

DEBT, 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

This study aims to analyze the effect of debt financing on the financial sustainability of Micro and Small Enterprises (MSEs) in Kenya and to examine whether firm size moderates this relationship. This study employs a descriptive research design using secondary data obtained from the financial statements of MSEs that benefited from the National Agricultural and Rural Inclusive Growth Project (NARIGP) across 21 counties in Kenya during the 2018–2022 period. The sample was determined using the Yamane formula, resulting in 390 MSEs with 1,950 firm-year observations. Debt financing was measured using bank loans, firm size was measured using the natural logarithm of total assets, and financial sustainability was measured using the net profit margin ratio and current ratio. Data were analyzed using panel data regression with EViews 12. The results indicate that debt financing has a positive and significant effect on the financial sustainability of MSEs in Kenya ($\beta = 4.78\text{E-}06$; $p < 0.01$). However, firm size does not significantly moderate the relationship between debt financing and financial sustainability ($\beta = 1.29\text{E-}06$; $t = 0.742$; $p \approx 0.458$). These findings indicate that bank loans can provide resources for working capital, investment, and continuity of business operations, thereby contributing to financial sustainability, while firm size does not significantly alter this relationship. The practical implication is that financial institutions should improve MSE access to appropriately structured bank credit, and MSE owners should direct borrowed funds toward productive and income-generating activities.

Keywords: Debt Financing, Financial Sustainability, Firm Size, Micro and Small Enterprises

1. Introduction

Micro and Small Enterprises (MSEs) contribute to employment, income generation and entrepreneurial activity, yet their continued operation depends partly on access to adequate financial resources. Financial sustainability is particularly important because MSEs often operate with limited internal resources and are consequently vulnerable to liquidity constraints and changing business conditions. Financial sustainability encompasses the capacity to generate adequate returns, maintain liquidity and sustain operations over time (Zabolotnyy & Wasilewski, 2019). For MSEs, access to appropriate financing is therefore important in supporting investment, business continuity and long-term viability.

Debt financing provides an important source of external capital where internally generated funds are insufficient to meet working-capital and investment requirements. However, empirical evidence on its financial consequences remains mixed. Manyanga et al. (2023) established that short-term debt, long-term debt and trade credit positively influenced the financial performance of SMEs in Zimbabwe. In contrast, Ali and Shaik (2022) found that debt financing negatively influenced financial performance among

Saudi Arabian energy firms. These contrasting findings suggest that the financial consequences of debt may depend on enterprise characteristics and the context in which borrowing occurs.

Firm size is one characteristic that may influence how enterprises access and utilize debt financing. Gutiérrez-Ponce (2024) established that larger firm size and greater collateral were important in enabling SMEs to access long-term leverage financing, demonstrating the relevance of enterprise characteristics in financing decisions. Larger MSEs may possess stronger asset bases and borrowing capacity, while smaller enterprises may experience greater financing constraints. It is therefore important to determine whether differences in firm size influence the relationship between debt financing and financial sustainability.

Micro and Small Enterprises (MSEs) contribute substantially to economic activity and employment in Kenya, yet their financial sustainability remains constrained by inadequate financial resources, liquidity pressures and difficulties in accessing affordable credit. According to Menne et al. (2022), debt financing can provide the capital required for working capital, productive investment and business expansion when internally generated funds are insufficient. However, MSEs often face borrowing constraints associated with collateral requirements, financing costs and repayment capacity (Shakir, 2022). These constraints can affect their ability to generate adequate returns while maintaining the liquidity required for continuity of operations (Masdupi et al., 2024).

Empirical evidence on the effect of debt financing on SME financial outcomes remains mixed. Okelo et al. (2021) established that debt financing influenced the financial performance of SMEs in Homa Bay, Kenya, with long- and short-term financing having stronger effects than trade credit. Manyanga et al. (2023) similarly found positive effects of short-term debt, long-term debt and trade credit on SME financial performance in Zimbabwe. Conversely, Ali and Shaik (2022) reported a negative relationship between debt financing and financial performance in their study of Saudi Arabian energy firms. More recent evidence also demonstrates that debt outcomes can depend on firm-specific characteristics and the composition of financing (Gutiérrez-Ponce et al., 2024). Nevertheless, much of this literature focuses on financial performance rather than financial sustainability incorporating both profitability and liquidity, leaving limited evidence among Kenyan MSEs.

Firm size may further influence the capacity of MSEs to access, utilize and service debt because enterprises differ in their asset bases and financing capacity. Recent evidence indicates that firm size can be important in firms' access to and use of leverage financing (Gutiérrez-Ponce et al., 2024). However, limited evidence exists on whether firm size moderates the relationship between debt financing and financial sustainability among MSEs in Kenya.

The urgency of this research is driven by several critical factors. First, MSEs contribute substantially to economic activity and employment in Kenya, yet their financial sustainability remains constrained by inadequate financial resources, liquidity pressures and difficulties in accessing affordable credit. Second, debt financing provides an important source of external capital for MSEs, yet empirical evidence on its financial consequences remains mixed, indicating a research gap that needs to be addressed. Third, firm size may influence how MSEs access, utilize and service debt, yet limited evidence exists on whether firm size moderates the relationship between debt financing and financial sustainability. Fourth, much of the existing literature focuses on financial performance rather than financial sustainability incorporating both profitability and

liquidity, leaving limited evidence among Kenyan MSEs. Fifth, MSEs supported under the National Agricultural and Rural Inclusive Growth Project (NARIGP) represent a unique context characterized by targeted financial support and rural economic development, providing an opportunity to examine the determinants of financial sustainability in a previously under-researched institutional context.

Previous research has shown significant but fragmented findings regarding the effect of debt financing on SME financial outcomes. Studies have demonstrated that debt financing positively influences financial performance, with short-term debt, long-term debt and trade credit contributing to improved financial outcomes (Manyanga et al., 2023; Okelo et al., 2021). However, other studies have reported contradictory findings, indicating that debt financing negatively influences financial performance (Ali & Shaik, 2022). Furthermore, recent evidence demonstrates that debt outcomes can depend on firm-specific characteristics such as firm size and collateral (Gutiérrez-Ponce et al., 2024). These inconsistencies suggest that the relationship between debt financing and financial sustainability remains underexplored, particularly in the context of MSEs in Kenya during the implementation of NARIGP.

The research gap in this study lies in the limited understanding of how debt financing influences financial sustainability among MSEs in Kenya, and whether firm size moderates this relationship. While individual studies have examined the direct effects of debt financing on financial performance, the integrated framework connecting debt financing, firm size, and financial sustainability remains underexplored (Ali & Shaik, 2022; Gutiérrez-Ponce et al., 2024; Manyanga et al., 2023; Okelo et al., 2021). Additionally, most previous studies have focused on financial performance rather than financial sustainability incorporating both profitability and liquidity, leaving a significant gap in knowledge regarding the determinants of financial sustainability among Kenyan MSEs. Furthermore, empirical evidence on the moderating role of firm size in the relationship between debt financing and financial sustainability remains limited, particularly in the context of MSEs supported under NARIGP.

The novelty of this research lies in several aspects. First, this study focuses on MSEs supported under the National Agricultural and Rural Inclusive Growth Project (NARIGP) in Kenya, representing a unique context characterized by targeted financial support and rural economic development. Second, this study develops an integrative model that simultaneously examines the influence of debt financing on financial sustainability, with firm size as a moderating variable, providing a more comprehensive understanding of the determinants of financial sustainability. Third, this study contributes to the limited empirical evidence on financial sustainability among MSEs in Kenya, providing insights into how debt financing and firm size collectively influence financial sustainability. Fourth, this study extends the application of pecking order theory and resource-based view to the context of MSE financing in emerging markets, validating theoretical predictions in an under-researched institutional context. Fifth, this study provides actionable insights for policymakers, financial institutions, and MSE owners in designing effective strategies to improve financial sustainability.

The purpose of this study is to examine the effect of debt financing on the financial sustainability of Micro and Small Enterprises in Kenya, and to assess whether firm size moderates this relationship. Specifically, this research aims to establish the effect of debt on the financial sustainability of Micro and Small Enterprises in Kenya, and to examine the moderating effect of firm size on the relationship between debt and the financial sustainability of Micro and Small Enterprises in Kenya. The choice of this goal was driven

by the limited understanding of how debt financing influences financial sustainability and the need for empirical evidence that can inform policymakers, financial institutions, and MSE owners in designing effective strategies to improve financial sustainability.

The contribution of this research is multifaceted. From a theoretical perspective, this research contributes to the enrichment of literature on MSE financing and financial sustainability by proposing and testing an integrative model that links debt financing and firm size with financial sustainability, extending the application of pecking order theory and resource-based view to the context of MSE financing in Kenya. The findings contribute to the understanding of how debt financing and firm size collectively influence financial sustainability, providing a more nuanced theoretical framework for analyzing MSE financial behavior in emerging markets. From a practical perspective, this study provides actionable insights for policymakers, financial institutions, and MSE owners in designing effective strategies to improve financial sustainability. For policymakers, the findings provide guidance on which financing instruments and support mechanisms should be prioritized in enhancing MSE financial sustainability. For financial institutions, the results offer insights into the importance of firm size and debt structure in assessing creditworthiness and designing appropriate financing products. For MSE owners, this study provides empirical evidence on the benefits and risks of debt financing in supporting financial sustainability. For academics, this study contributes to the growing body of literature on MSE financing in emerging markets, providing a foundation for future research on debt financing and financial sustainability.

2. Theoretical Background

2.1 Trade-Off Theory

Trade-Off Theory of Capital Structure explains financing decisions as a balance between the benefits of debt and the costs associated with financial distress. Debt may provide financing and tax advantages, but increasing leverage also exposes firms to repayment obligations and greater financial risk. According to Agyei et al. (2020), firms therefore seek a capital structure in which the benefits of additional debt are balanced against the associated costs of financial distress. For MSEs with limited internally generated funds, debt can provide resources for working capital, asset acquisition and investment, thereby supporting profitability and liquidity when borrowing remains within manageable levels (Serrasqueiro & Caetano, 2015). Excessive debt, however, may increase repayment pressure and undermine financial sustainability. Trade-Off Theory therefore provides the theoretical basis for examining the effect of debt financing on the financial sustainability of MSEs. In this study, Trade-Off Theory serves as the foundation for identifying and measuring the benefits and costs associated with debt financing that potentially influence financial sustainability. Debt is considered as one of the factors that can affect financial sustainability, so Trade-Off Theory can explore the optimal level of leverage that balances the benefits of debt against the costs of financial distress. When debt remains within manageable levels, it can support profitability and liquidity, and this can improve financial sustainability. In addition, Trade-Off Theory can help reveal how firm size can strengthen or reduce the impact of debt on financial sustainability.

2.2 Pecking Order Theory

Pecking Order Theory proposes that firms generally prefer internally generated funds to external financing because of information asymmetry and financing costs. This theory explains that firms follow a hierarchy of financing preferences, starting from retained

earnings, followed by debt, and finally equity issuance. These financing constraints may differ according to firm characteristics, particularly size, since smaller enterprises may have fewer assets, limited financial information and weaker borrowing capacity, while larger firms may possess stronger resource bases and greater capacity to access and utilize external financing (Serrasqueiro & Caetano, 2015). Such differences provide a theoretical basis for expecting the relationship between debt financing and financial sustainability to vary with firm size. In this study, Pecking Order Theory serves as the foundation for examining whether firm size, measured by the natural logarithm of total assets, moderates the relationship between debt financing and financial sustainability. Firm size is considered as one of the factors that can affect the relationship between debt and financial sustainability, so Pecking Order Theory can explore how differences in firm size influence the capacity of MSEs to access, utilize and service debt. When firm size increases, the capacity to access and utilize external financing also increases, and this can strengthen or weaken the effect of debt on financial sustainability. In addition, Pecking Order Theory can help reveal how information asymmetry and financing costs differ across firm sizes and influence the relationship between debt financing and financial sustainability.

2.3 Debt Financing

Debt financing refers to the acquisition of external capital through borrowing arrangements that create a contractual obligation for repayment, typically with interest, over a specified period. According to Menne et al. (2022), debt financing can provide the capital required for working capital, productive investment and business expansion when internally generated funds are insufficient. Debt financing encompasses various forms of borrowing, including short-term debt, long-term debt and trade credit, each with distinct implications for firm liquidity and financial stability. Short-term debt typically supports working capital requirements and is characterized by shorter repayment periods and lower interest costs, while long-term debt is generally used for asset acquisition and investment and involves longer repayment periods and higher interest costs. Trade credit represents financing obtained from suppliers through deferred payment arrangements, which is particularly important for MSEs with limited access to formal credit markets (Manyanga et al., 2023). However, MSEs often face borrowing constraints associated with collateral requirements, financing costs and repayment capacity (Shakir, 2022). These constraints can affect their ability to generate adequate returns while maintaining the liquidity required for continuity of operations (Masdupi et al., 2024). In this study, debt financing is measured using the debt-to-asset ratio, which represents the proportion of total debt to total assets. This indicator is commonly used in empirical research and is easily accessible from financial statements.

2.4 Financial Sustainability

Financial sustainability refers to the capacity of an enterprise to generate adequate returns, maintain liquidity and sustain operations over time (Zabolotnyy & Wasilewski, 2019). Financial sustainability encompasses both profitability and liquidity dimensions, reflecting the ability of an enterprise to generate sufficient income while maintaining adequate cash flows to meet short-term obligations and support long-term viability. For MSEs, financial sustainability is particularly important because they often operate with limited internal resources and are consequently vulnerable to liquidity constraints and changing business conditions. According to Zabolotnyy and Wasilewski (2019), financial

sustainability requires a balance between profitability and liquidity, as excessive focus on profitability may undermine liquidity, while excessive focus on liquidity may reduce profitability. In this study, financial sustainability is measured using return on assets (ROA) as a proxy for profitability and the current ratio as a proxy for liquidity, or using a composite index that combines both dimensions. This indicator is commonly used in empirical research and is easily accessible from financial statements.

2.5 Firm Size

Firm size refers to the scale of an enterprise's operations, typically measured by total assets, total sales or number of employees. According to Gutiérrez-Ponce (2024), larger firm size and greater collateral were important in enabling SMEs to access long-term leverage financing, demonstrating the relevance of enterprise characteristics in financing decisions. Larger MSEs may possess stronger asset bases and borrowing capacity, while smaller enterprises may experience greater financing constraints. Firm size can influence how enterprises access and utilize debt financing, as larger firms generally have more assets available for collateral, more stable cash flows and greater capacity to service debt obligations. In this study, firm size is positioned as a moderating variable that may strengthen or weaken the relationship between debt financing and financial sustainability. Firm size is measured using the natural logarithm of total assets, which is commonly used in empirical research and is easily accessible from financial statements. The natural logarithm transformation is applied to reduce skewness and heteroscedasticity in the data.

2.6 Hypothesis Development

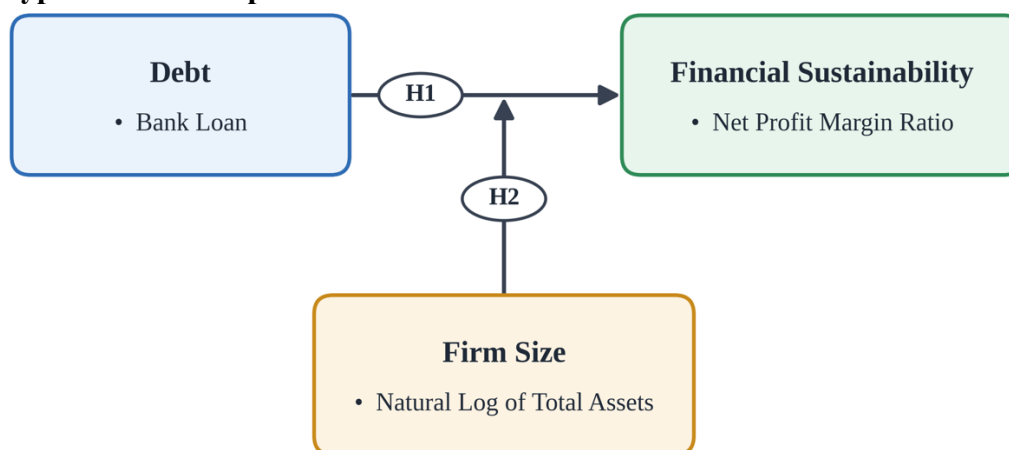


Figure 1: Conceptual Framework

2.6.1 The Influence of Debt on Financial Sustainability

Debt financing is widely considered as one of the factors that influence the financial sustainability of enterprises. Debt can provide resources for working capital, asset acquisition and investment, thereby supporting profitability and liquidity when borrowing remains within manageable levels (Serrasqueiro & Caetano, 2015). However, excessive debt may increase repayment pressure and undermine financial sustainability. Manyanga et al. (2023) examined 210 SMEs in Zimbabwe and established that short-term debt, long-term debt and trade credit positively influenced financial performance, indicating that debt can provide resources that support SME operations and performance. In contrast, Ali and Shaik (2022), using panel data from Saudi Arabian energy companies for the period 2012–2019, found that debt financing, measured by the debt-equity ratio, negatively influenced financial performance measured through return on assets and return on equity;

the negative relationship persisted after incorporating the current ratio as an interaction variable. Bellucci et al. (2023) further examined debt financing from the perspective of public financial support and found that subsidies influenced the debt structure of SMEs by encouraging longer-term borrowing, reducing the average cost of debt, increasing bank financing and reducing reliance on trade debt, although they did not significantly affect overall indebtedness. Based on this description, the following hypothesis is proposed:

H1: Debt has no significant effect on the financial sustainability of Micro and Small Enterprises in Kenya.

2.6.2 The Moderating Role of Firm Size on the Relationship between Debt and Financial Sustainability

Firm size may influence how enterprises access, utilize and service debt because enterprises differ in their asset bases and financing capacity. Recent evidence indicates that firm size can be important in firms' access to and use of leverage financing (Gutiérrez-Ponce et al., 2024). Larger MSEs may possess stronger asset bases and borrowing capacity, while smaller enterprises may experience greater financing constraints. These differences provide a theoretical basis for expecting the relationship between debt financing and financial sustainability to vary with firm size. Firm size is measured using the natural logarithm of total assets, which is commonly used in empirical research. When firm size increases, the capacity to access and utilize external financing also increases, and this can strengthen or weaken the effect of debt on financial sustainability. Based on this description, the following hypothesis is proposed:

H2: Firm size does not significantly moderate the relationship between debt and the financial sustainability of Micro and Small Enterprises in Kenya.

3. Methods

3.1 Research Design

This study employs a quantitative approach with a descriptive research design to examine the effect of debt financing on the financial sustainability of Micro and Small Enterprises (MSEs) in Kenya, with firm size as a moderating variable. The quantitative approach is considered appropriate because the study aims to empirically test the proposed hypotheses using statistical analysis of numerical data derived from financial statement data, debt financing data, and firm size indicators. The descriptive research design enables the examination of relationships between independent variable (Debt Financing), moderating variable (Firm Size), and dependent variable (Financial Sustainability). This study is explanatory in nature, explaining the relationships between variables and the extent to which these variables influence each other. The type of data used is secondary data, including financial statement data, bank loan data, and total asset data obtained from MSEs supported under the National Agricultural and Rural Inclusive Growth Project (NARIGP) across 21 counties in Kenya.

3.2 Population and Sample

The population in this study consists of 15,000 MSEs that had benefited from the National Agricultural and Rural Inclusive Growth Project (NARIGP) across 21 counties in Kenya. The MSE sector was selected due to its significant contribution to employment, income generation, and entrepreneurial activity in Kenya, as well as its sensitivity to macroeconomic factors such as access to credit and firm characteristics. The sample was

determined using the Yamane sampling formula, resulting in a sample of 390 MSEs. The sample selection was based on criteria relevant to the research objectives, including MSEs that had benefited from NARIGP, had complete financial statement data available during the 2018–2022 period, and had accessed bank loans during the observation period. The balanced panel comprised 390 MSEs observed over five years, resulting in 1,950 firm-year observations.

Table 1. Sample Determination

Description	Total
MSEs benefiting from NARIGP across 21 counties	15,000
Sample determined using Yamane formula	390
Observation period (years)	5
Firm-year observations	1,950

Source: Processed data (2026)

3.3 Data Collection Techniques

This study uses secondary data obtained from various official sources. Data were collected from financial statements of MSEs supported under NARIGP, project monitoring reports, and official records maintained by the project implementing agencies. The data collection procedure involved several sequential steps: (1) identification of MSEs that had benefited from NARIGP across 21 counties in Kenya; (2) selection of MSEs meeting the predetermined criteria, including complete financial statement data availability during the 2018–2022 period; (3) collection of debt financing data from bank loan records; (4) collection of total asset data from financial statements for firm size measurement; (5) collection of net profit and current asset/current liability data from financial statements for financial sustainability measurement; and (6) documentation of all extracted data systematically organized into a balanced panel dataset suitable for statistical analysis. A structured data collection template was used to ensure consistency and completeness of data extraction. The secondary data sources employed in this research are considered reliable as they represent official records from authorized institutions and established data providers.

3.4 Operational Definition of Variables

Table 2. Operational Definition and Measurement of Variables

Variable	Type	Definition	Measurement	Scale	Source
Financial Sustainability (FS)	Dependent	Capacity of an enterprise to generate adequate returns, maintain liquidity and sustain operations over time	Net Profit Margin Ratio and Current Ratio	Ratio	Financial statements of MSEs
Debt Financing (DEBT)	Independent	Acquisition of external capital through borrowing	Bank loans	Ratio	Bank loan records

Variable	Type	Definition	Measurement	Scale	Source
		arrangements that create a contractual obligation for repayment			
Firm Size (SIZE)	Moderating	Scale of an enterprise's operations, typically measured by total assets	Natural logarithm of total assets	Ratio	Financial statements of MSEs

Source: Developed for this research (2026)

3.5 Data Analysis Techniques

Data analysis in this study was conducted using panel data regression with the assistance of EViews 12 statistical software. The analysis stages included descriptive statistics, correlation analysis, panel data model selection, classical assumption tests, panel regression analysis, and hypothesis testing. Descriptive statistics were employed to describe the characteristics of the research data, including mean, median, standard deviation, minimum, and maximum values for all variables examined in the study. Correlation analysis was used to examine associations among the variables. The selection of the appropriate panel data regression model was carried out through three main stages. First, the Chow test was conducted to compare whether the Common Effect Model (CEM) or Fixed Effect Model (FEM) was the better model to use; if the probability value was less than 0.05, FEM was selected over CEM. Second, the Hausman test was conducted to determine whether the best model was FEM or Random Effect Model (REM); if the probability value was less than 0.05, FEM was selected over REM. Third, the Lagrange Multiplier test was conducted to confirm whether REM was more appropriate than CEM; if the probability value was less than 0.05, REM was selected over CEM.

Prior to hypothesis testing, classical assumption tests were conducted to ensure that the regression model satisfied the required assumptions so that the estimation results were more reliable. The tests included the normality test to examine whether residuals were normally distributed, where a probability value greater than 0.05 indicated a normal distribution; the multicollinearity test using Variance Inflation Factor (VIF) to detect high correlations among independent variables, where a VIF value less than 10 indicated no multicollinearity; the heteroscedasticity test to examine whether residuals had constant variance, where a probability value greater than 0.05 indicated no heteroscedasticity; and the autocorrelation test to detect serial correlation, where a probability value greater than 0.05 indicated no autocorrelation.

The direct effect of debt financing on financial sustainability was estimated using the following model:

$$FS_{it} = \beta_0 + \beta_1 DEBT_{it} + \varepsilon_{it}$$

Where:

FS_{it} = Financial sustainability of enterprise i at time t

$DEBT_{it}$ = Debt financing measured by bank loans

β_0 = Constant

β_1 = Coefficient of debt financing

ε_{it} = Error term

To test the moderating effect of firm size, the model was extended as follows:

$$FSit = \beta_0 + \beta_1 DEBTit + \beta_2 SIZEit + \beta_3 (DEBTit \times SIZEit) + \varepsilon it$$

Where:

SIZEit = Firm size measured by the natural logarithm of total assets

(DEBTit × SIZEit) = Interaction between debt financing and firm size

β3 = Coefficient used to test moderation

Hypothesis testing was conducted using several methods. The F-test was used to examine the simultaneous effect of independent variables on financial sustainability. The t-test was used to determine the partial effect of each independent variable on financial sustainability. The coefficient of determination (R²) was used to determine the model's ability to explain variations in financial sustainability. The coefficient β3 was used to test moderation, with a statistically significant interaction coefficient at the 5% significance level indicating significant moderation. All hypothesis tests were conducted at a significance level of 5% (p < 0.05).

4. Results and Discussion

4.1 Results

Table 3. Effect of Debt on Financial Sustainability of MSEs

Variable	Coefficient	Probability
Bank Loan	4.78E-06	<0.01
R-squared	0.046847	
F-statistic	76.57	<0.01
Durbin-Watson statistic	2.066	

Source: Data processed by researchers (2026)

Table 3 presents the panel regression results examining the effect of debt financing on the financial sustainability of MSEs in Kenya. The analysis established a positive and statistically significant relationship between debt financing and financial sustainability. Bank loans recorded a coefficient of 4.78E-06 (p < 0.01), indicating that an increase in bank-loan financing was associated with an increase in financial sustainability. The model recorded an R² of 0.046847, indicating that debt financing accounted for approximately 4.68% of the variation in financial sustainability. The overall model was statistically significant (F = 76.57, p < 0.01), while the Durbin-Watson statistic of 2.066 indicated no evidence of serious first-order autocorrelation.

Since p < 0.05, the null hypothesis that debt financing has no statistically significant effect on the financial sustainability of MSEs in Kenya was rejected. The study therefore established that debt financing had a positive and statistically significant effect on financial sustainability. The relatively low R², however, indicates that debt financing alone explains only a small proportion of variations in financial sustainability, suggesting that financial sustainability is also influenced by other enterprise and financing factors.

Table 4. Moderating Effect of Firm Size on the Relationship between Debt and Financial Sustainability

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	0.042671	0.016490	2.587729	0.0098
Bank Loan	4.80E-06	8.59E-07	5.582988	<0.001
Firm Size	0.089787	0.051958	1.728	≈0.084
Debt × Firm Size	1.29E-06	1.74E-06	0.742175	≈0.458
R-squared	0.048887			
Adjusted R-squared	0.047054			

Variable	Coefficient	Std. Error	t-Statistic	p-value
F-statistic	26.65955			<0.001
Durbin-Watson statistic	2.186403			

Source: Data processed by researchers (2026)

Table 4 presents the results of the Moderated Regression Analysis (MRA) examining whether firm size moderates the relationship between debt financing and financial sustainability. The study examined whether firm size moderates the relationship between debt financing and the financial sustainability of MSEs in Kenya. Firm size was measured using the natural logarithm of total assets, while an interaction term between bank loans and firm size was introduced into the regression model. The analysis was based on a balanced panel of 390 MSEs observed from 2018 to 2022, yielding 1,950 firm-year observations. The results showed that bank loans had a positive and statistically significant coefficient ($\beta = 4.80\text{E-}06$, $t = 5.583$, $p < 0.001$), indicating that debt financing remained positively associated with financial sustainability after incorporating firm size and the interaction term. Firm size had a positive but marginally significant coefficient ($\beta = 0.089787$, $t = 1.728$, $p \approx 0.084$). The interaction between debt and firm size also produced a positive coefficient ($\beta = 1.29\text{E-}06$); however, its t-statistic of 0.742 corresponds to a two-tailed probability of approximately 0.458. Since this probability exceeds the 0.05 significance level, the interaction effect was not statistically significant. The R-squared value of 0.048887 indicates that the model explains approximately 4.89% of the variation in financial sustainability, while the remaining 95.11% is explained by other factors outside the model. The F-statistic probability value of <0.001 confirms that the regression model is statistically significant. The Durbin-Watson statistic of 2.186403 indicates no evidence of serious first-order autocorrelation.

Although the interaction coefficient was positive, it was not statistically significant. The findings therefore indicate that the positive relationship between debt financing and financial sustainability did not vary significantly with firm size. In other words, while access to bank loans was positively associated with financial sustainability, there was insufficient statistical evidence to conclude that this relationship became stronger or weaker as the size of the MSE changed. Consequently, the second null hypothesis, which proposed that firm size has no statistically significant moderating effect on the relationship between debt financing and financial sustainability of MSEs in Kenya, was not rejected ($\beta = 1.29\text{E-}06$, $t = 0.742$, $p \approx 0.458$).

4.2 Discussion

4.2.1 Debt affects financial sustainability of MSEs

The hypothesis testing results indicate that debt financing has a positive and statistically significant effect on the financial sustainability of MSEs in Kenya, with a coefficient value of $4.78\text{E-}06$ and a probability value of <0.01, indicating that H01 is rejected. This finding suggests that bank loans can provide MSEs with resources for working capital, investment and continued business operations, thereby contributing to financial sustainability. In the MSE sector, access to bank loans is important because MSEs often operate with limited internal resources and are consequently vulnerable to liquidity constraints and changing business conditions. Based on Trade-Off Theory, debt can generate financial benefits provided that these benefits outweigh borrowing costs and the potential costs of financial distress (Agyei et al., 2020; Serrasqueiro & Caetano, 2015). MSEs with better access to bank loans are perceived as more capable of financing productive activities, thereby strengthening financial sustainability. This finding is

consistent with Manyanga et al. (2023), who established that short-term debt, long-term debt and trade credit positively influenced the financial performance of SMEs in Zimbabwe. The finding, however, differs from Ali and Shaik (2022), who reported that debt financing had a negative effect on the financial performance of Saudi Arabian energy companies. The contrasting findings suggest that the financial consequences of debt may vary across institutional settings, enterprise characteristics and financing structures. The relatively low R^2 of 0.046847 indicates that debt financing alone explains only a small proportion of variations in financial sustainability, suggesting that financial sustainability is also influenced by other enterprise and financing factors.

4.2.2 Firm size moderates the relationship between debt and financial sustainability

The hypothesis testing results indicate that firm size does not moderate the relationship between debt financing and financial sustainability, with an interaction coefficient of 1.29E-06 and a probability value of approximately 0.458, indicating that H02 is not rejected. This finding suggests that the positive relationship between debt financing and financial sustainability did not vary significantly with firm size. In other words, while access to bank loans was positively associated with financial sustainability, there was insufficient statistical evidence to conclude that this relationship became stronger or weaker as the size of the MSE changed. In the MSE sector, firm size may influence how enterprises access, utilize and service debt because enterprises differ in their asset bases and financing capacity. Based on Pecking Order Theory, financing constraints may differ according to firm characteristics, particularly size, since smaller enterprises may have fewer assets, limited financial information and weaker borrowing capacity (Serrasqueiro & Caetano, 2015). However, the non-significant moderating effect indicates that firm size does not significantly alter the relationship between debt financing and financial sustainability among MSEs supported under NARIGP. This finding differs from Gutiérrez-Ponce (2024), who established that larger firm size and greater collateral were important in enabling SMEs to access long-term leverage financing. This difference can be explained by the characteristics of MSEs supported under NARIGP, which are relatively homogeneous in terms of firm size due to the project's targeted support and standardized financing mechanisms. Consequently, the moderating role of firm size may be less pronounced in contexts where financing access is relatively uniform across enterprises.

5. Conclusion

This study aimed to examine the effect of debt financing on the financial sustainability of Micro and Small Enterprises (MSEs) in Kenya and to assess whether firm size moderates this relationship. Using a descriptive research design with panel regression analysis on a balanced panel of 390 MSEs observed from 2018 to 2022, yielding 1,950 firm-year observations, the study successfully tested the proposed hypotheses through statistical analysis.

The results indicate that debt financing has a positive and statistically significant effect on the financial sustainability of MSEs in Kenya, with a coefficient value of 4.78E-06 and a probability value of <0.01 , indicating that the first null hypothesis is rejected. Bank loans provide an important source of external finance that can support working-capital requirements, productive investment and continuity of business operations, particularly where borrowed funds are deployed in income-generating activities and enterprises maintain sufficient cash flows to meet repayment obligations. The model recorded an R^2

of 0.046847, indicating that debt financing accounted for approximately 4.68% of the variation in financial sustainability, while the remaining 95.32% is explained by other factors outside the model. The overall model was statistically significant ($F = 76.57$, $p < 0.01$), while the Durbin-Watson statistic of 2.066 indicated no evidence of serious first-order autocorrelation. The relatively low R^2 , however, indicates that debt financing alone explains only a small proportion of variations in financial sustainability, suggesting that financial sustainability is also influenced by other enterprise and financing factors.

In contrast, the study concludes that firm size does not significantly moderate the relationship between debt financing and financial sustainability, with an interaction coefficient of $1.29E-06$ and a probability value of approximately 0.458, indicating that the second null hypothesis is not rejected. Although the interaction between bank loans and firm size was positive, it was not statistically significant, indicating insufficient evidence that the effect of debt financing on financial sustainability varies with enterprise size. The results showed that bank loans had a positive and statistically significant coefficient ($\beta = 4.80E-06$, $t = 5.583$, $p < 0.001$), indicating that debt financing remained positively associated with financial sustainability after incorporating firm size and the interaction term. Firm size had a positive but marginally significant coefficient ($\beta = 0.089787$, $t = 1.728$, $p \approx 0.084$). Thus, debt financing contributes to financial sustainability, while firm size does not significantly alter this relationship among the MSEs studied.

The theoretical implications of this study extend the application of the Trade-Off Theory of Capital Structure and the Pecking Order Theory to the context of MSE financing in Kenya. The finding that debt financing significantly influences financial sustainability supports the Trade-Off Theory's emphasis on the balance between the benefits of debt and the costs of financial distress (Agyei et al., 2020; Serrasqueiro & Caetano, 2015). The finding that firm size does not significantly moderate the relationship between debt financing and financial sustainability challenges the Pecking Order Theory's assumption that financing constraints differ according to firm characteristics, particularly size (Serrasqueiro & Caetano, 2015). This study also contributes to the limited empirical evidence on financial sustainability among MSEs in Kenya, providing insights into how debt financing and firm size collectively influence financial sustainability during the implementation of NARIGP.

Based on these findings, several recommendations can be proposed. Since debt financing has a positive and statistically significant effect, financial institutions should improve MSE access to appropriately structured bank credit. Loan amounts, repayment periods and servicing arrangements should reflect enterprises' cash-flow patterns, repayment capacity and productive financing requirements. MSE owners and managers should also direct borrowed funds toward productive and income-generating activities capable of generating sufficient returns to meet financing costs and repayment obligations. Since firm size did not significantly moderate the relationship between debt financing and financial sustainability, debt-financing interventions should not be differentiated solely on the basis of enterprise size. Instead, lenders should assess financing needs using enterprise-specific factors such as cash-flow capacity, existing indebtedness, repayment ability and the intended use of borrowed funds. This approach can support the productive use of debt while limiting repayment pressures that could undermine financial sustainability.

This study has several limitations that should be acknowledged. First, the study focuses only on MSEs supported under NARIGP across 21 counties in Kenya, which may limit

the generalizability of the findings to other MSEs or regions. Second, the study uses a descriptive research design, which limits the ability to establish causal relationships between variables. Third, the study relies on secondary data from financial statements, which may be subject to reporting limitations and data availability constraints. Fourth, the model's explanatory power is relatively low, with an R-square value of 0.046847, indicating that other factors not included in the model may still influence financial sustainability. Fifth, the study examines only debt financing and firm size as determinants of financial sustainability, without considering other potential determinants such as access to equity financing, financial literacy, or enterprise-specific characteristics.

For future research, it is recommended to expand the scope of study by involving MSEs in other regions or sectors to improve the generalizability of the findings. Future studies may also incorporate additional variables, such as access to equity financing, financial literacy, entrepreneurial orientation, and enterprise-specific characteristics, to provide a more comprehensive understanding of the factors affecting financial sustainability. Additionally, qualitative or mixed-method approaches may be employed to gain deeper insights into the challenges and effectiveness of debt financing in supporting MSE financial sustainability. Researchers should also employ longitudinal designs to examine how financial sustainability evolves over time as debt financing and enterprise conditions develop.

In conclusion, this study contributes to the growing body of literature on MSE financing and financial sustainability by providing empirical evidence on the determinants of financial sustainability among MSEs in Kenya. The findings suggest that debt financing is a significant determinant of financial sustainability, while firm size does not significantly moderate this relationship. As Kenya continues to strengthen its MSE sector and promote financial inclusion, understanding these factors becomes increasingly important for developing effective strategies to enhance financial sustainability, strengthen enterprise resilience, and promote sustainable economic growth in the MSE sector.

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