LOAN STACKING AND DEBT STRESS: HOW HOUSEHOLD CHARACTERISTICS SHAPE REPAYMENT BEHAVIOR IN UGANDA

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ABSTRACT

This study examines the relationship between loan stacking and household debt repayment outcomes and financial stress in Uganda, with particular emphasis on structural and behavioral vulnerability in low-income settings. Using nationally representative household panel data covering 3,173 households, the analysis employs probit regression models to estimate the marginal effects of holding multiple concurrent loans on two binary outcomes: loan default and repayment-related worry. The empirical specifications control for key socioeconomic characteristics, including employment type, housing quality, demographic factors, and exposure to adverse economic shocks. Robustness is assessed through alternative model specifications and subsample analyses. The results indicate that each additional loan significantly increases the probability of default and intensifies repayment-related stress, suggesting that loan stacking amplifies household financial vulnerability. These effects are observed across income groups and are particularly pronounced among households reliant on farm wage labor, those residing in poor-quality housing, and those exposed to recent negative shocks. The findings underscore the importance of income volatility, limited asset buffers, and exposure to risk in shaping repayment capacity. The consistency of the estimates across specifications strengthens confidence in the empirical patterns. Although the observational nature of the data limits causal interpretation and does not fully capture unobserved behavioral traits such as risk preferences or time inconsistency, the panel structure improves empirical inference relative to cross-sectional analyses. The study yields important policy implications, highlighting the need for credit expansion strategies that account for household vulnerability rather than focusing solely on access. In particular, the results point to the role of credit information systems in limiting excessive multiple borrowing and the importance of flexible repayment structures that accommodate income volatility.

Keywords: *Loan Stacking, Debt Default, Debt stress*

1.0 Introduction

The rapid expansion of microfinance and digital lending in low- and middle-income countries has substantially increased household access to credit, often promoted as a pathway to financial inclusion and poverty reduction. However, accumulating evidence suggests that simultaneous borrowing from multiple sources—commonly referred to as *loan stacking*—may intensify repayment stress, delinquency, and intergenerational wealth poverty rather than enhance financial mobility (Sangwan et al., 2020). This paradox challenges the presumption that expanded credit access is inherently welfare-improving and calls for closer scrutiny of the behavioral and structural mechanisms shaping household repayment behavior under multiple borrowing.

Anchored in hyperbolic discounting theory**,** this study attempts to investigate and provide empirically grounded explanation for why households persistently accumulate debt despite foreseeable repayment difficulties. The concept of Hyperbolic discounting posits that individuals disproportionately value immediate rewards over future obligations, leading to time-inconsistent preferences and systematic present bias. In low-resource environments characterized by income volatility, liquidity constraints, and weak social protection, this bias becomes particularly pronounced. Households tend to prioritize urgent consumption needs while heavily discounting future repayment costs, making hyperbolic discounting especially suitable for analyzing borrowing and repayment behavior in such settings.

Within this framework, loan stacking emerges as a reactive coping strategy rather than a forward-looking financial plan. Borrowers meet short-term needs through additional credit while underestimating the cumulative burden of multiple repayment schedules. Hyperbolic discounting explains why borrowers may repeatedly take new loans even when they are aware of rising debt stress. Usually, immediate liquidity relief dominates consideration of future repayment consequences. Consistent with behavioral debt theory, debt is not merely a financial contract but also a cognitive burden that requires sustained self-control and planning—capacities that are weakened under economic scarcity (Mullainathan & Shafir, 2013; Cai, 2025). As loans accumulate, cognitive overload increases reliance on mental shortcuts, distorts financial judgment, and raises the likelihood of delayed repayment, strategic default, or chronic financial stress (Singh et al., 2018). In this sense, hyperbolic discounting provides a clear behavioral micro-foundation for understanding how loan stacking translates into repayment difficulties.

Complementing this behavioral perspective, household vulnerability theory emphasizes the structural constraints that limit repayment capacity. Vulnerability arises not only from low income but also from employment precariousness, asset poverty, and poor housing quality, which reduce households' ability to absorb shocks without falling into arrears or resorting to further borrowing (Aristei & Gallo, 2016). Exposure to shocks such as illness, adverse agricultural seasons, or unemployment can sharply undermine household liquidity, increasing repayment concerns and default risk (Ionescu & Ionescu, 2015). Importantly, these structural conditions are likely to *amplify present bias*, strengthening the relevance of hyperbolic discounting in vulnerable households. From this standpoint, default reflects not only behavioral bias but also structural disadvantage and institutional shortcomings.

Empirical evidence supports this dual-theory framing. In Malaysia, microfinance borrowers with multiple loans and limited business knowledge exhibited higher default rates, suggesting that loan accumulation alone can overwhelm borrowers with weak financial planning capacity (Noor Azaha, 2018). Similarly, evidence from India shows that borrowers engaged in informal employment, facing high debt-to-income ratios and weak credit supervision, are more prone to default— especially when loans are used for consumption rather than investment (Sangwan et al., 2020). Studies from developed economies further demonstrate that indicators such as housing quality, income volatility, and exposure to interest rate shocks are strong predictors of household default risk (Bilston & Rodgers, 2013).

Despite this growing literature, micro-level empirical studies explicitly examining how loan stacking interacts with household vulnerability remain limited, particularly in sub-Saharan Africa. This paper addresses these gaps by analyzing the relationship between loan stacking, repayment stress, and default in Uganda, a context marked by rapid credit expansion, dominant informal lending, and structurally embedded vulnerability. Grounded in hyperbolic discounting and vulnerability theory, the study develops and empirically tests hypotheses on the effects of loan count, employment insecurity, housing quality, and adverse shocks, contributing behaviorally and structurally grounded insights into household credit stress in emerging economies.

2.0 Literature Review and Development of Hypotheses

2.1 Loan Stacking, Cognitive Overload, and Repayment Outcomes

According to behavioral debt theory, cognitive load in dealing with repayment schedules, interest payments and prioritization of debts becomes overwhelming as more and more debts accumulate concurrently among low-income households (Mullainathan & Shafir, 2013). Loan stacking –a characteristic of some households in countries with high financial illiteracy rates and poor regulatory frameworks increases default-risk. Empirical studies affirm this relationship. for borrowers with multiple loans in India were inclined towards poor-quality investment decisions and high consumption- rather than meeting their repayment schedule, which led to higher delinquency rates (Singh et al., 2018). Likewise, microfinance clients in Malaysia with bad loan repayment behavior typically had multiple loans (Noor Azaha, 2018). These results are supported by macro-economic stress-testing models which show that higher total household liabilities make households more vulnerable to shocks, and increase the probability of default (Bilston & Rodgers, 2013). Notwithstanding, existing literature has generally been concentrated on either national level aggregates or types of credit in isolation (e.g., home mortgages) and we still know little about how cumulative borrowing across the heterogeneous sources of microcredit and other informal lenders affects subjective debt stress and objective loan repayment default among low-income rural borrowers.

H1: *The number of loans held by a household is positively associated with both the*

probability of debt default and subjective worry about repayment.

2.2 Labor Precarity, Income Volatility, and Default Risk

According to vulnerability theory, the degree of economic insecurity faced by households– particularly those involved in casual or seasonal work – causes them to experience income risk which undermines their capability to consistently fulfill some of their financial commitments (Dercon, 2002). Without a formal employment, informal workers also lack the contract

enforcement, social insurance and salary predictability that would make the repayment of debt possible during lumpy cash flows. Whereas wages stabilize income flows and provide for more disciplined debt payments. (Aristei & Gallo, 2016), for instance, found that households headed by unemployed workers or individuals with precarious jobs are highly more likely to fall into mortgage arrears in Italy, reinforcing the idea that labor market insecurity is a critical predictor of repayment distress. In the Indian microfinance sector (Sangwan et al., 2020) showed that low-income borrowers who have inconsistent income and were less monitored by lenders had a higher default risk. These results empirically validate the behavioral intuition that erratic income depletes the mental accounting commitment needed for reliable repayment. Although these studies do not provide measurable evidence that employment insecurity leads to the inability to repay credit, they reinforce empirically that there is a strong nexus between employment insecurity and repayment default, and additional such empirical studies are needed in sub-Saharan Africa where informal employment is predominant but financial institutions increasingly offer microloans at fixed terms.

H2: *Households engaged in less secure forms of employment (farm wage, casual labour, and unemployed) have a higher propensity to default on loans and report repayment anxiety than their counterparts with stable wage/labour market work.*

2.3 Housing Quality, Asset Poverty, and Creditworthiness

The asset-based theory of household finance posits that physical assets, and housing in particular, serve both as repositories of wealth and as signaling devices of creditworthiness and financial stability (Moser, 1998). Poor housing conditions —mud huts or dwellings with temporary floors— are all signs of asset poverty and the lack of collateral, preventing access to formal credit and pushing people towards seeking informal high-risk loans. Such households are also more prone to economic shocks, and less likely to emerge from debt traps.

Empirical evidence supports this framework. It has been noted that Indian households living in poor-quality housing are more likely to use costlier informal credit with greater default rates (Chakraborty & Gupta, 2023). Complementary results are provided by (Bilston & Rodgers, 2013), who included housing-related factors in stress-testing models for stress-testing analysis and found that lower housing wealth was related to higher loan repayment risk in the event of economic shock. Despite these insights few micro-level studies affirm the relationship between dwelling quality and repayment stress, empirically.

H3: *Households living in lower-quality dwellings (e.g., huts or temporary floors) are more*

likely to default on loans and experience repayment-related stress.

2.4 Economic Shocks, Liquidity Constraints, and Repayment Behavior

The vulnerability framework argues that adverse shocks —in the form of ill health, premature mortality, crop failure or job loss—can disrupt household income and liquidity, particularly in contexts with a weak formal safety net (Hoddinott & Quisumbing, 2003). In these situations, debt repayment becomes secondary to the need for survival, resulting in non-payment of debts, payment arrears and long-term indebtedness. Shocks magnify vulnerabilities that are already present, and can often set off chains of borrowing which compound financial fragility.

This chain of causation is confirmed in a number of empirical environments. (Ionescu & Ionescu, 2015) estimated large impacts of adverse labor market shocks in the Great Recession on student loan default rates for young US households. Likewise, (Slaymaker et al., 2019) found that

mortgage default risk increased for shock-prone low-income Irish households as interest rates rose and monetary policy was tightened.

While these results are robust, the existing body of work is based mostly on studies in high-income or middle-income countries with partial safety nets. There is limited evidence on the association between household-level shocks and repayment performance in rural African contexts where households are frequently exposed to a high burden of shocks, yet with negligible insurance coverage.

H4: *Households that experience a recent negative shock are more likely to default on*

loans and report worry about repayment.

2.5 Theoretical underpinning

Psychologists and behavioral economists recognize that individuals frequently display intertemporal impatience, systematically favoring immediate rewards over larger future benefits— a tendency known as present bias (Frederick et al., 2002; Laibson, 1997). Recent evidence shows that such preferences are especially prevalent in contexts marked by income volatility and liquidity constraints (Burghoorn et al., 2025). This study applies hyperbolic discounting theory to explain household borrowing and repayment behavior, emphasizing family-level biases that lead households to prioritize current cash needs over future repayment capacity.

Unlike the standard exponential discounting model, which assumes time-consistent preferences, hyperbolic discounting allows discount rates to decline over time, causing households to overweight immediate consumption relative to future outcomes. Within the quasi-hyperbolic (β, δ) framework (Laibson, 1997), δ captures long-run patience while β reflects present bias. A central implication of this structure is time inconsistency— households may initially plan to repay loans but later deviate when immediate consumption needs become salient.

When repayment periods coincide with pressing expenses such as food, school fees, or medical shocks, the short-term disutility of reduced consumption dominates earlier intentions. As a result, households may delay repayment, restructure debt, or take on additional loans to smooth consumption. This behavior is particularly acute among liquidity-constrained households. At the family level, present-biased decision-making favors meeting immediate collective needs, even at the expense of long-term financial sustainability. Consequently, hyperbolic discounting offers a coherent explanation for repeated borrowing and repayment stress, especially when loans are used for consumption rather than income-generating activities.

3.0 Methodology

3.1 Research Design

This study adopted a retrospective longitudinal (panel) research design utilizing secondary data collected by the Uganda Bureau of Statistics over two time periods (Wave 1 and Wave 2). The design was appropriate because it enabled the researcher to observe the same households at different points in time and to analyze how variations in the number of loans and socio-demographic characteristics influence debt repayment behavior. A retrospective approach was chosen because the data were collected previously for national monitoring purposes, allowing for

the examination of past patterns and transitions in household financial behavior without additional fieldwork. The panel structure provides an advantage over cross-sectional data by controlling for unobserved heterogeneity and enabling the assessment of dynamic changes in debt repayment across time (Wooldridge, 2015).

3.2 Data Source

The analysis utilized secondary data from the Uganda National Panel Survey (UNPS) 2021/2022 and 2023/2024, which provides detailed information on household demographics, income sources, financial access, remittance inflows, and debt management practices. These data are collected by Uganda Bureau of Statistics (UBOS) under standardized protocols ensuring national representativeness. Wave 1 data represent the baseline (Year 1), while Wave 2 data represent follow-up observations (Year 2). The retrospective aspect of the study lies in examining household responses and behaviors in Wave 2 with reference to prior conditions in Wave 1, allowing inference about behavioral changes over time.

3.3 Study Population and Sample

The study population comprised all households that participated in both Wave 1 and Wave 2 of the panel survey. Only households with complete records on key variables (such as debt status, remittances, social networks, and financial technology use) were retained. After data cleaning and consistency checks, a balanced sample of N = 3,173 households was obtained. The balanced nature of the panel ensures consistency in comparison and eliminates bias that may arise from attrition or sample replacement (Baltagi, 2008).

3.4 Variables and Measurement

3.4.1 Dependent Variable

Debt Repayment (R_{it}): Measured as a binary variable taking the value **1** if a household successfully repaid its debt in a given wave, and **0** otherwise. In some robustness checks, a continuous repayment ratio (amount repaid/amount borrowed) was also analyzed to capture repayment intensity.

3.4.2 Independent Variables

Number of Loans (N_{it}): A count variable indicating the total number of loans a household held during a given wave. A higher number of loans may increase repayment burden and the probability of default.

Socio-demographic Characteristics: These are observable attributes of the household head and household composition that influence access to credit, financial decisions, and repayment behavior. These variables capture heterogeneity in repayment ability, preferences, and risk attitudes across households. They include: Age, sex, education level, employment status, Location (Urban/Rural), household Size and dwelling characteristics.

3.5 Model Specification

To model household debt repayment behavior, the study exploits the panel structure of the data and estimates a nonlinear probability model with household-level unobserved heterogeneity. Since the dependent variable is binary, the analysis employs a panel logit specification, which is well suited for modeling discrete repayment outcomes while accounting for time-invariant household characteristics (Wooldridge, 2010).

If we Let $R_{it} \in \{0,1\}$ denote an indicator equal to one if household i successfully repays its loan obligations in period t, and zero otherwise. Then the latent repayment propensity $R_{it}*$ is specified as:

$$R_{it}* = \beta_0 + \beta_1 N_{it} + \beta_2' X_{it} + \mu_i + \varepsilon_{it},$$

where N_{it} denotes the number of outstanding loans held by household i at time t, and X_{it} is a vector of observed, time-varying household- and loan-level covariates, including socioeconomic characteristics, asset proxies, and loan purpose controls. The term μ_i captures unobserved household-specific heterogeneity, such as financial discipline, risk preferences, or credit history, which may be correlated with borrowing and repayment decisions. The observed repayment outcome is generated according to: $R_{it} = 1(R_{it}* > 0)$, implying the following conditional probability:

$$Pr\ (R_{it} = 1 | N_{it},\ X_{it},\ \mu_i) = \Lambda(\beta_0 + \beta_1 N_{it} + \beta_2' X_{it} + \mu_i),$$

where $\Lambda\ (\cdot)$ denotes the logistic cumulative distribution function.

Consistent with standard practice in short household panels, the model is estimated using a random-effects probit estimator, which accommodates unobserved household-level heterogeneity while preserving time-invariant covariates (Greene, 2012; Wooldridge, 2010). Standard errors are clustered at the household level to account for within-household serial correlation over time (Cameron & Miller, 2015). This probit specification provides a flexible framework for evaluating how multiple borrowing affects repayment performance, conditional on observed household characteristics and persistent unobserved heterogeneity.

To confirm if the model is well specified, with no omissions of important variables, a model significance and Goodness-of-fit tests were carried out. Test results indicated an F-statistic is large (28.57) and the P-value is effectively zero meaning that the probability that the results occurred by chance is almost zero. Since p is very high (p=0.927), the goodness-of-fit test results confirm that the model is correctly specified with no material omissions. In addition, marginal effects were calculated to interpret the magnitude of influence each variable has on the probability of debt repayment, expressed as a change in predicted probability.

3.6 Data Analysis Techniques

Data analysis was conducted using STATA version 16. Data Cleaning and Preparation involved Merging Wave 1 and Wave 2 datasets, verifying consistency of household identifiers, and handling missing values through listwise deletion. Descriptive statistics (means, frequencies, and standard

deviations) summarized household characteristics across waves were computed. Secondly, pairwise correlations coefficients were computed to examine the relationships among key variables and detect possible multicollinearity. Thirdly, Panel regression model (probit) was estimated to identify determinants of debt repayment behavior. Further still, Average marginal effects were computed to translate the log-odds coefficients into meaningful probabilities of repayment. Statistical significance of the results was determined at the 1, 5, and 10 percent levels respectively.

3.7 Ethical Considerations

Since the study utilized secondary panel data, ethical clearance was obtained from the Uganda Bureau of Statistics Data Access Committee. The data were anonymized to protect respondent confidentiality. No primary data were collected, and all analyses adhered to ethical standards of research integrity and data protection.

3.8 Control Variables

To isolate the impact of loan stacking on the two outcome constructs, the estimates adjust for a set of household-level covariates that affect debt performance and stress. These are demographic characteristics including age (and age squared) and sex of the head of household; and size of household. Employment status is represented by a series of dummy variables indicating whether the household head is employed with farm-wages, non-farm self-employment, on-farm employment and subsistence work or not working or out of labor force.

Housing quality is controlled for with binary indicators for type of dwelling (house, hut, muzigo), whether the roof and a floor are permanent. These indicators are believed to be the best corollary for family affluence and future economic security. We also control for both urban and rural residence using an indicator variable, to capture location specific disparities in access to markets and credit. Also, if households reported exposure to an adverse event such as ill-health, job loss or agricultural failure recently, they are coded that the shock was negative.

4.0 Results

4.1 Descriptive Statistics

Table 1 provides summary statistics of the main variables employed in the analysis. Of the 3,173 households, 44.7 percent reported that they had defaulted on at least one loan and 44.0 percent were anxious about repayment. A notable 13.8 percent of households live in huts and 61.9 percent have temporary flooring, which reflects high structural vulnerability. With respect to work, 7.7 percent participate in farm wage labour whereas 6.5 percent are either unemployed or non-labour. On average, there are 1.215 loans per household which indicates loan stacking among households as being common.

Table 1 : Descriptive statistics and scale reliabilities for household debt repayment behavior

Variable	N	Mean	SD	Min	Max
Household debt default	3173	0.447	0.497	0	1
Household debt repayment	3173	0.553	0.497	0	1
Worried of payment					
No	3173	0.560	0.496	0	1
Yes	3173	0.440	0.496	0	1
Number of loans	3173	1.215	0.483	1	6
Innovative FinTech					
No Innovative FinTech _	3172	0.913	0.282	0	1
Use of Innovative FinTech	3172	0.087	0.282	0	1
Received remittance					
No	3172	0.945	0.227	0	1
Yes	3172	0.055	0.227	0	1
Sex					
Female Household head	3172	0.322	0.467	0	1
Male Household head	3172	0.678	0.467	0	1
Level of Education of HH Head					
No formal education	3134	0.120	0.325	0	1
Some primary	3134	0.401	0.490	0	1
Completed primary	3134	0.169	0.375	0	1
Some secondary	3134	0.143	0.350	0	1
Completed secondary	3134	0.080	0.271	0	1
Post-secondary plus	3134	0.086	0.281	0	1
Status of Employment					
Nonfarm wage employment	2858	0.148	0.356	0	1
Farm wage employment	2858	0.077	0.266	0	1
Nonfarm self-employment	2858	0.285	0.451	0	1
On farm employment	2858	0.188	0.390	0	1
subsistence work	2858	0.238	0.426	0	1
Unemployed/Not in Labourforce	2858	0.065	0.246	0	1
Residence					
Rural	3173	0.779	0.415	0	1
Urban	3173	0.221	0.415	0	1
Dwelling type					
House	3172	0.755	0.430	0	1
Muzigo	3172	0.102	0.303	0	1
Hut	3172	0.138	0.345	0	1
Type of roof					
Temporary roof	3171	0.269	0.443	0	1
Permanent roof	3171	0.731	0.443	0	1
Type of floor					
Temporary floor	3171	0.619	0.486	0	1
Permanent floor	3171	0.381	0.486	0	1
Household head age	3172	45.019	13.528	18	103

4.2 Loan Stacking, Default Risk, and Financial Stress

Consistent with Hypothesis 1 which posits that loan stacking increases both the likelihood of household debt default and the incidence of repayment-related anxiety, our results provide strong and consistent evidence that the two (debt default and repayment anxiety) are positively related. In probit regression models with marginal effects, we observe that the number of loans per household is positively and significantly correlated with both objective and subjective indicators of financial distress. It is evident from Table 2 that one extra loan leads to a 9.13% increase in the odds of debt defaulting (p <.01). This result is economically significant since the average value of loans in our sample is slightly over one, indicating that even marginal loan exposure can increase default risk a great deal.

Table 2: Marginal effect of number of loans on household debt repayment

VARIABLES	Failure to pay debt	Se
Number of Loans	0.0913***	(0.0254)
Sex of HH head (male)	-0.0386	(0.0253)
Age of HH head	0.00974*	(0.00583)
Age squared	-0.00834	(0.00548)
Household size	0.00764*	(0.00450)
Urban(rural)	-0.0124	(0.0294)
Farm wage employment	0.145***	(0.0528)
Nonfarm self-employment	0.0287	(0.0397)
On farm employment	0.0362	(0.0530)
Subsistence work	0.0581	(0.0418)
Unemployed/Not in Labourforce	0.0857*	(0.0465)
Experience a negative shock	0.0574**	(0.0240)
Muzigo	0.0824*	(0.0421)
Hut	0.172***	(0.0368)
Permanent roof	0.0786**	(0.0368)
Permanent floor	-0.0661**	(0.0279)
Year Panel	-0.0597***	(0.0223)
Observations	3,141	

As a corollary to this behavior outcome, Table 3 provides analogous results for subjective financial stress – operationalized as self-reported worry about repaying debt. The marginal effect of number loan on this variable is 6.55 percent (p < 0.01), suggesting that families with multiple loans are not only more likely to default, but also more likely to suffer from financial anxiety. This is consistent with evidence from the field of behavioral economics, which shows that over-indebtedness causes cognitive stress and lowers household well-being (Karlan et al., 2016).

These findings are robust to several sensitivity checks. For instance, sub-samples of 75%, 50% and 25% in Table 4 are used to test if the loan effect is a due to outliers or size. The impact of

loan stacking effects is positive with statistical significance in all three subsamples, having marginal effects between 0.0811 and 0.0974. This consistency demonstrates the structural nature of this association and thus enhances causal credibility.

Additional evidence is in the pairwise correlation results indicate that, the amount of loans has a significant positive level of correlation with both borrowing default (r =0.072) and repayment worry (r = 0.047), which further confirms the validity of regression results. Results reveal that the correlations, although not large on a purely economic basis, are nevertheless statistically significant, while providing evidence in implied statement that although, loan stacking is not the sole determinant of repayment behavior, it is a non-trivial and independent contributor to financial distress.

The evidence enables us to provide empirical support for the "debt spiral" hypothesis: that several ongoing active credit accounts could encumber a household's ability to plan its finances, particularly among low-income countries with a weak buffer. Loan stacking could be due to haphazard lending processes or informal means of borrowing, unfortunately the result is the same – increased vulnerability for creeping into economic ruin and emotional distress.

This evidence is consistent with a burgeoning literature that questions the uncontrolled scale-up of microfinance and its negative effects (Bateman & Chang, 2012; Schicks, 2014). It implies that if credit deepening is not accompanied by financial education or repayment monitoring, it could make households worse off.

Table 3: *Marginal effect of worriedness of failure to pay debt*

VARIABLES	Worried about failure to pay	se
Number of Loans	0.0655***	(0.0252)
Sex of HH head (male)	-0.0391*	(0.0234)
Age of HH head	0.0123**	(0.00545)
Age squared	-0.0105**	(0.00513)
Household size	0.00682	(0.00454)
Urban(rural)	0.0164	(0.0303)
Farm wage employment	0.165***	(0.0560)
Nonfarm self-employment	0.0333	(0.0374)
On farm employment	0.0346	(0.0504)
Unemployed/Not in Labour force	0.0842*	(0.0433)
Experience a negative shock	0.0641***	(0.0228)
Subsistence work	0.0662	(0.0413)
Muzigo	0.0960**	(0.0409)
Hut	0.130***	(0.0407)
4o.dwell	-	
13.dwell	0.191	(0.190)
Permanent roof	0.0746**	(0.0335)
Permanent floor	-0.0908***	(0.0283)
Year Panel	-0.0545**	(0.0211)
Observations	3,141	

Standard errors: *** p<0.01, ** p<0.05, * p<0.1

4.3 Employment Status and Household Financial Vulnerability

This section tests Hypothesis 2, which posits that households engaged in precarious employment—particularly farm wage labor or those unemployed—are more likely to experience both debt default and repayment-related stress. The empirical evidence is highly consistent with this expectation. As shown in Table 2, households with farm wage employment as their main source of income are 14.5 percentage points more likely to be in default than more stable forms of employment such as non-farm wage work (p <.01).

The same is true for worry about repaying debt, as shown in Table 3: This group is similarly 16.5 percentage points more likely to report being worried about repaying their loans (again statistically significant at the 1% level). These findings indicate that the institutional profile of agricultural wage labour, as a segment generally precarious and seasonal in nature with low levels of wages, is unsustainable for continuous debt repayment.

Also, being unemployed or not in the labor force is related to high financial risk. This category of households is 8.57 percent more likely to default (p < 0.1) and 8.42 percent more likely to worry about repayment (p < 0.1) than the employed ones (Tables 2 &3). The findings are less strongly significant here, but the signs and magnitudes of the coefficients support the hypothesis that labor market detachment is associated with increased financial vulnerability.

These effects remain largely stable and do not vary much even for different sub-sample analyses (Table 4), validating the observed relationships are not an artifact of specific sample sizes or data features. For example, for the most vulnerable 25 percent of the sample farm wage employment is associated with an increase in default of 17.0 percent (p < 0.01), indicating even greater weighted importance among households with poorer economic resilience. This is in line with much of the literature on labour-debt linkages among the poor in developing countries. Earlier findings demonstrated that unstable sources of income from such sectors as agriculture and the informal economy, are the factors associated with poor financial results and more frequent use of emergency loans (Collins et al., 2009; Morduch & Schneider, 2017). This is particularly important in Uganda, where almost 77.9 percent of the sample resides in rural areas and significant income is obtained from farm-based labor, these factors would have a significant impact on household debt dynamics.

Furthermore, the findings call for critical reflection on credit targeting and loan design.

The classic credit-providing focus of the microfinance model, without income stabilization, could unwittingly be leading irregularly employed households to become overextended. These results therefore bring to the fore important policy questions relating to fitting lending practices with job market realities, and in rural/agrarian settings specifically.

Table 4:Estimated marginal effects of sub-sample analysis

VARIABLES	75% sample	50% sample	25% sample
Number of Loans	0.0811***	0.0974***	0.0916***
Sex of HH head (male)	-0.0585***	-0.0459*	-0.0476
Age of HH head	0.00850*	0.00623	0.00381
Household size	0.000128	3.54e-05	0.000922**
Farm wage employment	0.103**	0.143***	0.170***
Experience a negative shock	0.0658***	0.0563**	0.0505*
Muzigo	0.0762**	0.0881**	0.0986**
Hut	0.149***	0.163***	0.167***
Permanent roof	0.0698**	0.0679*	0.0560
Permanent floor	-0.0676***	-0.0785***	-0.0922***
Year Panel	-0.0369*	-0.0267	-0.0361
Observations	2,577	2,141	1,422

Standard errors *** $p<0.01$, ** $p<0.05$, * $p<0.1$

4.4 Housing Conditions as Predictors of Debt Default and Financial Stress

The results of this study support Hypothesis 3, which proposed that poorer housing quality—used as a proxy for asset poverty and long-term socioeconomic vulnerability—is significantly associated with a greater likelihood of both debt default and repayment related stress.

4.4.1 Type of dwelling and default risk

In Table 2, we find that households living in huts (usually made of temporary materials such as mud and wattle) are 17.2 percent more likely to be defaulting in debt ($p <.01$), while those residing in "muzigo" dwellings (tenement-style, low-cost rental units) are 8.24 percent more likely to be defaulting on debt ($p <.01$). The same phenomenon holds for subjective financial stress: in Table 3, living in huts raises the likelihoods of concern about repayment by 13.0–and muzigos by 9.6 percentage points—$p < 0.05$ or better on both measures. These results indicate that housing type is more than simply a living situation it also acts as an indicator of household economic status over time and, by extension creditworthiness. Even after controlling for style of employment, living in urban/rural area and household's characteristics these relationships remain consistent suggesting an independent effect of asset poverty on vulnerability to debt.

4.4.2 Permanent Structures and Financial Protection

Conversely, higher housing quality seems to act as a cushion against default and stress. In both models, a permanent floor is negatively correlated with debt distress: Default: – 6.61 percentage points ($p < 0.05$); Worry: –9.08 percentage points ($p < 0.01$) (Tables 2 &3). The presence of a permanent roof also is associated with reporting more successful repayment experience and experiencing less worry, although to slightly less statistical confidence. In Table 2, the likelihood of households with permanent roofing repaying their debts was higher by 7.86 percentage points ($p < 0.05$), and likewise is the positive association found in Table 3 for reducing repayment concern ($p < 0.05$). Collectively these variables serve as indicators of latent household wealth, and they serve as proxies to collateral in the formal moneylending market. Without land titles or a visible credit history, a home may not qualify or be used to assess borrower repayment ability.

4.4.3 Sub-sample Analysis

The robustness for the housing effects are reported in Table 4 subsample analyses. The influence of dwelling in a hut is still substantial, generating default risks higher by as much as 16.7 percent for the most vulnerable 25 percent of the sample (p <.01). The mitigating effect of floors becomes stronger in smaller sub-samples, as indicated by increasing effect sizes and levels of statistical significance from sample reductions. It is on the basis of these findings that we make a strong empirical case for conceptualizing housing as financial infrastructure. The dwelling the household occupies is not just a reflection of how well-off it is currently but also conditions financial behavior. Besides, it influences the households' propensity to take risks and psychological coping capacity when confronting debt (Fang et al., 2021).

4.4.4 Broader Implications

These results are consistent with prior research on the relationship between housing quality and financial well-being and creditworthiness. For example, (Kantak, 2025; Shaefer et al., n.d.) posit that housing is a consumption good but also an income-producing asset surrounding low-income urbanites. Further, social determinants of the material deprivation from housing can increase subjective insecurity independently of income due to lack of household conveniences (Guio & Maquet, 2007; Tøge & Bell, 2016). In Uganda—with 61.9 percent of the households living in houses having temporary flooring, and 13.8 percent live in huts (Table 1) like huts—these are not peripheral but central dynamics to consider when talking about financial resilience.

4.5 Exposure to Shocks and Household Debt Vulnerability

The results render credence to Hypothesis 4, which posits that households experiencing recent negative shocks—such as health emergencies, crop failures, or job loss—are significantly more likely to default on debt obligations and worry about repayment. As shown in Table 2, the recent exposure to a negative shock is associated with a 5.74 percent (p <0.05) rise in the probability of debt default. Along this line, Table 3 also reports the fact that the same construct increases the probability of worry about repayment by 6.41 percentage points (p < 0.01). These findings indicate that shocks have both material and psychological consequences for household financial behavior. The higher default risk may stem from temporary income disruptions, while the increased worry may reflect the cognitive burden and ambiguity that shocks enforce on future repayment prospects.

4.5.1 Robustness Checks Across Sample Segments

These effects are still statistically significant and are constant across all three sub-sample analyses presented in Table 4. In the poorest 25% of the sample, the marginal effect of a shock remains high and highly significant (+5.05pp, p < 0.1), indicating that shocks matter also at the bottom of the household income distribution. The existence of this effect despite changes in sample size and composition indicates a structural susceptibility; shocks have a uniform entropy-creating effect on financial outcomes, independent of other household attributes.

4.5.2 Theoretical Context and Mechanisms

These findings are consistent with the existing theory of vulnerability to shocks and consumption smoothing. In the absence or incompleteness of formal insurance markets, borrowing constitutes an informal mechanism that households use to smooth consumption in bad times. When the very credit that makes up the debt becomes unmanageable— such as loan stacking cases, or when the

repayment burden has to be met simultaneously with income shocks—the household's capacity to serve its obligation deteriorates (Morduch, 1995; Townsend, 1994).

In addition, behavioral economics literature increasingly depicts financial stress a product of income, economic volatility and perceived risk. This intuition is supported by the strong impact of negative shocks on the self-reported worry about debt repayment we find in this study. Table 3 reveals that on the basis of all three measures of wealth shocks, the psychological effects on welfare appear to be quantifiably large, complicating interpretations of household financial behavior using only conventional models in economic analysis.

4.5.3 Implications for Financial Resilience

This supports the case for the view that debt management and microfinance programs in low-income settings cannot properly account for risk without considering shock vulnerability). Lenders—including microfinance and community groups—frequently do not sufficiently screen for households' exposure to shocks, or offer suitable grace periods, emergency restructuring, or insurance-linked credit products. In a country like Uganda, with limited social safety nets and not even 5.5% of households receiving remittances but more than 91 percent without access to FinTech services (Table 1), that ground for latent financial recovery is practically non-existent. This institutional void raises the impact of shocks, directly leading to loan delinquency and borrower distress.

5. Discussion of key findings and Policy Implications

5.1 Discussion of Key Findings

This study examines how multiple borrowing, labor market conditions, asset vulnerability, and exposure to shocks shape household debt repayment outcomes and financial stress, with particular attention to behavioral mechanisms implied by hyperbolic discounting. Across specifications, the results suggest that repayment difficulties arise from the interaction of present-biased preferences and structural constraints, rather than from credit access alone.

Consistent with Hypothesis 1, households holding multiple concurrent loans are significantly more likely to default and to report repayment-related worry. This finding is consistent with models of hyperbolic discounting, in which individuals overweight immediate consumption needs relative to future repayment obligations (Laibson, 1997). In environments characterized by frequent liquidity shortfalls, households may repeatedly borrow to address short-term needs while underestimating the cumulative burden of future repayments. Loan stacking therefore reflects dynamic inconsistency in intertemporal choice. In addition, managing multiple repayment schedules—often across formal and informal lenders—increases cognitive and administrative complexity, which further raises default risk (Schicks, 2014). At the household level, these dynamics resemble a debt overhang mechanism, whereby existing obligations reduce the incentives and capacity to maintain repayment (Krugman, 1988). Importantly, the joint increase in default and financial worry highlights that repayment outcomes capture both objective financial behavior and subjective wellbeing, a distinction increasingly emphasized in the financial inclusion literature (Karlan et al., 2016).

In line with Hypothesis 2, employment status is a strong predictor of both default and financial stress. Households reliant on farm wage labor or outside formal employment face significantly higher risks, consistent with evidence that income volatility in agrarian and informal labor markets disrupts cash flows and complicates repayment planning (Amissah, 2025; Gautam, n.d.; Sanderson

et al., 2025). From a theoretical perspective, these results are consistent with the permanent income hypothesis, which posits that consumption and financial decisions depend on expected future income rather than current income alone (Friedman, 1957). When income streams are uncertain or erratic, households are more likely to prioritize short-term consumption and liquidity needs over scheduled debt repayments. In such contexts, credit expansion without complementary income-stabilization mechanisms may increase financial vulnerability rather than reduce it, supporting earlier critiques of credit-led development strategies (Bateman and Chang, 2012).

The results also support Hypothesis 3 by identifying housing quality as an important correlate of default and repayment-related worry. Households residing in makeshift or grass-thatched dwellings are significantly more likely to default and to report financial stress, while those with durable housing materials exhibit greater repayment capacity. This finding is consistent with the asset vulnerability framework, which emphasizes the role of physical assets in buffering households against economic shocks (Moser, 1998). Within a hyperbolic discounting framework, asset security may attenuate present bias by reducing short-term consumption pressure and increasing the perceived returns to future-oriented financial behavior. These results align with recent empirical work showing that housing improvements are associated with lower financial stress and improved credit outcomes in low-income settings (Ahmad, 2018; Hanson, 2025; Nasir et al., 2025).

Finally, consistent with Hypothesis 4, exposure to economic shocks—such as illness, job loss, or crop failure—is strongly associated with both loan default and increased financial worry. This finding accords with a long tradition in development economics that emphasizes risk and uncertainty as central determinants of household behavior (Townsend, 1994). In the absence of formal insurance or effective social protection, households often rely on credit as an informal risk-coping mechanism (Morduch, 1995). However, when shocks occur during repayment periods, credit obligations may exacerbate financial strain and increase default risk. From a behavioral perspective, shocks may further intensify present-biased preferences by increasing the salience of immediate losses, thereby weakening repayment commitment. This mechanism is consistent with behavioral evidence showing that exposure to economic shocks heightens fear of loss and alters risk perceptions (Haushofer and Fehr, 2014). Together, these findings reinforce concerns that financial inclusion initiatives that lack shock-responsive features may inadvertently increase household vulnerability (Clarke and Dercon, 2016; Heltberg et al., 2013).

Overall, the results suggest that default and repayment stress reflect predictable responses to income volatility, asset insecurity, and shocks in the presence of present-biased preferences. Policies aimed at improving repayment performance should therefore complement credit access with mechanisms that reduce exposure to short-term liquidity pressure, such as income-smoothing instruments, flexible repayment structures, and shock-responsive credit design.

5.2 Policy Implications

The findings of this study indicate that financial inclusion strategies focused primarily on expanding credit access may be insufficient in environments characterized by income volatility, limited insurance, and present-biased decision-making. When households exhibit hyperbolic discounting, short-term liquidity needs are systematically prioritized over future repayment obligations, increasing the likelihood of loan stacking, default, and financial stress. Effective

financial inclusion policy must therefore incorporate behavioral mechanisms alongside institutional design and household vulnerability.

Limiting Loan Stacking through Credit Information Systems

The strong association between multiple borrowing and repayment failure highlights the role of present bias in sequential borrowing decisions. When borrowers discount future repayment costs, they may repeatedly take on additional loans without fully internalizing cumulative obligations. Strengthening credit information systems—such as credit bureaus and digital loan registries—can mitigate this dynamic by constraining the scope for impulsive or myopic borrowing across lenders (Gajigo and Triki, 2012). In contexts where informal finance is widespread, integrating microfinance institutions, savings groups, and digital lenders into shared registries is essential. By increasing the salience of total indebtedness at the point of borrowing, such systems may counteract present-biased underestimation of future repayment burdens.

Aligning Credit Design with Employment and Income Volatility

Hyperbolic discounting predicts that households facing uncertain or irregular income will place greater weight on immediate consumption needs relative to future obligations. The elevated default risk observed among households reliant on agricultural and informal labor underscores the importance of aligning credit products with income realities. Flexible repayment schedules, seasonal repayment calendars, and income-contingent repayment schemes can reduce short-term liquidity pressure and help borrowers remain dynamically consistent in their repayment behavior (Banerjee and Duflo, 2013). Incorporating basic employment and income profiling into loan design may further improve matching between repayment schedules and borrowers' earning capacity, reducing stress-induced default.

Incorporating Asset-Based Lending and Housing Improvements

The strong relationship between housing quality, default, and financial stress suggests that asset security moderates present-biased behavior. From a hyperbolic discounting perspective, asset ownership—particularly secure housing—reduces the immediacy of consumption needs and strengthens commitment to future-oriented decisions. Lenders may therefore benefit from incorporating housing characteristics into credit assessment models, especially in settings where formal collateral is absent. Moreover, home-improvement microloans or subsidized credit for basic housing upgrades may enhance household resilience and indirectly improve repayment performance by easing liquidity pressure and reducing exposure to shocks (Das et al., 2022).

Building Shock-Responsive Credit Systems

Economic shocks intensify present bias by increasing the salience of immediate losses and survival needs, thereby weakening commitment to future repayments. The strong link between shocks, default, and financial worry suggests that credit systems lacking shock-responsive features may exacerbate behavioral vulnerability. Incorporating mechanisms such as temporary repayment moratoria, grace periods, emergency liquidity windows, or bundled insurance can help household's smooth consumption during shocks without resorting to additional borrowing or

default (Clarke and Dercon, 2016). Evidence from East African pilots combining credit with weather-indexed insurance and emergency transfers demonstrates the feasibility of such designs in low-income settings.

Enhancing Financial Literacy and Cognitive Support Mechanisms

Finally, loan stacking and repayment stress are compounded by cognitive load and limited financial bandwidth. Hyperbolic discounting is exacerbated when individuals face high stress and complex decision environments, reducing their ability to plan and commit to long-term obligations. Interventions such as integrated debt counseling, simplified repayment structures, and reminder systems can lower cognitive costs and increase the salience of future repayments, thereby reducing stress-induced default (Karlan et al., 2016). These supports are likely to be especially effective for first-time borrowers and individuals with limited financial literacy.

5.3 Theoretical and regional contribution

This paper contributes to the literature by documenting how household financial outcomes are shaped jointly by income conditions, structural constraints, and behavioral factors. By integrating insights from behavioral economics and development finance, the analysis highlights the importance of considering both objective repayment outcomes and subjective financial stress when assessing the effects of financial inclusion.

From a regional perspective, the focus on Uganda provides evidence relevant to Sub-Saharan Africa, where access to microfinance and digital credit has expanded rapidly in the absence of commensurate regulatory safeguards. The findings suggest that credit market expansion without corresponding improvements in product design, borrower screening, and risk management may increase household vulnerability rather than reduce it. As such, the results inform ongoing policy debates on how to design more resilient and context-appropriate financial inclusion frameworks in similar low-income settings

6. Conclusions, Limitations and Future Research

6.1 Conclusion

This paper examines how loan stacking and household vulnerability shape debt repayment outcomes and repayment-related stress in Uganda. Using household-level panel data and probit models with robustness checks, the analysis tests four hypotheses linking multiple borrowing, employment status, housing quality, and exposure to shocks to the likelihood of loan default and financial worry.

The results show that holding multiple concurrent loans is strongly associated with higher default risk and greater repayment stress across income groups. These risks are compounded by labor market precarity—particularly among farm wage workers and households outside formal employment—and by asset poverty, proxied by poor housing quality. Exposure to negative economic shocks independently increases the probability of both default and repayment anxiety, indicating that debt vulnerability reflects not only low or unstable income but also limited capacity to absorb volatility.

Taken together, the findings add to evidence questioning credit-centered models of financial inclusion that emphasize access while abstracting from household risk and vulnerability (Bateman and Chang, 2012; Demirgüç-Kunt et al., 2022). The results suggest that credit expansion in contexts characterized by informal finance, income instability, and weak insurance may increase financial fragility when lending terms are poorly aligned with household economic conditions.

Conceptually, the paper integrates insights from behavioral finance, household vulnerability frameworks, and development microeconomics by documenting that repayment behavior is jointly shaped by economic constraints and psychological stress. The joint analysis of objective default and subjective worry provides a more complete measure of financial wellbeing than approaches relying solely on repayment outcomes.

While the analysis focuses on Uganda, the mechanisms documented are likely relevant for other low- and middle-income countries experiencing rapid credit expansion without parallel investments in income stabilization, borrower protection, or risk management. These findings inform the design of financial inclusion policies that better account for household vulnerability in similar settings.

6.2 Limitations and Future Research

This study has several limitations that should be considered when interpreting the results. First, although the use of household panel data and extensive robustness checks strengthens internal validity, the analysis remains observational. Unobserved household characteristics, lender behavior, or time-varying shocks may influence both borrowing decisions and repayment outcomes, limiting causal interpretation.

Second, the measure of repayment-related worry is self-reported and may reflect psychological or cultural factors beyond debt obligations alone. While this subjectivity is inherent to measures of financial stress, it may introduce measurement error unrelated to repayment behavior. Future work could complement survey-based indicators with alternative measures of psychological stress or administrative data on repayment enforcement.

Finally, the analysis does not directly observe intra-household decision-making, coping strategies, or lender–borrower interactions that may mediate the relationship between vulnerability and repayment outcomes. Qualitative or mixed-methods approaches could provide insight into these mechanisms. Experimental or quasi-experimental evaluations of shock-responsive credit products, flexible repayment contracts, and asset-linked lending—such as housing-based loans—would further inform policy design and help establish causal effects.

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