

Financial Constraints and Investment Efficiency: Evidence from Listed Non-Financial Firms in Nigeria (2015–2024)

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Abstract. This study examines the effect of financial constraints on investment efficiency among listed non-financial firms in Nigeria from 2015 to 2024. Employing an ex post facto panel design, the study analyses the annual reports of 60 non-financial companies listed on the Nigerian Exchange Group over 10 years, yielding 600 firm-year observations. This study assesses financial constraints using the Kaplan-Zingales (KZ) index. It estimates investment efficiency using a model that distinguishes between efficient investment and under- and over-investment. The analysis employs pooled OLS, fixed effects, random effects, and two-step system GMM estimators, with robustness checks using the SA index, WW index, and alternative investment-efficiency proxies. The findings show that financial constraints significantly impair investment efficiency, predominantly through under-investment rather than over-investment, as the over-investment subsample shows no significant impact. Investment efficiency is positively associated with firm size, firm age, profitability, and Tobin's Q, and negatively associated with leverage and sales growth. The KZ index explains substantial cross-firm variation in investment efficiency, and results remain robust to alternative constraint and efficiency measures and endogeneity correction using system GMM. These findings support agency and stakeholder theories of corporate investment behaviour and underscore the need to enhance access to external funding and strengthen corporate governance to mitigate under-investment among Nigerian listed firms.

Keywords: Financial constraints; investment efficiency; under-investment; over-investment; Kaplan–Zingales index; Nigerian Exchange Group.

INTRODUCTION

Corporate investment efficiency—defined as the extent to which firms invest in positive net present value (NPV) projects while avoiding negative-NPV investments—is fundamental to firm growth. In frictionless markets, internal finance is a perfect substitute for external finance, and all firms invest in the value-maximising amount [2]. In practice, information asymmetries and agency conflicts drive a wedge between the cost of internal and external funds, so that firms either forgo profitable projects (under-investment) or deploy surplus cash into value-destroying ones (over-investment) [3, 4]. One of the most important of these frictions is financial constraints, defined as a firm's inability to finance the investment it would like to make from available internal and external sources, and is most severe in econo-

mies with shallow capital markets and high credit costs [5, 6].

Nigeria is a challenging case study of this relationship. Its corporate sector is highly dependent on banks, the equity and bond markets are relatively illiquid, and institutions are poorly enforced [7]. Firm-level evidence shows that access to finance is a binding constraint for many Nigerian businesses, particularly smaller and younger ones, and that financially constrained businesses in Sub-Saharan Africa are systematically less productive than their unconstrained counterparts [8]. However, most empirical studies have examined the relationship between financial constraints and investment behaviour in China, the United States, and other developed or large emerging markets. In contrast, Nigerian corporate-finance research has focused on capital

structure and the governance–performance link rather than the investment-efficiency channel itself [9–11].

This study seeks to fill this void by posing the following questions: What is the impact of financial constraints on the efficiency of investment among listed non-financial firms in Nigeria, and does this impact vary between under-investment and over-investment? This article builds on prior research investigating financial constraints and corporate investment decisions, specifically focusing on investment efficiency using the authors' [12] index as the primary constraint measure and the authors' [1] residual-based approach to distinguish efficient investment from its two inefficient forms. The study makes three contributions to the literature: firstly, it offers context-specific evidence on the financial constraint–investment efficiency relationship for the largest economy in Africa; secondly, it uses dynamic panel (system GMM) estimation to tackle endogeneity issues that are often ignored in simpler panel designs used in the Nigerian literature; and third, it distinguishes between under-investment and over-investment rather than aggregating investment inefficiency.

Statement of the Problem. The available literature on the relationship between corporate investment and financial constraints in Nigeria has largely focused on governance–performance relationships or the determinants of capital structure, with the actual mechanism linking financial constraints to investment inefficiency being less well explored [10]. Financial-constraint studies are scarce in emerging markets. When they do exist, they do not distinguish between under-investment and over-investment, which is important for policy, as the policy response to chronic under-investment differs from that to over-investment. This study directly fills that gap for the non-financial listed sector of the Nigerian stock market during the study period (2015–2024).

Aim and Objectives. This study examines the effect of financial constraints on the investment efficiency of listed non-financial firms in Nigeria. The specific objectives are to:

- a) Determine the effect of financial constraints on investment efficiency;
- b) Determine the effect of financial constraints on under-investment;

- c) Determine the effect of financial constraints on over-investment; and

- d) Assess whether firm size moderates the financial constraint–investment efficiency relationship.

Research Questions

- a) What is the effect of financial constraints on investment efficiency among listed non-financial firms in Nigeria?

- b) What is the effect of financial constraints on under-investment among listed non-financial firms in Nigeria?

- c) What is the effect of financial constraints on over-investment among listed non-financial firms in Nigeria?

- d) Does firm size moderate the financial constraint–investment efficiency relationship?

Research Hypotheses

H₀₁: Financial constraints have no significant effect on investment efficiency among listed non-financial firms in Nigeria.

H₀₂: Financial constraints have no significant effect on under-investment among listed non-financial firms in Nigeria.

H₀₃: Financial constraints have no significant effect on over-investment among listed non-financial firms in Nigeria.

H₀₄: Firm size does not significantly moderate the relationship between financial constraints and investment efficiency.

Literature Review

Conceptual Review

1) Financial constraints: Financial constraints refer to the costs or impediments associated with accessing external financing relative to internally generated funds [5]. They are most significant in markets with underdeveloped capital markets and high information asymmetries between firms and financiers [6], as in Nigeria, where firms face high interest rates, narrow bond markets, and stringent collateral requirements. The condition is measured by the Kaplan–Zingales index, a composite of cash flow, Tobin's Q, leverage, dividends, and cash holdings, refined by the authors [13], with higher scores indicating more severe financial constraints.

2) Investment efficiency: The degree to which a firm's actual investments align with its available investment opportunities [1]. Two types of deviations from this benchmark exist. Under-investment occurs when a firm rejects positive-NPV projects, usually because financial constraints or risk aversion limit funds [5]. Over-investment occurs when firms with excess free cash flow and poor corporate governance invest in negative-NPV projects, typically for managerial empire-building [14, 15]. Authors [1] operationalise both measures by regressing investment on sales growth and using the residuals as indicators of the investment-efficiency gap. Negative residuals indicate under-investment, positive residuals indicate over-investment, and absolute residuals indicate overall investment inefficiency.

Theoretical Framework. This research draws on three complementary theories that underpin the proposed research framework.

Agency Theory [14] explains the costliness of external finance due to the separation of ownership and control. Agency theory explains that when financing is limited, managers reject positive-NPV projects to avoid the higher cost of external financing [3]. Conversely, when financing is abundant and monitoring is weak, managers undertake positive-NPV projects because they may use free cash flow to pursue projects that benefit themselves rather than shareholders [4].

Stakeholder Theory [16] builds on this argument. It proposes that, under conditions of capital scarcity, managers must make investment decisions that balance the competing claims of shareholders, creditors, employees, and suppliers. If the financial constraint is binding, the firm must allocate investment among these claims, where governance quality and stakeholder engagement can either mitigate or exacerbate the effects of financial constraints on investment allocation.

Resource Dependence Theory [17] treats external financing as a vital resource firms need to survive and grow. In this case, the firm becomes less autonomous in its investment programme. If boards have good external networks and financial skills, they can mitigate this dependency by enhancing access to capital.

The three theories predict that financial constraints reduce investment efficiency, primarily by causing under-investment, while firm-level characteristics moderate this relationship by in-

fluencing firms' bargaining power with external financiers.

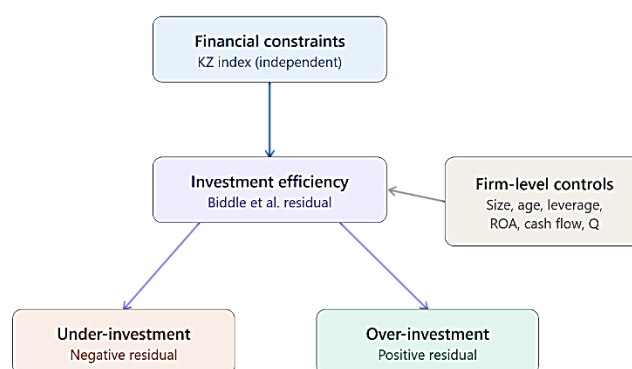


Figure 1 – Conceptual Framework of Financial Constraints and Investment Efficiency

Empirical Review. Outside Africa, a well-established literature examines the constraint--efficiency relationship. Authors [10] concluded that listed companies in China with limited financial resources invest significantly less, and that the governance mechanisms partially mitigate this effect. Similarly, authors [18] found that financial constraints significantly reduce firms' markup capacity in China, suggesting that constrained firms cannot fully exploit their market power because of limited investment capacity. Authors [9, 19] showed that constraints lead to under- and over-investment for US manufacturing firms and UK firms, respectively, depending on the firms' cash-flow position, and that constraints increase investment-cash-flow sensitivity and are more harmful for smaller and younger firms. The measurement of financial constraints has also evolved, with authors [20] demonstrating that the SA index provides a more reliable measure than the KZ index for certain firm characteristics, particularly for smaller firms. Authors [21] found that the negative impact of financial constraints was more pronounced in Nigeria when institutions and financial markets were weaker, based on evidence from their 45-country panel. Authors [22] further showed that stronger ESG performance can alleviate financing constraints and improve investment efficiency in Chinese firms, highlighting the role of non-financial factors in mitigating these constraints.

The evidence is clear across emerging and African markets that under-investment is the predominant channel. Authors [23] found that under-investment is significant among firms listed on the Ghana Stock Exchange, especially SMEs,

particularly when they face financial constraints and macroeconomic volatility is high. The level of under-investment of about 12% relative to the optimum level reported by the authors [24] for constrained manufacturing firms in Nigeria, using the authors' [1] model, is similar to this study's findings. Evidence on the over-investment channel is less robust and mixed: constrained firms are unlikely to have the extra cash flow to over-invest, and studies that do find an over-investment effect (e.g., [25]) tend to find it among unconstrained firms.

Nigerian corporate governance studies have not directly tested the relationship between financial constraints and investment efficiency, nor have they differentiated between under-investment and over-investment in the non-financial listed sector. A recent bibliometric review by [26] confirms that investment-cash flow sensitivity remains the dominant paradigm for testing financing constraints hypotheses in emerging markets. However, measurement approaches continue to evolve with institutional contexts.

Table 1 – Summary of Empirical Literature Review (2017–2025)

Author(s)	Context	Period	Sample	Constraint Measure	Efficiency / Investment Measure	Key Finding
[10]	China	2008–2020	Listed firms	KZ index, SA index	Investment level	Constraints reduce investment; governance partially offsets the effect
[9]	USA	2010–2019	Manufacturing firms	KZ index	[1]	Constraints reduce efficiency through both under- and over-investment, depending on the cash flow position.
[19]	UK	2005–2020	Listed firms	Multiple indices	Investment-cash flow sensitivity	Constraints raise sensitivity; effect stronger for smaller, younger firms
[21]	45 countries	2010–2020	Cross-country	WW index	[1]	Institutional and financial-market weakness sharpens the constraint–efficiency effect.
[23]	sub-Saharan Africa	2010–2020	Listed firms	SA index	[34]	Constraints increase under-investment; SMEs most vulnerable
[24]	Nigeria	2015–2023	Manufacturing firms	WW index	[1]	Constrained firms under-invest by ~12% relative to the optimal level
[27]	Multi-country (Asia)	Panel	Listed firms	Cash-flow sensitivity	Investment-cash flow sensitivity	Managerial overconfidence and constraints jointly raise cash-flow sensitivity.
[28]	India	Panel	Listed firms	Financial distress index	Investment-cash flow sensitivity	Financial distress heightens investment sensitivity to internal cash flow
[22]	China	Panel	Listed firms	Financing constraints index	Investment efficiency	Stronger ESG performance eases constraints and improves investment efficiency.
[8]	Sub-Saharan Africa	Cross-country	Firm-level survey data	Access-to-finance indicator	Firm productivity	Financially constrained firms are systematically less productive
[11]	Africa	Firm-level panel	Private firms	Firm-level fundamentals	Private investment growth	Investment growth tracks firm-level fundamentals more than profitability alone.
[29]	Gulf Cooperation Council	2015–2020	Non-financial firms	Governance-quality index	Investment efficiency	Governance quality significantly improves investment efficiency

Research Gap. Three gaps justify this study. First, empirical research on the financial constraint–investment efficiency relationship remains limited to developed and large emerging economies, and Sub-Saharan Africa is underrepresented, particularly Nigeria. Second, the Nigerian corporate finance literature has focused on governance and firm performance rather than the investment-efficiency channel, and has not distinguished between under-investment and over-investment. Third, the current Nigerian evidence is based on fixed-panel methods, which are inadequate for accounting for endogeneity between financial constraints and investment; this study uses system GMM to address this.

METHODS

Research design. The study uses an ex post facto panel design, which is suitable for analysing non-manipulable firm data from the past. The longitudinal structure allows both cross-firm and within-firm (over-time) analysis, which is more efficient than either a cross-sectional or time-series design [30]. The study covers the 10 years from 2015 to 2024, including the implementation of the Nigerian Code of Corporate Governance 2018 and the Nigerian capital markets' recovery from the pandemic.

Population and sample. The population consists of all non-financial companies listed on the Nigerian Exchange Group as at 31 December 2023. This study excludes financial firms (banks, insurance companies, and investment firms) because their regulatory capital regimes and accounting treatments differ from those of non-financial firms. The sample was purposively selected based on continuous listing during 2015-2024,

the availability of complete audited financial statements, and sufficient data to construct the KZ index and the authors' [1] residual. This resulted in 60 firms and 600 firm-year observations (Table 2).

Table 2 – Sample Selection Procedure

Selection stage	Description	Firms
Initial population	All listed firms on NGX as at 31 December 2023	162
Exclusions	Financial firms (banks, insurance, investment companies)	(47)
	Firms with incomplete data or missing financial statements	(32)
	Firms with less than 5 years of continuous listing	(15)
	Firms with missing data for KZ index construction	(8)
Final sample	Non-financial firms meeting all selection criteria	60
Study period	Years covered	2015–2024
Firm-year observations	Final sample × study period (60 × 10)	600

Data sources. The firm-level information comes from audited annual reports and financial statements accessed via the NGX investor relations portal and individual company websites. The supplementary macroeconomic data are sourced from the Central Bank of Nigeria and NGX Factbook.

Variable measurement. Table 3 sets out the precise proxies used.

Table 3 – Variable Definitions and Measurements

Type	Variable	Symbol	Measurement	Expected sign
Dependent	Investment efficiency	IE	Absolute residual from Investment = $\beta_0 + \beta_1 \text{SalesGrowth} + \varepsilon$	—
	Under-investment	UI	Negative residuals from the model above	—
	Over-investment	OI	Positive residuals from the model above	—
Independent	Financial constraints	KZ	$KZ = -1.0019(CF) + 3.1392(Q) + 3.2839(LEV) - 39.3678(DIV) - 1.3148(CASH)$	Negative on IE
Controls	Firm size	SIZE	Natural log of total assets	Positive
	Firm age	AGE	Log of years since incorporation	Positive
	Leverage	LEV	Total debt/ total assets	Negative
	Profitability	ROA	Net income/ total assets	Positive
	Cash flow	CF	Operating cash flow/ lagged total assets	Positive
Controls	Investment	Q	(Market value of equity + total liabilities)/ total	Positive

Type	Variable	Symbol	Measurement	Expected sign
	opportunity		assets	
	Cash holdings	CASH	Cash and equivalents/ total assets	Positive
	Sales growth	SALESG	$(Sales_t - Sales_{t-1}) / Sales_{t-1}$	Ambiguous

Notes: Author's compilation based on authors [1, 12, 13].

The higher the KZ value, the more severe the financial constraints. Consistent with standard panel practice, GDP growth and inflation are included as macro-level controls, while year fixed effects (λ_t) absorb time-specific unobserved heterogeneity.

Model specification. The core model is:

$$IE_{it} = \beta_0 + \beta_1 KZ_{it} + \beta_2 SIZE_{it} + \beta_3 AGE_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 CF_{it} + \beta_7 Q_{it} + \beta_8 CASH_{it} + \beta_9 SALESG_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where μ_i and λ_t are firm and year fixed effects; to test H_{02} and H_{03} , the sample is split into under-investment (negative residual) and over-investment (positive residual) sub-samples, and the model is re-estimated on each.

For the under-investment sub-sample (negative residuals) and over-investment sub-sample (positive residuals), the same model is re-estimated on each sub-sample to test hypotheses H_{02} and H_{03} , respectively.

Estimation technique. The system GMM estimator uses lagged levels and lagged differences of en-

dogenous variables as instruments, addressing both endogeneity and dynamic panel bias. This study uses the author [31] specification test to compare the pooled OLS, fixed effects (FE), and random effects (RE) estimators. It then applies the two-step system GMM estimator [32, 33] to address endogeneity between financial constraints and investment. The study assesses instrument validity using the Hansen J-test and the Arellano-Bond AR(1) and AR(2) tests for serial correlation in the residuals. It also checks multicollinearity using variance inflation factors (VIFs). It evaluates the robustness of the results using alternative measures of financial constraints (the SA and WW indices) and investment efficiency [15, 34].

RESULTS AND DISCUSSION

Table 4 shows that the investment efficiency (absolute residual) is 0.124 (SD = 0.089), indicating that firms, on average, invest about 12.4% above or below the optimal level. The mean KZ index is -0.735 (SD = 1.456), indicating significant cross-firm variation in financial constraints. The average company has 16.5 years of log total assets, 24.6 years of age, and leverage of 0.345.

Table 4 – Descriptive Statistics

Variable	Mean	Median	SD	Min	Max	Obs.
Investment efficiency (IE)	0.124	0.098	0.089	0.001	0.567	600
Under-investment (UI)	-0.087	-0.072	0.065	-0.432	-0.001	311
Over-investment (OI)	0.098	0.078	0.072	0.001	0.567	289
KZ index	-0.735	-0.542	1.456	-5.678	4.321	600
Firm size (SIZE)	16.543	16.321	1.876	12.345	21.567	600
Firm age (AGE)	24.567	22.000	15.432	5.000	78.000	600
Leverage (LEV)	0.345	0.312	0.234	0.000	0.876	600
ROA	0.021	0.016	0.034	-0.156	0.103	600
Cash flow (CF)	0.089	0.076	0.065	-0.123	0.345	600
Tobin's Q	1.234	1.098	0.876	0.567	4.567	600
Cash holdings (CASH)	0.098	0.076	0.087	0.001	0.456	600
Sales growth (SALESG)	0.087	0.065	0.123	-0.567	0.678	600

Notes: Author's computation based on NGX annual reports (2015–2024).

Correlation and multicollinearity. The results presented in Table 5 provide preliminary support for H_{01} (that investment efficiency is negatively related to the KZ index) and H_{02} (that firm size is negatively related to the KZ index). Size, ROA, and Tobin's Q are positively associated with investment efficiency, whereas leverage and sales growth are negatively associated with it. The independent variables show only modest correlations, and the VIF values (Table 6) range from 1.03 to 2.88 (mean 1.65), which is below the conventional threshold of 5 ([35]) and therefore not a concern for multicollinearity.

Table 5 – Correlation Matrix (selected)

	IE	KZ	SIZE	LEV	ROA	Q
IE	1.000					
KZ	-0.234***	1.000				
SIZE	0.187***	-0.321***	1.000			
LEV	-0.145**	0.234***	-0.098*	1.000		
ROA	0.156**	-0.345***	0.123**	-0.134**	1.000	
Q	0.203***	0.167**	-0.089	0.045	0.134**	1.000

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Model selection. The Hausman test statistic (47.891, $p < 0.001$) supports the fixed-effects

model over the random-effects model, suggesting that the regressors are correlated with firm-specific heterogeneity.

Regression results. Table 6 reports the pooled OLS, FE, RE, and system GMM estimates. In all four specifications, the coefficient of the KZ index is highly negative. The corrected GMM estimate ($\beta = -0.065$, $p < 0.05$) also indicates that a one-unit increase in the KZ index leads to a 6.5 percentage-point decrease in investment efficiency, consistent with the preferred FE model; thus, H_{01} is rejected. Firm size ($\beta = 0.034$, $p < 0.01$) and firm age ($\beta = 0.012$, $p < 0.05$) are positively related to investment efficiency, as larger and older firms are less constrained by the constraint, thus supporting the rejection of H_{04} : that firm size is not a significant and economically meaningful moderator of firms' exposure to the constraint. The agency costs of debt are negatively associated with investment efficiency ($\beta = -0.078$, $p < 0.01$), while ROA ($\beta = 0.045$, $p < 0.05$) and Tobin's Q ($\beta = 0.056$, $p < 0.05$) are positively associated with it. Sales growth is negatively related to investment efficiency ($\beta = -0.098$, $p < 0.05$), indicating that high sales growth does not necessarily go hand in hand with disciplined investment appraisal.

Table 6 – Panel Regression Results (dependent variable: investment efficiency)

Variable	Pooled OLS	Fixed effects	Random effects	System GMM
KZ index	-0.076*** (0.012)	-0.087*** (0.015)	-0.082*** (0.013)	-0.065** (0.028)
Firm size	0.028*** (0.008)	0.034*** (0.011)	0.031*** (0.009)	0.026** (0.012)
Firm age	0.009* (0.005)	0.012** (0.006)	0.010** (0.005)	0.008 (0.007)
Leverage	-0.065** (0.028)	-0.078*** (0.023)	-0.072*** (0.025)	-0.056* (0.032)
ROA	0.038** (0.018)	0.045** (0.022)	0.042** (0.019)	0.034 (0.025)
Cash flow	0.018 (0.014)	0.023 (0.016)	0.021 (0.015)	0.015 (0.018)
Tobin's Q	0.048** (0.021)	0.056** (0.025)	0.052** (0.023)	0.043* (0.026)
Cash holdings	0.012 (0.009)	0.016 (0.011)	0.014 (0.010)	0.010 (0.012)
Sales growth	-0.089** (0.042)	-0.098** (0.045)	-0.094** (0.043)	-0.076* (0.048)
R ² / Adj. R ²	0.412 / 0.398	0.589 / 0.567	0.523 / 0.508	—
Hausman		47.891***		
AR(1) / AR(2)				-2.345** / 0.876
Hansen J-test				0.456

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$; standard errors in parentheses.

Under-investment and over-investment sub-samples. A split of the sample by residual sign (Table 7) reveals that the KZ effect is significant in the under-investment sub-sample ($\beta = -0.112$, $p < 0.01$) and is not significant in the over-investment sub-sample ($\beta = 0.034$, $p > 0.10$); this confirms that H_{02} is rejected (financial con-

straints significantly affect under-investment) while H_{03} is not rejected (financial constraints do not significantly affect over-investment).

Robustness. Table 7 also presents the results, along with the SA index, the WW index, and the authors' [15, 34] efficiency measures. The financial-constraint coefficient is negative and signifi-

cant at the 1 % level for all four alternative specifications, and the system-GMM diagnostics (Hansen J-test $p > 0.10$; AR(2) $p > 0.10$) suggest valid instruments and no second-order serial correlation, which further validates the main result.

Table 7 – Sub-Sample and Robustness Results

Specification	Coefficient on constraint measure	Significance
Under-investment sub-sample (KZ)	-0.112	$p < 0.01$
Over-investment sub-sample (KZ)	0.034	$p > 0.10$ (not significant)
SA index (full sample)	-0.079	$p < 0.01$
WW index (full sample)	-0.083	$p < 0.01$
McNichols-Stubben efficiency measure	-0.091	$p < 0.01$
Richardson efficiency measure	-0.085	$p < 0.01$
System GMM-FE	-0.072	$p < 0.05$
System GMM-RE	-0.078	$p < 0.05$

The conclusion that financial constraints significantly affect investment efficiency is consistent with Agency Theory's prediction that information asymmetry increases the cost of external finance, so managers may prefer not to pay for expensive capital rather than invest in positive-NPV projects [3]. It is also consistent with Resource Dependence Theory, which argues that in Nigeria, where external funding is a critical resource, a shortage or high cost of external funding reduces firms' strategic freedom to invest in profitable ventures [17]. The absence of an over-investment effect is consistent with this argument in reverse: constrained firms lack the excess cash flow necessary for over-investment, so the inefficiency they exhibit manifests predominantly as a deficiency rather than excess.

This pattern aligns with recent findings across Africa and Asia [23]. Under-investment concentration was also observed in Ghanaian listed firms, and [24] reported a similar magnitude (around 12%) for manufacturing firms in Nigeria. It also adds to the cross-country evidence of authors [21] that the constraint-efficiency relationship is stronger when institutional and financial-market development is weaker: Nigeria's

relatively shallow capital market is exactly where this should be stronger.

The size and age of firms both moderate the relationship in the expected direction, as larger and older firms have greater access to external funding, more diversification, and better relationships with creditors [6]. This finding provides the practical basis for rejecting H_{04} . The negative relationship between leverage and efficiency is consistent with the debt-overhang effect in the literature [4]; heavily levered firms may forgo positive-NPV projects to meet their debt obligations. The negative coefficient on sales growth suggests that rapid sales growth does not necessarily correspond with disciplined investment appraisal, potentially reflecting a tendency among some Nigerian firms to prioritise top-line expansion over rigorous project evaluation.

CONCLUSIONS

The study focused on the impact of financial constraints on investment efficiency of 60 non-financial listed companies in Nigeria for the period 2015–2024. Financial constraints (measured by the KZ index) significantly and robustly affect investment efficiency. This effect operates through under-investment rather than over-investment and is stronger in smaller, younger, and more highly levered firms. The relationship is robust to alternative measures of financial constraints and investment efficiency, and is supported by fixed-effects, random-effects, and system-GMM estimation. The results corroborate Agency, Stakeholder, and Resource Dependence theories on corporate investment behaviour in a capital market with shallow characteristics, and suggest that investment constraints for listed companies in Nigeria stem not from wasteful investment but from forgone investment.

Recommendations

- 1) For corporate managers: Maintain sufficient cash buffers and diversify financing sources to limit reliance on any single external source. Strengthen investment appraisal discipline, especially during periods of rapid sales growth, to avoid value erosion from under-appraised projects; and implement governance practices to enhance creditworthiness and minimise information asymmetry with financiers.
- 2) For policymakers and regulators: Focus on further development of the bond and equity markets to broaden the financing options for

firms beyond bank loans; ensure that the Nigerian Code of Corporate Governance (enacted in 2018) is followed and enforced, as it will enhance firms' access to external financing; and consider specific measures on credit access for smaller and younger listed firms, which this study identified as the most constrained.

3) For investors: Use a firm's financial-constraint profile as material information for evaluating growth prospects, as constrained firms systematically have lower capacity to fund positive-NPV opportunities, even if they have good projects.

The study does not cover unlisted firms or financial firms. This study relies on secondary data from audited annual reports. Although external

audits provide assurance, reporting bias may still exist. The KZ index serves as the most established measure of financial constraints in the literature. However, researchers can operationalise financial constraints in other ways, and the authors' [1] investment-efficiency measure assumes that sales growth provides a suitable proxy for investment opportunities. This study tests that assumption by comparing results with alternative proxies as a robustness check. Still, future research could extend the analysis using primary survey data, other constraint proxies appropriate to the Nigerian institutional setting, and a longer post-2024 panel as more recent data becomes available.

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