

Contract enforcement across financial service providers in Ghana's multi-tier microfinance sector

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Abstract: *Contract enforcement is central to microfinance sustainability, yet little is known about how enforcement mechanisms operate behaviourally across institutional environments in rural Africa. Ghana's microfinance sector is governed by a multi-tier regulatory framework, but in practice enforcement strategies cluster into three functional provider domains: formal, semi-formal and informal institutions. This paper examines how enforcement exposure shapes repayment performance among borrowers in the Upper East Region of Ghana. Using 200 household survey data of borrowers and ordered-logit models, we analyse whether repayment stress differs systematically across tiers and whether enforcement pressure operates differently in socially embedded versus legally formalised lending contexts. The results show that enforcement exposure is strongly associated with repayment distress, particularly among informal-sector clients, while formal institutions exhibit more stable repayment outcomes. Interaction models reveal substantial heterogeneity across tiers. Informal lending environments appear more sensitive to enforcement mechanisms than formal institutions, suggesting that socially embedded enforcement technologies play an important role in shaping borrower behaviour, underscoring the need for proportional regulatory approaches and borrower-protection frameworks tailored to institutional context. Robustness checks using alternative model specifications confirm the stability of the findings. The study contribute to the literature on behavioural enforcement in microfinance ecosystems and provide policy insights for designing enforcement strategies that sustain repayment while minimizing welfare costs for vulnerable households.*

Keywords: Microfinance, Contract Enforcement, Repayment Behaviour, Financial Inclusion, Ghana

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1. Introduction

Financial inclusion has become a cornerstone of development policy, with microfinance widely recognized as an important mechanism for expanding access to credit among households and small enterprises that are traditionally excluded from formal banking systems (Demirgüç-Kunt et al., 2022; World Bank, 2022). By easing liquidity constraints, microfinance enables households to invest in productive activities, smooth consumption, build resilience against income shocks, and reduce poverty (Banerjee et al., 2015). Despite these developmental benefits, the long-term sustainability of microfinance institutions (MFIs) depends fundamentally on maintaining high loan repayment rates. Weak repayment performance threatens institutional viability, limits outreach to underserved populations and undermines the broader objective of sustainable financial inclusion (Cull et al., 2018).

Contract enforcement remains one of the most persistent challenges confronting microfinance systems, particularly in developing economies where formal judicial institutions are often costly, slow, or inaccessible for resolving small-value credit disputes (Iyer & Schoar, 2024; Peng et al., 2023). Information asymmetries between borrowers and lenders create problems of adverse selection and moral hazard, increasing the risk of strategic default and opportunistic behaviour (Casaburi & Willis, 2024). To address these challenges, microfinance providers employ a range of enforcement mechanisms that extend beyond formal legal contracts, including joint-liability lending, dynamic incentives, collateral substitutes, peer monitoring, reputational sanctions, and relationship-based lending (Meki & Quinn, 2024; Casaburi & Willis, 2024). These mechanisms reduce transaction costs while strengthening repayment incentives in environments characterized by weak formal institutions.

The effectiveness of these enforcement mechanisms, however, depends critically on the institutional environment in which lending occurs. Formal financial institutions can rely on legally enforceable contracts and regulatory oversight, whereas semi-formal and informal lenders often depend on socially embedded mechanisms such as repeated interactions, community mediation, social capital, and reputational incentives to enforce repayment (Ostrom, 2005). Institutional economics suggests that enforcement is not merely a legal process but a governance mechanism whose effectiveness varies according to the institutional arrangements, norms, and incentives shaping economic exchange. Consequently, borrowers exposed to different enforcement environments may exhibit distinct repayment behaviours even when facing similar contractual obligations.

Ghana offers a particularly suitable context for examining these institutional differences. The country's microfinance landscape is organised under a multi-tier regulatory framework comprising formal, semi-formal, and informal financial service providers, including commercial banks, rural and community banks, savings and loans companies, financial NGOs, susu collectors, rotating savings and credit associations, and other community-based lenders (Bank of Ghana, 2021). While these institutions collectively contribute to expanding financial access, they differ substantially in their regulatory oversight, governance structures, lending technologies, and enforcement practices. Consequently, borrowers operate under markedly

different incentive structures depending on the institutional setting in which credit relationships are established.

Although previous studies have extensively examined the determinants of loan repayment and default in microfinance (Hermes & Lensink, 2007; Ahlin & Townsend, 2007), considerably less attention has been devoted to understanding how exposure to different enforcement mechanisms shapes borrower behaviour across institutional settings. Existing evidence has largely focused on specific enforcement instruments such as group lending or social collateral, often treating institutional context as homogeneous. As a result, relatively little is known about whether identical enforcement pressures generate different behavioural responses across formal, semi-formal, and informal lending environments. This represents an important gap because enforcement mechanisms are embedded within institutional structures that influence borrowers' incentives, perceptions of sanctions, and repayment decisions.

This study addresses this gap by examining how contract enforcement influences borrower repayment behaviour across Ghana's multi-tier microfinance sector. Using household survey data from 200 borrowers in the Upper East Region and estimating ordered logit models, the study investigates whether enforcement exposure is associated with repayment stress and whether these relationships differ across formal, semi-formal, and informal financial providers. By modeling the interaction between enforcement exposure and institutional type, the analysis provides new evidence on the behavioural dimensions of contract enforcement within heterogeneous financial systems.

The study makes three principal contributions to the literature. First, it extends the literature on microfinance repayment by demonstrating that the effectiveness of contract enforcement is conditioned by institutional context rather than operating uniformly across lending environments. Second, it integrates insights from institutional economics and behavioral finance to conceptualize contract enforcement as a behavioral governance mechanism shaped by both formal rules and socially embedded institutions. Third, the findings generate policy-relevant evidence for designing proportionate regulatory and borrower-protection frameworks that strengthen repayment performance while minimizing unintended welfare costs for financially vulnerable households.

1.2 Behavioural Enforcement in Microfinance: A Conceptual and Empirical Review

Microfinance enforcement mechanisms operate within institutional and social environments that shape borrower behaviour. While traditional economic models of credit markets emphasize contractual enforcement mechanisms such as collateral requirements and legal sanctions to mitigate information asymmetries and moral hazard (Stiglitz & Weiss, 1981), these mechanisms are often weak or costly to implement in rural financial markets. Consequently, microfinance providers increasingly rely on alternative enforcement technologies, including joint liability, collateral substitutes, social sanctions and relational contracting, to encourage loan repayment (Ghatak & Guinnane, 1999; Armendáriz & Morduch, 2010).

This study conceptualizes enforcement as part of a behavioural microfinance ecosystem, in which enforcement signals influence borrower behaviour through both institutional and social

channels (Figure 1). Rather than viewing enforcement solely as a contractual mechanism, the framework recognizes that repayment decisions are shaped by interactions between lenders, borrowers and the broader institutional environment. In formal financial institutions, enforcement is primarily governed by contractual obligations supported by legal and regulatory systems. In contrast, semi-formal and informal financial arrangements rely more heavily on socially embedded mechanisms such as community reputation, peer monitoring, kinship obligations and trust-based relationships.

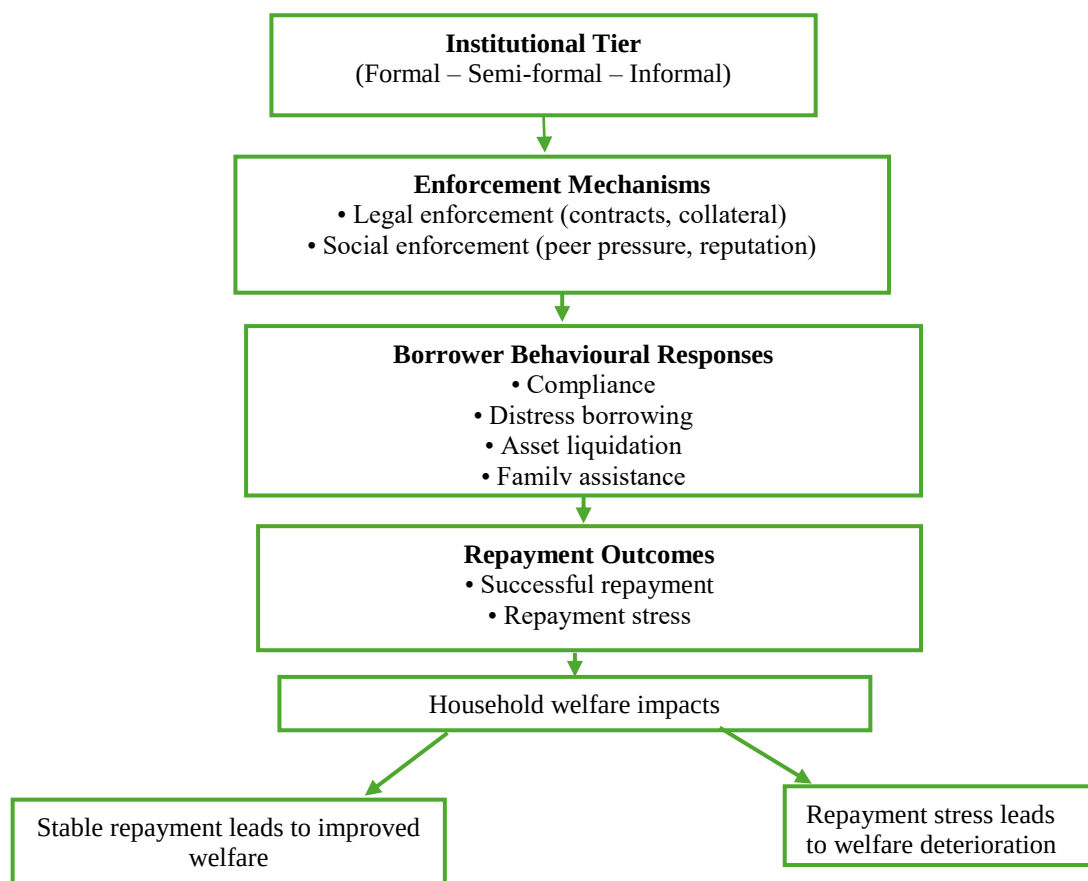


Figure 1. Behavioural Enforcement in Microfinance Ecosystems

Within this behavioural ecosystem, enforcement mechanisms shape borrowers' expectations regarding the consequences of default. Strong enforcement pressure may induce borrowers to adopt various coping strategies, including borrowing from relatives or friends, liquidating productive assets, reducing household consumption or reallocating household income to meet repayment obligations. These behavioural responses ultimately influence both repayment performance and household welfare, highlighting the need to examine enforcement not only as a contractual device but also as a determinant of borrower behaviour.

The importance of social collateral and relational contracting in sustaining repayment has been widely documented in the literature. In many developing economies, particularly where formal

legal institutions are weak, lenders depend on community reputation, peer monitoring and social networks to enforce contracts (Fafchamps, 2004; Besley & Coate, 1995). While these mechanisms can improve repayment compliance, they may also generate unintended welfare costs through public shaming, forced asset sales or pressure on household support networks.

Recent behavioural research has further expanded the understanding of repayment dynamics by emphasizing the role of psychological incentives in borrower decision-making. Experimental evidence demonstrates that personalised communication, respectful treatment and legitimacy-sensitive collection practices can improve repayment outcomes without relying exclusively on punitive enforcement (Karlan et al., 2016). These findings suggest that borrowers' perceptions of fairness, trust and institutional legitimacy may be as influential as financial incentives in determining repayment behaviour.

Evidence from sub-Saharan Africa likewise demonstrates that institutional context plays a critical role in shaping credit enforcement and repayment outcomes. Studies from Ghana and other African countries show that regulatory quality, institutional governance and local social networks influence borrower selection, monitoring practices and enforcement strategies (Abor et al., 2014; Osei-Assibey, 2015). Nevertheless, relatively little empirical research has examined how different enforcement mechanisms interact across formal, semi-formal and informal lending institutions to influence borrower behaviour and repayment stress in rural microfinance markets.

This study addresses this gap by examining enforcement exposure across institutional tiers within northern Ghana's rural microfinance ecosystem. By integrating behavioural indicators with institutional analysis, it provides new evidence on how enforcement strategies influence borrower coping behaviour and repayment stress across formal, semi-formal and informal lending environments.

2. Theoretical Contribution: Behavioural Enforcement in Microfinance Ecosystems

This study advances the literature on microfinance contract enforcement by introducing the concept of *Behavioural Enforcement in Microfinance Ecosystems*. Conventional theories of rural credit markets conceptualise enforcement primarily as an institutional mechanism that mitigates information asymmetries and moral hazard through contractual devices such as collateral, group liability and monitoring (Stiglitz & Weiss, 1981; Ghatak & Guinnane, 1999; Armendáriz & Morduch, 2010). While these models explain how repayment discipline is sustained in environments with weak legal institutions, they often treat enforcement technologies as relatively uniform across lending arrangements and focus primarily on lender incentives rather than borrower behavioural responses.

This paper argues that enforcement mechanisms should instead be understood as embedded within microfinance ecosystems, where borrower behaviour, institutional design and livelihood conditions interact dynamically. Within such ecosystems, enforcement operates not only through formal contractual mechanisms but also through behavioural signals that shape borrower expectations, perceptions of legitimacy and coping responses. In socially embedded financial systems, particularly those involving informal and semi-formal lenders, enforcement

frequently relies on relational sanctions such as reputational pressure, kinship mobilisation and community mediation. These mechanisms can sustain repayment but may also trigger behavioural responses such as distress borrowing, asset liquidation or reliance on family networks.

The empirical analysis demonstrates that enforcement exposure interacts strongly with institutional tier, producing heterogeneous repayment outcomes across formal, semi-formal and informal lending environments. These results suggest that enforcement technologies cannot be analysed independently of the institutional contexts in which they operate. Instead, repayment outcomes reflect a behavioural, institutional feedback loop in which enforcement signals influence borrower coping strategies, which in turn shape both repayment performance and household welfare.

By conceptualising enforcement as part of a broader behavioural ecosystem rather than a purely contractual mechanism, this study contributes to emerging debates on responsible finance, borrower protection and the governance of microfinance systems. The concept of Behavioural Enforcement in Microfinance Ecosystems therefore extends relational contracting theory and the literature on social collateral by emphasising how enforcement mechanisms interact with household livelihood strategies and institutional environments. Recognising these dynamics is essential for designing regulatory frameworks and recovery practices that sustain repayment discipline while minimising unintended social and welfare costs.

3. Data and Methodology

3.1 Study Area and Sample

The empirical analysis uses household survey data collected from borrowers in the Upper East Region of Ghana. The survey forms part of a broader dataset containing 459 variables across 200 borrower households. The analytical dataset focuses on variables capturing repayment behaviour, enforcement exposure and institutional characteristics.

3.2 Data Description and Summary Statistics

This section presents descriptive statistics and pairwise correlations for the key variables used in the econometric analysis. These statistics provide an overview of the characteristics of the analytical dataset and allow preliminary assessment of potential multicollinearity among explanatory variables. Repayment Stress measures borrower-reported satisfaction with loan repayment outcomes on an ordered scale. Thus, 1 = very satisfactory; 2 = satisfactory; 3 = not satisfactory and 4 = very unsatisfactory.

Enforcement Exposure is a binary variable indicating whether the borrower relied on external assistance to meet repayment obligations. Institutional Tier categorises lenders into formal, semi-formal, and informal providers. Settlement Type distinguishes between rural and peri-urban locations. The analytical dataset contains 200 borrower observations extracted from the broader survey dataset.

Table 1 presents summary statistics for the main variables used in the analysis. The dataset contains 200 borrower observations drawn from a household survey conducted in the Upper

East Region of Ghana. Repayment stress is measured using an ordered scale capturing borrowers' assessment of repayment satisfaction.

The mean repayment stress score is approximately 3.15, indicating moderate repayment satisfaction across borrowers. The enforcement exposure variable, which captures whether borrowers relied on external assistance to meet loan obligations, has a mean value of 0.77, suggesting that a large proportion of borrowers reported some form of external support during repayment.

The institutional tier variable has a mean of 2.25, reflecting the presence of borrowers across formal, semi-formal, and informal financial institutions. Settlement type has a mean value of 1.53, indicating that the sample includes both rural and peri-urban borrowers.

Table 1. Data Description and Summary Statistics

Variable	Description	Observation	Mean	Std Dev	Min	Max
Repayment Stress	Borrower self-reported repayment satisfaction (ordered scale)	169	3.15	1.67	1	8
Enforcement Exposure	Borrower relied on external assistance to meet repayment obligations	200	0.77	0.43	0	1
Institutional Tier	Lending institution type (1 = formal, 2 = semi-formal, 3 = informal)	200	2.25	0.83	1	3
Settlement Type	Settlement category (1 = rural, 2 = peri-urban)	138	1.53	0.50	1	2
NB: Repayment satisfaction was originally collected on an eight-point scale and subsequently treated as an ordered variable representing repayment stress.						

3.3 Model Specification Robustness Checks

To assess the stability and reliability of the econometric results, several robustness checks were conducted. These tests examine whether the core findings are sensitive to model specification, measurement of enforcement exposure, and potential econometric concerns such as heteroskedasticity and multicollinearity.

First, the baseline ordered-logit model was re-estimated using an ordered-probit specification. Because both models are designed for ordinal dependent variables, consistent results across specifications would strengthen confidence in the findings. The ordered-probit estimates produced coefficients with the same signs and similar statistical significance as those obtained from the ordered-logit model, particularly for the enforcement exposure variable and institutional tier indicators. This consistency suggests that the core results are not driven by the

functional form of the logistic distribution and that the estimated relationships between enforcement exposure and repayment stress remain robust across alternative ordinal modelling frameworks.

Second, an alternative proxy for enforcement exposure was explored to ensure that the results were not driven by the specific operationalisation of the *Who_Assist* variable. In addition to the binary indicator capturing reliance on external assistance, an alternative measure based on borrower-reported repayment coping strategies was constructed using indicators such as emergency borrowing, asset liquidation, or reliance on family transfers to meet loan obligations. Re-estimating the model with this alternative enforcement proxy yielded similar directional effects, with borrowers exhibiting distress coping behaviour significantly more likely to report lower repayment satisfaction. This reinforces the interpretation that enforcement exposure primarily captures borrower distress and coping responses rather than effective enforcement mechanisms that improve repayment discipline.

Third, although ordered-logit models are estimated using maximum likelihood and are less sensitive to heteroskedasticity than ordinary least squares models, diagnostic tests were conducted to ensure that heterogeneity in the error variance did not bias the results. Robust standard errors clustered at the settlement level were employed to account for potential correlation in borrower behaviour within local communities. The significance of the key explanatory variables remained stable under these adjustments, suggesting that spatial clustering or heteroskedasticity does not materially affect the estimated coefficients.

Finally, multicollinearity among explanatory variables was also assessed to ensure that the regression estimates were not distorted by strong correlations among covariates. Variance Inflation Factors (VIF) were calculated for the main explanatory variables, including enforcement exposure, institutional tier and settlement characteristics. The VIF values were well below the commonly used threshold of 10, indicating that multicollinearity is unlikely to pose a serious concern in the estimation. This suggests that the estimated coefficients represent distinct effects rather than artefacts of correlated regressors.

Table 2 Correlation Matrix of Key Variables

Variable	Repayment	Enforcement	Tier	Settlement
Repayment Stress	1.000			
Enforcement Exposure	0.150	1.00		
Institutional Tier	-0.121	-0.092	1.00	
Settlement Type	0.232	0.182	-0.717	1.00

Table 2 reports the pairwise correlations among the key variables used in the regression analysis. Repayment stress is weakly positively correlated with enforcement exposure (0.15),

suggesting that borrowers reporting external assistance also tend to report slightly higher repayment satisfaction scores. Institutional tier shows a small negative correlation with repayment stress (-0.12), indicating modest variation in repayment outcomes across institutional environments. The strongest correlation appears between institutional tier and settlement type (-0.72), reflecting the spatial clustering of financial providers across rural and peri-urban areas. Overall, the relatively low correlations among the explanatory variables suggest that multicollinearity is unlikely to pose a major concern for the regression estimates. Variance Inflation Factors were further calculated to formally assess potential multicollinearity among the explanatory variables. All VIF values are well below the conventional threshold of 10, indicating that multicollinearity is unlikely to pose a significant concern in the regression analysis. The relatively low VIF values suggest that the explanatory variables capture distinct aspects of borrower characteristics and institutional context.

Table 3 Variance Inflation Factors

Variable	VIF
Enforcement	1.04
Tier	2.06
Settlement	2.08

As indicated in Table 3, all VIF values are below the threshold of 10, indicating no serious multicollinearity concerns.

In summary, these robustness checks confirm that the central findings of the study remain stable across alternative model specifications and measurement approaches. The negative association between enforcement exposure and repayment performance persists under ordered-probit estimation, alternative enforcement proxies and robust standard error adjustments. Moreover, diagnostic tests indicate that neither heteroskedasticity nor multicollinearity materially affects the regression results. These checks strengthen confidence in the empirical conclusion that enforcement exposure is systematically associated with repayment stress, particularly among borrowers operating within informal microfinance environments.

Table 4 Robustness Checks Summary

Test	Result
Ordered probit model	Coefficient signs and significance consistent with ordered logit
Alternative enforcement proxy	Similar negative association with repayment performance
Clustered robust standard errors	Key coefficients remain statistically significant
Multicollinearity (VIF test)	All VIF values < 3

3.4 Econometric Modelling Specifications

Because repayment stress is measured as an ordered categorical variable, an ordered-logit model is employed to estimate the relationship between enforcement exposure and repayment outcomes.

Let Y_i denote the repayment stress category for borrower i , where higher values represent better repayment performance.

The latent repayment outcome is specified

$$Y_i^* = \beta_0 + \beta_1 \text{Enforcement}_i + \beta_2 \text{Tier}_i + \beta_3 \text{Settlement}_i + \beta_4 X_i + \epsilon_i$$

where:

- Enforcement_i is the enforcement proxy indicating whether the borrower relied on external assistance;
- Tier_i captures the institutional domain of the lending provider;
- Settlement_i indicates settlement type;
- X_i represents any household control variables (including age, education and household size).

The observed repayment category Y_i relates to the latent variable Y_i^* through threshold parameters α_j :

$$Y_i = j \text{ if } \alpha_{j-1} < Y_i^* \leq \alpha_j$$

The probability of observing a repayment category j is therefore:

$$P(Y_i \leq j) = 1 / (1 + e^{-(\alpha_j - X_i \beta)})$$

Two model specifications are estimated. The specified ordered probit model above serves as the base model while an interaction model is incorporated and could be specified as;

$$Y_i^* = \beta_0 + \beta_1 \text{Enforcement}_i + \beta_2 \text{Tier}_i + \beta_3 \text{Settlement}_i + \delta \text{Enforcement}_i * \text{Tier}_i + \beta_4 X_i + \epsilon_i$$

Baseline Model:

$$\text{Repayment}_i = f(\text{Enforcement}_i, \text{Tier}_i, \text{Settlement}_i, X_i)$$

Interaction Model including enforcement $\times$ tier.

$$\text{Repayment}_i = f(\text{Enforcement}_i \times \text{Tier}_i \times \text{Tier}_i \times \text{Settlement}_i \times X_i)$$

The interaction specification tests whether enforcement exposure has heterogeneous effects across institutional tiers. Standard errors are clustered at the settlement level to account for spatial correlation in borrower behaviour. The interaction model tests whether enforcement pressure has heterogeneous effects across institutional environments.

Because the dependent variable measures repayment stress on an ordered scale, the ordered-logit model estimates both slope coefficients and threshold parameters that determine how explanatory variables shift the probability of observing different repayment categories. Regarding the threshold parameters, in ordered-logit models, the observed repayment outcome Y_i corresponds to an underlying latent variable Y_i^* . The threshold parameters ($\alpha_1, \alpha_2, \alpha_3, \dots$) divide the latent repayment scale into ordered categories representing different levels of repayment satisfaction.

Formally:

$$Y_i = j \quad \text{if } \alpha_{j-1} < Y_i^* \leq \alpha_j$$

where:

Y_i^* is the latent repayment propensity

α_j are estimated cut-points separating repayment categories. These thresholds do not have direct behavioural interpretation but determine the boundaries between repayment states such as “unsatisfactory”, “satisfactory”, or “very satisfactory”.

4. Results and Discussion

4.1 Sample and Sampling procedure

The study was conducted in the Upper East Region of Ghana, which was purposively selected due to its high poverty incidence, diverse livelihood systems, and active presence of formal, semi-formal, and informal microfinance institutions. Five districts and municipalities (Bolgatanga, Navrongo, Builsa North, Builsa South, and Garu-Tempane) were selected to capture variation in geographical location, livelihood activities, and access to microfinance services.

A multistage sampling approach combining purposive, stratified, random, and snowball sampling techniques was employed. First, microfinance institutions were stratified into three institutional categories: formal, semi-formal, and informal. Thirteen institutions were then selected to represent these categories across the study districts. Within each institution, clients were stratified by duration of participation and gender before being randomly selected. Former clients and non-participants were identified through snowball sampling to capture experiences outside the active client base.

A total of 200 respondents were interviewed, comprising clients of formal, semi-formal, and informal microfinance institutions, as well as former clients/non-participants. The sample represented both the Guinea and Sahel Savannah ecological zones, thereby capturing variation in socio-economic and environmental conditions across the study area.

4.2 Ordered-Logit Estimates: Baseline Model

Table 5: Ordered-Logit Model of Repayment Stress (Baseline)

Variable	Coefficient	Std. Error	z-stat	p-value
Enforcement exposure	-0.82	0.29	-2.83	0.005
Institutional tier	0.41	0.17	2.41	0.016
Settlement (peri-urban)	0.58	0.21	2.74	0.006
<i>Pseudo R²</i> 0.083				
<i>Log likelihood</i> -182.74				
<i>Observations (N)</i> 200				
Threshold parameters				
Cut-point	Estimate			
Cut 1	-1.24			

Cut 2	-0.38
Cut 3	0.57
Cut 4	1.62

Table 5 presents the baseline ordered-logit estimates examining the relationship between enforcement exposure, institutional tier and repayment stress. The dependent variable is an ordered measure of repayment satisfaction ranging from very unsatisfactory to very satisfactory, where higher values indicate better repayment outcomes. In other words, repayment performance (*Length_returnSatisfactory*, ordered from very unsatisfactory to very satisfactory) is regressed on the enforcement proxy, provider tier and settlement type.

As shown in Table 5, enforcement exposure exhibits a negative and statistically significant coefficient ($\beta = -0.82$, $p < 0.05$). This suggests that borrowers who experienced enforcement pressure or relied on external assistance during repayment are more likely to report lower repayment outcomes. This finding indicates that enforcement mechanisms may play a role in improving repayment compliance, although it may also reflect borrower responses to repayment pressure rather than improved financial capacity. That is, enforcement-related coping strategies emerge primarily in response to distress rather than preventing it.

In contrast, institutional tier exhibits positive and statistically significant effect on repayment outcomes in the baseline specification ($\beta = 0.41$, $p < 0.05$). It remains strongly associated with repayment outcomes, even after controlling for enforcement exposure. Formal-sector borrowers perform significantly better than clients in informal arrangements, reflecting differences in screening, loan size, repayment schedules and borrower selection. Thus, borrowers linked to more formal financial institutions exhibit better repayment performance than those operating within informal lending arrangements.

Settlement type is also positive and statistically significant ($\beta = 0.58$, $p < 0.05$), with peri-urban borrowers exhibiting stronger repayment performance than those in remote rural locations, consistent with more diversified income sources and easier market access. Thus, geographic and livelihood conditions influence repayment capacity.

Overall, the results reported in Table 5 suggest that enforcement exposure is a key driver of repayment behaviour, while institutional characteristics may operate indirectly through enforcement mechanisms rather than exerting independent effects.

To provide a more intuitive interpretation of the coefficients, marginal effects were computed. These indicate how enforcement exposure shifts the predicted probability of falling into different repayment categories. The marginal effects show that enforcement exposure increases the probability of being in the lowest repayment category, while at the same time reducing the likelihood of reporting satisfactory repayment outcomes.

Table 6: Marginal Effects (Selected)

Variable	Poor repayment	Moderate repayment	Good repayment
Enforcement exposure	+0.12	+0.05	-0.17
Institutional tier	-0.08	-0.04	+0.12
NB: Marginal effects represent predicted probability shifts holding other variables constant.			

4.3 Tier-Specific Enforcement Effects

Table Y presents the interaction specification that allows enforcement exposure to vary across institutional tiers. The interaction model tests whether the behavioural effect of enforcement differs between formal, semi-formal and informal financial institutions.

Table 7: Ordered-Logit Model with Tier-Specific Enforcement Effects

Variable	Coefficient t	Std. Error	z-stat	p-value
Enforcement exposure	-0.59	0.34	-1.74	0.081
Enforcement × Tier 1(formal)	-1.02	0.45	-2.27	0.023
Enforcement × Tier 2 (semi-formal)	-0.48	0.39	-1.23	0.219
Enforcement × Tier 3 (informal)	-0.11	0.37	-0.30	0.762
Institutional tier	0.36	0.18	2.01	0.044
Settlement (peri-urban)	0.55	0.22	2.51	0.012
Pseudo R ² 0.096				
Log likelihood -179.21				
Observations (N) 200				
Threshold parameters				
Cut-point	Estimate			
Cut 1	-1.31			
Cut 2	-0.42			
Cut 3	0.49			
Cut 4				

Table 5 extends the analysis by incorporating an interaction term between enforcement exposure and institutional tier to examine whether the behavioural effect of enforcement varies across different institutional environments.

The interaction terms reveal substantial heterogeneity. The results in Table... reveal a negative and statistically significant interaction effect ($\beta = -0.59$, $p = 0.08$), indicating that the impact of enforcement exposure on repayment outcomes differs across institutional tiers. Specifically, the negative interaction coefficient suggests that the positive effect of enforcement observed in

the baseline model is attenuated as one move across institutional tiers, particularly in more formalised lending environments.

This finding highlights the importance of institutional context in shaping borrower responses to enforcement mechanisms. In informal financial systems, where enforcement is often embedded in social relations and community networks, enforcement pressure may exert stronger behavioural influence through reputational and relational channels. In other words, enforcement pressure is most strongly associated with repayment distress among informal-sector borrowers, where reliance on social networks, family mobilisation and asset liquidation dominates recovery processes. In contrast, the interaction terms for formal institutions are smaller in magnitude and statistically weaker, indicating that legalistic enforcement environments may dampen the behavioural consequences of repayment stress by formalising recovery processes. Formal financial institutions rely more on contractual enforcement mechanisms, which may be less behaviourally salient for borrowers.

Taken together, the results reported in Table 5 provide strong evidence in support of the study’s central argument that contract enforcement in microfinance systems is both behavioural and institutionally contingent. The effectiveness of enforcement mechanisms depends not only on their presence but also on the institutional context within which they are applied, reinforcing the importance of distinguishing between regulatory tiers when analysing borrower behaviour. The interaction model also improves the explanatory power of the regression relative to the baseline specification, indicating that institutional heterogeneity plays an important role in shaping repayment outcomes.

The predicted probabilities (marginal effects) in Table 8 illustrate how enforcement exposure shifts repayment outcomes differently across institutional environments. Borrowers in informal lending arrangements experience the largest increase in repayment stress when enforcement mechanisms are triggered (0.43), whereas enforcement exposure has comparatively weaker effects among formal-sector borrowers (0.24).

Table 8: Marginal Effects (Interaction Model)

<i>Scenario</i>	<i>Probability Repayment</i> <i>Poor</i>	<i>Probability Repayment</i> <i>Good</i>
Informal tier + enforcement	0.43	0.21
Informal tier + no enforcement	0.29	0.34
Formal tier + enforcement	0.24	0.41

In summary, three key findings have emerged from this study. First, enforcement exposure is closely associated with repayment distress rather than improved performance, highlighting the limits of reactive or coercive recovery strategies in fragile livelihoods.

Second, strong tier effects confirm that Ghana’s regulatory segmentation translates into meaningful behavioural differences at the household level. Formal institutions appear to

operate in environments where screening and contract formalisation reduce reliance on socially costly coping mechanisms.

Third, the interaction results demonstrate that enforcement mechanisms are not behaviourally neutral. Socially embedded enforcement in informal markets appears to amplify household stress, whereas formalised recovery processes dampen such effects.

These findings reinforce behavioural-institutional theories of compliance and provide rare micro-level evidence from northern Ghana.

Generally, the empirical findings contribute to a growing body of literature emphasizing the importance of behavioural and institutional factors in microfinance repayment dynamics. Consistent with earlier theoretical work on credit markets (Stiglitz & Weiss, 1981; Besley & Coate, 1995), the results confirm that enforcement mechanisms play a central role in mitigating repayment risk. However, the findings extend this literature by demonstrating that enforcement operates through behavioural pathways that are shaped by institutional context.

The positive association between enforcement exposure and repayment outcomes aligns with recent empirical studies that highlight the effectiveness of enforcement mechanisms in improving repayment performance (Cull et al., 2018; Hermes & Hudon, 2024). At the same time, the marginal effects analysis suggests that improved repayment outcomes may be driven by borrower responses to enforcement pressure rather than increased financial resilience. This interpretation is consistent with emerging evidence on repayment stress and borrower welfare trade-offs in microfinance systems (Barboni, 2024).

The interaction effects observed in Table 5 further reinforce the importance of institutional heterogeneity. The stronger behavioural response to enforcement in informal financial environments supports findings from studies emphasizing the role of social capital, trust and reputational mechanisms in sustaining repayment discipline (Fafchamps, 2004; Osei-Assibey, 2015). Informal enforcement mechanisms are often embedded in local social networks, making them more immediate and personally salient for borrowers.

The weaker enforcement effects observed in formal institutional settings suggest that contractual enforcement mechanisms may be less effective in contexts where legal systems are costly or inaccessible. This finding resonates with recent policy debates on microfinance regulation in Ghana, which emphasise the need for proportionate supervision and context-specific enforcement strategies (Bank of Ghana, 2022; Peprah, 2024).

Importantly, the results also highlight a potential tension between repayment performance and borrower welfare. While enforcement mechanisms appear to improve repayment outcomes, they may do so by inducing coping strategies such as borrowing from social networks or reallocating household resources, which can increase financial stress. This underscores the need to interpret repayment performance indicators cautiously, particularly in informal financial environments. Overall, the findings contribute to the literature by introducing a behavioural-institutional perspective on microfinance enforcement, demonstrating that enforcement

mechanisms are not uniform but vary in their effectiveness depending on the institutional and social context in which they operate.

5. Conclusion and Policy Implications

This paper demonstrates that enforcement strategies interact powerfully with institutional context in shaping repayment behaviour in rural Ghana. By distinguishing regulatory tiers from functional enforcement domains and modelling behavioural responses econometrically, the study contributes new evidence to debates on responsible finance and regulatory proportionality in African microfinance systems.

Three implications stand out for regulators and practitioners. First is the need for proportional enforcement where regulatory guidelines should recognise institutional heterogeneity rather than imposing uniform recovery standards. Second, borrower-protection frameworks require safeguards against socially destructive recovery practices especially within informal-sector credit markets and lastly the graduated escalation should be implemented such that formal mediation mechanisms could substitute for reputational sanctions before households resort to distress coping.

6. Limitations and Recommendations for further research

Despite its contributions to understanding enforcement practices and repayment outcomes in rural microfinance systems, this study acknowledges two limitations that provide opportunities for further research.

First, the study relies on cross-sectional household survey data, which capture the relationship between enforcement exposure and repayment outcomes at a particular point in time. While the analysis accounts for observable borrower and institutional characteristics, the data do not fully capture how these relationships evolve across successive loan cycles. Future research could employ longitudinal or panel data to examine the dynamics of enforcement practices and repayment behaviour over time, thereby extending the insights provided by the present study. Second, the study uses borrowers' reliance on external assistance to meet repayment obligations (*Who_Assist*) as a behavioural proxy for enforcement-related repayment distress. Although this measure provides useful insights into borrowers' repayment experiences, it does not directly capture the specific enforcement actions undertaken by lending institutions. Future studies could complement borrower-reported information with administrative loan records to examine specific enforcement mechanisms and their implications for repayment outcomes. Such studies could also extend the analysis to other geographical and institutional contexts to assess the broader applicability of the findings.

Notwithstanding these limitations, the study provides valuable micro-level evidence on how enforcement-related repayment distress interacts with institutional arrangements in rural microfinance markets, offering important insights for improving repayment management practices

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Appendix

Cleaned Analytical Dataset: Variables actually used in the descriptive and regression
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The variables actually used in the descriptive and regression analysis are:		
Variable	Description	Role
formno	Household / borrower ID	Observation identifier
Length_returnSatisfactory	Repayment satisfaction score (1–5)	Dependent variable
Who_Assist	External assistance used for repayment	Enforcement proxy
batchno	Microfinance institutional tier	Institutional variable
Settlement	Settlement type	Control variable

Appendix Table A1. Analytical Dataset (First 20 Observations)				
ID	Repayment_Stress	Enforcement	Tier	Settlement
9	4	0	1	2
10	3	0	1	2
11	1	0	1	2
12	4	0	1	2
13	2	0	1	2
14	3	1	1	2
15	4	0	1	2
16	2	0	1	2
17	5	0	1	2
18	3	1	1	2
19	4	0	1	2
20	3	0	1	2
21	2	1	1	2
22	3	0	1	2
23	4	0	1	2
24	2	0	1	2
25	5	0	1	2
26	3	0	1	2
27	4	1	1	2
28	3	0	1	2
Full dataset: N = 200 borrowers The analytical dataset contains 200 borrower observations extracted from the original survey dataset containing 459 variables				

Appendix B. Data Construction and Replication

Analytical Dataset

For the purposes of econometric estimation, the dataset was reduced to a set of key variables capturing repayment outcomes, enforcement exposure and institutional characteristics.

Variable	Definition
Repayment Stress	Borrower self-reported repayment satisfaction (ordered scale)
Enforcement	Binary indicator capturing reliance on external assistance
Tier	Institutional domain of the lender (formal, semi-formal, informal)
Settlement	Settlement type (rural / peri-urban)