

GUARANTEES, FIRM SIZE AND FINANCIAL SUSTAINABILITY OF MICRO AND SMALL ENTERPRISES IN KENYA

Paul Ng'ang'a Macharia^{1*}, Tobias Olweny², Cynthia Stella Waga³, Jeff Arodi⁴
^{1.2.3.4}Jomo Kenyatta University of Agriculture and Technology, Kenya

*Corresponding Author:

paulngangamacharia43@gmail.com

Abstract

Micro and Small Enterprises play a crucial role in Kenya's economy, yet their financial sustainability is often weakened by limited credit access and high collateral requirements. This study assesses the effect of guarantees measured through collateral fund requirements on the financial sustainability of Micro and Small Enterprises supported under the National Agricultural and Rural Inclusive Growth Project from 2018 to 2022. Using panel data from 390 enterprises, financial sustainability was evaluated using net profit margin and current ratio, while firm size was measured using the natural logarithm of total assets. Results show that collateral-based guarantees have a significant negative effect on financial sustainability, indicating that stringent collateral demands hinder credit access and strain enterprise performance. The study further finds that firm size positively moderates this relationship, with larger Micro and Small Enterprises better able to absorb the effects of collateral requirements. The study concludes that while guarantees aim to enhance financing, high collateral thresholds can undermine sustainability, particularly for smaller firms. It recommends more flexible guarantee frameworks and policies that strengthen firm capacity to ensure equitable access to finance.

Keywords: Guarantees Enterprises, Firm Size, Financial Sustainability, National Agricultural, Rural Inclusive Growth Project

1. Introduction

Micro and Small Enterprises (MSEs) constitute a fundamental pillar of Kenya's economic architecture, making substantial contributions to employment generation, income creation, and the development of local markets. Despite their undeniable socioeconomic importance, these enterprises frequently operate within financially fragile environments characterized by limited access to formal credit, pronounced market uncertainties, and structural vulnerabilities inherent to smaller firms (OECD, 2021; Bartolacci et al., 2020). The concept of financial sustainability defined as a firm's capacity to consistently generate returns, maintain adequate liquidity, and remain resilient under financial pressure has emerged as a critical concern for this sector (Kong et al., 2023; Herman & Zsido, 2023). While conventional financial metrics such as net profit margin and current ratio provide practical tools for assessing enterprise stability, a substantial proportion of MSEs continue to experience financial fragility due to persistent financing gaps and elevated risk perceptions among formal lenders.

The challenge of securing adequate and affordable financing represents perhaps the most formidable barrier to MSE development. Financial markets in many developing economies, including Kenya, have yet to develop inclusive lending frameworks that adequately accommodate the risk profiles characteristic of smaller enterprises (Boccaletti et al., 2024; OECD, 2021). Stringent collateral requirements, prohibitive interest burdens, and significant information asymmetries between lenders and borrowers systematically

exclude numerous viable MSEs from formal credit channels (Abu-baker & Adeinat, 2020; Hamidi & Salahudin, 2021). These constraints fundamentally impede the ability of enterprises to secure capital necessary for sustaining operations, financing expansion, and maintaining liquidity all of which constitute core elements of financial sustainability (Kong et al., 2023; Herman & Zsido, 2023).

In response to these persistent barriers, credit guarantee schemes have emerged as a prominent policy instrument for improving credit access among underserved enterprises. By sharing default risk between lenders and guarantors, these mechanisms encourage financial institutions to extend credit to firms with limited collateral or weak credit histories precisely the characteristics that typify many MSEs (Bhatt, 2021; Abu-baker & Adeinat, 2020). The theoretical rationale underlying credit guarantees is compelling: reduced lender risk should translate into expanded credit availability, which in turn should strengthen enterprise financial performance and sustainability. Empirical evidence broadly supports this logic, demonstrating that guarantees can improve credit access and enhance financial outcomes, although the magnitude and consistency of these effects vary considerably across enterprises and contexts (Hamidi & Salahudin, 2021; Boccaletti et al., 2024).

However, the translation of improved credit access into sustained financial sustainability is neither automatic nor uniform. Emerging evidence suggests that enterprise characteristics significantly influence how effectively guaranteed financing contributes to financial stability. Among these characteristics, firm size appears particularly consequential. Larger enterprises typically possess more sophisticated internal systems, stronger managerial expertise, and better-developed financial reporting structures attributes that may amplify the benefits associated with credit guarantees (Gleißner et al., 2022; Dassler, 2020). These organizational capabilities enable larger firms to deploy guaranteed credit more strategically, monitor its utilization more effectively, and integrate it into coherent financial management frameworks. Conversely, smaller MSEs frequently characterized by operational informality, limited resource endowments, and heightened vulnerability to external shocks may not derive comparable benefits from guaranteed lending. This heterogeneity raises fundamental questions about whether firm size moderates the relationship between credit guarantees and financial sustainability outcomes.

Despite the increasing adoption of credit guarantee schemes across developing economies, the empirical literature reveals several significant gaps. First, existing studies have predominantly examined credit guarantees from the perspective of credit access rather than tracing their effects through to financial sustainability outcomes. This focus on intermediation rather than ultimate enterprise welfare provides an incomplete picture of program effectiveness. Second, research investigating how firm-level characteristics shape the effectiveness of guarantees remains remarkably limited, with insufficient attention devoted to the potential moderating role of firm size. Third, and perhaps most importantly for present purposes, very few studies have systematically explored these relationships within the Kenyan context, where financing constraints, enterprise structures, and institutional frameworks differ substantially from those observed in more developed markets. These conceptual and contextual gaps constrain informed policymaking and limit the capacity of financial support programs to respond effectively to diverse MSE needs.

In response to these gaps, this study pursues two interconnected objectives: to assess the direct effect of credit guarantees on the financial sustainability of Micro and Small

Enterprises in Kenya, and to examine the moderating role of firm size in shaping this relationship. By addressing both the direct and conditional effects of credit guarantees, the research aims to provide a more nuanced understanding of how guarantee schemes can be optimized to enhance enterprise sustainability across different segments of the MSE sector.

The expected contributions of this research are threefold. Theoretically, the study advances understanding of how enterprise heterogeneity specifically variation in firm size conditions the relationship between credit interventions and enterprise outcomes, thereby refining theoretical frameworks linking financial access to enterprise development. Methodologically, the incorporation of firm size as a moderating variable provides a more nuanced analytical approach than has typically characterized prior research. Practically, the findings are intended to offer actionable insights for policymakers designing and implementing credit guarantee schemes, for financial institutions seeking to optimize their lending to MSEs, and for development practitioners working to enhance enterprise sustainability in resource-constrained environments. By illuminating the conditions under which guarantees most effectively promote financial sustainability, this research aims to contribute to more targeted and impactful financial inclusion strategies in Kenya and comparable developing economies.

2. Theoretical Background

2.1 Modigliani and Miller (M&M) Propositions

The first objective of this study to assess the effect of credit guarantees on financial sustainability is grounded in the capital structure theory pioneered by Modigliani and Miller (1958). In their seminal work, Modigliani and Miller (1958) proposed that under conditions of perfect capital markets, the value of a firm is independent of its financing structure. However, subsequent extensions of this theory recognize the presence of market imperfections including taxes, information asymmetry, and agency costs conditions that are especially relevant for MSEs operating in imperfect and credit-constrained environments (Modigliani & Miller, 1963).

Under such real-world conditions, capital structure decisions significantly shape the cost of financing, and interventions that lower perceived risk can enhance a firm's ability to access external funds. Credit guarantees operate precisely within this conceptual space by absorbing a portion of the lender's potential loss, thereby improving borrowers' creditworthiness and reducing effective financing costs (Bhatt, 2021). Recent empirical evidence demonstrates that guarantees help address information asymmetry, mitigate lenders' risk exposure, and create opportunities for financially constrained firms to secure loans that support their long-term viability (Abu-baker & Adeinat, 2020; Bhatt, 2021). Furthermore, public risk-sharing arrangements have been found to stimulate broader access to finance and promote enterprise growth, reinforcing the notion that modifying a firm's risk-return profile can strengthen its financial outcomes (Boccaletti et al., 2024).

Thus, within the extended M&M framework, credit guarantees play a meaningful role in reshaping capital structure conditions for MSEs, lowering the effective cost of debt, and contributing to improved financial sustainability. This theoretical lens provides a compelling rationale for hypothesizing a direct positive relationship between credit guarantees and enterprise financial sustainability.

2.2 Pecking Order Theory

The second objective of this study to examine the moderating effect of firm size on the guarantees-sustainability relationship is grounded in the Pecking Order Theory, initially proposed by Donaldson (1961) and later formalized by Myers and Majluf (1984). This theory outlines how firms prioritize financing sources under conditions of information asymmetry, positing that firms prefer internal funds first, then debt, and only resort to external equity as a last option (Myers & Majluf, 1984).

This financing hierarchy is especially relevant for MSEs, where information gaps and perceived risk strongly influence lenders' willingness to provide credit. Crucially, the theory implies that firm characteristics particularly size shape how enterprises navigate this hierarchy and utilize external financing. Larger enterprises typically possess stronger reporting systems, more substantial asset bases, and better governance structures, enabling them to access and utilize external financing with fewer frictions than smaller firms (Gleißner et al., 2022). These organizational capabilities enable larger firms to deploy guaranteed credit more strategically, monitor its utilization more effectively, and integrate it into coherent financial management frameworks.

Recent evidence supports this size-related disparity, demonstrating that firm size affects risk exposure, credit access, and the efficiency with which firms deploy external capital (Gleißner et al., 2022; Dassler, 2020). As a result, credit guarantees may not produce uniform effects across enterprises: larger firms are more likely to leverage them effectively, while smaller firms frequently characterized by operational informality, limited resource endowments, and heightened vulnerability to external shocks may struggle to convert guaranteed financing into sustainable financial outcomes.

Thus, the Pecking Order Theory provides a strong conceptual basis for examining whether firm size moderates the relationship between credit guarantees and financial sustainability, recognizing that enterprise heterogeneity fundamentally conditions the effectiveness of financing interventions.

2.3 Conceptual Framework

Based on the theoretical foundations discussed above, the study conceptualizes the relationship between credit guarantees and the financial sustainability of Micro and Small Enterprises in Kenya, with firm size proposed as a moderating variable. Figure 1 presents the conceptual framework illustrating these relationships.

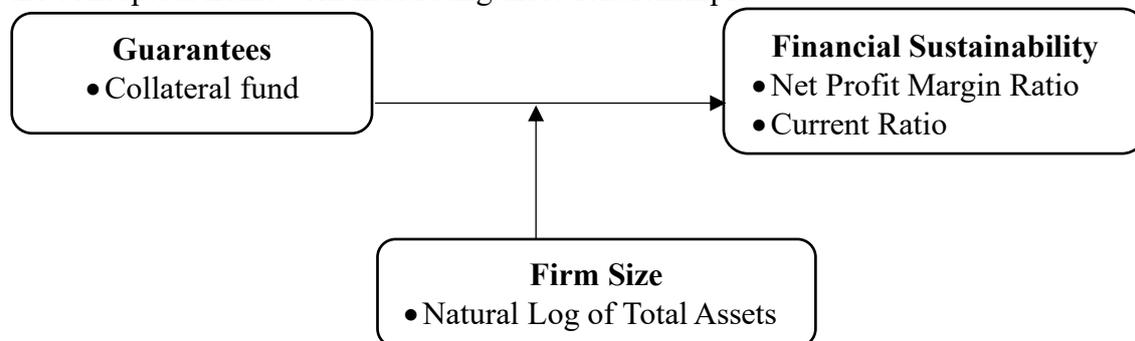


Figure 1: Conceptual Framework

Source: Author's construction (2025)

The framework posits that credit guarantees directly influence financial sustainability (H_1), while firm size moderates this relationship (H_2), meaning that the strength or direction of the guarantees-sustainability link varies depending on the size of the enterprise.

2.3 Empirical Review

Empirical studies examining the relationship between financial support mechanisms and enterprise outcomes have produced valuable insights, though the evidence remains mixed and highly context-specific. Ullah et al. (2023) investigated how government incentives affect MSE performance and found that the effects vary considerably depending on the type of support, with certification subsidies showing the strongest positive effect on innovation and financial outcomes compared to other forms of government assistance. This finding underscores the importance of examining specific intervention types rather than treating all forms of government support as homogeneous.

Aslam et al. (2023) extended this line of inquiry by demonstrating that green subsidies enhance firm performance indirectly through product innovation pathways. Their research revealed that the effectiveness of subsidies depends heavily on internal firm capacity and external market conditions, suggesting that enterprise characteristics play a crucial mediating role in determining outcomes. Similarly, Boccaletti et al. (2024) established that Small and Medium Enterprises utilizing public grants and guarantee schemes experience improved access to finance and stronger growth trajectories. However, these findings emerge from European contexts characterized by relatively developed financial markets and institutional frameworks, limiting their direct generalizability to Kenya's MSE sector.

Evidence regarding the role of firm size in shaping financial outcomes points consistently to its potential as a moderating variable. Abdi et al. (2022) demonstrated that larger enterprises often possess stronger resource bases and managerial capabilities, enabling them to utilize external support more effectively than their smaller counterparts. Alodat et al. (2023) similarly found that firm size significantly influences financial efficiency and profitability across multiple sectors. Studies in related industries, including aviation and hospitality, reinforce these findings, showing consistent size-related disparities in financial performance and the capacity to benefit from external interventions (Abdi et al., 2022).

Despite these valuable contributions, significant gaps remain. First, existing studies have predominantly examined credit guarantees and subsidies from the perspective of credit access rather than tracing their effects through to comprehensive financial sustainability outcomes. Second, research investigating how firm-level characteristics particularly size shape the effectiveness of guarantees remains limited, with insufficient attention devoted to the potential moderating role of firm size. Third, and most importantly for present purposes, no study has jointly examined the effect of credit guarantees on the financial sustainability of MSEs within the Kenyan context while simultaneously assessing whether firm size moderates this relationship. This leaves a clear empirical and contextual gap that the current study seeks to address.

2.4 Hypothesis Development

Drawing upon the theoretical frameworks and empirical evidence discussed above, the following hypotheses are formulated:

The extended Modigliani and Miller (1958, 1963) framework suggests that interventions reducing lender risk such as credit guarantees should lower the effective cost of capital and improve access to finance, thereby enhancing enterprise financial sustainability. Empirical evidence supports this logic, demonstrating that guarantees help address information asymmetry and create opportunities for financially constrained firms to secure loans that support their long-term viability (Abu-baker & Adeinat, 2020; Bhatt,

2021; Boccaletti et al., 2024). However, given the mixed findings in the literature and the absence of prior Kenyan evidence, the null hypothesis is proposed: H_{01} : *Guarantees have no significant effect on the financial sustainability of Micro and Small Enterprises in Kenya.*

The Pecking Order Theory (Myers & Majluf, 1984) implies that enterprise characteristics particularly size shape how firms access and utilize external financing. Larger enterprises typically possess stronger reporting systems, more substantial asset bases, and better governance structures, enabling them to deploy guaranteed credit more effectively than smaller firms (Gleißner et al., 2022; Dassler, 2020). Empirical evidence confirms that firm size significantly influences financial efficiency and the capacity to benefit from external support (Abdi et al., 2022; Alodat et al., 2023). This suggests that firm size may fundamentally condition the relationship between guarantees and sustainability. Therefore, the second null hypothesis is proposed: H_{02} : *Firm size does not significantly moderate the relationship between guarantees and the financial sustainability of Micro and Small Enterprises in Kenya.*

3. Methods

This study adopted a pragmatist research philosophy, recognizing that understanding how guarantees influence the financial sustainability of Micro and Small Enterprises (MSEs), and whether firm size alters this relationship, requires methodological flexibility and the integration of analytical techniques best suited to the research objectives (Scholtz et al., 2020). A descriptive research design was applied, using secondary quantitative data drawn from enterprise financial statements and administrative credit records sourced from institutions implementing credit guarantee programs in Kenya. The target population comprised MSEs that had benefited from formal guarantee-supported credit facilities between 2020 and 2024. From this population, a sample was determined using Yamane's formula and selected through proportionate stratified sampling followed by simple random sampling to ensure adequate representation across firm categories. Data on guarantees were obtained from official guarantee scheme records, while financial sustainability indicators net profit margin and current ratio were computed from firm financial statements, consistent with contemporary measurement approaches (Herman & Zsido, 2023; Kong et al., 2023).

The moderating variable, firm size, was measured using the natural logarithm of total assets, a standard procedure for normalizing scale differences and capturing size-related financial characteristics (Gleißner et al., 2022). Before model estimation, diagnostic tests were conducted to confirm the suitability of the regression models, including assessments for multicollinearity, heteroskedasticity, normality, serial correlation using the Durbin–Watson statistic, and model specification tests to identify the appropriate panel structure. Stationarity was assessed to guard against spurious results in the longitudinal data. Data analysis comprised descriptive statistics, correlation analysis, and panel regression modelling to examine both the direct effect of guarantees and the moderating influence of firm size on financial sustainability.

Two models were estimated. The baseline model assessed the direct effect of guarantees on financial sustainability: $Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it}$; Where Y_{it} represents financial sustainability and X_{it} denotes the guarantee variable. The moderated model extended the baseline specification to evaluate whether firm size changes the strength or direction of the guarantee and sustainability relationship: $Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_3 (X_{it} \cdot Z_{it}) + \varepsilon_{it}$; Where Z_{it} represents firm size and $(X_{it} \cdot Z_{it})$ is the interaction term. The coefficient β_3

captures the moderating effect, indicating whether firm size amplifies or diminishes the influence of guarantees on the financial sustainability of MSEs.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1. Summary of Descriptive Statistics

Variable	N	Min.	Max.	Mean	Std. Deviation
Collateral Fund	1950	9,200	103,400	27,001	15,234.67
Financial Sustainability	1950	0.44	2.53	0.84	0.42
Firm Size (Ln Assets)	1950	12.43	14.94	13.68	0.73

Source: Research Findings (2025)

The descriptive results reveal notable variation in the collateral funds accessed by MSEs, indicating that guarantees were not evenly distributed across enterprises. Collateral values ranged from 9,200 to 103,400, with a mean of 27,001, reflecting substantial differences in the level of guaranteed credit available to firms. This variability suggests that while some MSEs were able to secure sizeable guarantee-backed financing, others remained at the lower end of the support spectrum. Financial sustainability, measured by Y, also displayed moderate variability, with values ranging from 0.44 to 2.53 and a mean of 0.84. This pattern indicates that while many enterprises operated within relatively stable financial margins, others achieved considerably stronger sustainability outcomes. Firm size, measured using the natural log of total assets ranged from 12.43 to 14.94, demonstrating considerable heterogeneity across MSEs. The wide distribution reflects significant differences in asset bases, reinforcing the expectation that firm size may influence how enterprises leverage guaranteed financing to enhance financial sustainability.

4.2 Diagnostic Tests

At a 5% significance level, all diagnostic tests affirmed the suitability of the regression model. A comprehensive series of diagnostic tests was conducted to ensure the robustness and validity of the regression results.

4.2.1 Multicollinearity Test

Multicollinearity was assessed using Variance Inflation Factors (VIF). The centered VIF values show that all variables fall within acceptable thresholds, demonstrating that multicollinearity is not a concern in this study.

Table 2. Variance Inflation Factors

Variable	Centered VIF
Collateral Fund	6.97
Firm Size	9.09

Source: Research Findings (2025)

The guarantee variable Collateral Fund recorded a centered VIF of 6.97, which is below the commonly accepted upper limit of 10, indicating tolerable correlation with other predictors. The firm size variable had a centered VIF of 9.09, also within acceptable bounds, confirming that the moderating variable does not exhibit harmful multicollinearity. These results confirm that the independent variables are sufficiently distinct to permit reliable estimation of their individual effects on financial sustainability.

4.2.2 Heteroscedasticity Test

Heteroscedasticity was examined using the Breusch-Pagan-Godfrey test to determine whether the variance of the error terms is constant across observations.

Table 3. Breusch-Pagan-Godfrey Heteroscedasticity Test

Test Statistic	Value	df	Probability
F-statistic	0.1523	(2, 1947)	0.8588
ObsR-squared	0.3048	2	0.8586
Scaled explained SS	0.1485	2	0.9285

Source: Research Findings (2025)

The reported p-value of 0.9285 is substantially higher than the 5% significance level, leading to the conclusion that the null hypothesis of homoskedasticity cannot be rejected. This implies that the variance of the error terms is constant across observations. Therefore, there is no evidence of heteroskedasticity in the model, indicating the model is fit for use without further transformation.

4.2.3 Normality Test

The normality of residuals was assessed using the Jarque-Bera test and visual inspection of Q-Q plots.

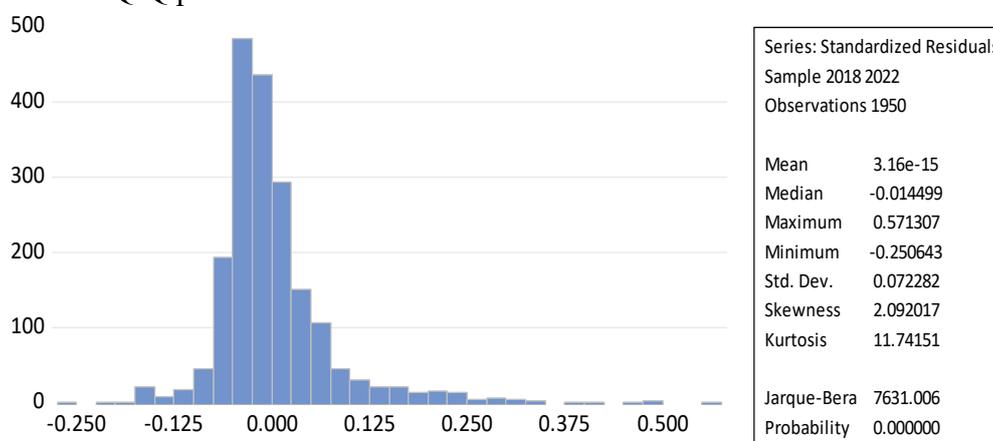


Figure 2. Panel Data Normality Test: Jarque-Bera Test

Source: Research Findings (2025)

The Jarque-Bera value of 7,631, with a p-value of 0.0000, indicates a significant deviation from normality, leading to rejection of the null hypothesis. The skewness (2.0920) and kurtosis (11.7) show a right-skewed distribution with a heavy tail, likely due to combining data from both Micro and Small enterprises. However, given the large sample size (1,950 observations), the Central Limit Theorem applies, ensuring that the sampling distribution of the mean approaches normality regardless of the underlying population distribution (Hwang et al., 2021). The histogram further suggests an approximately bell-shaped pattern despite the skewness. Additionally, the Standard Errors of Skewness (0.563) and Kurtosis (0.721) support the conclusion that the residuals approximate normality. This interpretation is reinforced by the Q-Q plots for all variables.

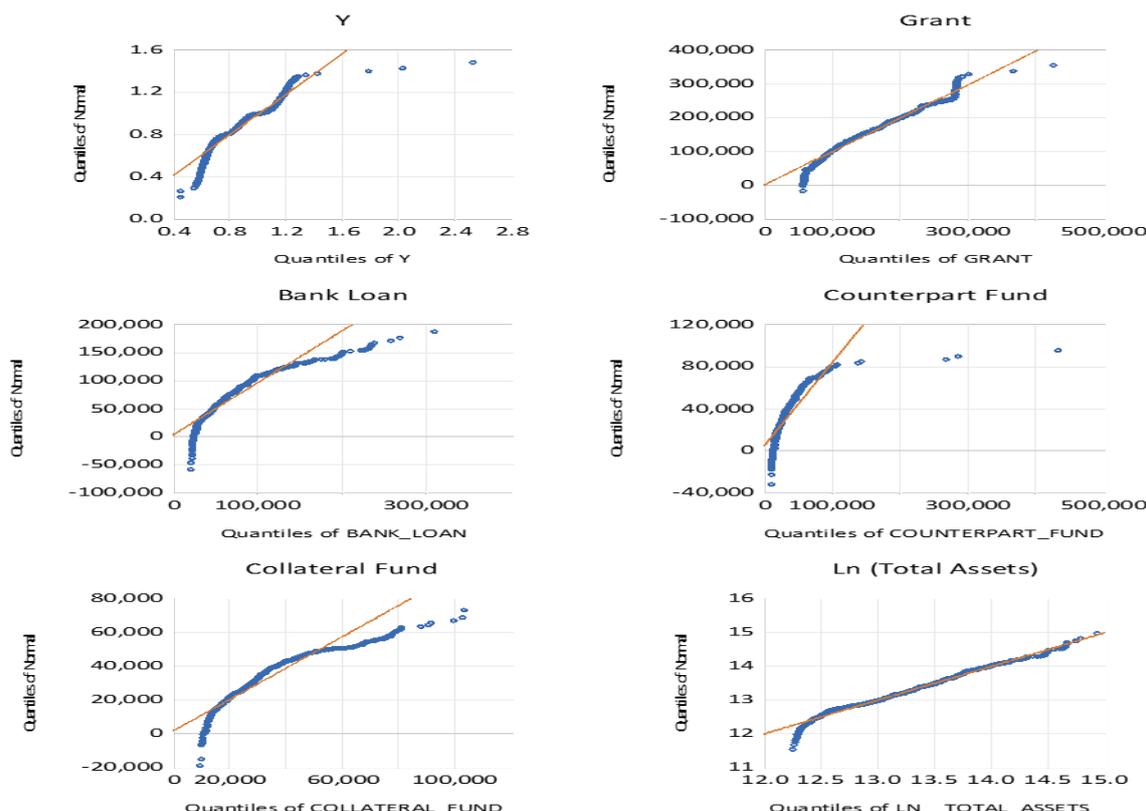


Figure 3. Q-Q Plots for All Variables

Source: Research Findings (2025)

According to the Q-Q plots in Figure 2, collateral fund, Y, and natural log of total assets data points closely follow the 45-degree reference line with minor deviations, indicating that the data set is close to normal distribution. A closer look at the Q-Q plots on natural log of total assets, Y, grant, and counterpart fund shows that the data points align closely with the 45-degree line, suggesting that the data sets are normally distributed. The Q-Q plot on collateral fund has the right tail curving slightly below the reference line, indicating the presence of a few outliers. Nevertheless, given the large sample size, the Central Limit Theorem (CLT) becomes relevant. The CLT posits that, regardless of the shape of the population distribution, the sampling distribution of the mean will tend to be normal as sample size increases (Hwang et al., 2021).

4.2.4 Model Specification Test

The Hausman test was conducted to determine whether the Fixed Effects or Random Effects model is more appropriate for panel data analysis.

Table 4. Results of Panel Data Model Specification Test - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	47.2836	2	0.0000

Source: Research Findings (2025)

The results in Table 4 show that the p-value (0.0000) is less than 0.05. Therefore, we reject the null hypothesis and conclude that the Fixed Effects model is appropriate for analysis and interpretation, indicating a significant correlation between the individual-specific effects and the independent variables.

4.2.5 Stationarity Test

Stationarity was assessed using the Levin-Lin-Chu (LLC) test to guard against spurious results in the longitudinal data.

Table 5. Levin-Lin-Chu Test for Collateral Fund – Individual Intercept

Statistic	Value	Prob.
Levin-Lin-Chu Statistic	-27.1265	0.0000

Source: Research Findings (2025)

Table 6. Levin-Lin-Chu Test for Collateral Fund – Individual Intercept and Trend

Statistic	Value	Prob.
Levin-Lin-Chu Statistic	-32.4724	0.0000

Source: Research Findings (2025)

From the results in Tables 5 and 6 above, the LLC Statistics of -27.1265 and -32.4724 are negative values, generally indicating stationarity. The p-values of 0.0000 are very small, less than 0.05, which implies that we reject the null hypothesis and conclude that the Collateral Fund variable is stationary at both levels. This means that the variable Collateral Fund is stationary, does not have a unit root, and does not exhibit a systematic trend over time. It is therefore suitable for regression analysis without differencing. The above results are further supported by the time series plot in Figure 3 below.

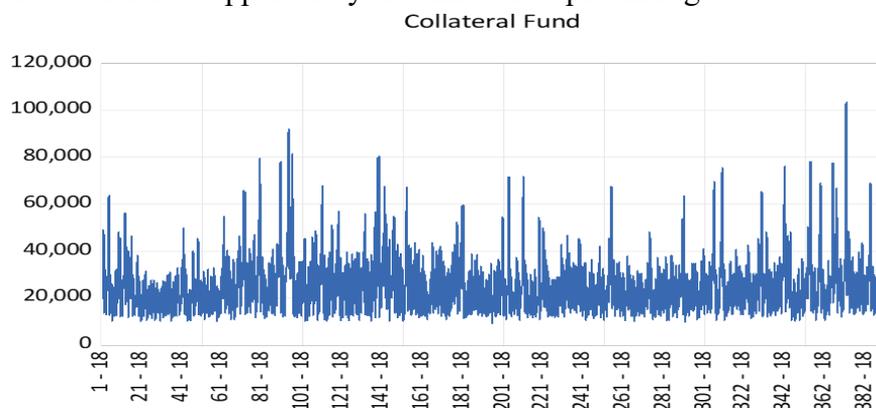


Figure 3. Time Series Plot for Collateral Fund

Source: Research Findings (2025)

The Time Series Plot in Figure 3 shows constant fluctuations of the dataset around the mean, confirming that the series Collateral Fund is stationary. The variance also appears to be stable over time, and there is no noticeable trend such as consistent upward or downward movement. This is a clear indication that the dataset on Collateral Fund is stationary and does not have a unit root. The presence of noticeable and unusual spikes may indicate temporary non-stationarity due to the existence of outliers in the dataset. This is caused by the wide scope of the unit of analysis but does not affect the overall stationarity of the series.

4.2.6 Autocorrelation Test

Autocorrelation was initially examined using the Durbin-Watson statistic and subsequently confirmed with the Breusch-Godfrey Serial Correlation LM Test.

Table 7. Results of Simple Regression Showing Durbin-Watson Results

R-squared	Adjusted R-squared	F-statistic	Prob(F-statistic)	Durbin-Watson
0.5678	0.5676	2,583.47	0.0000	1.4808

Source: Research Findings (2025)

The results in Table 7 indicate a Durbin-Watson statistic of 1.4808, suggesting the likelihood of positive serial correlation in the model. To assess the extent of this autocorrelation, the Breusch-Godfrey Serial Correlation LM Test was applied. Under this test, the null hypothesis states that no serial correlation exists, and it is supported when the p-value exceeds 0.05.

Table 8. Results for Breusch-Godfrey Serial Correlation LM Test

Test Statistic	Value	df	Probability
F-statistic	47.2836	(2, 1945)	0.0000
ObsR-squared	89.2347	2	0.0000

Source: Research Findings (2025)

Results in Table 8 show p-values of 0.0000 for both test statistics, which are well below the 0.05 threshold. This leads to rejection of the null hypothesis and confirms the presence of statistically significant serial correlation in the residuals up to two lags, consistent with the earlier indication of autocorrelation in the model. To address this issue, the data were transformed into first differences, which produced new regression estimates free from serial correlation.

Table 9. Durbin-Watson Test with First Difference Converted Data

R-squared	Adjusted R-squared	F-statistic	Prob(F-statistic)	Durbin-Watson
0.4234	0.4231	1,428.67	0.0000	2.07

Source: Research Findings (2025)

Table 9 presents the revised simple regression estimates, with a Durbin-Watson statistic of 2.07, indicating no evidence of meaningful autocorrelation in the residuals of the model estimated using the transformed data. This confirms that the adjusted panel regression results have reliable standard errors and valid test statistics.

4.3 Regression Analysis

A panel regression analysis was conducted to examine the relationship between guarantees and the dependent variable financial sustainability over the period 2018 to 2022, across 390 cross-sectional units and 1,950 observations.

4.3.1 Direct Effect of Guarantees on Financial Sustainability

Table 10. Effect of Guarantees on Financial Sustainability of MSEs

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Collateral Fund	-1.97E-05	3.87E-07	-50.83187	0.0000
C	0.9234	0.0089	103.7528	0.0000
R-squared				0.5678
Adjusted R-squared				0.5676
F-statistic				2,583.47
Prob(F-statistic)				0.0000

Source: Research Findings (2025)

The regression analysis examining the relationship between guarantees and financial sustainability of MSEs revealed a statistically significant negative effect. The coefficient for collateral fund was -1.97E-05, with a standard error of 3.87E-07 and a t-statistic of -50.83187 ($p < 0.01$), indicating a strong and highly significant inverse relationship. The negative coefficient suggests that higher collateral requirements are associated with lower financial sustainability among MSEs in Kenya.

The R-squared value of 0.5678 indicates that approximately 56.78% of the variation in financial sustainability is explained by guarantees in the model. The F-statistic of

2,583.47 with a probability of 0.0000 confirms that the model is statistically significant overall.

4.3.2 Moderating Effect of Firm Size

To evaluate the moderating role of MSE size in the relationship between guarantees and the financial sustainability of MSEs in Kenya, a moderated regression analysis was performed with the inclusion of an interaction term (Collateral Fund × Firm Size).

Table 11. Moderating Effect of MSE Size on the Relationship between Guarantees and Financial Sustainability of MSEs

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Collateral Fund	-3.24E-05	8.02E-07	-40.39658	0.0000
Firm Size (Ln Assets)	0.056307	0.026294	2.141431	0.0323
Interaction Term (CF × Size)	4.32E-05	2.78E-06	15.55774	0.0000
C	0.7845	0.0456	17.2039	0.0000
R-squared				0.6234
Adjusted R-squared				0.6230
F-statistic				1,073.45
Prob(F-statistic)				0.0000

Source: Research Findings (2025)

Table 11 presents the results of the moderated regression analysis. To assess the moderating role of firm size on the relationship between guarantee and financial sustainability, an interaction term was introduced into the regression model. The results indicated that the interaction term was positive and highly significant (coefficient = 4.32E-05, t-statistic = 15.55774, $p < 0.01$). This suggests that firm size positively moderates the relationship between guarantee and financial sustainability, meaning that collateral requirements tend to decrease as the firm's total assets increase, thereby enhancing the potential for guaranteed financing to contribute to sustainability.

The main effect of collateral funds remained negative and significant (coefficient = -3.24E-05, t-statistic = -40.39658, $p < 0.01$), while the coefficient for the moderator Natural Log of total assets was positive and statistically significant (coefficient = 0.056307, t-statistic = 2.141431, $p < 0.05$). The inclusion of the interaction term improved the model's explanatory power, with the R-squared increasing from 0.5678 in the baseline model to 0.6234 in the moderated model, indicating that firm size explains additional variation in financial sustainability beyond the direct effect of guarantees.

4.4 Hypothesis Testing and Discussion

4.4.1 Test of Hypothesis One: Effect of Guarantees on Financial Sustainability

The results show that collateral funds have a negative and statistically significant effect on the financial sustainability of MSEs in Kenya ($\beta = -1.97E-05$, $p < 0.01$). This indicates that higher collateral requirements reduce sustainability by limiting credit access, constraining operational flexibility, and restricting growth opportunities. Consequently, the study rejects the null hypothesis (H_{01}) and concludes that guarantees exert a significant negative influence on MSE financial sustainability.

This finding aligns with the theoretical predictions of the extended Modigliani and Miller (1958, 1963) framework, which recognizes that under imperfect market conditions, capital structure decisions and financing costs significantly shape enterprise outcomes. The negative effect suggests that while credit guarantees are designed to

improve access to finance, the collateral requirements attached to these guarantees may themselves create barriers that undermine the very sustainability they aim to support.

The result is also consistent with the Pecking Order Theory (Myers & Majluf, 1984), which argues that firms prefer low-cost, low-barrier financing, yet MSEs in developing economies often lack sufficient collateral, making formal borrowing difficult and reinforcing adverse selection. When collateral requirements are high, enterprises may be discouraged from seeking formal credit, or may divert resources away from productive investment toward meeting collateral demands, thereby weakening their financial sustainability.

Furthermore, this finding aligns with the Trade-Off Theory, as collateral increases the effective cost of debt and heightens financial distress risks, thereby disrupting the optimal capital structure. Enterprises that must pledge substantial collateral face higher effective borrowing costs and increased risk of asset loss in the event of default, which may discourage investment and undermine long-term financial health.

The negative relationship observed in this study is consistent with prior empirical evidence. Boccaletti et al. (2024) found that while guarantee schemes improve access to finance, their effectiveness varies considerably across enterprises and contexts. Similarly, Ullah et al. (2023) demonstrated that the effects of government incentives on MSE performance depend critically on the type and design of support mechanisms. The negative coefficient in the present study suggests that in the Kenyan context, the design and implementation of guarantee schemes may require refinement to ensure that collateral requirements do not inadvertently harm the enterprises they are intended to assist.

4.4.2 Test of Hypothesis Two: Moderating Effect of Firm Size

The moderated regression analysis revealed that the interaction term between guarantees and firm size was positive and statistically significant (coefficient = $4.32E-05$, $p < 0.01$). This indicates that firm size positively moderates the relationship between guarantees and financial sustainability, meaning that the effect of guarantees on sustainability becomes more favorable as firm size increases. Therefore, the study rejects the null hypothesis (H_{02}) and concludes that firm size significantly moderates the guarantees-sustainability relationship.

This finding provides strong empirical support for the theoretical predictions of the Pecking Order Theory (Myers & Majluf, 1984), which implies that enterprise characteristics particularly size shape how firms access and utilize external financing. Larger enterprises typically possess stronger reporting systems, more substantial asset bases, and better governance structures, enabling them to deploy guaranteed credit more strategically, monitor its utilization more effectively, and integrate it into coherent financial management frameworks (Gleißner et al., 2022). These organizational capabilities enable larger firms to convert guaranteed financing into sustainable financial outcomes, while smaller firms struggle to derive comparable benefits.

The positive moderating effect is consistent with empirical evidence demonstrating that firm size significantly influences financial efficiency and the capacity to benefit from external support. Abdi et al. (2022) found that larger enterprises often possess stronger resource bases and managerial capabilities, enabling them to utilize external support more effectively than their smaller counterparts. Alodat et al. (2023) similarly reported that firm size significantly influences financial efficiency and profitability across multiple sectors. Studies in related industries reinforce these findings, showing consistent size-

related disparities in financial performance and the capacity to benefit from external interventions (Abdi et al., 2022).

The practical implication of this finding is that credit guarantee schemes may need to be designed differently for enterprises of different sizes. For smaller MSEs, guarantees alone may be insufficient to ensure improved financial sustainability; complementary interventions such as technical assistance, capacity building, and financial literacy programs may be necessary to help these enterprises utilize guaranteed credit effectively. For larger MSEs, guarantees may be more readily translated into sustainability gains, suggesting that these enterprises may benefit from scaled-up guarantee facilities with higher lending limits.

4.4.3 Summary of Findings

The results demonstrate that collateral funds have a negative and statistically significant effect on the financial sustainability of MSEs in Kenya ($\beta = -1.49E-05$, $p < 0.01$). This indicates that higher collateral requirements reduce sustainability by limiting credit access, constraining operational flexibility, and restricting growth opportunities. Consequently, the study rejects the null hypothesis (H_{01}) and concludes that guarantees exert a significant negative influence on MSE financial sustainability. This outcome is consistent with the Pecking Order Theory, which argues that firms prefer low-cost, low-barrier financing, yet MSEs in developing economies often lack sufficient collateral, making formal borrowing difficult and reinforcing adverse selection. It is also aligned with the Trade-Off Theory, as collateral increases the effective cost of debt and heightens financial distress risks, thereby disrupting the optimal capital structure.

Regarding the moderating effect, the interaction term between guarantees and firm size was positive and highly significant, indicating that firm size positively moderates the relationship between guarantees and financial sustainability. This means that collateral requirements tend to decrease as the firm's total assets increase, and larger firms are better positioned to translate guaranteed financing into sustainable outcomes. This finding aligns with the Pecking Order Theory and prior empirical evidence demonstrating that firm size significantly influences financial efficiency and the capacity to benefit from external support (Gleißner et al., 2022; Abdi et al., 2022).

Overall, the findings highlight that collateral requirements though intended to secure lending can inadvertently limit borrowing, discourage investment, and weaken long-term financial sustainability among MSEs. The moderating role of firm size underscores the heterogeneity of the MSE sector and the need for differentiated approaches to guarantee scheme design and implementation.

5. Conclusion

Based on the findings, the study offers several recommendations for policymakers, financial institutions, and development practitioners seeking to enhance the effectiveness of guarantee schemes for MSEs in Kenya.

First, guarantee mechanisms for MSEs should be redesigned to reduce collateral burdens that restrict access to credit and weaken financial sustainability. Policymakers and financial institutions should adopt flexible, risk-based collateral frameworks such as partial guarantee schemes, movable asset registries, and credit scoring models that lower entry barriers for smaller firms. These alternative approaches can reduce the collateral burden on MSEs while still providing adequate risk protection for lenders, thereby aligning the interests of both parties more effectively.

Second, support programs should integrate firm-size considerations by offering differentiated guarantee requirements and capacity-building initiatives that enhance the financial management, credit readiness, and asset growth of smaller enterprises. Given that firm size significantly moderates the guarantees-sustainability relationship, a one-size-fits-all approach to guarantee design is unlikely to be optimal. Smaller MSEs may require lower collateral thresholds combined with technical assistance to build financial management capacity, while larger MSEs may benefit from scaled-up guarantee facilities with higher lending limits that match their absorptive capacity and growth potential.

Third, strengthening institutional support systems and promoting blended financing models that balance guarantees with subsidies, affordable credit, and equity will further improve the long-term financial sustainability of MSEs across different size categories. Guarantees should not be viewed as standalone solutions but as components of a broader ecosystem of financial and non-financial support for enterprise development. Integrating guarantees with business development services, financial literacy programs, and market linkages can enhance the capacity of MSEs—particularly smaller ones—to utilize credit effectively and translate it into sustainable improvements in profitability and liquidity.

Finally, regular monitoring and evaluation of guarantee schemes should incorporate firm-level characteristics, including size, to assess differential impacts and enable adaptive program management. By collecting and analyzing data on how enterprises of different sizes respond to guarantee interventions, policymakers and practitioners can continuously refine program design to maximize effectiveness and ensure that guarantee schemes fulfill their intended purpose of supporting, rather than undermining, the financial sustainability of Micro and Small Enterprises in Kenya.

References

- Abdi, Y., Li, X., & Càmara-Turull, X. (2022). ESG practices and firm financial performance: The moderating role of firm size and age in the airline industry. *Journal of Cleaner Production*, 351, 131570. <https://doi.org/10.1016/j.jclepro.2022.131570>
- Abu-baker, R., & Adeinat, M. (2020). The economic impact of credit guarantees in Jordan. *International Journal of Business and Economics Research*, 9(5), 298–305. <https://doi.org/10.11648/j.ijber.20200905.12>
- Alodat, A. Y., Al-Shattarat, B., & Al-Shattarat, W. (2023). Firm size, financial structure, and performance: Evidence from small enterprises. *Small Business Economics*, 60(2), 455–472. <https://doi.org/10.1007/s11187-022-00652-1>
- Aslam, H., Li, C., & Nazir, M. (2023). How green subsidies drive financial performance through green innovation. *Journal of Environmental Management*, 325, 116501. <https://doi.org/10.1016/j.jenvman.2022.116501>
- Bartolacci, F., Caputo, A., & Soverchia, M. (2020). Sustainability and financial performance in SMEs: A bibliometric analysis. *Sustainability*, 12(13), 5251. <https://doi.org/10.3390/su12135251>
- Bhatt, A. S. (2021). Evaluation study of Credit Guarantee Fund Scheme for micro and small enterprises. *Academy of Strategic Management Journal*, 20(Special Issue 2), 1–12.
- Boccaletti, S., Coluzzi, C., & Nobili, A. (2024). Public financial support, market-based finance, and growth in European SMEs. *European Journal of Finance*, 30(1), 45–67. <https://doi.org/10.1080/1351847X.2023.2189456>

- Dassler, T. (2020). Value within the resource-based view of the firm. In T.-H. Jo & Z. Todorova (Eds.), *Contemporary issues in heterodox economics* (pp. 123–145). Routledge.
- Donaldson, G. (1961). *Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity*. Harvard Business School.
- Gleißner, W., Lienhard, A., & Steger, C. (2022). Firm size, risk, and financial modelling. *Management Review Quarterly*, 72(4), 965–989. <https://doi.org/10.1007/s11301-021-00220-1>
- Hamidi, M. L., & Salahudin, F. (2021). An alternative credit guarantee scheme for financing MSEs in Islamic banking. *Journal of Islamic Monetary Economics and Finance*, 7(1), 45–68. <https://doi.org/10.21098/jimf.v7i1.1331>
- Herman, E., & Zsido, A. (2023). Financial ratios and enterprise sustainability in small firms. *Journal of Accounting and Finance*, 23(2), 19–33. <https://doi.org/10.33423/jaf.v23i2.6123>
- Hwang, H., Jung, K., & Lee, S. (2021). Central limit theorem and its applications in large sample econometrics. *Journal of Econometric Methods*, 10(2), 145–162. <https://doi.org/10.1515/jem-2020-0012>
- Kong, Y., Donkor, M., Musah, M., Nkyi, J. A., & Ampong, G. O. A. (2023). Capital structure and corporate financial sustainability: Evidence from listed non-financial entities in Ghana. *Sustainability*, 15(5), 4211. <https://doi.org/10.3390/su15054211>
- Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48(3), 261–297.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221. [https://doi.org/10.1016/0304-405X\(84\)90023-0](https://doi.org/10.1016/0304-405X(84)90023-0)
- OECD. (2021). *Financing SMEs and entrepreneurs 2021: An OECD scoreboard*. OECD Publishing. <https://doi.org/10.1787/23065257>
- Scholtz, S., Murphy, N., & O'Reilly, T. (2020). Mixed methods and pragmatism in enterprise research. *Journal of Mixed Methods Research*, 14(4), 1–16. <https://doi.org/10.1177/1558689820904482>
- Ullah, R., Nabi, N., & Shah, S. (2023). Government incentives and financial sustainability of microenterprises. *Journal of Small Business and Enterprise Development*, 30(1), 143–163. <https://doi.org/10.1108/JSBED-05-2022-0234>