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Flexible Microcredit: Effects on Loan Repayment and Social Pressure

Abstract

Flexible repayment schedules allow borrowers to invest in profitable yet risky projects, but practitioners fear they erode repayment morale. We study repayment choices in rigid and flexible loan contracts that allow discretion in repayment timing. To separate strategic repayment choices from repayment capacity given income shocks, we conduct a lab-in-the-field experiment with microcredit borrowers in the Philippines. Our design allows us to observe social pressure, which is considered both central to group lending, and excessive in practice. In our rigid benchmark contract, repayment is much higher than predicted under simple payoff maximization. Flexibility reduces high social pressure, but comes at the cost of reduced loan repayment. We present theoretical and empirical evidence consistent with a strong social norm for repayment, which is weakened by the introduction of flexibility. Our results imply that cooperative behavior determined by social norms may erode if the applicability of these norms is not straightforward.

JEL-Codes: O160, D900, G210.

Keywords: peer punishment, social norms, microfinance, flexible repayment.

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"We pledge to attend regularly the weekly Center meetings,
to utilize our loans for the purpose approved, to save and pay our installments weekly,
to use our increased incomes for the benefit of our families, to ensure that other members
of our group and Center do likewise and to take collective responsibility if they do not."

Official weekly pledge, recited at each center meeting
Grameen Foundation

1 Introduction

Flexible repayment schedules for microloans are beneficial for borrowers. Compared to rigid repayment schedules, repayment flexibility has been shown to increase income by fostering investment in riskier and more profitable projects (Barboni and Agarwal 2018; Battaglia et al. 2019; Czura 2015a; Field et al. 2013).[1] Yet, microfinance institutions hardly ever offer flexible repayment schedules in practice. The main argument brought forth is that rigid repayment schedules help create the necessary repayment discipline (Armendáriz and Morduch 2010; Labie et al. 2017; Meyer 2002). Field experiments suggest that repayment flexibility may both increase default rates (Czura 2015a; Field et al. 2013) or reduce them (Barboni and Agarwal 2018; Battaglia et al. 2019). Both higher and lower levels of default have been attributed to the high-risk high-return investments that flexible loans facilitate. However, field experiments struggle to distinguish between the effects of repayment flexibility on ex-ante project choices of borrowers (ex-ante moral hazard) and their ex-post decision to repay the loan or strategically default (ex-post moral hazard). Empirical evidence suggests that ex-post moral hazard plays an important role in rigid repayment contracts (Breza 2014; Karlan and Zinman 2009).

We present the first causal evidence on ex-post moral hazard under flexible repayment conditions, and compare it to that under rigid repayment. Using a lab-in-the-field experiment with 645 microcredit borrowers in the Philippines, we study how flexibility (the ability to defer repayments and make up for them later) affects individual loan repayment choices in individual and group loans. Group loans are characterized by joint liability for repayment and the possibility to show disapproval through peer punishment. We find that flexibility increases strategic defaults by 50 percent (16 percentage points) in both types of loans. Flexibility reduces peer punishment – both when it is used to insure income shocks, and when it is used absent any shocks. This suggests that flexibility may increase ex-post moral hazard by reducing social pressure. Our results are consistent with a social norm which is brought in from the outside, and reflected in peer punishment patterns. We illustrate

[1]'Flexible repayment' has been used in the literature to refer to various repayment structures that diverge from rigid weekly repayments starting immediately after loan disbursal. For instance, Field et al. (2013) study a two-months grace period at the beginning of the loan, while Barboni and Agarwal (2018) study a three-month repayment holiday that requires a one-month notice period. Throughout this paper, we use 'repayment flexibility' for contracts which allow *discretion* in when to repay, and thus enable the borrower to condition repayments on shock realizations (see e.g. Battaglia et al. (2019) and Czura (2015a)).

this hypothesis using a theory framework of microcredit repayment in the presence of installment-based social norms. We provide additional evidence from an incentivized norm elicitation experiment.

Our lab-in-the-field setting is particularly suitable to answer our research question: It allows us to vary repayment flexibility as well as peer punishment possibilities (through the liability structure) in a controlled environment, while maintaining a close connection to the field. This has several advantages: First, we can disentangle repayment capacity from the choice to repay, and thus cleanly identify ex-post moral hazard. Second, we can measure social pressure in an incentive-compatible way through costly punishment choices.[2] The ability to observe punishment when shocks are fully visible to peers allows us to speak to recent concerns about excessive social pressure in microcredit.[3] Third, we minimize the distance to borrowers' natural environment: Experimental sessions are run with borrowing peers in existing microcredit centers in their weekly meeting locations. Repayment decisions are framed using terminology from real lending contracts. This field context allows us to build upon the experience and the existing social capital which prevail in the centers.

We implement a microcredit repayment game with stochastic income. In flexible repayment treatments, participants have the option to defer individual repayment installments, and make up for them later. In contrast to other types of flexibility (see footnote 1), this discretion allows borrowers to condition repayments on the realization of income shocks, and thus provides self-insurance against default. The downside of discretion in repayment timing is that borrowers can misuse it to increase early consumption. We cross-randomize flexible repayment conditions with individual liability (IL) or joint liability (JL), resulting in a 2×2 experimental design in which the availability of flexibility varies within, and the liability structure between participants. The cross-randomization allows us to study the relationship between ex-post moral hazard and flexibility across liability structures, which provides insights on mechanisms.[4] In our joint-liability treatments, we measure social pressure using an incentivized elicitation of costly peer punishment choices. We hypothesize that the interaction of repayment flexibility and social pressure is detrimental to repayment incentives (see mechanism section). In contrast, this interaction may be beneficial in case of shocks: Recent evidence shows that

[2] We use the strategy method to elicit all decisions. The strategy method elicits conditional decisions for different states of the world – here, the realization of income shocks. The strategy method was first introduced by Selten (1967). Brandts and Charness (2011) review 29 comparisons of the strategy method with the direct-response method, and find that treatment effects observed with the strategy method are in all cases also observed with the direct method. In contrast, results from the strategy method constitute a conservative lower bound for emotionally-motivated outcomes, such as punishment.

[3] A large body of qualitative evidence comes from anthropological case studies: Montgomery (1996), Rahman (1999), and Karim (2008) report cases of drastic social pressure on defaulting borrowers, such as verbal harassment, shaming in public, raiding of houses to confiscate assets for sale to cover the loan installments, or stripping down the defaulter's house completely. Czura (2015b) quantifies excessive peer punishment in a lab-in-the-field environment with microcredit borrowers in rural India.

[4] It also relates our findings more directly to the existing evidence on flexible microcredit, which uses both individual- and joint-liability contracts. Field and Pande (2008) study joint-liability group loans; Field et al. (2013) study individual-liability group loans; Battaglia et al. (2019) as well study individual-liability group loans but only offer flexibility to clients with a good repayment record; Barboni and Agarwal (2018) study former borrowers in joint-liability group loans that have accumulated a good repayment history and are now promoted to receiving an individual-liability loan.

peer punishment is often excessive, both relative to game-theoretical predictions, and in the sense that non-repaying borrowers are punished even when shocks are perfectly observable (see footnote 3).

In our benchmark contracts with rigid repayment, we find that 66 percent of participants choose to fully repay their loan absent shocks. This holds in both individual- and joint-liability treatments, and despite the fact that loan repayment was designed to be monetarily unprofitable. Flexibility increases strategic default by 50 percent (16 percentage points). Further, we find high levels of peer punishment even when no deterrent effect is possible: 51 percent punish for non-repayment in case of observable shocks. Flexibility reduces peer punishment by around half – both when it is used to insure income shocks, and when it is misused to increase early consumption. This implies that punishment is reduced for strategic default: Defaulters face lower punishment if they defer installments before they default. However, our punishment results do not explain our repayment results since the stakes of the experimental punishment were small relative to the repayment stakes. Consistent with this, repayment rates are the same in individual- and joint-liability treatments, and decrease similarly with flexibility.

In light of our results, we discuss an understudied driving force in microcredit repayment: social norms. Through meeting and reciting pledges every week (see quote at the beginning of this paper), clients internalize what it means to be a 'good' borrower: to pay installments every week, and to discipline peers (Grameen Foundation 2010). Social norms are most commonly understood as a psychological cost for non-compliance (Bénabou and Tirole 2006; P. Fischer and Huddart 2008). Thus, social norms may compel borrowers to make installments, even if this is not strategically optimal in a monetary sense. Similarly, they may compel peers to punish excessively, e.g. for non-repayment in case of observable shocks. Norms, which may be induced by the lender, could help explain two recent puzzles in microfinance research: First, why repayment rates do not differ between individual- and joint liability contracts, especially when weekly group meetings are held constant (Attanasio et al. 2015; Giné and Karlan 2014). Second, why peer pressure appears to be excessive and sequentially irrational (Czura 2015b). In addition, and most relevant for our findings, if social norms refer to weekly installments (for example, because a social norm on the overall loan repayment is not practical to induce and maintain), the discretion introduced by repayment flexibility means that applying the norm may no longer be straightforward. In turn, uncertainty in socially prescribed behavior may lower incentives for repayment.

In our mechanism section, we present suggestive evidence for installment-based social norms. We start by showing theoretically how an exogenous social norm (e.g. induced by the lender) affects repayment incentives. To illustrate the basic mechanism, we focus on the case of individual liability. As in the experiment, we model flexibility as the option to postpone individual repayments. We derive theoretical predictions for the timing of repayment and the use of flexibility. These are then used to re-examine our empirical findings in more detail. In linking theory and experiment, we interpret the peer punishment we observe in our joint-liability treatments as a reflection of the prevailing social norms: Punishments are designed as costly incredible threats, and small in magnitude relative to the stakes of the repayment choices. They are thus unlikely to have any instrumental value. Instead, given our field setting within existing microfinance centers and our loaded framing, it is likely that our participants bring their norms to the lab.[5] To investigate the parallel between punishment and norms, we conduct an incentivized norm elicitation following Krupka and Weber (2013). In a small (N=44) sample of borrowers from the same lender, we find that social norms for repayment mirror the punishment patterns observed in our experiment: Default is rated less socially inappropriate, and with more dispersion in the ratings, if borrowers use flexibility to defer payments before they default. Our results suggest that flexibility may decrease repayment by creating uncertainty in the socially prescribed behavior.

Our study builds on and contributes to the literature in three ways. First, we present the first causal evidence on the effect of repayment flexibility on ex-post moral hazard. To the authors' knowledge, we are also the first to cleanly identify ex-post moral hazard in a flexible repayment setting. We contribute to a growing literature on flexible microcredit, which documents positive effects on investments, and mixed evidence on overall repayment: Field et al. (2013) study the effects of a grace period between loan disbursement and the start of the loan repayment and find increases in business profits at the expense of higher default. Barboni and Agarwal (2018) study advantageous selection *into* flexible repayment conditions. They offer borrowers a choice between a rigid and a flexible contract, where the latter allows for three-month repayment holidays (with one month advance notice), but carries a higher interest rate. They find that offering this contract leads to increased repayment rates and business revenues. Notably, neither of these studies give borrowers discretion on whether to repay at a given moment, and thus to condition repayments on shock realizations (see footnote 1). In contrast, Czura (2015a) examines repayment that allows for occasional skips. She finds suggestive evidence of increased investments, higher income, and higher defaults, though these are obfuscated by a crisis of the lender. Most recently, Battaglia et al. (2019) offer borrowers to delay up to two monthly repayments at any time. They find improved business outcomes and lower defaults, and argue that the insurance value of flexibility facilitates increased entrepreneurial risk taking.

Second, we are among the first papers to measure and quantify peer punishment in a microfinance context, and the first to study its interaction with the contract structure. While social capital is considered critical to high repayment rates in microcredit, standard models of group lending

[5] Social norms may induce punishment directly, if disciplining non-repaying borrowers is part of the norm. Alternatively – to the extent that this is possible using the strategy method – peers may be angered by repayment norm violations, and express this anger in the form of punishment (Akerlof 2016). Empirical evidence suggests that the strategy method is likely to reduce but not eliminate anger (Aina et al. 2018; Brandts and Charness 2011). Psychological game theory offers several rationales for anger-based punishment, including anger based on material outcomes (Aina et al. 2018), and anger based on others' intentions or types (Akerlof 2016; Battigalli et al. Forthcoming). Our peer punishment results are consistent with either a direct norm on punishment, or with a mix of outcome-based and intention-based anger.

universally predict zero punishment in equilibrium: The credible threat of social sanctions is enough (Armendáriz 1999; Besley and Coate 1995). On the other hand, a rich literature on coordination games documents that people frequently engage in costly and non-credible punishment (Fehr and Gächter 2000, 2002; Henrich et al. 2006, 2010; Masclet et al. 2003). Evidence on peer punishment in microfinance has been largely qualitative or anecdotal (see footnote 3). Czura (2015b) is the first to document and quantify excessive punishment in microfinance, relative to both game-theoretical and fairness-based benchmarks. We confirm and complement the findings of Czura (2015b) by showing how excessive peer pressure reacts to changes in repayment structure. Repayment flexibility allows borrowers to self-insure against shocks, and may thus reduce punishments.

Third, our study contributes to a growing literature on the importance of social norms, including norms for risk sharing in village economies (Jakiela and Ozier 2016), productivity in firms (Huck et al. 2012), or xenophobia (Bursztyn et al. 2019). We hypothesize that high-repayment equilibria in microcredit may be sustained by social norms, and that these norms may be lender-induced. We provide a theoretical framework showing that social norms can be an important determinant for repayment when dynamic incentives are weak (e.g. due to competition between lenders). While on a small sample, our incentivized norm elicitation is the first of its kind in microfinance.

The remainder of this paper is structured as follows: Section 2 describes the experimental design, the procedures, and the setting for our study. Section 3 outlines the empirical strategy. In Section 4, we present the main experimental results. Section 5 presents theoretical and empirical evidence for social norms. Section 6 discusses potential confounds and Section 7 concludes.

2 Experiment

2.1 Design

We design a microfinance repayment game to analyze ex-post moral hazard. We exogenously vary the liability structure and the availability of repayment flexibility in a 2×2 design: Individual vs. joint liability and flexibility vs. no flexibility.

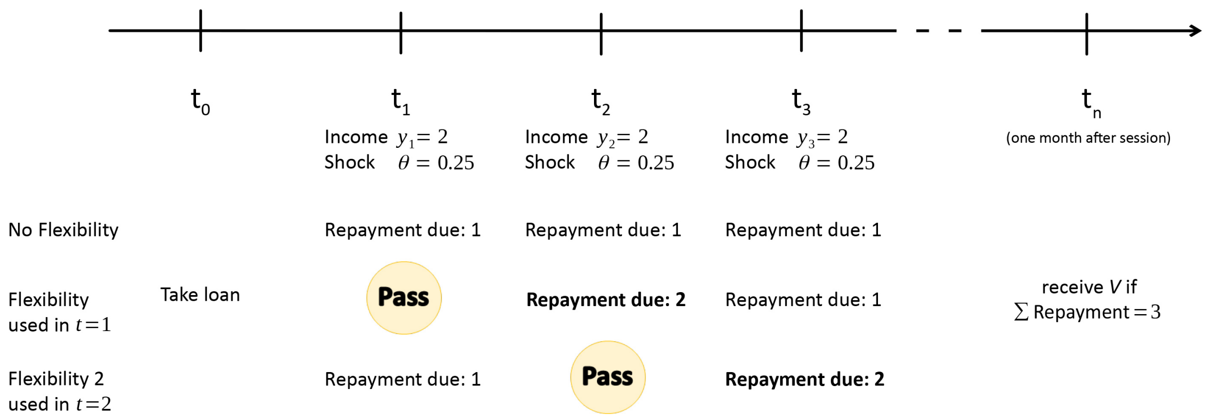
Individual liability (IL) The standard game models a simple credit repayment choice under risk over three periods. An individual takes out a loan which is automatically invested into a risky project and generates a per-period income of $y_t = 2R$ with probability $1-\theta$, and $y_t = 0$ with probability $\theta = 0.25$. The loan requires a repayment R in periods $t = 1,2,3$, where the total repayment of $3R$ covers both loan principal and interest, and is held constant throughout. In the experiment, each R is represented by one income token.

Each period, the individual makes a choice between two actions: make the required repayment R (and consume her remaining income R), or consume her entire income $2R$. The individual cannot save, so a choice to repay is conditional on not suffering an income shock in that period. When $y_t = 0$, neither repayment nor consumption is possible.[6]

A loan is considered to be in default after the first non-repayment, whether due to choice or bad luck, for the rest of the game. Repayment choices continue after any type of non-repayment. Repaying the loan in full yields a future benefit V, such as the utility from access to future loans, which we call the 'continuation value'. In the experiment, V is a payment of 100 pesos, paid in cash one month after the experimental sessions. In contrast, all experimental income allotted to consumption (income not spent on repayment nor lost to a shock) can be spent right after the session on a vast selection of consumption items. All consumption was paid out in kind (see procedures, Section 2.2), which captures the temptation of immediate consumption and prevents the use of experimental payouts for non-consumption purposes, such as loan repayment.

In the spirit of Jackson and Yariv (2014) and the shrinking pies in bargaining experiments (see Roth (1995) for a review), we induce discounting across periods by reducing the consumption value of income tokens: One token R is worth 40, 30, and 20 pesos in period 1, 2, and 3, respectively, implying that future repayments are discounted. Consequently, $3R$ from one period each are worth 90 pesos.[7] In the presence of income shocks, the expected payout from always repaying (and receiving V if no shocks arrive) is 129 pesos. The expected payout from default (non-repayment in all periods) is 135 pesos. A payoff-maximizing and risk-neutral individual should therefore choose to default.[8]

Figure 1: Experimental Design (IL and IL-flex)



[6]The severity of the shock excludes partial repayment choices within a period, which simplifies the design. Savings constraints are a standard assumption in microfinance games (Abbink et al. 2006; Giné et al. 2010) and have been well-documented empirically (see e.g. Bauer et al. (2012) on present bias and Baland et al. (2011) on financial pressure from relatives or friends).

[7]The exchange rate in March 2016 was 51 PHP per EUR. Average daily income in our sample was about 200 PHP.

[8]Adding risk aversion as well as any temporal discounting between the session and the payment of V one month later would further increase the appeal of default.

Individual liability and flexibility (IL-flex) The purpose of repayment flexibility is to allow borrowers to insure their repayment against income shocks and secure a good record with the lender. We design flexibility as the option to defer a repayment installment to the next period. This option is represented by a pass token that sets the repayment obligation for the current period to zero, but requires a double repayment in the subsequent period. By using the pass token when an income shock arrives, borrowers can prevent default, relative to the rigid repayment required in IL. Each borrower receives one pass token, which can be used in period 1, in period 2, or not at all (see Figure 1 and Figure D.4). Flexibility cannot be used in period 3, which serves as a catch-up period for repayments from period 2.[9]

Failure to make a double repayment results in default, as do shocks once the pass token has been used. It is not possible (or not cost-effective) for the lender to observe shocks, which means borrowers can use flexibility independent of shock arrival. Rather than self-insure against an idiosyncratic shock, the borrower may choose to misuse flexibility to increase early consumption by delaying payment until the next period. It is tempting to do so: Immediate consumption increases by R, while the future loss is $\delta(1-\theta)R$, where δ captures the experimentally induced reduction of R's purchasing power over time. This creates a trade-off in period 1: Using the pass token in period 1 means that it cannot be used to insure shocks in period 2. The probability of a shock-induced default increases from θ (period 3 shock) to $\theta+(1-\theta)\theta$ (shock in periods 2 or 3). In contrast, there is no trade-off to flexibility use in period 2, and thus it becomes monetarily dominant.

Joint liability (JL) We model joint liability as a two-person borrowing group that is jointly responsible for repaying $2R$ in each period. Joint liability is enforced automatically in case of non-repayment of any member of the borrowing group. The repayment choice becomes a coordination game: Borrowers simultaneously choose whether to repay or not. If they choose to repay, but their partner does not, they automatically repay for their partner as well.[10] The bank does not distinguish between the source of repayment: As long as $2R$ is repaid in each period, both borrowers will receive V.

A measure of peer pressure is introduced via the possibility to send punishment points (framed as 'dislike' tokens) to one's partner. Punishment decisions are elicited using the strategy method (see footnotes 2 and 5): Participants choose punishments for all possible single-period actions

[9] The design focuses on the key consumption vs. insurance trade-off from giving borrowers the ability to ad-hoc postpone repayments. Three periods and one pass token are the minimum required to do this. The assumption that shocks in period 3 are not insurable scales the expected benefit of repayment by $(1-\theta)$. Since this holds across treatments, it does not affect the game dynamics.

[10] These design choices are commonly used simplifications in a microfinance lab experiment (Abbink et al. 2006; Cassar et al. 2007). First, the reduction of the usual five-person group to two persons makes strategic considerations regarding partner's choices easier. This sacrifices the risk-sharing potential of larger groups, in which risks are diversified and more borrowers can offer mutual insurance. Second, automatic enforcement of joint liability reduces the decision space, which is important to focus on repayment choices and ex-post moral hazard. Finally, it is a realistic representation of how microfinance institutions put joint liability into practice. For example, our partner organization instructs the loan officer to extend the weekly group meeting until all repayments are made.

of their partner, conditional on the arrival of shocks (in *JL*: Repay, Don't repay, Don't repay (shock)).[11] Participants can choose between allocating zero, one or two punishment points. Each point costs the sender five pesos of her show-up fee, and reduces the receiver's show-up fee by 15 pesos. Figure D.6 illustrates the setup for the case of flexibility. Because partners learn whether they were punished only after making their own repayment decisions, all punishments are incredible threats. In addition to these incentivized measures for repayment and punishment, we ask for (non-incentivized) beliefs of the partner's repayment and punishment choices.

Joint liability and flexibility (JL-flex) We examine the interaction of joint liability and flexibility in a two-person borrowing group, where both partners have one pass token and can defer one repayment installment to the next period (see Figure D.5). Borrowers can now choose between self-insurance and mutual insurance when a shock arrives. Mutual insurance may be associated with significant peer punishment, even when the borrower is mechanically unable to repay (Czura 2015b). If peers punish when they have to repay for their partner, self-insurance through repayment flexibility potentially avoids this punishment, but comes at the cost of making a double repayment in the next period.

By design, mutual insurance and self-insurance through flexibility largely crowd each other out: In a period when a borrower uses the pass token, her repayment obligation is reduced to zero. She cannot simultaneously insure her partner's repayment (for instance, because this would reveal to the lender that she does not have a shock). In the next period, the borrower needs her full income for her own double repayment, which again leaves no scope for insuring her partner. In addition, if she faces a shock when the double repayment is due, her partner cannot insure her, since the group repayment obligation $3R$ exceeds the group income $2R$. In contrast to the *IL-flex* treatment, there is a cost to using flexibility even in period 2: A shock in period 3 would result in group default instead of just individual default. While our design is stylized, flexibility may partially crowd out mutual insurance in real lending groups: In the presence of savings constraints, allowing borrowers to bunch repayment installments together puts added pressure on the current period's income, which decreases their capacity to insure others.[12]

As in the *JL* treatment, incentivized punishment decisions are elicited for each single-period action of the partner (which now include flexibility use and its repayment), and conditional on the arrival of shocks. In addition, we ask for (non-incentivized) beliefs about the partner's use of flexibility.

[11] Once adding flexibility, there are six possible actions within a single period (see Figure 4). While it would have been more realistic to condition punishments on past repayment history and shock realizations, or to allow punishments every period, the dimensionality of this would have been prohibitive in our experimental setting. Our single-period punishments can be used to calculate the expected level of punishment for any three-period strategy, see Section 4.3.

[12] Compare also G. Fischer and Ghatak (2016), who show theoretically that small and frequent repayments are more incentive-compatible for present-biased borrowers than allowing them to delay and bunch installments. In our setting, present bias of participants would not affect choices between periods (consumption is realized at the end of the session), but would merely rescale the value of V (which is paid one month later). Instead, present bias is one way to microfound the savings constraints which are built into our design.

2.2 Procedures

We use a mixture of a within- and between-subject design. We first randomize the liability structure at the session level, and then vary flexibility treatments within individuals: IL-Sessions run *IL* and *IL-flex* treatments, while JL-Sessions run *IL*, *JL* and *JL-flex* treatments. While *IL* is run in both session types to facilitate comparisons, time constraints made it impractical to run all four treatments in the same session. For similar reasons and to facilitate comprehension, we do not vary the order of treatments, but allow them to naturally build upon each other. Section 6 discusses the consistency of our findings with the presence of order effects between the treatments.

Throughout the experiment, we use the strategy method (see footnote 2) to elicit decisions. Borrowers state their repayment choices and use of flexibility conditional on the arrival of income shocks. For instance, Figure D.4 illustrates the decisions in *IL-flex* when income shocks are possible ex ante but do not arrive ex post. Due to the automatic enforcement assumption, the elicitation of choices is largely identical in *IL* and *JL* treatments (compare Figures D.4 and D.5). The key difference is in payoffs: A decision to repay costs either one or two income tokens, depending on the unknown repayment choice of an anonymous partner in the session. The repayment decision can thus be understood as a signal of repayment capacity, in which case the borrower is held liable for her partner's repayment. At the end of the session, we randomly select one of the treatments to be paid out. Participants realize the shocks themselves by drawing chips from a black bag, which contains one shock chip and three non-shock chips (capturing $\theta = 0.25$). In *JL* conditions, they are randomly and anonymously matched with a partner from the same session to calculate payoffs. Punishment is implemented for one randomly selected period, based on repayment choices and the shock realization.

The general setup of the microfinance repayment game was explained extensively using flip chart graphics, test questions, and a practice round including shock realizations. We used loaded framing, referring explicitly to loan repayment and consumption, explained the individual idiosyncratic shock as a thief that steals all of that period's income, and introduced flexibility as a pass token (the concept of passing was known from card games). Each of the treatments was explained in the same manner and test questions were asked. If more than five participants failed a specific question, the explanation was repeated before final choices were made. Choices were noted in private by local research assistants using paper and pen.

Sessions lasted on average about three hours. After registration, participants completed a small individual survey covering incentivized measures of risk and time preferences over money, as well as survey questions regarding their borrowing group. We randomly allocated seating to the participants. Average earnings amounted to 202 pesos (roughly four euros), which equals approximately a daily wage for our sample population. There were three types of payments: First, the show-up fee of 70 pesos was paid in cash at the end of the session. It was reduced by any punishment activity (five [ten] pesos for sending one [two] punishment tokens and 15 pesos for each punishment token received; so a maximum of 40 pesos could be deducted). Second, the continuation value V was paid as 100 pesos in cash, handed out by a research assistant in the borrowing center one month after the session.[13] Third, the income tokens earned in the microcredit game could be traded for items from a consumption table (see Figure E.7), containing a variety of products such as sweets, food staples, household items and beauty products, offered at typical market prices. Participants were encouraged to familiarize themselves with the items before the start of the session with the help of a consumption catalog that displayed all items and their value, and all items were visible throughout the session.

2.3 Study Setting and Sample Recruitment

We conducted experimental sessions in 33 borrowing centers of the microfinance institution Ahon Sa Hirap (ASHI), across three provinces of the Philippines: Rizal, Laguna, and Antique. All clients are organized in groups of five borrowers. Each group is part of a borrowing center, consisting of two to eight groups, in which weekly repayment meetings take place. Of the 33 centers, 27 centers (covering 82 percent of our participants) offer joint-liability loans for general business activities. Joint liability is enforced both within the borrowing groups, and between groups on the center level. The remaining six centers – all in the more rural Antique province – offer loans with individual liability for agricultural production. Despite this variation, all clients attend weekly group repayment meetings in their center. Joint-liability loans are repaid over 25, 50 or 100 weeks. Individual-liability agricultural clients service only interest payments on a weekly basis, and reimburse the principal at harvest time (up to six months after loan disbursal, depending on the crop cycle). Loan sizes range from 2,000 to 100,000 pesos, and average 14,350 pesos (281 EUR) for the most recent loan. The typical annual interest rate is 46 percent.

Importantly for the interpretation of our results, the lender takes various measures to encourage social capital and instill a strong culture of repayment: Borrowers select their own peers, and loan applications have to be approved by fellow group members. Borrowers and loan officers jointly recite a pledge at every weekly meeting (similar to the Grameen pledge quoted at the start of this paper), in which they promise to faithfully make their repayment installments and support each other. In addition to the weekly meetings, social activities are organized at the center level to build solidarity between borrowers.

In cooperation with our partner organization, we identified ASHI borrowing centers with at least 20 borrowers and a center meeting hall with seating. We obtained the exhaustive member list for these centers, and randomly selected 20 members to be invited for participation; five members

[13] At the time of the session, participants received a voucher to confirm this payment. Trust is unlikely to be a significant concern, since the research team benefited from the long-standing reputation of the lender as well as the lender's regular weekly interactions with the borrowers.

Table 1: Borrower Characteristics (administrative data)

Variable	Total	Means IL-Session	JL-Session	Difference IL vs. JL
	(1)	(2)	(3)	(4)
Female	0.931	0.954	0.907	-0.046
	(0.254)	(0.210)	(0.290)	(0.483)
Age	46.546	46.606	46.483	-0.122
	(11.745)	(12.180)	(11.299)	(0.944)
Probability of living below NPL	45.218	47.213	43.142	-4.071
	(31.591)	(32.666)	(30.353)	(0.500)
Electricity	0.802	0.783	0.821	0.038
	(0.399)	(0.413)	(0.384)	(0.659)
Tap Water	0.230	0.181	0.278	0.097
	(0.421)	(0.386)	(0.449)	(0.321)
Landline Phone	0.022	0.028	0.016	-0.012
	(0.147)	(0.166)	(0.125)	(0.512)
Education: Secondary graduate	0.506	0.473	0.541	0.067
	(0.500)	(0.500)	(0.499)	(0.362)
Loan Amount in PHP 1000	14.350	13.765	14.963	1.198
	(11.087)	(10.156)	(11.974)	(0.438)
Main income: Enterprise	0.466	0.463	0.469	0.007
	(0.499)	(0.500)	(0.500)	(0.955)
Main income: Farming	0.261	0.242	0.278	0.035
	(0.439)	(0.429)	(0.449)	(0.806)
Iron Roof	0.754	0.715	0.794	0.079
	(0.431)	(0.452)	(0.405)	(0.363)
IL-loan center	0.179	0.174	0.184	0.010
	(0.383)	(0.380)	(0.388)	(0.942)
Observations	577	305	272	577

Notes: The table presents means and standard deviations in parentheses for administrative variables. NPL refers to the national poverty line. All variables except age, probability of living below NPL, and loan amount are binary. Column (4) reports differences and p-values in parentheses from regressions with standard errors clustered at the session level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

were invited as back-up. Invitation letters were handed out one week in advance during the center meeting. Sessions took place in the center meeting hall on different days than the weekly meetings. Participation was voluntary, and participants were assured that their choices in the experiment would not be revealed to the lender.

In total, 645 participants took part in 33 sessions (one per center) in March and April 2016. Our main analysis sample consists of 577 participants: three participants left after the intake survey, the decisions of 37 participants cannot be analyzed due to enumerator errors in recording answers, and 28 participants did not pass our comprehension test.[14] Table 1 presents background characteristics of our participants, and shows that session type (IL vs. JL) is balanced on observables. Our sample is predominantly female, and on average 47 years old. Around half have completed secondary school.

[14] We excluded participants from our main analysis if less than 75 percent of test questions overall or 50 percent of the test questions from any one treatment were answered correctly. This exclusion does not affect our results (see Section 6).

The main sources of household income are own non-farm businesses (47 percent) and farming (26 percent). Forty-five percent of our sample households live below the national poverty line (national average: 21 percent), as measured by the PPI index. Eighty percent are connected to the electricity grid, 23 percent to piped water, and two percent to the landline telephone grid. Three-quarters live in a house with an iron roof (as opposed to a palm roof).

3 Empirical Strategy

A key advantage of our lab-in-the-field experiment is that we can observe repayment choices separately from realized outcomes. Given our focus on ex-post moral hazard, our analysis focuses on individual choices in response to contract design features. In particular, we examine choice data regarding loan repayment, the use of flexibility, and peer punishment in detail.

Overall Loan Repayment We identify ex-post moral hazard as the fraction of participants who fails to repay their loan in the absence of income shocks, i.e. despite being fully capable to repay. To do so, we follow individuals' repayment choices along the *no-shock path*: In each period, participants choose to repay or not, conditional on not suffering a shock in the current period, but without knowing whether shocks will arrive in the future. The no-shock path refers to the path of the game tree where shocks are possible ex-ante, but do not arrive ex-post. This is a useful concept for analysis purposes: Since no shocks arrive, the borrower is able to repay in all periods, and any failure to do so must be the result of moral hazard. Conversely, full repayment of the loan indicates that no moral hazard is present.[15] Our main outcome of interest is a binary indicator for full repayment – meaning the individual either repays every period, or uses flexibility and then repays.[16] To make treatments comparable, we apply this variable definition to choices in both individual- and joint-liability conditions, and abstract from group repayment outcomes. We estimate the effect of flexibility on repayment using a linear probability model by regressing

$$Repay_{its} = \alpha + \beta_F flexible_t + \lambda_s + \epsilon_{its} \tag{1}$$

where $Repay_{its}$ is an indicator for full repayment of individual i in treatment t in session s, and $flexible_t$ switches on for treatments with flexible repayment conditions (*IL-flex* or *JL-flex*). Repayment regressions use within-individual variation in flexibility, and are run separately by session type: We compare choices in treatments $t = \{IL, IL\text{-}flex\}$ in IL-Sessions, and $t = \{JL, JL\text{-}flex\}$ in JL-Sessions. The

[15] The concept of the no-shock path has no bearing on the way choices were incentivized (see Section 2.3 for experimental procedures).

[16] In individual-liability conditions, this is equivalent to the repayment of three income tokens. In joint-liability conditions, full repayment costs between three and six income tokens, given the automatic enforcement of joint liability (see Figure D.5). This cost is not known when the decision is made.

coefficient β_F thus estimates the effect of flexible repayment for a given liability structure. We include session fixed effects λ_s and cluster errors ϵ_{its} at the level of the individual. We additionally estimate the effect of joint liability on repayment by running

$$Repay_{its} = \alpha + \beta_L joint_t + \lambda_s + \epsilon_{its} \tag{2}$$

for treatments $t = \{IL, JL\}$, using the within-individual variation in liability structure contained in JL-Sessions. The indicator $joint_t$ is equal to one if treatment $t = JL$ and zero otherwise, other variables are as defined above.

Use of Flexibility We further study the effect of the liability structure on the use of flexibility, i.e. the choice to defer payments. Liability structure was randomized between sessions, leading to a between-subject design that compares the *IL-flex* and *JL-flex* treatments. Two distinctions are necessary: Flexibility can be used in case of shocks or absent shocks, and it can be used earlier (period 1, thus foregoing insurance) or later (period 2). We index the resulting four scenarios by $c = \{$*T1 no shock, T1 shock, T2 no shock, T2 shock*$\}$, and create a binary indicator $Flexuse^c$ for whether a participant chooses to use flexibility in a given scenario. We use a linear probability model to estimate

$$Flexuse^c_{its} = \alpha + \beta^c_U joint_t + \epsilon^c_{its} \tag{3}$$

where $Flexuse^c_{its}$ is a binary indicator for flexibility use in scenario c by individual i in treatment t in session s. The indicator $joint_t$ now switches on for treatment $t =$ *JL-flex* (the omitted category is *IL-flex)*, and β_U is the effect of the liability structure on the use of flexibility. For flexibility use in period 2, we restrict the analysis to the sample of participants who can still use flexibility at this point, i.e. who have not already used it in period 1. Due to the selection problem in conditioning on an endogenous variable, estimates for flexibility use in period 2 should be interpreted as correlational evidence only. Finally, since liability was randomized between sessions, we cluster errors ϵ^c_{its} at the session level, resulting in 33 clusters.

Punishment Our two joint-liability treatments, *JL* and *JL-flex*, allow for peer punishment. We analyze punishment for repayment and flexibility choices, conditional on shock realizations. Since flexible repayment expands the choice set, we create pairs of choices in the two treatments, matched on i) whether a shock occurs (equivalently, repayment capacity) and ii) the amount repaid. For instance, we compare punishment for non-repayment following a shock, when *JL* leaves borrowers only the choice to rely on mutual insurance, while *JL-flex* provides a choice between mutual insurance and self-insurance via flexibility. Thus, for each choice pair within a given shock-repayment scenario, we run OLS on

$$Punish_{its} = \alpha + \beta_P flexible_t + \lambda_s + \epsilon_{its} \tag{4}$$

where $Punish_{its}$ denotes the level of punishment by individual i in treatment t in session s. For a given choice of the partner, the level of punishment is the number of punishment tokens chosen (0, 1, or 2). We express punishment as a proportion $[0,1]$ of the maximum possible punishment to facilitate later comparisons with our norm elicitation study. The treatment variable $flexible_t$ is an indicator for treatment $t =$ *JL-flex* (the omitted category is *JL*), and β_P is the effect of flexible repayment on punishment for a given choice combination. As in previous specifications using within-individual variation in flexibility, we include session fixed effects λ_s and cluster errors ϵ_{its} at the level of the individual.

4 Results

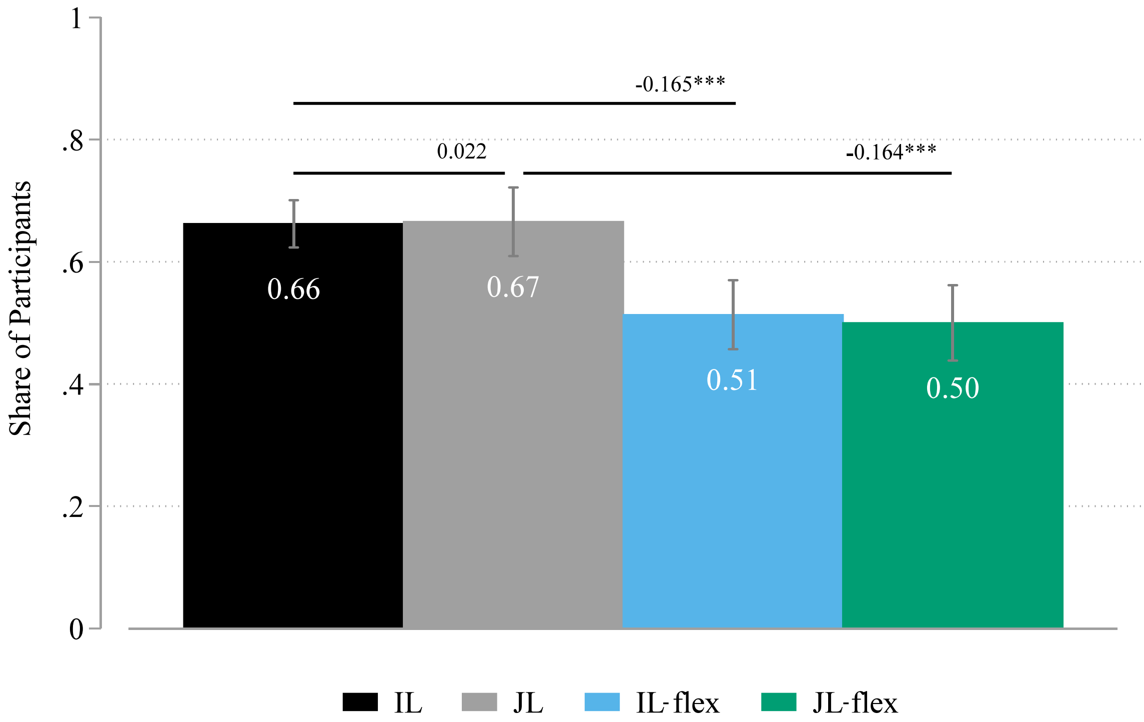
4.1 Overall Loan Repayment

Overall, repayment rates are high: In all treatments, more than 50 percent of participants repay, despite the fact that repayment was designed to be monetarily unprofitable (see Section 2.1). Flexibility has a substantial impact on repayment behavior: *IL-flex* reduces repayment by 16.5 percentage points relative to *IL*. Equivalently, strategic default increases by 46 percent. Numbers are similar with joint liability: Looking at individual choice data, *JL-flex* reduces repayment by 16.4 percentage points relative to *JL*, equivalent to an 58 percent increase in strategic default on the overall loan (when evaluated at the individual level). We find no significant difference across liability structures, neither with nor without flexibility. In *IL* and *JL*, 66.2 and 66.5 percent of participants fully repay their loan, whereas in *IL-flex* and *JL-flex*, 51.3 and 50.0 percent do so. The group features in the joint liability setting – mutual insurance and peer punishment – do not appear to influence individual repayment choices on average. We summarize these findings in Result 1.

Result 1. Repayment rates are high relative to monetary incentives, and do not differ across liability structure. Flexibility increases strategic default by 16 percentage points (50 percent).

The high share of borrowers choosing to repay in all three periods in our lab-in-the-field experiment is consistent with the near-complete repayment rates that the partner institution reports for its borrowers: In the years 2014-2018, the repayment rate was always at least 96%. Our finding that flexibility lowers repayment is in line with Field et al. (2013), who find higher defaults with a grace period. It stands in contrast to Barboni and Agarwal (2018) and Battaglia et al. (2019), who find

Figure 2: Individual Full Repayment



Notes: Binary indicator for full repayment. Coefficients from OLS regressions with session fixed effects and standard errors clustered at the individual level (shown in Appendix Table A.1). ***p<0.01, **p<0.05, *p<0.10.

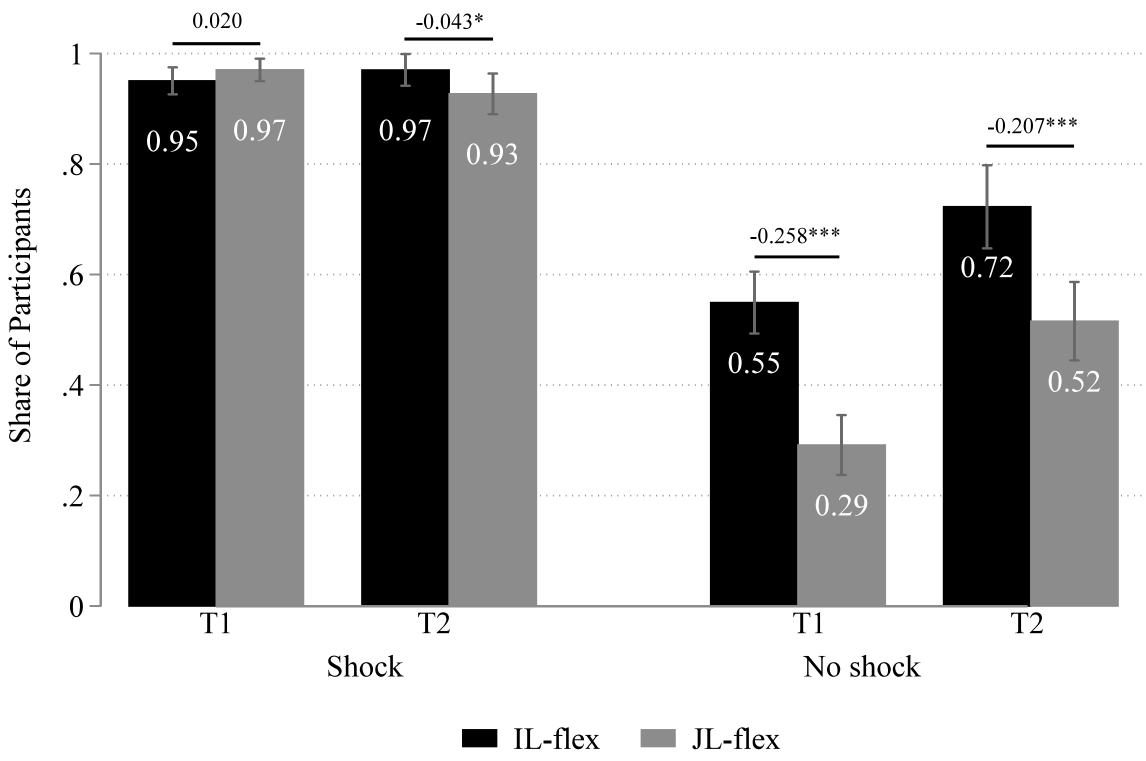
lower defaults with temporary repayment waivers. All three studies include endogenous project selection, and defaults that may be driven by shocks. We abstract from these and show that strategic defaults increase with flexibility. One way to reconcile these results is that different flexibility designs affect ex-ante project choice (and thus risk) in different ways. Our finding that the liability structure does not affect repayment is in line with Giné and Karlan (2014) and Attanasio et al. (2015), who find similar repayment rates in individual- and joint liability contracts in randomized field experiments.

4.2 Use of Flexibility

Each participant has one pass token, which allows her to postpone a repayment in period 1, period 2, or not at all. Borrowers can use this flexibility to insure their repayment capacity against an income shock (henceforth 'self-insure using flexibility'), but they can also misuse it to increase early consumption absent shocks.

Figure 3 shows whether participants use flexibility i) in case of a shock (left panel) and ii) in case of no shock (right panel) in a given period. In case of a shock in either period, we observe nearly universal use of flexibility, with no difference between the *IL-flex* and *JL-flex* treatments. This indicates that participants understand the insurance value of flexibility. For participants in *JL-flex*, we additionally infer that self-insurance against income shocks is widely preferred to mutual insurance by their borrowing peer. This is notable insofar as self-insurance through flexibility requires a double repayment in the next period, while mutual insurance does not.

Figure 3: Use of Flexibility



Notes: Share of participants who use flexibility. Using flexibility in T2 is conditional on still having it, i.e. not having used it in T1. Coefficients from four OLS regressions comparing the use of flexibility in the respective scenario, with *IL-flex* as the reference category and standard errors clustered at session level (shown in Table A.2). *** p<0.01, ** p<0.05, * p<0.1.

We also observe substantial use of flexibility absent shocks: Summing across periods, 88 percent of participants in *IL-flex* and 66 percent of participants in *JL-flex* misuse flexibility when no shocks arrive. Participants in *IL-flex* face a trade-off in period 1 between early consumption and self-insurance of shocks in period 2. Once period 2 arrives without shocks, flexibility use is monetarily dominant (see the caveat on non-monetary penalties in Section 5.2). In line with these incentives, flexibility use increases from 55 percent in period 1 to 72 percent in period 2 in *IL-flex*, conditional on not having used it previously (Figure 3). In *JL-flex*, using flexibility has the added cost of eliminating mutual insurance possibilities in the current and the next period. Consistent with these additive costs, joint liability significantly reduces flexibility misuse to 29 percent in period 1 and 52 percent in period 2. Given the crowd-out between self-insurance and mutual insurance, do peers attempt to coordinate their use of flexibility? Using (non-incentivized) beliefs about partner's behavior, we find that participants' use of flexibility correlates with their belief that their partner will use flexibility, both in the case of shocks (Spearman's ρ=0.137, p=0.010) and without (Spearman's ρ=0.279, p<0.001)). This suggests coordination in the use of flexibility. Result 2 summarizes our findings.

Result 2. Flexibility is used to insure income shocks. However, there is substantial misuse of flexibility to increase early consumption, especially in individual-liability contracts. Joint liability halves the misuse in period 1, when the insurance value of flexibility is largest.

4.3 Peer Punishment

The strategy method provides us with punishment choices for each action the partner can take (see Figure D.6). We first discuss punishment for single-period actions. Because borrowers plausibly choose three-period strategies rather than independent actions, we subsequently calculate the expected level of punishment for key three-period strategies, internalizing the risk of shocks.

Single-Period Punishment To facilitate later comparisons with our norm elicitation, we report punishment levels in shares of the maximum possible punishment (two tokens). Punishment is widely used. Figure 4 shows that non-repayment absent shocks is punished with 61 (60) percent in *JL* (*JL-flex*). In *JL*, we also find high levels of punishment (38 percent) when the partner cannot repay due to a shock. Since shocks are fully observable and make it impossible to repay, this result reflects recent concerns about excessive or anti-social peer pressure in microfinance (we discuss this further in Section 5.1). Surprisingly, even repayment actions receive non-zero punishment levels (14 and 9 percent, respectively), potentially to uphold a general sense of pressure.

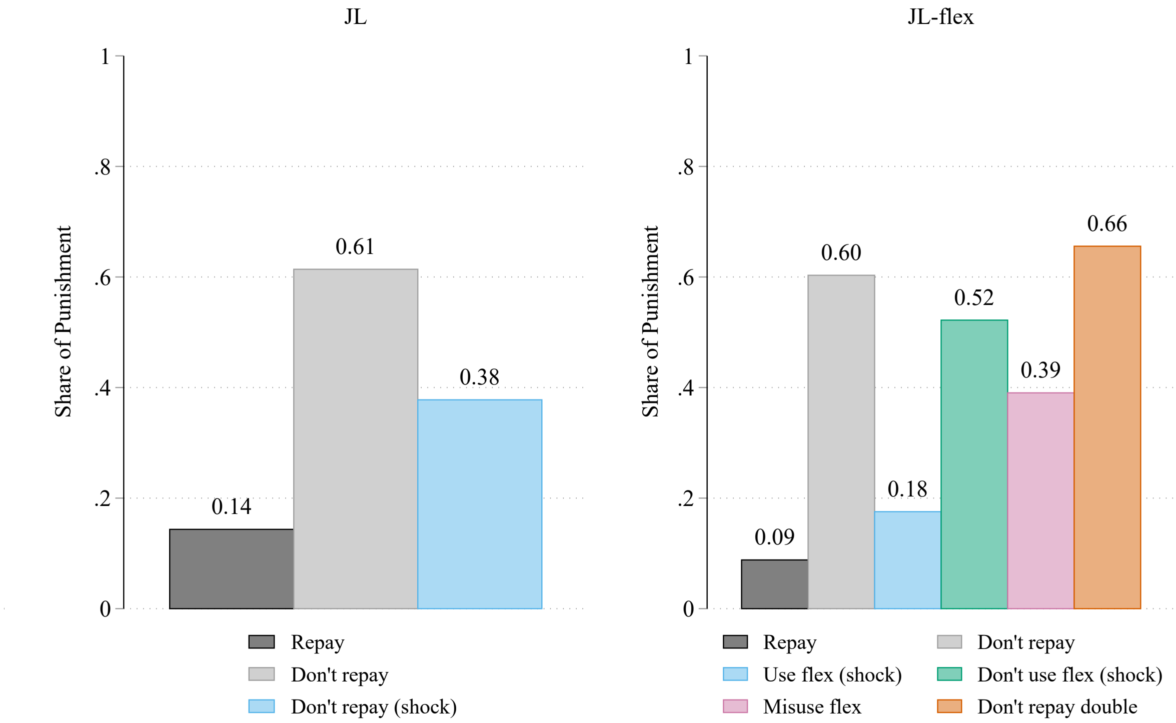
Flexibility gives rise to additional actions. When hit by a shock, participants can either self-insure by using their pass token, or rely on their partner to repay. Punishment for these two cases is shown in the middle two bars of the right panel in Figure 4. Using flexibility reduces the level of punishment by 20 percentage points (53 percent), as compared to punishment for a shock in *JL*.[17] In contrast, relying on one's partner to insure shocks (and not using flexibility) increases the level of punishment by 14 percentage points (37 percent) as compared to punishment for a shock in *JL*.[18] This behavior indicates that self-insurance through flexibility is clearly preferred over relying on the partner to repay.

Absent shocks, flexibility provides a way to reduce the punishment for defaulting on one's loan: The right panel of Figure 4 reveals that misuse of flexibility is punished less (39 percent) than simply defaulting on an installment (60 percent), despite the fact that no repayment occurs in either case. This is not compensated by a significantly higher punishment for defaulting on the subsequent

[17]Regression results for both level and incidence of punishment are shown in Panel B of Table A.3.

[18]For implementation reasons, we were not able to distinguish situations by whether the pass token is still available but not used, or no longer available. Thus, 'Don't use flex (shock)' refers to any situation in *JL-flex* where a shock hits and flexibility is not used.

Figure 4: Level of Punishment (single-period actions)



Notes: Share of punishment: punishment choice relative to the maximum possible punishment (two tokens). Punishment choices are conditional on partner's action and shock arrival as indicated.

double installment (66 percent). Columns 4 and 8 of Table A.3, Panel A, confirm that neither the level nor the incidence of punishment increase significantly when comparing single-installment to double-installment default. Ceiling effects may play some role, but cannot fully explain this phenomenon: Recall that participants assigned either zero, one, or two punishment points for a given action of their partner. Single-installment default is punished with zero (12 percent), or one point (56 percent), which means that a majority is able to increase the punishment for double-installment default if they want to. Only 19 percent of participants punish with two points for both single- and double-installment default (i.e. the punishment maximum is binding), while 36 percent punish both with one point.

Expected Punishment for Strategies Arguments such as the one on strategic default above are better illustrated using the expected punishment that a borrower faces when choosing her overall strategy across all three periods. Recall that punishment was paid out for a random period. The expected punishment for a strategy is the average punishment over all one-period actions in it, where each action is weighted by the probability that the action is applicable (which depends on the arrival of shocks). Appendix C provides further details on the calculation.

In line with our analysis of overall repayment, we focus on strategies which lead to either full repayment or no repayment on the no-shock path.[19] In the *JL* condition, this leads to two strategies: Repay all installments (denoted *RRR*), or default on all installments (*DDD*). In the *JL-flex* condition, participants who wish to repay have three main strategies at their disposal (note that *F* refers to flexibility use, and R_2 refers to a subsequent double repayment): They can repay every period (*RRR*), they can misuse flexibility in period 1 (FR_2R, thus foregoing shock insurance in period 2), or they can misuse flexibility in period 2 (RFR_2). In all three full-repayment strategies, we assume that flexibility is used *in case of shocks* (consistent with the results in Section 4.2). On the opposite extreme, participants may choose to default on the overall loan by not making any repayments (*DDD*). To provide a benchmark and allow comparisons to the *JL* condition, this strategy assumes that flexibility is not used in any state of the world. Finally, we consider a strategy that is monetarily equivalent to straight default, but socially more sophisticated: Participants hide their plan to default by using flexibility in the first period (regardless of shock arrival), and default on all installments starting in period 2 (*FDD*).

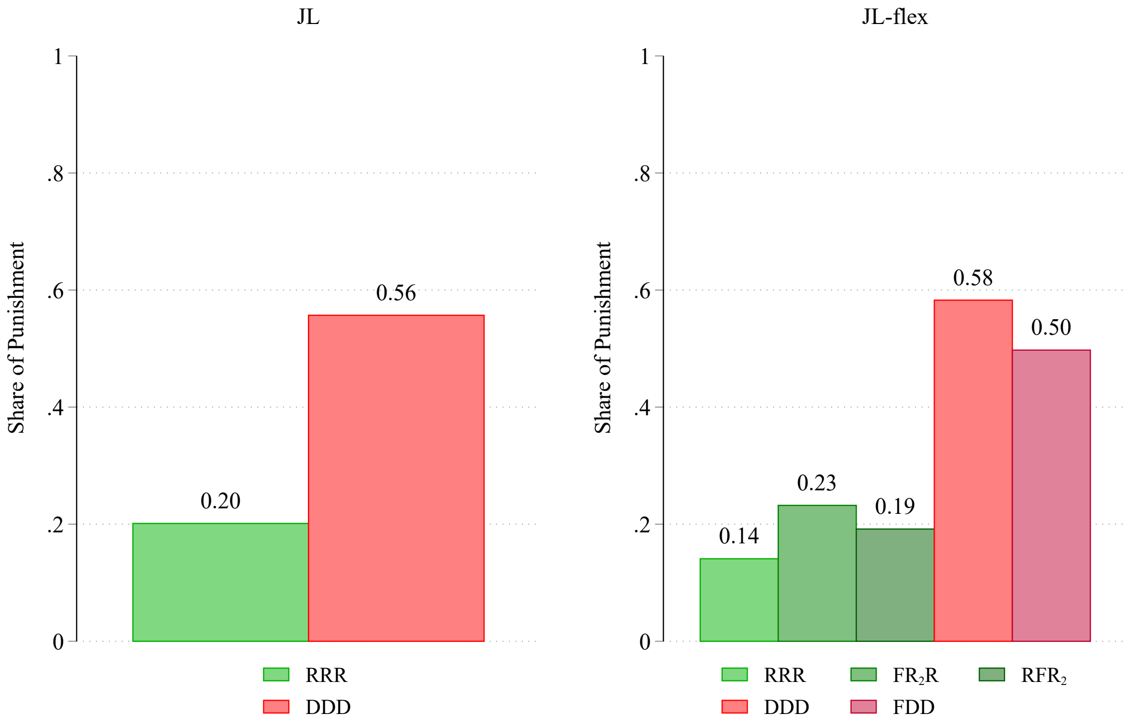
Figure 5 shows the expected punishment for these strategies. Consistent with the intuition from the single-period punishment discussion, we find that flexibility reduces excessive punishment for those who choose to repay: Participants can self-insure income shocks, and thus suffer fewer penalties from having to rely on their partner. The expected punishment for *RRR* is reduced by 30 percent, though this difference is not statistically significant ($p = 0.107$, Wilcoxon signed-rank test comparing *RRR* in *JL* vs. *JL-flex*). Misusing flexibility comes at a cost, which increases in its foregone insurance value: Misuse in period 1 is punished 21 percent more than misuse in period 2 ($p < 0.001$, Wilcoxon signed-rank test comparing FR_2R vs. RFR_2). Finally, we observe that flexibility can reduce the expected punishment for strategic default on the overall loan: Borrowers who plan to default can dodge 15 percent of the punishment by first using flexibility to postpone repayments ($p < 0.001$, Wilcoxon signed-rank test comparing *DDD* vs. *FDD* within *JL-flex*). Result 3 summarizes our findings:

Result 3. Flexibility reduces the punishment for missing installments due to shocks (excessive punishment) by half, and thus the punishment of borrowers who repay their loan and use flexibility responsibly. However, flexibility also reduces the expected punishment for strategic default.

It is difficult to rationalize the observed levels of punishment with expected payoff maximization. Punishment is costly, and not credible in the sense that punishment decisions are revealed only after repayment choices have been made (see Section 2.1). However, non-credible punishment is frequently observed in the literature (Fehr and Gächter 2000, 2002; Henrich et al. 2006, 2010; Masclet et al. 2003). There is broad consensus that peer punishment depends on intentions for noncooperation (Charness and Levine 2007; Rand et al. 2015). Alternatively, Aina et al. (2018) highlight in a recent

[19]With three periods, eight states of the world depending on shock realizations, and between one and three possible actions per period and state, it is impractical to document the expected punishment level for all possible strategies.

Figure 5: Expected Punishment



Notes: The expected punishment for a strategy is the average punishment over all one-period actions, where each action is weighted by the probability that it is played. Strategy names refer to actions on the no-shock path: R is repayment, D is default, F is flexibility use, and R_2 is a double repayment following flexibility use.

contribution that unfulfilled expectations about material outcomes may cause frustration, and thus punishment that is based on outcomes rather than intentions. Peers' inferences about intentions or types may explain the punishment we observe for default or flexibility misuse, but it does not explain why peers punish for shock-induced non-repayment (see also Czura (2015b)). In contrast, outcome-based punishment may explain why peers punish when they have to repay for their partner, but it would predict the same level of punishment for all types of non-repayment, irrespective of shock arrival. Explaining the punishment patterns we observe with existing theories would thus require a mixture of intention-based and outcome-based frustration. An explanation based on anger and frustration is made less likely by our use of the strategy method, which is generally understood to produce a lower bound for emotionally motivated outcomes (Brandts and Charness 2011). We propose an alternative explanation in the following section: Our punishment patterns may reflect the existing social norms. Instead of having an instrumental or deterrent function, they may simply mirror participants' attitudes regarding socially desirable repayment behavior.[20]

[20]In their theory of injunctive norms, Kimbrough and Vostroknutov (2020) propose that punishment is driven by resentment of actions that violate norms.

5 Evidence for Social Norms

5.1 Social Norms and Microfinance

We hypothesize that lender-induced social norms may be an important missing puzzle piece in understanding the existing evidence on microfinance repayment. Many microfinance institutions, including our partner organization, put great emphasis on shaping the picture of a what constitutes a good borrower. A prominent illustration is that borrowers recite a pledge at the beginning of every meeting to pay all weekly installments, support each other, and help to maintain discipline within the group (Grameen Foundation (2010); also see the weekly joint oath discussed in Breza (2014)). Qualitative studies argue that borrower's repayment choice is driven by social norms and what is perceived as appropriate.[21] This is consistent with substantial default rates in mobile lending, which lacks the personal interactions that may be required to instill social norms (Kaffenberger et al. 2018).

The existence of social norms may reconcile several puzzles observed in microfinance research. First, empirical studies find no repayment differences between individual liability and joint liability (Attanasio et al. 2015; Giné and Karlan 2014), and speculate that social image concerns are sufficient to maintain the consistently high observed repayment rates (Giné and Karlan 2014). Notably, weekly group meetings are held constant across liability structures. Second, the reputation of microfinance group lending has long been tarnished with reports of excessive pressure and monitoring (Karim 2008; Montgomery 1996; Rahman 1999), culminating in the borrower suicides which led to the 2010 Andhra Pradesh microfinance crisis (studied e.g. in Breza and Kinnan (2018)). Czura (2015b) quantifies peer punishment in a lab-in-the-field experiment with microcredit borrowers in rural India. She confirms that borrowers punish excessively relative to both game-theoretical and fairness-related benchmarks, and speculates that borrowers have internalized the mission indoctrination of the microlender. Finally, a social norm that induces borrowers to make each weekly (or monthly) installment may explain why the introduction of repayment flexibility reduces repayment rates. Having discretion on whether to repay at a given moment or not creates uncertainty in the socially prescribed behavior.[22] This may offer borrowers a way to dodge some of the punishment usually associated with strategic default.

Section 5.2 proceeds with a simple theoretical framework of loan repayment in the presence of an exogenous social norm. We derive theoretical predictions, and use these to re-examine our empirical findings in more detail in Section 5.3. Section 5.4 reports the results from an incentivized norm elicitation following the methodology of Krupka and Weber (2013).

[21] For example, repayment in Morocco is low when microfinance institutions are perceived as illegitimate or loans are perceived as development aid (Morvant-Roux et al. 2014). Osmani (2016) claims that strict rules helped establish a social norm for repayment in Bangladesh.

[22] This uncertainty is not simply due to introducing a new repayment scheme, and may not necessarily resolve as social norms adapt over time. We discuss this further in the conclusion.

5.2 Theory: Loan Repayment with Social Norms

The following section presents a simple model of loan repayment that is consistent with our empirical findings. To illustrate the basic mechanism, we focus on the case of individual liability, and impose an exogenous social norm on repayment (e.g. induced by the lender). As in the experiment, we model flexibility as the option to postpone individual repayments. We show that flexibility unambiguously leads to higher repayment rates absent social norms. However, when repayment is sustained by social norms, introducing flexibility can lead to the erosion of these norms, and increase default rates.

As discussed previously, the motivation for repayment flexibility is to allow borrowers to condition repayment timing on shock realizations. However, it creates a trade-off as flexibility can be misused to increase early consumption. The simplest possible model which captures the trade-off between consumption and insurance has three repayment periods. We thus model a repayment game where an agent invests a loan into a risky project, which requires a repayment R in periods $t = 1,2,3$. Repaying the loan in full yields a continuation value V in $T = n$ (e.g., access to future loans). The project generates a risky income of $y_t = 2R$ with probability $1-\theta$, and $y_t = 0$ with probability θ. There are no savings. We diverge from our experimental design in assuming that there are no shocks in the last period, i.e., that $y_3 = 2R$ with certainty. This eases the tractability of our model without affecting the game dynamics.[23] To show the simplest possible case, we assume risk-neutral borrowers who discount exponentially over time. Lifetime utility is:

$$U = c_1 + \delta c_2 + \delta^2 c_3 + \delta^n V. \tag{5}$$

We now introduce a social norm that is imposed by the MFI, asking clients to be good borrowers and faithfully repay when each installment is due. As a consequence, clients suffer a psychological cost κ each time they fail to make a scheduled repayment, including in the case of income shocks.[24] We think of κ as the social penalty incurred from declining to repay whenever the lender (or peers in a group setting) ask them to. Assume $0 < \kappa < R$ to avoid that repayment becomes trivial.

Benchmark: Rigid repayment and social norms Analogue to our empirical analysis, we focus on strategic repayment choices, and thus on the game path where shocks are possible ex ante, but do not materialize ex post. When the borrower makes the first decision in period 1, she already knows there

[23]Period 3 is used as a catch-up period to repay postponed installments from period 2. In our experiment, we allowed for shocks in period 3. Since these were not insurable and triggered contract default, this assumption impacts the probability of obtaining the continuation value V, but not borrowers' relative incentives across the treatments.

[24]It is possible to condition κ on whether the borrower fails to repay due to moral hazard (κ_M), or due to income shocks (κ_S). For lenders and peers, these cases can be hard to distinguish in practice. To the extent that peer punishment reflects social norms, our experimental results suggest that $\kappa_S \approx 0.6\kappa_M$, consistent with the excessive punishment observed in Czura (2015b). The simplifying assumption $\kappa_S = \kappa_M$ increases the insurance value of flexibility, but does not qualitatively change our results.

is no shock in period 1. If there is a shock, the loan installment cannot be paid, and the borrower is in default. The assumption $\kappa < R$ ensures that it is not optimal to make repayments after a default.

Absent shocks in period 1, the borrower decides to repay R (and consume $c_1 = y_1 - R = R$), or to default. Repayment yields

$$U_1^R = R + \underbrace{(1-\theta)(\delta R + \delta^2 R + \delta^n V)}_{\text{no shock in t2}} + \underbrace{\theta(-\delta\kappa + \delta^2(2R-\kappa))}_{\text{shock in t2}}. \tag{6}$$

Defaulting yields

$$U_1^D = 2R - \kappa + \underbrace{(1-\theta)(\delta(2R-\kappa) + \delta^2(2R-\kappa))}_{\text{no shock in t2}} + \underbrace{\theta(-\delta\kappa + \delta^2(2R-\kappa))}_{\text{shock in t2}}. \tag{7}$$

The repayment condition without flexibility is thus

$$\delta^{n-1} V \geq (R-\kappa)[\frac{1}{(1-\theta)\delta} + 1 + \delta]. \tag{8}$$

For a given level of patience and income uncertainty, the borrower repays for sufficiently high levels of the continuation value, or sufficiently strong social norms.

Flexible repayment and social norms We now introduce a pass token, which allows the borrower to postpone a current repayment obligation to the next period. The pass token can be used in periods 1 or 2, with or without shocks. It is tempting for the borrower to use flexibility in period 1: Immediate consumption increases by R, while the repayment of flexibility is discounted to $\delta(1-\theta)R$. But there is a trade-off: Using the pass token in period 1 means it cannot be used to insure shocks in period 2.

Assume that there is uncertainty regarding the social norm for flexibility. The social norm compels the agent to make a repayment when asked, but now she has discretion over when to repay. As a result, the social norm is either weakened or uncertain. The psychological cost for not repaying (while invoking flexibility) becomes $\lambda\kappa$, with $0 < \lambda < 1$ representing alternatively a scale parameter, or a probability that the cost κ will be incurred. Since the social norm imposes a penalty for not repaying when asked, we assume that the penalty for defaulting on the subsequent double repayment is still κ. We present empirical support for this assumption in Section 5.4.

Using flexibility is always dominant in the case of shocks. Furthermore, straight default is now dominated by using flexibility at first, and then defaulting. This is because the social penalty for invoking flexibility $\lambda\kappa$ is weaker than that for simple non-repayment, κ. Focusing on choices when no shocks arrive, and starting in period 1, borrowers are left with four strategies:

1. *Flex-S*: Use flexibility only if shocks arrive, repay in periods 1, 2, and 3.

$$U_1^{Flex-S} = R + (1-\theta)(\delta R + \delta^2 R + \delta^n V) + \theta(-\delta\lambda\kappa + 0 + \delta^n V) \tag{9}$$

2. *Flex-2*: Use flexibility in period 2 (shocks in period 2 are insured), repay in periods 1 and 3.

$$U_1^{Flex2} = R + (1-\theta)(\delta(2R-\lambda\kappa) + 0 + \delta^n V) + \theta(-\delta\lambda\kappa + 0 + \delta^n V) \tag{10}$$

3. *Flex-1*: Use flexibility in period 1 (and forfeit shock insurance in period 2), repay in periods 2 and 3.

$$U_1^{Flex1} = 2R - \lambda\kappa + (1-\theta)(0 + \delta^2 R + \delta^n V) + \theta(-\delta\kappa + \delta^2(2R-\kappa)) \tag{11}$$

4. *Flex-D*: Use flexibility in period 1, then default.

$$U_1^{Flex-D} = 2R - \lambda\kappa + (1-\theta)(\delta(2R-\kappa) + \delta^2(2R-\kappa)) + \theta(-\delta\kappa + \delta^2(2R-\kappa)) \tag{12}$$

Characterizing the equilibrium behavior for the full parameter space is complicated, since no strategy is dominated. We summarize key patterns here, and defer to Appendix B for full derivations. We restrict our attention to cases where repayment is sustained by the social norm. In other words, the continuation value V is sufficiently low that borrowers default at $\kappa = 0$.

A first insight is that the four strategies can be ordered by their sensitivity to the social penalty κ (i.e., equations 9 to 12 are strictly ranked by their slope in κ): At low levels of κ, default (Flex-D) is the most attractive. However, the appeal of this strategy quickly decreases as κ increases (equation 12 steeply decreases in κ). The appeal of flexibility use in period 1 (Flex-1) is the second-most sensitive to κ, followed by Flex-2, and finally by Flex-S.

For sufficiently low λ – in other words, if flexibility creates sufficient uncertainty in the socially prescribed behavior – the result is a profile where the borrower moves from Flex-D to Flex-1, then Flex-2, and finally Flex-S as κ increases from 0 to R.[25] Flexibility is misused (strategies Flex-1 and Flex-2) for intermediate values of κ:

$$\frac{R[2+\delta] - \delta^{n-1}V}{[1+\delta]} \leq \kappa < \frac{(1-\delta)}{\lambda}R. \tag{13}$$

[25]Specifically, this holds for $\lambda \leq \bar{\lambda} \equiv \frac{(1-\delta^2)}{(2+\delta)-\delta^{n-1}\frac{V}{R}}$. For higher values of λ, the borrower moves from Flex-D (for low κ) directly to Flex-S (for higher κ), without misusing flexibility for early consumption. This is inconsistent with our data, which shows that 87 percent of participants in *IL-flex* misuse flexibility absent shocks. We thus focus on the case where $\lambda \leq \bar{\lambda}$ holds.

For lower values of κ, the borrower defaults. For higher κ, flexibility is only used for shocks. Rearranging the left-hand side of inequality 13 allows us to state a repayment condition with flexibility,

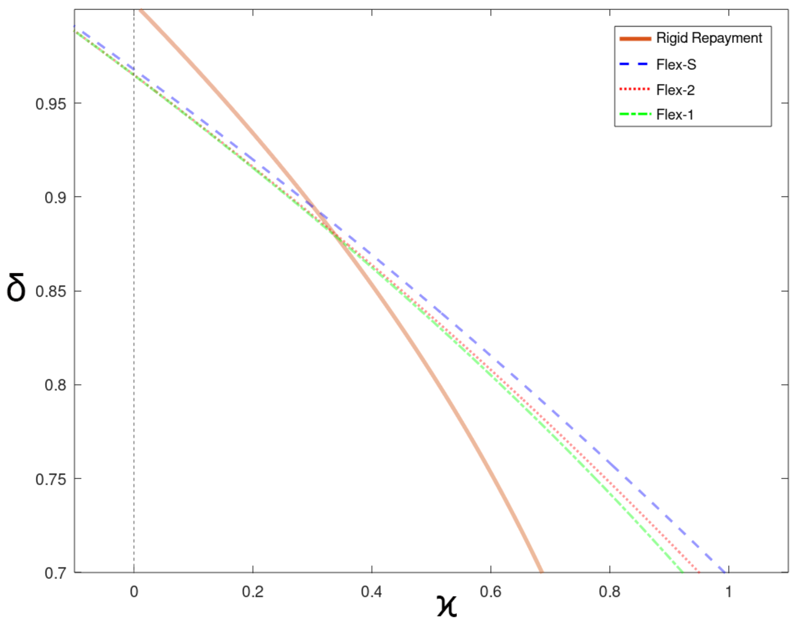
$$\delta^{n-1}V \geq R[2+\delta]-\kappa[1+\delta]. \tag{14}$$

Inequality 14 can be compared to the repayment condition without flexibility (inequality 8). The repayment condition with flexibility is stronger (holds less often) whenever

$$\kappa \geq (1-(1-\theta)\delta)R. \tag{15}$$

Default rates will be higher under flexible repayment contracts for large κ, large δ, and small θ.

Figure 6: Repayment Conditions with Rigid and Flexible Repayment



Notes: For a given κ, each curve states the minimum value of δ for which the respective strategy is preferred to default (equation 7 in rigid repayment and equation 12 in flexible repayment). For instance, the Flex-2 curve compares equations 10 and 12. The overall repayment condition under flexibility is given by the lowest curve of Flex-1, Flex-2, and Flex-S. This figure shows simulations using $V=3.3$, $R=1$, $n=4$, $\theta=0.25$, and $\lambda=0.2$. Note the experiment induced $V/R=3.3$, $\theta=0.25$ and $\delta\approx 0.8$ (see Section 2.1).

The comparison of repayment conditions across treatments is illustrated in Figure 6. For a given κ, each curve states the minimum value of δ for which the respective strategy is preferred to default. The figure shows that at $\kappa=0$, repayment is more incentive-compatible with flexibility: Being able to delay an installment allows the agent to insure against shocks, and thus increase the probability that V can be obtained. As κ increases, repayment becomes incentive-compatible for lower δ across all conditions, since agents increasingly repay to avoid social penalties, rather than to obtain V. However, this shift in the individuals' objective means that there are relatively more defaults in the flexible condition: Flexibility erodes the social norm of repayment, by reducing the penalty for the first non-repayment (the use of the pass token) to $\lambda\kappa$. Relatively speaking, default is more costly in the benchmark condition of rigid repayment, where κ is incurred for each missed installment. The model leads to the following testable predictions (see Appendix B.2 for details):

Prediction 1. [Overall repayment] *In the presence of strong social norms, repayment is higher under a rigid repayment contract than under a flexible repayment contract.*

Corollary 1. *Absent social norms, repayment flexibility leads to strictly higher repayment rates.*

Prediction 2. [Default path] *Using flexibility at first and then defaulting strictly dominates defaulting straight away.*

Prediction 3. [Flexibility misuse] *The insurance value of flexibility decreases over time. Thus, misuse of flexibility (use of flexibility absent shocks) will increase over time, conditional on flexibility still being available.*

Prediction 4. [Partial repayments] *In rigid repayment contracts, partial payments are always dominated by full repayment or full default. With repayment flexibility, partial repayments can be optimal: Borrowers may comply with single but not double installments.*

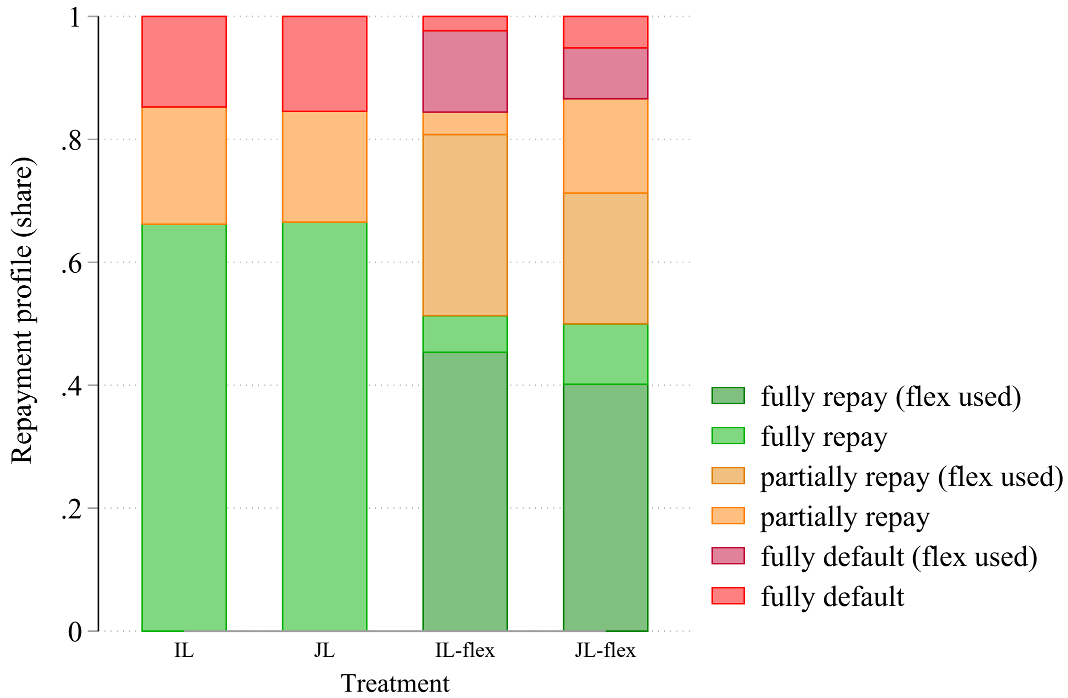
5.3 Loan Repayment Paths

We can now re-examine our findings in light of a repayment model which features installment-based social norms. Our main result on repayment is in line with Prediction 1: We observe that repayment is higher under rigid than under flexible repayment conditions.

To gain more detailed insights, we create repayment profiles which classify participants with respect to their behavior across all three repayment installments. As for overall repayment, all profiles refer to behavior on the no-shock path, and thus focus on ex-post moral hazard. Without flexibility, participants can *fully repay* all three tokens, they can *fully default* by not repaying any token, or they can *partially repay* by paying only one or two tokens. In the flexibility treatments, we distinguish for each profile whether flexibility has been used. If a participant chooses to repay all three tokens and uses flexibility in either period 1 or 2, she will be classified as *fully repay (with flex use)*. If she chooses to default on all three repayment installments, but uses flexibility to postpone repayment first, she will be classified as *fully default (with flex use)*. If a participant repays one or two tokens and has used flexibility, her profile is *partially repay (with flex use)*.

Figure 7 displays the repayment profiles for each treatment. The green bars indicate full repayment and correspond to the bars in Figure 2. Between *IL* and *JL* the distribution of repayment profiles is nearly identical: 66 percent fully repay all three tokens, 15 percent fully default on all three installments, and 18 to 19 percent partially repay one or two installments. Between *IL-flex* and *JL-flex* the distribution of repayment profiles also looks very similar. In *IL-flex* (*JL-flex*), 51.3 (50.0) percent fully repay all three tokens, with 45.4 (40.2) percent using flexibility to do so. Finally, 15.6 (13.4) percent fully default on all three installments, and 33.1 (36.6) percent partially repay one or two installments.

Figure 7: Repayment Profiles (no-shock path)



Notes: Fraction of participants who fully repay, partially repay and fully default in each treatment. For the flexibility treatments, the graph additionally indicates for each of the three scenarios whether flexibility has been used.

What do we learn from these results in view of our model? In addition to Prediction 1, our data are consistent with Prediction 2: Using flexibility to postpone repayments before defaulting on them appears to dominate defaulting straight away – especially in individual-liability contracts, where there is no crowd-out with mutual insurance. While the overall share of full default is not affected by flexible repayment conditions, default with flexibility use largely replaces straight default in both *IL-flex* (85 percent of defaults), and *JL-flex* (62 percent). Prediction 3 refers to the timing of flexibility use, which has been discussed in Section 4.2. Consistent with the prediction, flexibility misuse increases over time in both *IL-flex* and *JL-flex*, conditional on being available (Figure 3).

Our results are more puzzling in light of Prediction 4: We find substantial amounts of partial repayments in all repayment conditions. Moreover, the drop in overall repayment in the flexibility treatment is exclusively driven by an the increase in partial repayments. The model predicts that partial repayments are dominated in the *IL* benchmark condition with rigid repayment (though not in *JL*, given the possibility of free-riding). With flexible repayment conditions, strong social norms

($R \leq \kappa < 2R$) may make it optimal to repay single but not double installments. However, when we examine partial repayments with flexibility use, over half of participants repay the double installment and default on the remaining single installment (see Table A.5 for key statistics on partial repayments).

Why do participants partially repay their loan, and why does partial repayment increase with flexibility? Three explanations come to mind. First, participants might be confused, and this confusion increases with flexibility. Several arguments speak against this explanation: All main findings are robust to the inclusion of participants who failed to pass the comprehension test. Furthermore, we predict partial repayments with treatment indicators, and control for a treatment-specific comprehension score (Table A.6). We find that high comprehension correlates negatively with partial repayments at baseline, but does not significantly interact with flexibility. We discuss confusion-based robustness tests in more detail in Section 6.

Second, an installment-based social norm may interact with the induced artificial discounting of consumption tokens (Section 2.1): If the penalty for non-repayment is κ each period, but the cost of repayment is discounted across periods (40, 30, and 20 pesos in periods 1, 2, and 3), then for κ in the relevant range, it may be optimal to default in period 1 and repay in period 3.[26] An examination of the dynamics of partial repayments reveals the opposite: 70 (65) percent of partial repayers in *IL* (*JL*) pay the first installment, while only 38 (41) percent pay the second (Table A.5). We infer that borrowers are unlikely to have internalized this mechanism.

Anecdotal evidence from post-session conversations with participants suggests a third explanation: Flexible repayment conditions generated uncertainty in socially appropriate behavior, which gave participants room for strategic misinterpretation. Flexibility effectively excused non-repayment of an installment in one period, albeit with strict conditions on repayment and the number of times it can be used. In line with a large literature on motivated beliefs and biased information processing (see Gino et al. (2016) for a review), as well as on moral wriggle room (Dana et al. 2007), borrowers may have convinced themselves that the occasional missing of installments is approved by the lender, even beyond the use of the pass token.[27] Such borrowers may fully repay under rigid repayment conditions, where social norms provide no slack for missing installments. Flexible conditions may provide a welcome excuse to move to partial repayment, while maintaining the image of a good borrower to both oneself and to the lender.

[26]Note that experimental periods are close together in time, and all payouts take place at the end of the session. Thus, there is unlikely to be any real temporal discounting between periods. A non-monetary cost κ would thus be constant across periods. This is an unavoidable limitation of a lab-in-the-field design.

[27]The expected punishment for paying, for example, two out of three installments (strategies *RRD*, *DRR*, or *RDR*) is 0.32 in *JL*, and 0.27 in *JL-flex*. The expected punishment for FR_2D in *JL-flex* is 0.33 (see Section 4.3 for details on expected punishment). However, our punishment design imposes a constant penalty for each missed installment. As a result, it would not capture an alleged acceptability of occasionally missing installments when repayment is flexible.

5.4 Norm Elicitation Experiment

The last section discussed the empirical support for social norms in our repayment data. We hypothesize that our participants bring these social norms from their real-life borrowing context to our experiment (see Section 2.3 for a summary of the lender's efforts to instill a culture of repayment). To provide more direct evidence on the social norms prevailing in our microcredit centers, we collected additional data in April 2019 on borrowers of the same lender in eight centers in Laguna province.

First, we present suggestive evidence on repayment norms from short surveys administered to 23 clients (see Table A.7). All but one borrower agree or strongly agree with statements that repaying is the moral thing to do, that they have learned this in their initial group training, and that the loan officer highlights the importance of repaying each week. These arguably lender-induced views are further reinforced in many borrowing groups: two-thirds agree that the undesirability of non-repayment is discussed between group members.

Using the methodology of Krupka and Weber (2013), we conduct an incentivized norm elicitation in order to answer the following questions: (i) Is there a social norm for repayment? (ii) If yes, do norms mirror the punishment patterns we observe in our experiment? (iii) Does the applicability of these norms become more uncertain in the presence of flexibility? In eight sessions, a total of 44 clients were presented with different vignettes representing scenarios that closely mirror our experiment. Borrowers were asked to rate the social appropriateness of each possible repayment choice in a given scenario. Krupka and Weber (2013) show that norms can be elicited using a matching coordination game: Participants are incentivized not to reveal their own valuations, but to match those of others. Norms emerge as the focal point in the coordination game.

Vignettes describe the loan repayment behavior of a fictitious client, Maria, in a nearby joint-liability loan center (see Appendix F). As in the experiment, vignettes refer to single-period actions under either rigid or flexible repayment conditions, and build in observable income shocks. To approach a more realistic borrowing scenario, we ask about repayment choices in week 3 (and in some cases, week 4) of a 25-week repayment cycle, when the first two weeks were repaid.[28] Participants rated the social appropriateness of each vignette on a six-point Likert-scale from 1 'very socially inappropriate' to 6 'very socially appropriate', using different smileys to illustrate the options. Participants received a bonus payment if their rating of a randomly drawn vignette matched the rating of another randomly drawn participant:[29] A bonus of 50 pesos was paid if the ratings matched exactly, 20 pesos bonus was paid if the rating only deviated by one point on the scale. All participants received a participation pay-

[28]We focused on week 3 out of 25, because default on the first repayment installments is virtually non-existent. We avoid moving later into the repayment cycle and specifying the full previous repayment history, as this may be misperceived as a signal about the borrower's type or intentions.

[29]This is strategically equivalent to matching on the modal response (as in Krupka and Weber (2013)), but was easier to understand for our participants.

ment of 50 pesos. Analogous to the experiment, the order of the vignettes was kept constant to ease the exposition (first rigid, then flexible repayment conditions), and all participants rated all vignettes.

Table 2: Norm Results

Panel A	**Punishment vs. Norms**								
	Level of Punishment in Experiment (0-1)	Norm Elicitation: Inappropriateness (0-1)							
				Percent of Respondents					
Action	Mean	Mean	SD	+++	++	+	-	- -	- - -
No flexibility									
Repay	0.14	0.06	0.12	**73**	25	0	2	0	0
Don't repay (shock)	0.38	0.85	0.15	0	0	2	14	**43**	41
Don't repay	0.61	0.86	0.19	0	2	2	14	25	**57**
Flexibility									
Repay	0.09	0.23	0.27	**48**	14	20	11	7	0
Use flex (shock)	0.18	0.47	0.3	5	**39**	11	11	30	5
Misuse flex	0.39	0.69	0.28	5	7	14	14	**39**	23
Don't repay (shock)	0.52	0.77	0.28	7	2	2	18	30	**41**
Don't repay	0.6	0.9	0.16	0	0	5	5	30	**61**
Action in subsequent period									
No flex: Don't repay, second time		0.89	0.21	0	7	0	2	23	**68**
Flex: Don't repay double	0.66	0.9	0.18	0	2	2	5	25	**66**

Panel B	**Norms: Main Comparisons**		
Action	Mean	SD	Wilcoxon signed-rank test
Use of flex in case of shock			$p < 0.001$
No flex: Don't repay (shock) vs.	0.85	0.15	
Flex: Use flex (shock)	0.47	0.3	
Don't repay in two consecutive periods (per-period averages)			$p < 0.001$
No flex: Don't repay & Don't repay, second time vs.	0.88	0.17	
Flex: Misuse flex & Don't repay double	0.79	0.20	

Notes: The table is ordered according to the severity of actions (measured in terms of punishment or inappropriateness). Punishment refers to choices in the experiment in the *JL* and *JL-flex* treatments. Norm vignettes refer to the repayment choice in week 3 in a 25-week loan cycle, except for 'Action in subsequent period,' which refers to week 4. Inappropriateness of a given action is measured on a six-point Likert-scale (rescaled for comparability to 0-1) with higher numbers indicating higher inappropriateness. For implementation reasons, the inappropriateness rating of 'Don't repay double' conditions on previous misuse of flexibility, while the corresponding punishment does not condition on why flexibility was used.

Table 2 sets out the results. On (i), we find strong evidence for the existence of social norms on repayment: 73 percent of participants rate repayment as 'very appropriate' and 25 percent as 'mostly appropriate,' suggesting a strong focal point in the coordination game (in the sense of Krupka and Weber (2013)). Perhaps more surprisingly, 84 percent rate non-repayment following a shock as either 'very inappropriate' or 'mostly inappropriate', suggesting that social norms do not excuse non-repayment even when it is unavoidable. On (ii), we find suggestive evidence that the punishment we observe in our experiment reflects the underlying social norms: The ranking of actions by appropriateness is the same in the norm elicitation as in the punishment choices (see Table 2). Non-repayment due to a shock is rated nearly as inappropriate as strategic default – an even more extreme result than for punishment, potentially due to the fact that punishment was intrinsically costly while appropriateness ratings were incentivized on coordination. A further parallel is that norms clearly favor using flexibility to self-insure against shocks, rather than to rely on peers. Section 4.3 discusses intention-based and outcome-based frustration as possible drivers of punishment, as participants were directly affected by their peer's repayment decisions. The fact that we see the same patterns in a norm elicitation with a different sample speaks against this explanation: Participants in the norm elicitation judged repayment choices in hypothetical vignettes, with no connection to themselves.

Does the applicability of norms become uncertain in the presence of flexibility? The most direct evidence for question (iii) is the dispersion of appropriateness ratings: The more participants struggle to coordinate on the same rating, the more uncertainty there is in what constitutes socially desirable behavior. Table 2 shows that the modal rating for strategic default (very inappropriate) is chosen by 57 percent of participants, compared to 39 percent of participants who choose the modal rating (mostly inappropriate) for flexibility misuse, despite the fact that both equate to the non-repayment of an installment. Moreover, all six rating options are chosen by at least 5 percent of participants for flexibility misuse, with 26 percent giving a *positive* rating (for strategic default: 4 percent). The dispersion of ratings becomes becomes even larger for flexibility use in case of shocks: Ratings are distributed nearly symmetrically, with 39 percent rating flexibility use as 'mostly appropriate' and 30 percent rating it as 'mostly inappropriate'. Our results suggest substantial uncertainty in how to apply existing repayment norms to flexible repayment conditions.

An additional way to test question (iii) comes from Prediction 4 as well as our repayment results (Figure 7): Both in theory and empirics, using flexibility first and then defaulting largely dominates defaulting straight away. In Section 4.3, we show that the expected punishment for strategic default is lower when repayments are postponed first using flexibility (Figure 5). We observe a similar pattern in social appropriateness rankings, in a sample disconnected from our experiment: In addition to the vignettes about repayment behavior in week 3, we added selected vignettes about choices in week 4, conditioning on week 3 behavior (see Appendix F). Averaging the appropriateness rating of two consecutive non-repayments yields 0.88 (SD 0.17). In contrast, misusing flexibility and then defaulting on the double installment appears to be less inappropriate (average 0.79 (SD 0.20), Wilcoxon signed-rank test $p<0.001$). This result is driven by an increased relative appropriateness of misusing flexibility, while defaulting on a double installment is considered as inappropriate as a second single-installment default (Table 2). Figure A.2 shows the distribution of the combined ratings and confirms an increased dispersion with flexibility, suggesting higher uncertainty.

If flexibility creates uncertainty in socially appropriate behavior, can our norm elicitation help us to understand the observed frequency of partial repayments? Section 5.3 speculated that participants may have interpreted flexibility as a signal that occasional non-repayment is excused by the lender, in line with studies on moral wriggle room and motivated reasoning (Gino et al. 2016). However, Table 2 clearly shows that flexible repayment conditions do not increase the perceived appropriateness of non-repayment (absent flexibility use): Strategic default is rated similarly in both mean and dispersion across repayment conditions. In other words, the observed social uncertainty appears to be specific to the use of flexibility itself. On closer look, this is perhaps not surprising: Motivated reasoning needs a motivation. In contrast to our norm elicitation respondents, our experimental participants are directly affected by their interpretation of the repayment conditions, and thus have an incentive to interpret them to their advantage. Hence, motivated reasoning remains a potential concern, and should be the subject of further research.

6 Potential Confounds

Balance across session types We randomly allocated centers to either IL- or JL-Sessions. To avoid confounds in our analysis, it is necessary to rule out systematic differences between sessions. As shown in Table 1, observable characteristics are balanced across session types. In both types of sessions, we administer a benchmark *IL* treatment, such that choices in this treatment serve as an additional randomization check. Column 1 in Table A.8 shows that the share of participants who fully repays their IL loan is the same in both session types. This also holds true if we examine the three periods in *IL* separately (Column 2).

Order effects Our treatments are run in a constant order (see Section 2.2), giving rise to potential concerns about order effects between our treatments. Several arguments alleviate such concerns. First, since we elicited choices with the strategy method and only realized shock outcomes, matching (where applicable) and corresponding earnings after all decisions had been made, participants did not receive intermediate feedback which may have permitted learning.

Second, the mere repetition of experimental decisions may have led participants to realize that repayment is not monetarily profitable, and thus to default more. This mechanism is inconsistent with the fact that the observed increase in overall loan defaults in flexible treatments is entirely driven by an increase in partial repayments (Figure 7): Partial repayments are monetarily dominated by full repayment, full default, or both. Our results are thus not explained by participants learning how to maximize payoffs over time. This conclusion is further supported by a technical detail: To account for the uncertainty regarding future shock arrival when making repayment choices, we also elicit a repayment choice conditional on being in default following a shock. Around 22 percent repay after a shock-induced default, with no variation between treatments (Table A.8). If learning took place, we should see a decrease in this fraction over time, and thus in later treatments.

Other effects relating to the order of treatments are possible; for instance participants' concentration may decrease over time. Several pieces of evidence speak against order effects in a more general sense: Repayment behavior is identical in the first two treatments in JL-Sessions (*IL* and *JL*). Two interpretations are possible: Either, there are no order effects and no effects of joint liability on repayment (consistent with the existing evidence, e.g., Giné and Karlan (2014)). Or these two effects exactly cancel each other out. Since there is no theoretical reason to expect the latter, we deem the former to be more plausible. Furthermore, overall repayment drops when we introduce flexibility, but this introduction happens in the second treatment in IL-Sessions, and in the third treatment in JL-Sessions. Despite both the difference in order and the difference in liability structure, the drop in repayment has a similar magnitude in both session types. Our evidence thus suggests that participants do not simply change their behavior as a function of time and treatment order, but that the treatments themselves cause behavior to change.

Confusion Our main analysis excludes participants who failed to meet our comprehension threshold, based on the test questions described in Section 2.3 and footnote 14. To make sure this is not driving our results, we repeat our analyses including all participants. All observed effects of flexibility and joint liability on overall loan repayment (Table A.1), as well as the effect of joint liability on flexibility use (Table A.2) are robust to the inclusion. The same holds true for punishment choices: In Table A.4, we replicate results regarding the level of punishment from Table A.3 with very similar coefficients. The fact that our analyses are robust to the inclusion of confused participants suggests that lack of comprehension is unlikely to be an important driver of our results.

We further explore in how far confusion can explain partial repayments. We first study the relationship between partial repayments and the treatment-specific comprehension score. In Column 1 of Table A.6, we find that above-median comprehension predicts an 8 percentage point (27 percent) decrease in the incidence of partial repayments. Confusion thus helps explain the presence of partial repayments at baseline. This effect is small relative to the 15 percentage point increase in partial repayments in flexibility treatments (see Column 2 and Figure 7). We test whether this increase is driven by reduced comprehension in flexibility treatments, but find no significant interaction between the two. Confusion thus helps explain the presence of partial repayments, but not their increase in the flexibility treatments.

7 Conclusion

We study repayment choices under both rigid and flexible repayment conditions in a lab-in-the-field experiment with microcredit borrowers in the Philippines. Although repayment is not payoff-maximizing in our setting, we find high repayment rates across both individual- and joint-liability contracts. The introduction of flexibility increases strategic defaults on the overall loan by 50 percent. Flexibility also reduces peer punishment in joint-liability contracts – both when it is used to insure income shocks, and when it is used to increase early consumption absent shocks.

Our results are consistent with a strong social norm on repayment, which participants bring to our sessions from their real-life borrowing experience. Through meeting and reciting pledges every week, clients internalize what it means to be a good borrower: to pay installments every week, and to discipline peers. Norms, which may be induced by the lender, could help explain not only the high repayment rates and punishment patterns in our experiment, but also two recent puzzles in microfinance research: First, why repayment rates do not differ between individual- and joint-liability contracts. Second, why peer pressure appears to be excessive and sequentially irrational. Furthermore, if social norms refer to weekly installments, the discretion introduced by repayment flexibility means that applying the norm may no longer be straightforward. In turn, uncertainty in socially prescribed behavior may increase ex-post moral hazard. We present supporting evidence for this explanation using a theoretical framework, and from the first incentivized norm elicitation study in microfinance.

Our results broaden the recent discussion on flexible repayment in microfinance. Existing evidence suggests that flexible repayment can increase profits by facilitating high-risk, high-return investment (Barboni and Agarwal 2018; Battaglia et al. 2019; Field et al. 2013). Our results reveal an additional benefit of flexible repayment schemes: they may also reduce excessive social pressure in group lending (which has been documented in Czura (2015b), Karim (2008), Rahman (1999), and Montgomery (1996)), by providing borrowers with a way to self-insure against income fluctuations. However, our results also suggest that flexibility may destabilize high-repayment equilibria which are sustained by social norms. We hypothesize that motivated beliefs may act to exacerbate the consequences of norm uncertainty.

Several caveats apply. First, our experiment newly introduces flexible repayment terms. We cannot speak directly to whether and how norms would adjust to flexibility over time, and whether increased strategic defaults would persist. Having said that, the nature of flexibility is to give the borrower discretion in whether to repay or not at a given moment. This may create uncertainty in socially appropriate behavior which does not simply resolve over time: a norm for flexibility would have to distinguish between responsible and irresponsible use. Shock arrival and repayment capacity are imperfectly observed in practice, and shocks may have persistence. As a result, social penalties are unlikely to discriminate perfectly on whether flexibility is used responsibly or not, and whether a subsequent default is strategic or shock-induced. This may impede the creation of a norm on the responsible use of flexibility. Furthermore, lenders may be constrained in what kind of norms may be induced. A major benefit of rigid, no-exceptions rules on weekly repayments is that they are *simple*, and can easily be integrated into the pledge that borrowers recite at the start of every meeting. In contrast, inducing a norm on exactly *when* flexibility use is acceptable may be more complicated, especially since repayment capacity is hard to quantify in practice.

Second, we study a particular type of flexibility – discretion in the timing of repayment (also studied in Battaglia et al. (2019) and Czura (2015a)). Different flexibility designs may have different implications for norm uncertainty. In particular, neither the two-months grace periods in Field et al. (2013) nor the (pre-planned) repayment holidays in Barboni and Agarwal (2018) give borrowers any discretion in whether to repay at a given point in time. While these flexibility designs make socially appropriate behavior more straightforward, they do not provide insurance against shocks. This is important in light of Battaglia et al. (2019), who show that insurance provision rather than the easing of credit constraints appears to drive increases in profits from flexibility. Our results point to a fundamental trade-off in the design of repayment: Giving borrowers the ability to condition repayments on unobservable (or uncontractable) shocks necessarily requires giving them discretion in whether to repay at a given point in time. Discretion may increase moral hazard, both through present bias (studied theoretically in G. Fischer and Ghatak (2016)), and through uncertainty in social norms.

Going beyond repayment flexibility, recent evidence shows that debt relief programs worsen future repayment discipline, and increase moral hazard even among borrowers who were not at risk of default (Giné and Kanz 2018; Kanz 2016). Such observations are consistent with repayment equilibria that are sustained by social norms, which erode when lenders change previously established repayment protocols. Future research is needed on the exact nature of social norms in lending contexts, on how these are formed, and how they respond to product innovations. Policymakers wishing to introduce regime changes may need to consider accompanying measures to address the prevailing social norms.

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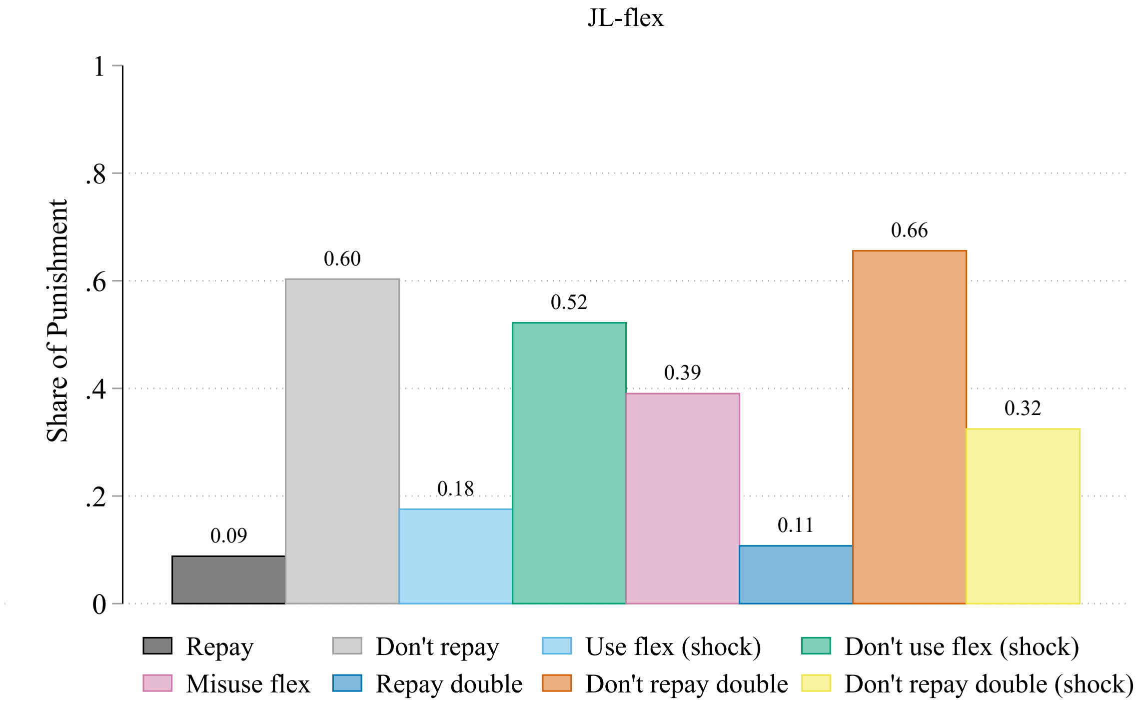
Online Appendix

A Additional Tables and Figures

Figure A.1: Level of Punishment in *JL-flex*



Notes: Share of punishment: punishment choice relative to the maximum possible punishment (two tokens). Punishment choices are conditional on partner's action and shock arrival as indicated.

Table A.1: Full Repayment

	Main Sample			Incl. those who failed comprehension test		
	IL vs. IL-flex	IL vs. JL	JL vs. JL-flex	IL vs. IL-flex	IL vs. JL	JL vs. JL-flex
	(1)	(2)	(3)	(4)	(5)	(6)
IL-flex	-0.165***			-0.182***		
	(0.0355)			(0.0350)		
JL		0.0221			0.0209	
		(0.0342)			(0.0332)	
JL-flex			-0.164***			-0.175***
			(0.0398)			(0.0388)
Mean of DV	0.679	0.643	0.665	0.679	0.641	0.661
Observations	607	544	526	632	574	555
No. of participants	305	272	272	318	287	287
R^2	0.076	0.085	0.081	0.081	0.081	0.084
Session FE	yes	yes	yes	yes	yes	yes

Notes: Dependent variable is a binary indicator for full repayment. Columns 1–3 show regressions for the main sample. Columns 4–6 include participants who failed the comprehension test, as defined in footnote 14. OLS regressions with session fixed effects and standard errors clustered on individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: Use of Flexibility

	Main Sample				Incl. those who failed comprehension test			
	Shock		No Shock		Shock		No Shock	
	T1	T2	T1	T2	T1	T2	T1	T2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JL-flex	0.0198	-0.0433*	-0.258***	-0.207***	0.0253	-0.0414*	-0.251**	-0.208***
	(0.0185)	(0.0255)	(0.0939)	(0.0698)	(0.0179)	(0.0244)	(0.0942)	(0.0686)
Mean of DV in IL-flex	0.951	0.970	0.549	0.723	0.943	0.971	0.552	0.718
Observations	575	327	575	329	603	340	603	342
No. of participants	304	135	304	137	317	140	317	142
R^2	0.003	0.009	0.068	0.043	0.004	0.008	0.064	0.044

Notes: Dependent variable is a binary indicator for using flexibility in a given scenario. Using flexibility in T2 is conditional on still having it, i.e. on not having used it in T1. Columns 1–4 show regressions for the main sample. Columns 5–8 include participants who failed the comprehension test, as defined in footnote 14. OLS regressions with standard errors clustered on session level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: Punishment: Main Sample

Panel A: Punishment in case of no shock

	Level of Punishment				Incidence of Punishment			
Choice in JL	Repay	Don't Repay	Don't Repay	Don't Repay	Repay	Don't Repay	Don't Repay	Don't Repay
Choice in JL-flex	Repay	Don't Repay	Misuse Flex	Don't Repay Double	Repay	Don't Repay	Misuse Flex	Don't Repay Double
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JL-flex	-0.0450**	-0.00623	-0.220***	0.0422	-0.0470	-0.00653	-0.367***	-0.0856***
	(0.0211)	(0.0269)	(0.0341)	(0.0296)	(0.0296)	(0.0246)	(0.0383)	(0.0285)
Mean of DV in JL	0.14	0.61	0.61	0.61	0.20	0.89	0.89	0.89
Observations	499	499	499	499	499	499	499	499
No. of Participants	272	272	272	272	272	272	272	272
R^2	0.052	0.104	0.169	0.151	0.058	0.148	0.247	0.148
Session FE	yes	yes	yes	yes	yes	yes	yes	yes

Panel B: Punishment in case of shock

	Level of Punishment				Incidence of Punishment			
Choice in JL	Don't Repay	Don't Repay	Don't Repay		Don't Repay	Don't Repay	Don't Repay	
Choice in JL-flex	Use Flex	Don't Use Flex	Don't Repay Double		Use Flex	Don't Use Flex	Don't Repay Double	
	(1)	(2)	(3)		(5)	(6)	(7)	
JL-flex	-0.203***	0.144***	-0.0536*		-0.231***	0.208***	-0.0818**	
	(0.0322)	(0.0330)	(0.0295)		(0.0409)	(0.0409)	(0.0375)	
Mean of DV in JL	0.38	0.38	0.38		0.51	0.51	0.51	
Observations	498	498	498		498	498	498	
No. of Participants	270	270	270		270	270	270	
R^2	0.128	0.143	0.117		0.129	0.127	0.133	
Session FE	yes	yes	yes		yes	yes	yes	

Notes: Dependent variable in Columns 1-4 is the level of punishment as measured by (0-1 rescaled) punishment points and in Columns 5-8 incidence of punishment, i.e. percent of participants who punish. The omitted category is *JL*. Choices with and without flexibility are matched on i) shock realization and ii) the amount repaid. Number of responses in *JL*: 272 (270) and *JL-flex*: 227 (228) for no shock (shock) scenario. OLS regressions with session fixed effects and standard errors clustered on individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Punishment: Robustness

Panel A: Level of punishment in case of no shock

	Main Analysis Sample				Incl. those who failed comprehension test			
Choice in JL	Repay	Don't Repay	Don't Repay	Don't Repay	Repay	Don't Repay	Don't Repay	Don't Repay
Choice in JL-flex	Repay	Don't Repay	Misuse Flex	Don't Repay Double	Repay	Don't Repay	Misuse Flex	Don't Repay Double
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JL-flex	-0.0450**	-0.00623	-0.220***	0.0422	-0.0432**	0.000413	-0.220***	0.0534*
	(0.0211)	(0.0269)	(0.0341)	(0.0296)	(0.0206)	(0.0264)	(0.0336)	(0.0292)
Mean of DV in JL	0.14	0.61	0.61	0.61	0.14	0.62	0.62	0.62
Observations	499	499	499	499	523	523	523	523
No. of Participants	272	272	272	272	287	287	287	287
R^2	0.052	0.104	0.169	0.151	0.058	0.102	0.168	0.144
Session FE	yes	yes	yes	yes	yes	yes	yes	yes

Panel B: Level of punishment in case of shock

	Main Analysis Sample			Incl. those who failed test questions		
Choice in JL	Don't Repay	Don't Repay	Don't Repay	Don't Repay	Don't Repay	Don't Repay
Choice in JL-flex	Use Flex	Don't Use Flex	Don't Repay Double	Use Flex	Don't Use Flex	Don't Repay Double
	(1)	(2)	(3)	(5)	(6)	(7)
JL-flex	-0.203***	0.144***	-0.0536*	-0.210***	0.134***	-0.0579**
	(0.0322)	(0.0330)	(0.0295)	(0.0314)	(0.0325)	(0.0294)
Mean of DV in JL	0.38	0.38	0.38	0.39	0.39	0.39
Observations	498	498	498	522	522	522
No. of Participants	270	270	270	285	285	285
R^2	0.128	0.143	0.117	0.138	0.134	0.112
Session FE	yes	yes	yes	yes	yes	yes

Notes: Dependent variable is the level of punishment as measured by (0-1 rescaled) punishment points. Columns 1–4 show regressions for the main sample. Columns 5–8 include participants who failed the comprehension test, as defined in footnote 14. The omitted category is *JL*. Choices with and without flexibility are matched on i) shock realization and ii) the amount repaid. OLS regressions with session fixed effects and standard errors clustered on individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Partial Repayments

	N	Partial Repayers	Share Repaying
IL	577	110	
T1 repaid			.70
T2 repaid			.38
T3 repaid			.44
JL	272	49	
T1 repaid			.65
T2 repaid			.41
T3 repaid			.59
IL-flex	302	100	
T1 repaid			.31
T1 flex used			.45
T2 repaid			.38
T2 flex used			.44
T3 repaid			.37
Use flex, repay single but not double			.39
Use flex, repay double but not single			.50
No flex used			.11
JL-flex	254	93	
T1 repaid			.42
T1 flex used			.17
T2 repaid			.33
T2 flex used			.41
T3 repaid			.46
Use flex, repay single but not double			.23
Use flex, repay double but not single			.35
No flex used			.42

Notes: Share of participants (of those who only partially repay) who make a given installment.

Table A.6: Partial Repayment and Confusion

	(1)	(2)	(3)
High Comprehension	-0.0807***	-0.0153	0.00142
	(0.0237)	(0.0267)	(0.0312)
Flexibility		0.153***	0.173***
		(0.0342)	(0.0404)
High Comprehension x Flex			-0.0359
			(0.0496)
Mean of DV	0.250	0.250	0.250
Observations	1,405	1,405	1,405
No. of Participants	577	577	577
R^2	0.008	0.033	0.033

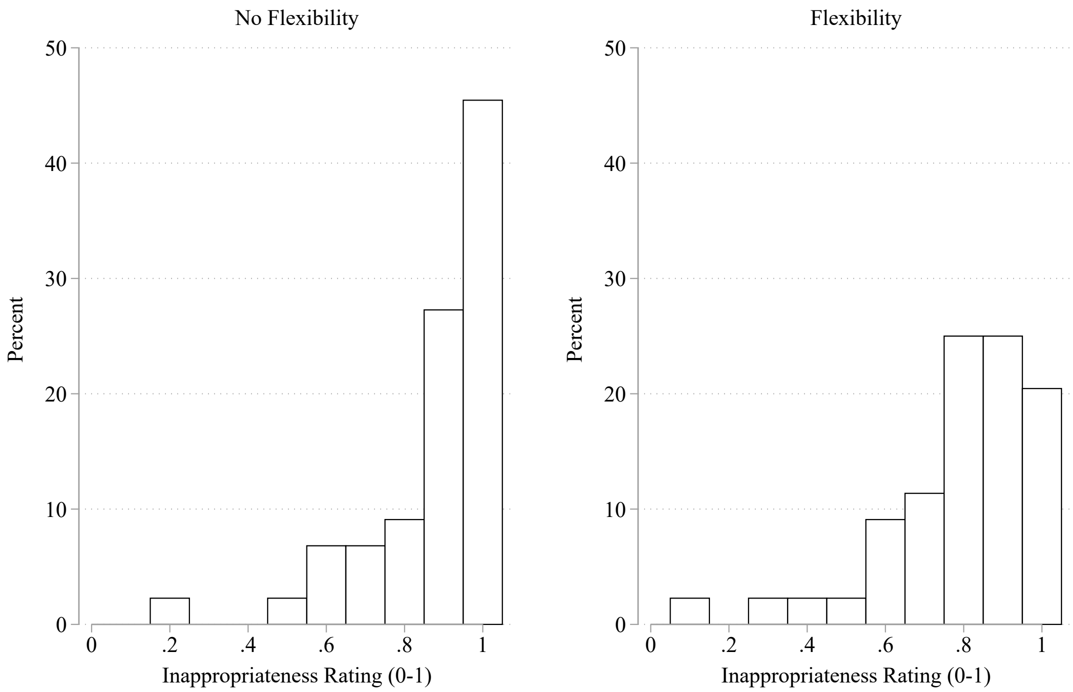
Notes: Dependent variable is a binary indicator for partial repayment in a given treatment. High comprehension is an indicator for above-median performance on test questions for a given treatment. Flexibility is a binary indicator for *IL-flex* and *JL-flex* treatments. OLS regressions with standard errors clustered on session level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Qualitative Interviews on Norms

	Share		Mean	Std. Dev.
	Agree	Agree strongly	Likert scale (1 to 4)	
Repaying is the right/moral thing to do	0.35	0.61	3.57	0.59
We learned in our group training that repayment is essential.	0.35	0.61	3.57	0.59
Our loan officer emphasizes that we should repay each week.	0.43	0.57	3.57	0.51
The group has discussed the undesirability of non-repayment extensively with each other.	0.57	0.13	2.78	0.74

Notes: Agreement of 23 borrowers is measured on a four-point Likert-scale (1-4): 1) disagree strongly, 2) disagree, 3) agree, 4) agree strongly.

Figure A.2: Histogram of the Injunctive Norm for Defaulting Twice



Notes: No flexibility: averaged inappropriateness ratings of actions i) 'Don't repay' and ii) 'Don't repay, second time.' Flexibility: averaged inappropriateness ratings of actions i) 'Misuse flex' and ii) 'Don't repay double.'

Table A.8: Balance by Session Type and Order Effects

	Repaid in IL (full) (1)	Repaid in IL (by period) (2)	Repay after shock default (3)	Repay after shock default (4)
JL-Session	-0.0353	0.00435		
	(0.0559)	(0.0428)		
Period 2		-0.0525***		
		(0.0177)		
Period 3		-0.0393**		
		(0.0192)		
JL-Session x Period 2		-0.0174		
		(0.0313)		
JL-Session x Period 3		-0.0232		
		(0.0292)		
JL			-0.00735	-0.00735
			(0.0453)	(0.0588)
IL-flex			-0.0168	-0.0138
			(0.0291)	(0.0367)
JL-flex			-0.0163	-0.0140
			(0.0422)	(0.0544)
Mean of DV in IL	0.679	0.793	0.234	0.234
Observations	577	1,731	1,379	1,379
No. of participants	577	577	577	577
R^2	0.001	0.004	0.130	0.622
Session FE			yes	no
Individual FE			no	yes

Notes: Dependent variable as indicated. OLS regressions with standard errors clustered on session level in parentheses. The sample in Column 2 includes one observation per participant and period in *IL*. The sample in Columns 3 and 4 includes one observation per participant and treatment played. *** p<0.01, ** p<0.05, * p<0.1.

B Theory Appendix

B.1 Equilibrium Behavior with Flexibility

Using flexibility is dominant in the case of shocks. Furthermore, straight default is dominated by using flexibility at first, and then defaulting. This is because the social penalty for invoking flexibility $\lambda\kappa$ is weaker than that for simple non-repayment, κ. Focusing on the game path without shocks, borrowers are left with four non-dominated strategies:

1. Flex-S: Use flexibility only if shocks arrive, repay in periods 1, 2, and 3.

$$U_1^{Flex-S} = R + (1-\theta)(\delta R + \delta^2 R + \delta^n V) + \theta(-\delta\lambda\kappa + 0 + \delta^n V) \tag{A1}$$

2. Flex-2: Use flexibility in period 2 (shocks in period 2 are insured), repay in periods 1 and 3.

$$U_1^{Flex2} = R + (1-\theta)(\delta(2R - \lambda\kappa) + 0 + \delta^n V) + \theta(-\delta\lambda\kappa + 0 + \delta^n V). \tag{A2}$$

3. Flex-1: Use flexibility in period 1 (and forfeit shock insurance in period 2), repay in periods 2 and 3.

$$U_1^{Flex1} = 2R - \lambda\kappa + (1-\theta)(0 + \delta^2 R + \delta^n V) + \theta(-\delta\kappa + \delta^2(2R - \kappa)). \tag{A3}$$

4. Flex-D: Use flexibility in period 1, then default.

$$U_1^{Flex-D} = 2R - \lambda\kappa + (1-\theta)(\delta(2R - \kappa) + \delta^2(2R - \kappa)) + \theta(-\delta\kappa + \delta^2(2R - \kappa)) \tag{A4}$$

We restrict our attention to cases where repayment is sustained by a social norm. In particular, we assume that the continuation value V is sufficiently low that borrowers default at $\kappa = 0$ in both rigid and flexible repayment conditions (as shown below):

$$\delta^{n-1} V < R(2 + \delta) \tag{A5}$$

To identify the weakest condition that will guarantee repayment, it is necessary to identify the profile of strategies that will be played as κ increases from zero to R. It is straightforward to show that, at $\kappa = 0$,

$U_1^{Flex-D} > U_1^{Flex-1} > U_1^{Flex-2} > U_1^{Flex-S}$. While default is most attractive at $\kappa = 0$, the expected utility from default decreases quickly as κ increases: $\frac{\partial U^{Flex-D}}{\partial \kappa} = -\lambda - (\delta + \delta^2)$. The strategies have the reverse order in their slope in κ, with Flex-D being the most sensitive to κ, and Flex-S being the least sensitive:

$$\frac{\partial U^{Flex-D}}{\partial \kappa} < \frac{\partial U^{Flex-1}}{\partial \kappa} < \frac{\partial U^{Flex-2}}{\partial \kappa} < \frac{\partial U^{Flex-S}}{\partial \kappa} < 0. \tag{A6}$$

This can be seen in Figure B.3. As κ increases, the borrower moves from Flex-D to Flex-1. Comparing equalities A3 and A4, Flex-1 is preferred to Flex-D if

$$\kappa \geq \frac{R[2+\delta] - \delta^{n-1}V}{[1+\delta]}. \tag{A7}$$

As κ increases further, Flex-2 and finally Flex-S become attractive. Flexibility is misused to increase early consumption as long as Flex-2 is preferred to Flex-S, i.e. if A2 is larger than A1: $(1-\delta)R > \lambda\kappa$ Combining the two inequalities yields that flexibility is misused (Flex-1 and Flex-2) for intermediate values of κ:

$$\frac{R[2+\delta] - \delta^{n-1}V}{[1+\delta]} \leq \kappa < \frac{(1-\delta)}{\lambda} R. \tag{A8}$$

This yields a positive interval for κ if

$$\lambda \leq \frac{(1-\delta^2)}{[2+\delta] - \delta^{n-1}\frac{V}{R}} \tag{A9}$$

Condition A9 is important because it guarantees that the order of strategies is Flex-D, Flex-1, Flex-2, and finally Flex-S as κ increases. In turn, this implies that $U_1^{Flex-1} \geq U_1^{Flex-D}$ (inequality A7) is the weakest condition that guarantees repayment under flexibility. For higher values of λ, the borrower moves from Flex-D (for low κ) directly to Flex-S (for higher κ), without misusing flexibility. As a result, the weakest repayment condition becomes $U_1^{Flex-S} \geq U_1^{Flex-D}$ (curve 'Flex-S' in Figure B.3). Because 87 percent of participants in our sample misuse flexibility absent shocks, we focus on the case where condition A9 holds.

Rearranging inequality A7 for an easier comparison with the rigid benchmark case, the repayment condition under flexibility is

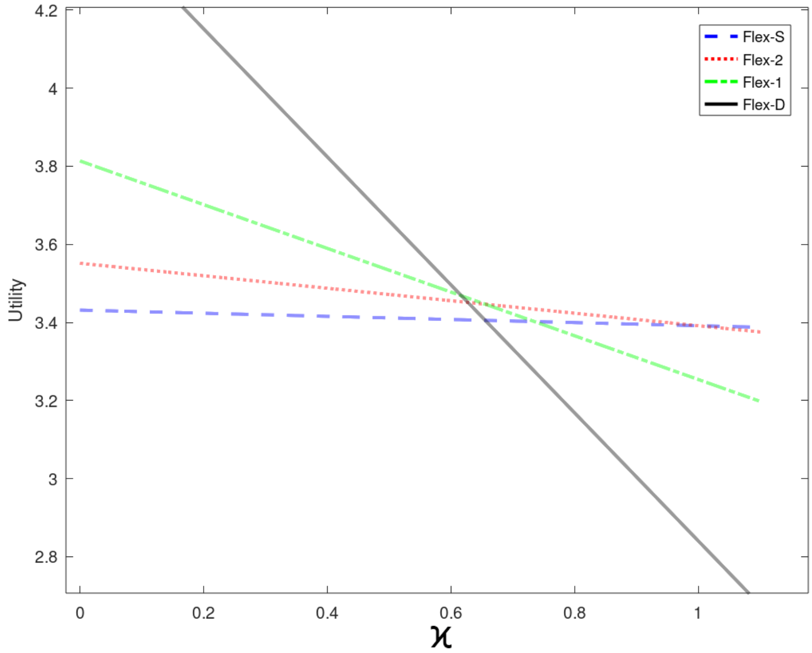
$$\delta^{n-1}V \geq R[2+\delta] - \kappa[1+\delta]. \tag{A10}$$

Comparing inequality A10 with the repayment condition from the benchmark case (inequality 8), flexibility imposes stronger conditions (causes more defaults) than rigid repayment if

$$\kappa \geq (1-(1-\theta)\delta)R. \tag{A11}$$

Default rates will be higher under flexible repayment contracts for large κ, large δ, and small θ.

Figure B.3: Repayment Behavior with Flexible Repayment



Notes: Curves represent the expected utility from a given strategy under flexible repayment (equations A1 to A4). This figure shows simulations using $V=3.3$, $R=1$, $n=4$, $\theta=0.25$, and $\lambda=0.2$. Note the experiment induced $V/R=3.3$, $\theta=0.25$, and $\delta\approx 0.8$ (see Section 2.1).

B.2 Derivation of Predictions

Prediction 1. [Overall repayment] *In the presence of strong social norms, repayment is higher under a rigid repayment contract than under a flexible repayment contract.*

Corollary 1. *Absent social norms, repayment flexibility leads to strictly higher repayment rates.*

The prediction and its corollary follow from inequality A11. Prediction 1 follows for sufficiently large κ, while its corollary follows for $\kappa=0$.

Prediction 2. [Default path] *Using flexibility at first and then defaulting strictly dominates defaulting straight away.*

The expected utility from defaulting can be inferred from equation A4 with λ set to 1. Prediction 2 follows from $\lambda<1$.

Prediction 3. [Flexibility misuse] *The insurance value of flexibility decreases over time. Thus, misuse of flexibility (use of flexibility absent shocks) will increase over time, conditional on flexibility still being available.*

Using flexibility in absence of a shock yields early consumption $R-\lambda\kappa$ in exchange for a delayed payment δR, and is thus attractive as long as $\lambda\kappa<(1-\delta)R$ (see condition A8). Comparing equations A2 and A3, flexibility use in period 1 is unconditionally preferred to flexibility use in period 2 if

$$\theta\delta^n V < R\cdot[1+\delta(\theta\delta-2+\delta+2\theta)]-\kappa[\lambda+\delta(\theta\delta+\theta-\lambda)] \tag{A12}$$

Prediction 3 makes a simpler, conditional statement: In the moment of using it, flexibility has the same benefit in periods 1 and 2, but the cost of using it is lower in period 2. Thus, conditional on still being available, flexibility use should be higher in period 2 than in period 1.

> **Prediction 4**. [Partial repayments] *In rigid repayment contracts, partial payments are always dominated by full repayment or full default. With repayment flexibility, partial repayments can be optimal: Borrowers may comply with single but not double installments.*

In rigid repayment contracts, adding individual repayments to the default path (equation 7) incurs a cost of $R-\kappa$, and does not obtain the continuation value V. For $\kappa < R$, making no repayments dominates making partial repayments. For $\kappa \geq R$, making all repayments dominates partial repayments.

In flexible repayment contracts, the borrower faces a double installment $2R$ after using flexibility to defer repayment. By assumption, the social norm imposes a penalty for not repaying when asked, and thus the penalty for defaulting on a double repayment is still κ. Starting from a full repayment strategy with flexibility use (e.g. equation A3), defaulting on the double repayment yields $2R-\kappa-\delta^{n-1}V$. In cases where $R \leq \kappa < 2R$, and for low V or δ, borrowers may thus find it profitable to comply with single installments but default on double installments.

C Expected Punishment Calculation

The expected punishment for a strategy is the average punishment over all one-period actions, where each action is weighted by the probability that the action is applicable. The calculations also take into account that punishment was paid out for one random period. In *JL*, we calculate expected punishment $E[P]$ of strategy S containing actions a_{it} in case of no shock in period t and a_{jt} in case of a shock as follows:

$$E[P(S)] = \frac{1}{3}\sum_{t=1}^{3}(1-\theta)P(a_{it})+\theta P(a_{jt}) \tag{A13}$$

where $P(a)$ denotes the sample mean punishment of action a in the respective treatment, t the respective period, and θ the shock probability ($\theta = 0.25$ in our experiment). Given our joint-liability setting with mutual insurance, we assume that an individual resumes her initial strategy after a shock (i.e., someone playing RRR resumes repayment after shocks). Note that in *JL*, $a_{it} = R$ for all t in the strategy RRR and $a_{it} = D$ for all t in the strategy DDD. In both cases, a_{jt} = *don't repay (shock)* as the individual is not able to repay, so the calculation simplifies to

$$E[P(S)] = (1-\theta)P(a_{it}) + \theta P(a_{jt}) \tag{A14}$$

In *JL-flex*, flexibility gives rise to additional strategies, both in case of a shock and without. For all strategies that involve repayment and/or the use of flexibility *(RRR, FR*$_2$*R, RFR*$_2$, and *FDD)*, we assume that flexibility would be used in case of a shock, so a_{jt} = *use flex (shock)* if flexibility is available. This implies that we need to consider additional actions triggered by the use of flexibility (i.e. repay $2R$ or default on $2R$). For example, $E[P(FR_2R)]$:

$$\begin{aligned} E[P(FR_2R)] = [&\underbrace{(1-\theta)P(\textit{misuse flex}) + \theta P(\textit{use flex (shock)})}_{\text{Period 1}} \\ &+ \underbrace{(1-\theta)P(\textit{repay double}) + \theta P(\textit{don't repay double (shock)})}_{\text{Period 2}} \\ &+ \underbrace{(1-\theta)P(\textit{repay}) + \theta P(\textit{don't repay (shock)})}_{\text{Period 3}}]/3 \end{aligned} \tag{A15}$$

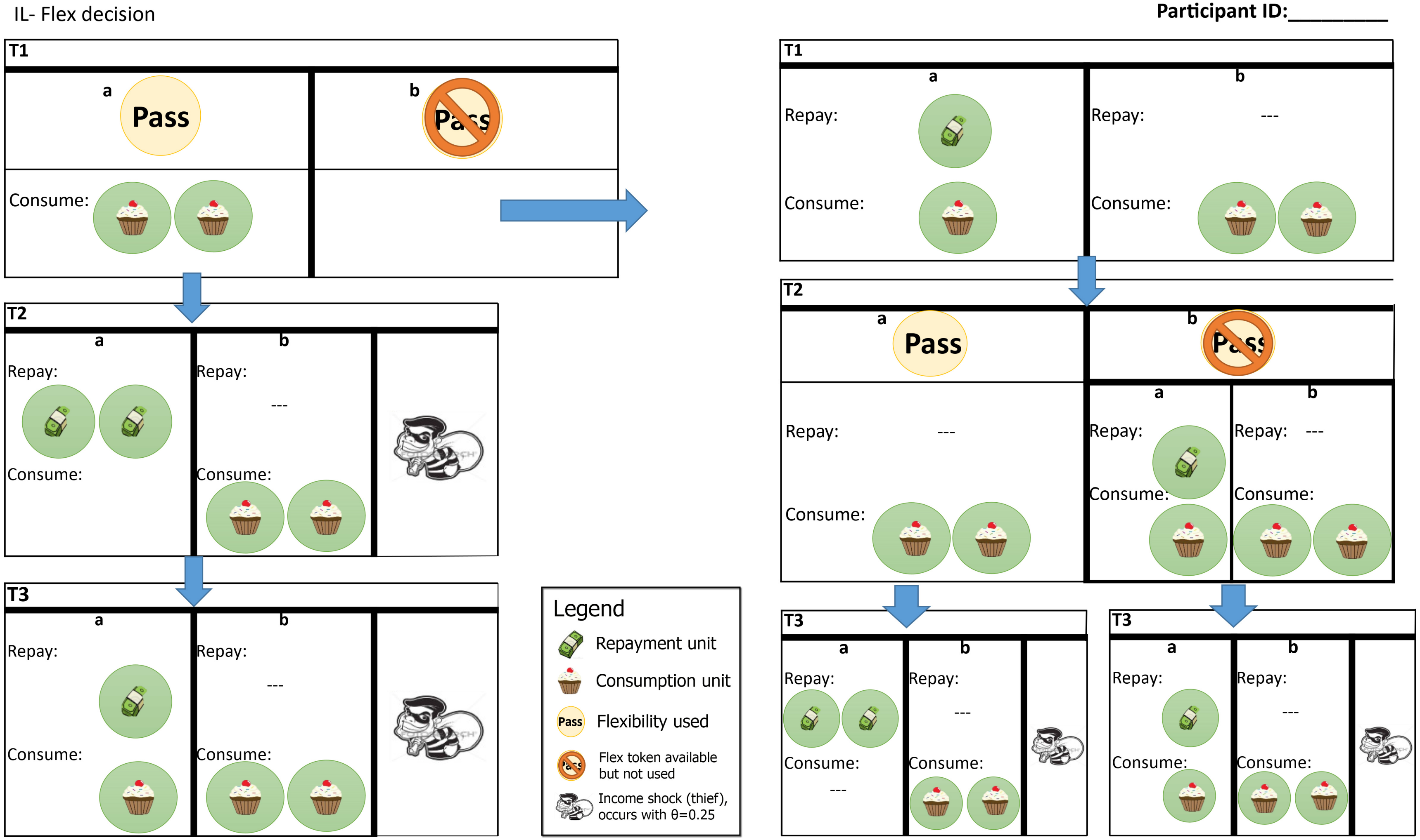
For *DDD* in *JL-flex*, we assume a_{jt} = *don't use flex (shock)*, so the calculation is analogue to *DDD* in *JL*.

D Details on Elicitation of Choices

Flexibility As with all other choices, we elicited decisions on the use of flexibility using the strategy method. First, subjects were asked whether they wanted to use their pass token in period 1 when there is no shock. If they decided to use it, they were subsequently asked about their repayment decisions in period 2 and 3. If they chose not to use it, they had the choice to use their pass token in period 2: first, when there is no shock and second, in case of a shock in period 2. Last, all participants decided whether to use their pass token in period 1 in case of a shock. This procedure lays out nearly the complete strategy on flexibility use.

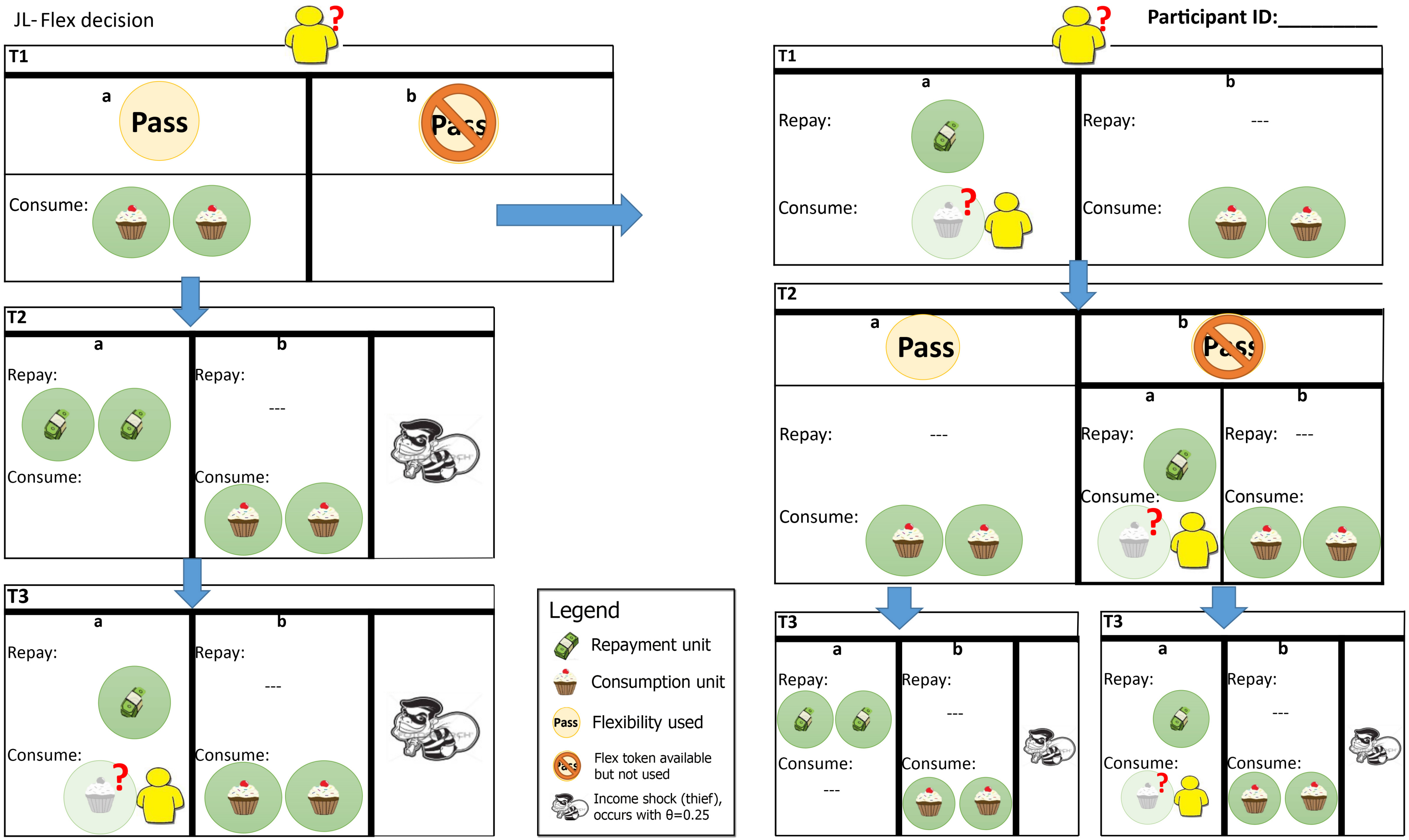
Punishment In total, we elicited punishment decisions in *JL-flex* for eight different choices of the partner: repayment, non-repayment, flexibility use in case of a shock, misuse of flexibility, double repayment (repaying flexibility), non-repayment of flexibility, not using flexibility in case of a shock and non-repayment of flexibility due to a shock.

Figure D.4: Decisions in IL-flex (no-shock path)



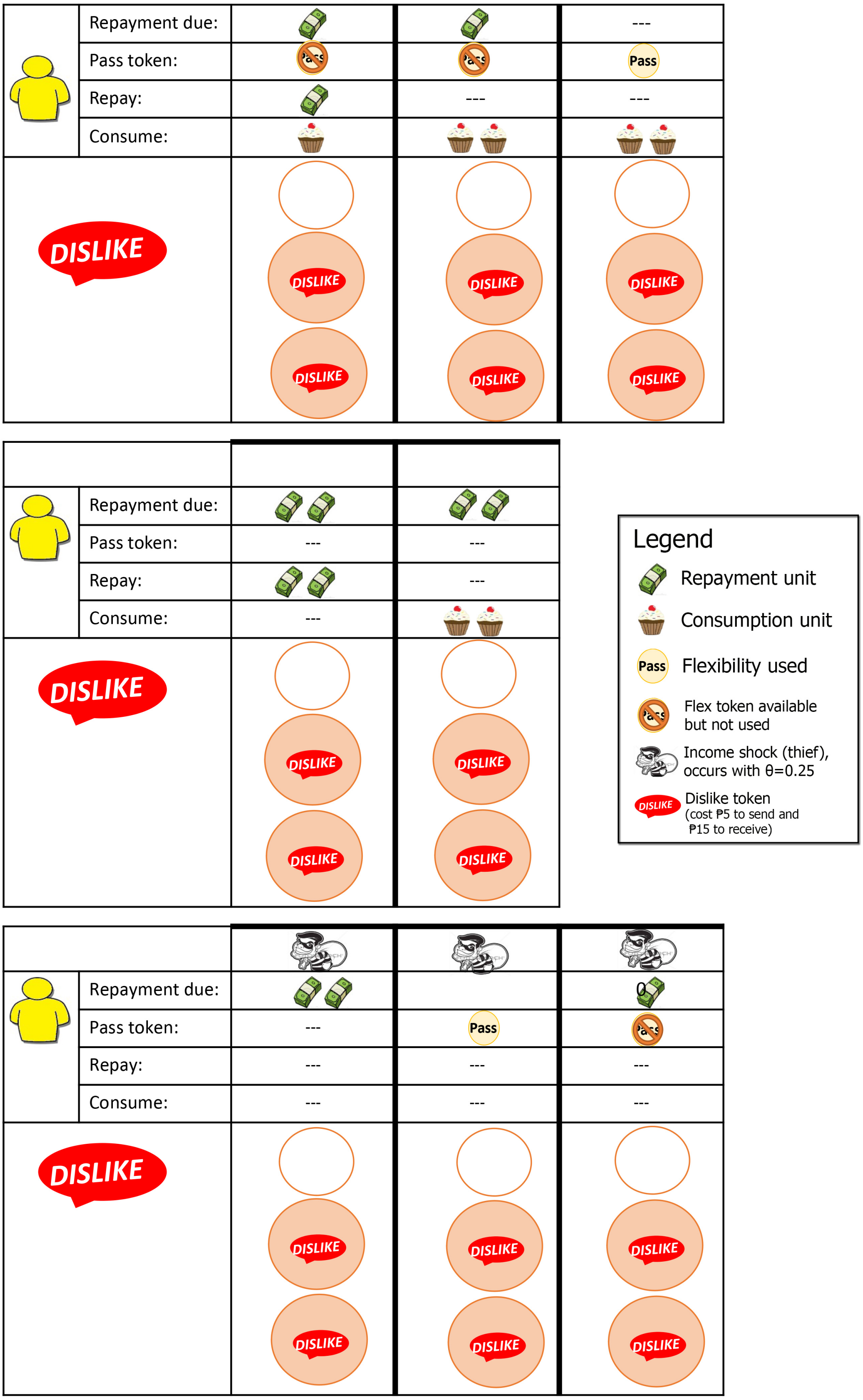
Notes: This figure shows one of the decision sheets from the *IL-flex* treatment, following the path where shocks are possible ex ante but do not arrive ex post. Choices following shocks are elicited on additional decision sheets. The borrower starts in the top left panel, and in the case that no shocks arrive in T1. If she decides to use her pass token in T1, she consumes 2 in T1 and moves to T2 in the middle left panel. In T2, a shock arrives with $\theta = 0.25$. If no shock arrives in T2, she decides between repaying the pass token with $2R$, and consuming 2. In T3, a shock arrives with $\theta = 0.25$. If no shock arrives in T3, she decides between repaying 1 (and consuming 1), and consuming 2. Note that repayment after default is possible but dominated. Alternatively, the borrower may choose not to use her pass token in T1, in which case she moves to the right decision panels as shown. Decisions are repeated for other shock realizations following the strategy method (see Section 2.2 for procedures).

Figure D.5: Decisions in JL-flex (no-shock path)



Notes: This figure shows one of the decision sheets from the *JL-flex* treatment, following the path where shocks are possible ex ante but do not arrive ex post. Decisions are analogue to those described in Figure D.4, except that repayment may now cost either one or two tokens, depending on the (unknown) choice of an anonymous partner. See Section 2.2 for procedures.

Figure D.6: Punishment Decisions in JL-flex



Notes: This figure shows the decision sheet for punishments in the *JL-flex* treatment. Each column shows a possible behavior of the partner and whether a shock has arrived, and asks the participant to assign zero, one, or two dislike tokens. Each token costs five pesos to send and 15 pesos to receive. For instance, the first column corresponds to the punishment for 'Repays' in the *JL-flex* panel of Figure 4. The second column corresponds to 'Does not repay', the third column to 'Misuses flex', and so on. For the randomly selected payoff-relevant treatment, punishment is paid out for a randomly selected period within this treatment (Section 2.2).

E Experimental Setup

Figure E.7: Consumption Table

Notes: Consumption table displaying items for in-kind experimental payouts: income tokens earned in the microcredit game could be traded for these items.

F Norm Elicitation: Vignettes

We will now conduct a study. In the following we will describe various decision-making situations and we will portray the behavior of Maria. Think of Maria who is a fictitious member in a nearby ASHI center, similar to yours. Maria took a loan to run a small internet shop with four old computers. At her shop, people can pay to use a computer and go online.

Scenario 1: no flexibility, week 3 Maria has a 25-week loan. It's the third week of her loan cycle [SHOW SCHEDULE]. In weeks 1 and 2, she has repaid. Today is the next center meeting and her third repayment is due.

1. Maria repays her loan installment. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
2. Maria does not repay her loan installment. You know that there were many power cuts this week, and she could not earn much from her internet shop because her computers don't work without power (she does not have a generator).
3. Maria does not repay her loan installment. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.

Scenario 2: no flexibility, week 4 Now let's look at the next week. Remember that Maria has repaid in weeks 1 and 2. Let's look at the following situation: last week, as far as you know Maria's business was going ok and she did not suffer from any emergency. However, she did not repay her loan installment. Today is the center meeting and Maria's fourth repayment installment is due.

1. Maria repays her loan installment. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
2. Maria does not repay her loan installment. You know that there were many power cuts this week, and she could not earn much from her internet shop because her computers don't work without power.
3. Maria does not repay her loan installment. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
4. Suppose Maria has not repaid either in weeks 3 or in week 4. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment. How socially appropriate do you believe Maria's behavior to be, when you *jointly* consider her behavior in weeks 3 and 4?

Scenario 3: flexibility, week 3 Now imagine that Maria has a new loan product, the 'pass token' [SHOW SCHEDULE]. The pass token schedule means that she has to repay a weekly installment every week, but you get 2 pass tokens with which you can pass the repayment amount due in this week to the next week. The following week, you have to pay a double repayment installment. For example, in some weeks you may have problems repaying your installment because someone in your family gets sick, your children have school activities, or you had a bad business week, etc. The pass token allows you to pass your week's repayment installment to the next period without defaulting to ASHI. ASHI does not check the reasons for you using the pass token so you can use it whenever you want. The only restriction is that you only have 2 pass tokens in total, and you cannot use the two tokens in a row. You have to repay the first before the second token can be used.

Again, Maria has a 25-week loan and this time, she has two pass tokens. It's the third week of her loan cycle [SHOW SCHEDULE]. In weeks 1 and 2, she has repaid. Today is the next center meeting and her third repayment installment is due.

1. Maria repays her loan installment. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
2. Maria uses one of her pass tokens, which postpones this week's installment to next week. You know that there were many power cuts this week, and she could not earn much from her internet shop because her computers don't work without power.
3. Maria uses one of her pass tokens, which postpones this week's installment to next week. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
4. Maria does not repay her loan installment. As far as you know her business is going ok and she does not have any unexpected financial difficulties at the moment. She does not use one of her pass tokens.
5. Maria does not repay her loan installment. You know that there were many power cuts this week, and she could not earn much from her internet shop because her computers don't work without power. She does not use one of her pass tokens.

Scenario 4: flexibility, week 4 Now we are in the next week. Remember that Maria has repaid in weeks 1 and 2. Imagine that last week, her business was going ok, she had no unexpected financial difficulties and that she used her pass token. Today is the fourth center meeting and her third and fourth installments are due, that is two installments in total.

1. Maria repays the two installments. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
2. Maria does not repay the two installments. You know that there were many power cuts *this week*, and she could not earn much from her internet shop because her computers don't work without power.
3. Maria does not repay the two installments. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment.
4. Suppose Maria has used her pass in week 3, and does not repay the two installments in week 4. As far as you know, her business is going ok and she does not have any unexpected financial difficulties at the moment. How socially appropriate do you believe Maria's behavior to be, when you *jointly* consider her behavior in weeks 3 and 4?