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Firm size and Financial Performance: Evidence from Listed Firms in Nairobi Security Exchange – Kenya

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Abstract

This study empirically investigates the effect of firm size on firm financial performance among firms listed on the Nairobi Securities Exchange over the period 2012–2023. Using a balanced panel of 468 firm-year observations from 39 firms, the study applies a fixed-effects regression model to control for unobserved, time-invariant firm characteristics that may jointly influence performance and firm growth. The regression results show that firm size has a positive and statistically significant relationship with firm performance indicating that increases in firm scale are associated with substantial improvements in performance within firms over time. In contrast, control variable including firm age exhibits a negative and significant relationship with performance suggesting that older firms may face maturity-related rigidity or declining efficiency. Firm leverage is also negative and statistically significant implying that higher debt exposure marginally reduces performance. Overall, the findings indicate that scaling up is performance-enhancing in this context, but the benefits may be constrained by ageing effects and leverage-related financial risk. The study recommends that NSE-listed firms should pursue well-governed, efficiency-focused growth in size while keeping leverage prudent and renewing strategies to avoid age-related performance decline.

Key words: *Firm Size, Firm Performance, Return on Assets, Firm Age, Leverage, Fixed Effects Model, Nairobi Securities Exchange, Kenya*

1. Introduction

Firm performance commonly captured through accounting outcomes such as return on assets (ROA), return on equity (ROE), operating margins, and market-based measures such as Tobin's Q remains a central concern for investors and policymakers because it shapes survival, employment, tax revenues, and long-run productivity growth (Latifi et al., 2021; Kijkasiwat & Phuensane, 2020; OECD, 2025). Globally, the performance question is inseparable from firm size because economies are dominated numerically by micro, small, and medium enterprises (MSMEs), yet output and productivity are often concentrated in fewer large firms (World Bank, 2025; OECD, 2021). This "size–performance" tension matters even more in periods of shocks (e.g., COVID-19 and post-pandemic inflationary pressures), where smaller firms tend to face tighter liquidity, thinner buffers, and weaker access to external finance conditions that can quickly translate into poorer operating performance (Adian et al., 2020; OECD, 2021; Jaiswal & Elmarzouky, 2025).

From a global perspective, theory provides competing predictions on how firm size affects performance. On the one hand, larger firms may enjoy scale economies, bargaining power, diversified revenue bases, and stronger resource bundles that raise efficiency and profitability (Tomas Žiković et al., 2025; Latifi et al., 2021). Larger scale can also support investments in technology, compliance systems, professional management, and innovation capability—channels frequently linked to stronger performance outcomes (Kijkasiwat & Phuensane, 2020; Latifi et al., 2021). On the other hand, size can also introduce bureaucratic rigidities, agency problems, and slower strategic responsiveness, potentially weakening profitability as firms grow beyond an efficient frontier (Canarella & Miller, 2021; Muthusamy & Kannan, 2023). Recent evidence from traditional U.S. industries, for example, suggests that the link between scale-related strategies and profitability can weaken over time under more volatile and knowledge-driven competitive conditions (Muthusamy & Kannan, 2023), reinforcing the idea that "bigger" is not automatically "better" for performance.

Empirically, international studies increasingly show that the size performance relationship is heterogeneous across sectors, institutional environments, and firm categories (OECD, 2025; Tomas Žiković et al., 2025). In European wine firms, profitability drivers differ when SMEs are analyzed separately from large and very large firms, implying that the determinants of performance (and the returns to scale) vary substantially by size category (Tomas Žiković et al., 2025). In corporate finance research, size also interacts with financial structure and agency costs: debt, R&D intensity, and governance frictions can affect performance differently in small versus large firms, producing non-linear outcomes (Canarella & Miller, 2021; Jaiswal & Elmarzouky, 2025).

Even within working-capital management, evidence indicates that performance improves when firms optimize liquidity cycles, but "optimal" policies may depend on organizational capacity often correlated with firm size (Deari & Palomba, 2024; OECD, 2021). These findings collectively suggest that firm size is not merely a control variable; it can be a structural condition that shapes the mechanisms through which strategy and finance translate into performance (Kijkasiwat & Phuensane, 2020; Latifi et al., 2021).

A major reason the literature remains inconclusive is measurement and context. Firm size is proxied using total assets, sales, market capitalization, or employment, and each proxy captures different economic realities (OECD, 2025; Tomas Žiković et al., 2025). Likewise, "firm performance" can reflect short-run profitability (ROA/ROE), operational efficiency, growth, or market valuation outcomes that need not move together, particularly in emerging markets and during macroeconomic turbulence (Jaiswal & Elmarzouky, 2025; OECD, 2021). Cross-country evidence during the pandemic underscores that performance shocks were strongly mediated by firm capabilities and financing access factors that correlate with size, but not perfectly, meaning size can be both a cause and a consequence of performance (Adian et al., 2020; World Bank, 2025). This motivates continued research that is sensitive to sector, period, and institutional setting, rather than assuming a universal linear relationship between size and performance (OECD, 2025; Muthusamy & Kannan, 2023).

Moving from the global to the regional context, Sub-Saharan Africa (SSA) presents a particularly important setting for the firm size performance debate because the region's manufacturing and formal enterprise structure is often characterized by a large mass of small firms and a thin layer of medium-sized enterprises commonly discussed as the "missing middle" challenge (Teal, 2023). Evidence synthesized in SSA manufacturing debates emphasizes that small firms predominate and that constraints (credit, regulation, fixed costs, and informality-related incentives) can prevent firms from scaling into the size range typically associated with productivity upgrading and better wages (Teal, 2023). This matters for performance because productivity and profitability are closely linked to capabilities (technology adoption, management quality, market access) that are often harder to finance and organize in very small firms (OECD, 2025; World Bank, 2025). As a result, the regional policy problem is not only that many firms underperform, but also that the size distribution itself may be part of the explanation for persistent productivity gaps and limited structural transformation (Teal, 2023; UNIDO, 2023).

Regional statistics reinforce this concern. SSA's industrialization challenge is frequently framed around comparatively weak manufacturing dynamism and limited movement into higher-productivity activities, where firm growth (into medium and large scale) is typically expected to underpin sustained performance improvements (Teal, 2023; UNIDO, 2023). When SMEs face repeated liquidity shocks, costly credit, and limited trade finance, they may remain trapped in low-scale, low-margin market segments, constraining both firm-level performance and aggregate competitiveness (Adian et al., 2020; OECD, 2021; World Bank, 2025). At the same time, the region's few large firms can face their own performance constraints linked to regulatory burdens, infrastructure costs, and exposure to macroeconomic volatility, implying that performance challenges are not exclusive to small firms rather, they can be size-contingent and environment-dependent (Teal, 2023; Muthusamy & Kannan, 2023).

Narrowing further to the local (Kenyan/East African) context, the firm size–performance question is especially salient because MSMEs dominate enterprise counts and employment, but many operate with limited capitalization, weak productivity, and constrained access to formal finance (KBA & JICA, 2021; World Bank, 2025). Kenya's macro-sector signals also point to performance pressures that can interact with firm scale. For example, official economic reporting indicates that manufacturing growth slowed to 2.7% in 2022 from 7.3% in 2021, reflecting a more subdued operating environment for producers and agro-processing value chains (KNBS, 2023). Such slowdowns typically test firm resilience: larger firms may cope through diversification and balance-sheet access, while smaller firms may face sharper margin compression and cash-flow stress (Adian et al., 2020; OECD, 2021; KNBS, 2023). In addition, Kenya's financing landscape for MSMEs remains a recurring constraint in national diagnostics, with bank-credit access conditions shaping working capital, investment, and ultimately performance (CBK, 2023; KBA & JICA, 2021).

Empirical work relevant to Kenya and comparable markets also supports the view that performance is jointly shaped by scale, financing, and managerial capability. Evidence from multi-country SME settings shows that firm size can moderate how innovation translates into performance: innovation may raise performance more reliably when firms have sufficient financial capital and organizational capacity conditions that tend to improve with size (Kijkasiwat & Phuensane, 2020). Similarly, evidence on business model innovation suggests that performance gains can be indirect and capability-mediated, implying that SMEs may innovate without immediate performance payoffs unless complementary capabilities are present (Latifi et al., 2021). These mechanisms are highly relevant in East Africa, where many firms remain small and informally constrained, raising the likelihood that size is intertwined with finance constraints, capability limits, and therefore persistent underperformance (CBK, 2023; Teal, 2023; World Bank, 2025).

Taken together, the funnel of evidence from global patterns to SSA's size distribution challenge and Kenya's MSME-dominated structure highlights a clear research problem: firm performance is a pressing concern, yet the effect of firm size is not uniform, may be non-linear, and is likely contingent on financing conditions, innovation capability, governance frictions, and macroeconomic shocks (Canarella & Miller, 2021; Teal, 2023; Tomas Žiković et al., 2025). This creates a strong justification for context-specific empirical testing in East Africa/Kenya using appropriate performance metrics (e.g., ROA/ROE/Tobin's Q), robust size proxies (assets/sales/employment), and models that can capture heterogeneity (e.g., fixed effects, non-linear

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specifications, interaction terms), so that policy and managerial recommendations do not rely on assumptions that "bigger is always better" or "small is always efficient" (OECD, 2025; Jaiswal & Elmarzouky, 2025; World Bank, 2025).

2. Statement of the Problem

Despite firm performance being central to economic growth, employment, and financial stability, the relationship between firm size and performance remains theoretically ambiguous and empirically inconclusive. While larger firms may benefit from economies of scale, stronger resource bases, and better access to finance, they may also suffer from bureaucratic inefficiencies and agency problems; conversely, smaller firms may be more flexible yet face binding financial and capability constraints. Empirical evidence shows that the size–performance relationship varies across sectors, institutional environments, and economic shocks, and is sensitive to how both size and performance are measured. This uncertainty is particularly acute in Sub-Saharan Africa and Kenya in particular where MSMEs dominate firm populations, a "missing middle" persists, access to finance is limited, and firms operate under recurrent macroeconomic and liquidity shocks. Consequently, it remains unclear whether firm size enhances or constrains performance in this context, whether the relationship is linear or non-linear, and how it is conditioned by financing access, innovation capability, and economic volatility. This lack of context-specific evidence limits the effectiveness of policy and managerial strategies aimed at improving firm performance, thereby motivating the need for empirical investigation of the firm size–performance relationship in Kenya/East Africa using appropriate performance measures, size proxies, and models that capture heterogeneity.

3. Objective of the Study

The main objective of the study was to examine effects of firm size on the financial performance of firms listed at the Nairobi Securities Exchange (NSE), Kenya.

4. Literature Review

4.1 Theoretical Review - Agency Theory

Agency theory anchors the firm size–firm performance relationship by framing firm size as a structural condition that can intensify (or help mitigate) principal–agent conflicts arising from the separation of ownership and control in modern corporations. In agency settings, shareholders (principals) delegate decision-making to managers (agents), but managers may pursue private benefits (e.g., empire-building, perquisite consumption, discretionary spending) rather than value maximization, generating agency costs that can depress firm performance (Jensen & Meckling, 1976). As firms grow, their organizational complexity typically increases more hierarchical layers, wider information asymmetries, and greater managerial discretion potentially widening agency problems and weakening performance unless effective monitoring and incentives are in place (Fama & Jensen, 1983).

Within this logic, firm size can affect performance through two competing agency-based channels. First, larger firms may suffer higher agency costs because monitoring becomes harder and managers gain more latitude to allocate resources inefficiently, which can erode profitability and overall performance (Rohim et al., 2024). Second, firm size can also enhance performance by enabling stronger governance and monitoring capacity such as better internal controls, higher-quality reporting, and more sophisticated external scrutiny which can restrain opportunistic behavior and improve decision efficiency (Goswami et al., 2023). Related evidence further indicates that firm size interacts with financing and monitoring mechanisms (e.g., leverage, debt discipline) that can reduce agency frictions and shape performance outcomes in emerging-market contexts (Ahmed et al., 2023). Empirically, research also shows that the relationship between firm size and agency costs may be non-linear, implying that performance effects of size can vary across the firm life cycle and governance regimes rather than being uniformly positive or negative (Canarella & Miller, 2022). Overall, agency theory therefore provides a coherent lens for hypothesizing and testing whether firm size improves firm performance through stronger monitoring or undermines it through heightened agency costs, with outcomes contingent on firms' control and governance structures.

4.2 Firm size and financial performance

Dang, Li, and Yang (2018) argue that the "firm size–performance" evidence is partly a measurement issue: different size proxies (total assets, total sales, market capitalization) can lead to different coefficient magnitudes and even alter the inference on other regressors in corporate finance models. Using evidence across multiple corporate finance specifications, they show that researchers should justify the chosen size proxy theoretically and test robustness across alternative measures because each proxy captures a different dimension of "size" (scale, market valuation, or operating footprint). This is essential for firm performance studies because conclusions about whether "bigger performs better" can be sensitive to how size is operationalized.

Ibhagui and Olokoyo (2018) provide direct evidence that firm size conditions performance outcomes through nonlinear mechanisms. Using Nigerian listed firms and a threshold framework, they show that leverage harms accounting performance (ROA/ROE) mainly among smaller firms, while the negative effect weakens as firms grow and can disappear past a size threshold—implying that larger firms may better absorb financing frictions, renegotiate debt, or spread fixed monitoring and

distress costs. Their results reinforce a core implication for size–performance research: average size effects can conceal structural breaks where "size" changes the economic regime in which performance is generated.

Kijkasiwat and Phuensane (2020) examine firm size as both a direct determinant of performance and an interaction factor shaping how innovation translates into performance. Using a large multi-country SME dataset and structural modeling, they report that firm size is significantly associated with firm performance and also moderates the innovation–performance relationship—suggesting that resource constraints, managerial complexity, and financing access vary systematically with size and can either amplify or dampen performance payoffs from innovation. This is important for the size–performance literature because it implies that size may not only "raise performance" directly (through economies of scale), but also changes the productivity of strategic choices (innovation, finance) that drive performance.

Kotey, Akomatey, and Kusi (2021) provide industry-level evidence of a nonlinear (inverted U-shaped) relationship between firm size and profitability in Ghana's insurance brokerage industry. Using panel data and both static and dynamic estimators, they find that size initially improves profitability (consistent with economies of scale/scope), but beyond an inflection point additional size reduces profitability (consistent with bureaucratic costs, weaker monitoring, and slower decision-making). The study reframes the common assumption that "larger is always better," showing that firm performance can peak at an optimal scale, after which diseconomies dominate.

Yadav, Pahi, and Gangakhedkar (2022) extend this debate using a very large Asia–Pacific sample (non-financial listed firms across multiple economies) and a dynamic fixed-effects framework. They report evidence of a negative size–profitability relationship while firm growth is positively related to profitability, interpreting the size penalty as large-firm inefficiency accumulating over time. Their contribution is that the size–performance link is evaluated alongside growth dynamics and macro/financial development controls, implying that "getting larger" and "growing efficiently" are not the same and profitability can rise with growth even when size (level) correlates negatively with profit rates.

Pallayil and Ambrammal (2022) focus on India's manufacturing sector and apply dynamic panel system GMM to address endogeneity in the size–performance relationship. Using 2007–2019 panel data and both accounting-based (ROA, return on net worth) and market-based (Tobin's Q) performance measures, they show that the sign and strength of the firm size effect can differ by performance proxy and horizon (short-run vs. long-run). This reinforces two central lessons for the literature: (i) size can matter differently for operational profitability versus market valuation, and (ii) credible identification strategies (e.g., system GMM) are critical because size is jointly determined with performance through investment capacity, financing access, and market power.

Kang, Mensah, and Gonzalez-Ehnes (2022) revisit the profitability–size relationship explicitly in the presence of financial leverage, highlighting that leverage can be a mechanism that helps explain why profitability may decline at higher size in some settings. Their study positions leverage as a conditioning variable in the size–profitability nexus and motivate interpreting size effects as contingent on financing structure rather than purely on operational scale. In practical terms, this stream of evidence implies that policies and managerial decisions that accompany scale (debt reliance, covenant constraints, refinancing costs) can mediate how size translates into firm performance.

Attia, Ezz Eldeen, and Daher (2023) offer explicit threshold-based evidence from the MENA region, showing that firm size can define regimes in the capital structure–performance relationship. Using a dynamic panel threshold approach on a large panel of listed firms (2007–2020), they document a "size-threshold effect," meaning that the performance consequences of financing choices vary depending on whether the firm is below or above a critical size level. Although their primary focus is capital structure, the implications directly support the firm size–performance literature: size is not merely a linear control, but a structural characteristic that can shift firm behavior, risk capacity, and performance production functions.

Mansikkamäki (2023) links firm size to performance through the dynamics of growth and profitability, emphasizing heterogeneity by firm age and initial conditions. The study's framing supports a nuanced interpretation: size can correlate with higher performance when it reflects accumulated capabilities and efficient scaling, but size can also correlate with lower profitability when it reflects maturity, rigidity, and reduced marginal efficiency. This approach aligns with the broader evidence that the sign of the size–performance relationship depends on whether size is capturing competitive advantage (economies, bargaining power) or organizational costs (coordination loss, slower adaptation).

Finally, Tomas Žiković, Katunar, and Višić (2025) provide recent sector-specific evidence from European wine firms using dynamic panel models and explicit size segmentation (SMEs vs. large/very large). They show that profitability determinants differ across size categories and that performance drivers (e.g., debt burden, asset turnover, productivity) operate differently depending on firm scale. The study strengthens the modern consensus that size effects are best understood as contextual and segmented: firm size alters constraints, strategy sets, and the marginal productivity of resources, so performance models should test interactions or stratify by size rather than relying on a single pooled estimate.

4.3 Conceptual Framework

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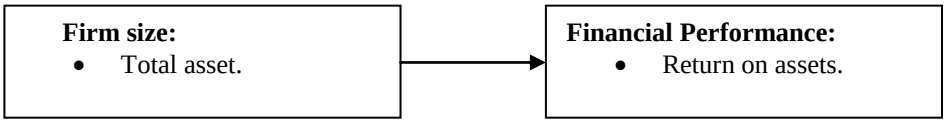
The conceptual framework of this study provides a structured foundation for examining the relationship between firm size and firm performance, with particular attention to both direct and indirect pathways through which firm scale influences performance outcomes. The framework is designed to illustrate how differences in firm size shape access to resources, organizational capabilities, and strategic choices that ultimately affect profitability and efficiency in the context of Kenyan Nairobi Securities Exchange Listed firms. Control variables in this study were Firm Age and Firm Leverage.



Independent Variables **Dependent Variable**

Figure 1: Conceptual Framework

5. Research Methodology

The positivist research paradigm focuses on obtaining objective knowledge through systematic observation, quantitative data, and statistical analysis to explain causal relationships. This study adopts a positivist approach to ensure reliable, valid, and precise findings grounded in empirical evidence.

This study targeted 67 firms listed on the Nairobi Securities Exchange (NSE) over 2012–2023 to examine the relationship between firm size and firm performance. Firms were included only if they operated continuously throughout the period, have complete and consistent data, and did not undergo major restructurings (e.g., mergers/acquisitions) that could affect comparability. Firms with missing data or inconsistent operations are excluded. The final sample was 39 listed firms at the NSE.

The study used secondary data collected through a structured extraction schedule from audited annual reports sourced from firm websites, the Capital Markets Authority, and the African Financials database (Byers, 1995; Arun et al., 2022; Sekaran & Bougie, 2019; Vartanian, 2010; Orodho, 2005).

6. Research Findings and Discussion

6.1 Measurement of Variables

Firm performance (dependent variable) is measured using Return on Assets (ROA). Firm size (main explanatory variable) is measured using the natural logarithm of total assets (lnTA). Control variables include firm age (log of years since incorporation) and firm leverage (debt-to-equity ratio).

Table 1: Measurement of variables

Variable	Measurement	Source
Financial performance	Return on assets	Umar et al., (2024), Pham et al., (2024)
Firm age	Natural logarithm of number of years since incorporation	Firmansyah and Kartiko (2024).
Firm leverage	Firm leverage is commonly measured using the debt-to-equity ratio, which is calculated by dividing a firm's total debt by its shareholder equity	Titman & Wessels, 1988; Frank & Goyal, 2009).
Firm size	Natural logarithm of total assets	Firmansyah and Kartiko (2024).

Source: Authors

6.2 Regression Models

Building on panel-data evidence on firm size and firm performance, this study applied a panel regression framework for 2012–2023 to estimate the effect of firm size on financial performance among NSE-listed firms. Given the repeated firm-year observations, the analysis used fixed-effects models to control for unobserved, time-invariant firm characteristics.

Model 1: ***Testing the effect of control variables on financial performance***

$$ROA_{it} = \beta_0 + \beta_1 FA_{it} + \beta_2 LEV_{it} + \varepsilon_{it}$$

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Model 2: ***Testing the effect of firm size on financial performance***

$$ROA_{it} = \beta_0 + \beta_1 FA_{it} + \beta_2 LEV_{it} + \beta_3 FS_{it} + \varepsilon_{it}$$

6.3 Descriptive Statistics

The descriptive statistics for the study variables are presented in Table 2. The firm performance variable (n = 468) has a mean of 0.7962, indicating that, on average, firms report slightly positive performance. However, the standard deviation of 4.9491 shows substantial dispersion in performance across firms. The minimum value of −2.4566 confirms that some firms experienced negative performance, while the maximum of 42.3371 suggests the presence of exceptionally high-performing observations that may reflect outliers or periods of unusually strong returns. Such wide variation is consistent with evidence that firm performance differs markedly across firms and time, and that firm characteristics (including scale) can contribute to performance heterogeneity (Pallayil & Ambrammal, 2022; Yadav et al., 2022).

Table 2: Descriptive Statistics Results

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm performance	468	0.796154	4.949137	-2.456647	42.33706
Firm age	468	38.55128	18.41328	1	74
Leverage	468	3.390512	26.01921	-11.77886	568.1991
Firm size	468	7.170118	1.03889	4.425008	9.097318

Source: Authors computation

The firm age variable (n = 468) has a mean of 38.5513 years, implying that the typical firm in the sample is relatively mature. The standard deviation of 18.4133 indicates meaningful variability in lifecycle stages, and the range from 1 to 74 years shows that both newly established and long-established firms are captured. This spread matters because firm age is linked to learning and selection dynamics where more efficient firms survive and expand while less efficient firms exit implying that maturity can shape stability and performance outcomes across firms (Jovanovic, 1982).

The leverage variable (n = 468) has a mean of 3.3905 and a very large standard deviation of 26.0192, indicating extreme cross-firm variation in financing structure. The minimum value of −11.7789 suggests that some firms may have net cash positions or accounting configurations that yield negative leverage values (depending on the leverage definition), while the maximum of 568.1991 indicates very highly levered firms, implying elevated financial risk and/or unusual balance sheet structures. This kind of dispersion aligns with capital structure theory, which emphasizes that leverage can vary widely due to agency costs, asymmetric information, financing constraints, and firm-specific preferences (Harris & Raviv, 1991; Myers, 1984).

Finally, firm size (n = 468) has a mean of 7.1701 with a standard deviation of 1.0389, and it ranges from 4.4250 to 9.0973. Because firm size is commonly modeled in logarithmic form to improve comparability and reduce skewness, this distribution indicates substantial variation in scale within the sample (Dang et al., 2018). Notably, the gap between the minimum and maximum (9.0973 − 4.4250 ≈ 4.6723) implies that the largest firms are roughly 107 times larger than the smallest firms on the original (antilog) scale, highlighting a wide spread in operational scale. This heterogeneity is important because performance and productivity patterns frequently differ by firm size category, with scale affecting efficiency, market power, and capacity to absorb shocks and fixed costs (OECD, 2024; Pallayil & Ambrammal, 2022).

6.4 Correlation Analysis Results

The pairwise correlation coefficients for the study variables are presented in Table 3.

Table 3: Correlation Results

Variable	FP	FA	FL	FS
Firm performance	1.0000			
Firm age	-0.0533	1.0000		
Leverage	0.0145	0.0264	1.0000	
Firm size	-0.2489*	-0.0579	0.0622	1.0000

Source: Authors computation

The correlation between firm size (FS) and firm performance (FP) is negative and statistically significant (r = −0.2489*), indicating that larger firms in the sample tend to exhibit lower performance on average. This pattern is consistent with evidence that profitability can decline as firms become large often attributed to rising coordination costs, bureaucratic frictions, and managerial inefficiencies that may dominate scale benefits in some contexts (Yadav et al., 2022). At the same time, prior research shows that the size–performance relationship can vary by how performance is measured (accounting vs. market outcomes) and

can be context dependent; for example, size may improve some accounting returns while weakening market-based performance (Pallayil & Ambrammal, 2022). This reinforces the importance of carefully operationalizing firm size because different size proxies can change inferences in empirical corporate finance work (Dang et al., 2018).

The correlations between the control variables and firm performance are very weak. Firm age (FA) is weakly and negatively associated with FP (r = −0.0533), suggesting little linear association between maturity and performance in this sample an outcome that aligns with broader findings that age effects are often nuanced and may operate through interaction mechanisms (e.g., how growth strategy and profitability evolve over the life cycle) rather than through a strong simple bivariate relationship (Mansikkamäki, 2023). Leverage (FL) also shows a near-zero correlation with FP (r = 0.0145), implying that, at the bivariate level, financing structure is not strongly aligned with performance differences. This is plausible given evidence that leverage–performance links are frequently contingent on firm characteristics such as size, with debt effects being more harmful for smaller firms but weakening as firms grow (Ibhagui & Olokoyo, 2018). Finally, the correlations among the explanatory variables themselves are small (e.g., FA–FS = −0.0579; FL–FS = 0.0622), suggesting limited risk of severe multicollinearity at the pairwise level, although multivariate diagnostics (e.g., VIF) remain advisable especially when size measurement choices can materially affect estimates (Dang et al., 2018).

6.5 Regression Analysis Results

The fixed-effects regression results in Table 4 evaluate one main hypothesis: whether firm size significantly affects firm performance, while treating firm age and firm leverage as control variables. The model is estimated on a balanced panel of 468 firm-year observations drawn from 39 firms (12 observations per firm). Because panel data contain repeated observations for the same firms over time, the fixed-effects estimator is useful for controlling for unobserved, time-invariant firm characteristics such as inherited capabilities, sector positioning, corporate culture, or persistent managerial quality that could otherwise bias estimates if correlated with firm size or the controls (Baltagi, 2021). The significant F-test that all $u_i = 0$ ($F(38, 426) = 14.18$, $p < .001$) confirms that firm-specific effects are jointly important, strengthening the case for a fixed-effects approach rather than pooled OLS (Baltagi, 2021). The reported Corr (u_i, Xb) = 0.5056 further indicates correlation between unobserved firm effects and the regressors, which is precisely the scenario where fixed effects are typically preferred because it removes time-invariant omitted heterogeneity from the error term.

Table 4: Regression Test Results

Fixed-effects (within) regression	**Number of Obs.**	**468**
Group variable: COMPANYID	Number of groups	39
R-sq: within = 0.9994	Obs per group: min	12
between = 0.9999	Avg	12.0
overall = 0.9999	Max	12
	F(3, 426)	248722.43
Corr(u_i, Xb) = 0.5056	Prob > F	0.0000

Firm Performance	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf. Interval]**
Firm age	-0.2489672	0.0075531	-32.96	0.000	-0.2638132 to -0.2341211
Firm leverage	-0.0086450	0.0036366	-2.38	0.018	-0.0157930 to -0.0014971
Firm size	1.2488380	0.0053643	232.81	0.000	1.2382940 to 1.2593820
_cons	-0.0018170	0.0003494	-5.20	0.000	-0.0025037 to -0.0011303
sigma_u			.0097785		
sigma_e			.00751487		
Rho			.62869124		
F test that all u_i=0: F(38, 426) = 14.18 Prob > F = 0.0000					

Source: Authors Computations

Overall model performance is exceptionally strong. The within $R^2 = 0.9994$ indicates that the included regressors explain about 99.94% of the within-firm variation in standardized performance over time. The model is jointly significant with F (3, 426) = 248,722.43 and Prob > F = 0.0000, implying that the regressors, taken together, strongly predict changes in performance within firms. While high explanatory power is desirable, such an extremely large within R^2 should also be interpreted carefully in applied corporate finance because it may reflect a combination of strong co-movement between standardized variables, the stabilizing role

of firm fixed effects, and the possibility that the chosen size proxy is closely connected to how performance is generated or measured in the dataset. This is consistent with the caution in the size literature that empirical inferences can be sensitive to how firm size is measured and how models are specified (Dang et al., 2018).

Crucially, the hypothesis variable firm size shows a positive and highly statistically significant relationship with firm performance. The coefficient on standardized firm size is $\beta = 1.2488$ ($t = 232.81$, $p < .001$; 95% CI [1.2383, 1.2594]). Because the model uses standardized variables, this coefficient can be interpreted as an elasticity-like standardized effect: a one standard deviation increase in firm size is associated with an approximately 1.25 standard deviation increase in firm performance, holding constant firm age and leverage. This is not only statistically significant, but also economically large. The result supports rejection of the null hypothesis that firm size has no effect on firm performance. In interpretation terms, as firms expand their asset base/scale, they tend to experience substantial improvements in performance within the same firm over time. This finding is consistent with the "economies of scale/scope" argument: larger firms can spread fixed costs (compliance, technology, governance systems) over larger output, access cheaper financing, negotiate better input prices, and invest more in productivity-enhancing capabilities channels that can translate into stronger profitability and performance (Pallayil & Ambrammal, 2022). It also aligns with evidence that size can shape the effectiveness of strategic choices such as innovation; larger firms often have more resources and organizational capacity to convert investments into measurable performance gains (Kijkasiwat & Phuensane, 2020).

At the same time, the positive coefficient should be read alongside the broader literature showing that the size–performance relationship is not universally positive across countries, sectors, and measures. Some studies find negative or nonlinear relationships often attributed to bureaucratic frictions and diminishing marginal returns to scale once firms become very large. For example, panel evidence from Asia–Pacific markets report cases where firm size is negatively associated with profitability while firm growth remains positive, implying that "being large" can sometimes reduce profit rates even when "growing" is beneficial (Yadav et al., 2022). Other work emphasizes that the sign can vary depending on whether performance is accounting-based or market-based and on whether endogeneity is addressed using dynamic methods such as system GMM (Pallayil & Ambrammal, 2022). Therefore, your strongly positive within-firm estimate most plausibly indicates that, in this particular sample and period, within-firm expansion in size is associated with within-firm improvements in performance, even if cross-sectional or alternative-sample evidence elsewhere sometimes differs.

The two control variables firm age and leverage behave as meaningful covariates, even though they were not the primary hypothesis. Firm age has a negative and statistically significant coefficient ($\beta = -0.2490$, $t = -32.96$, $p < .001$; 95% CI [−0.2638, −0.2341]). Interpreting this within the standardized framework, a one standard deviation increase in firm age is associated with a 0.25 standard deviation decline in firm performance, holding size and leverage constant. Although older firms are often expected to benefit from learning and accumulated experience, modern evidence increasingly suggests that age can also capture maturity-related rigidity: older firms may face inertia, slower strategic adaptation, and declining marginal efficiency as markets evolve, particularly when technological or competitive conditions shift (Mansikkamäki, 2023). Your result is consistent with that "maturity/rigidity" view: after accounting for firm expansion (size) and capital structure (leverage), aging itself is associated with weaker performance trajectories within firms.

Firm leverage also shows a negative and statistically significant association with performance, though the magnitude is much smaller ($\beta = -0.0086$, $t = -2.38$, $p = .018$; 95% CI [−0.0158, −0.0015]). In standardized terms, a one standard deviation increase in leverage is associated with about a 0.009 standard deviation decline in performance suggesting that leverage has a statistically detectable but economically modest adverse association in this fixed-effects setting. This pattern is consistent with the idea that higher debt burdens can reduce profitability through interest costs and financial distress risk, especially during periods of macroeconomic volatility. Recent evidence from developed-market firms around COVID-era conditions, for instance, continues to document meaningful links between financing structure and performance, though the direction and magnitude can vary by firm characteristics and period (Jaiswal & Elmarzouky, 2025). It also aligns with evidence that leverage effects can differ by size: leverage tends to be most harmful among small firms, and the negative effect can weaken as firms become larger and more resilient an interaction that is particularly relevant to a study where size is central (Ibhagui & Olokoyo, 2018).

7. Conclusions and Recommendations

Analyzing a sample of firms listed on the Nairobi Securities Exchange over the period 2012–2023, this study sought to examine the effect of firm size on firm performance, while controlling for firm age and firm leverage. The fixed-effects regression results indicate that firm size has a positive and statistically significant effect on firm performance, implying that, within firms over time, increases in size are associated with meaningful improvements in performance. In contrast, firm age shows a negative and significant relationship with performance, suggesting that as firms become older, performance may decline, possibly due to maturity-related rigidity, slower adaptation, or reduced efficiency gains. Firm leverage is also negative and statistically significant, although its effect is relatively small, indicating that higher debt exposure can marginally weaker performance, likely through financing costs and risk pressures. The study contributes to the firm size–performance literature by providing NSE-based evidence that growth in firm scale is strongly associated with improved performance when unobserved firm-specific characteristics are controlled for. This supports the view that larger firms may benefit from economies of scale, stronger market power, and better capacity to invest in productivity-enhancing resources and systems. At the same time, the negative effects of age and leverage

highlight that performance improvements from growth are not automatic: older firms may face structural and strategic inertia, and debt-financed expansion may introduce vulnerabilities that dampen profitability.

Based on these findings, several recommendations emerge. First, managers of NSE-listed firms should pursue strategic scaling focused on efficiency, productivity, and market expansion, rather than growth for its own sake. Growth strategies should be accompanied by strong cost control, process optimization, and governance systems to ensure scale benefits translate into higher performance. Second, firms should adopt active renewal strategies such as innovation, restructuring, and capability upgrading to counteract performance declines associated with organizational aging. Third, financial managers should maintain prudent leverage levels, ensuring that debt financing supports value-creating investment and does not undermine performance through excessive interest burdens or distress risk. Policymakers and capital market institutions can support this by improving access to long-term financing instruments that reduce reliance on costly short-term debt. Future research should test whether the size–performance relationship differs across sectors, whether performance gains from size occur with time lags, and whether governance quality or innovation capability moderates the impact of size on performance. Studies may also explore alternative performance measures and address potential reverse causality between performance and firm growth.

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