .793$	Not supported
H2: PERF × BIND	$\beta = -0.125$, $p = .956$	$\beta = -0.125$, $p = .956$	$\beta = -1.493$, $p = .584$	Not supported
BIND (direct)	$\beta = -0.647$, $p = .031$	$\beta = -0.647$, $p = .025$	$\beta = -0.638$, $p = .074$	Negative; significant in 2 of 3 models
PERF (direct)	$\beta = -2.015$, $p = .063$	$\beta = -2.015$, $p = .055$	$\beta = -1.448$, $p = .256$	Negative; marginal in 2 of 3 models
MOWN (direct)	$\beta = 0.009$, $p = .159$	$\beta = 0.009$, $p = .150$	$\beta = 0.007$, $p = .353$	Positive; not significant

Source: Author's Computations (2026)

Table 8 demonstrates that the moderation hypotheses are not supported with any of the three estimators. The interaction between the presence of Board members with different opinion and Board members with similar opinion within the model is negligible and insignificant for H1 ($\beta = 0.002$, $p = .904$), which means that the effect of managerial ownership on leverage is not modified by board independence. The interaction of PERF × BIND is also not significant, similarly to H2 ($\beta = -0.125$, $p = .956$) and hence does not indicate any difference in the performance–leverage relationship in terms of board independence. These null findings are consistent: the interaction coefficients are not significant ($p > .50$) in both the random-effects and fixed-effects specifications. All three models show a negative direct effect for BIND with two of them being significant; all three show a negative direct effect for PERF, also two of which are significant, showing that substantive conclusions are not dependent on the choice of estimator. The lack of moderation could be due to the small size of the panel, because the interactions take a lot more variation than direct effects, and the fact of the interaction terms being highly correlated with the uncentred versions could also lead to larger standard errors.

V. Conclusion and Recommendations

Conclusion

This study investigated the moderating effect of the board independence on the relationship between managerial ownership and capital structure of listed pharmaceutical firms in Nigeria, and the relationship between firm performance and capital structure. Pooled OLS was used to perform the diagnostic tests and no heteroskedasticity, serial correlation and cross sectional dependence were found from the tests. Three conclusions follow. First, among the various factors that have been proposed as correlates of leverage, the strongest one is board independence, where firms with more independent directors leverage less. Secondly, there is a marginal relationship between lower leverage and higher firm performance, which is consistent with pecking order behaviour. Third, managerial ownership does not impact the company's leverage ratio, nor does board independence moderate the impact of either managerial

ownership or performance. The role of the board in monitoring performance and the ability of the internal funders to provide financing, then, seems to have a much greater effect on capital structure in these firms than do insiders' equity holdings.

Recommendations

Boards and managers of pharmaceutical companies should consider that independent directors are not a substitute for debt discipline in their companies and should ensure or increase the level of board independence; and should use retained earnings before external debt, especially in view of foreign-exchange exposure.

The Financial Reporting Council of Nigeria and the Nigerian Exchange should ensure that the board-composition provisions of the Nigerian Code of Corporate Governance 2018 are continuously observed in order to enhance the quality of data for future research, as well as for mandatory disclosure of managerial shareholding in the company for the year at hand.

A high percentage of independent directors should not be viewed as a red flag of increased debt load and financing risk should be assessed based on board quality, profitability and liquidity, not on insider ownership alone.

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