Demand for Commitment in Credit and Saving Contracts: A Field Experiment*

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Abstract

We conduct a field experiment in which we offer credit and saving contracts to the same pool of Pakistani microfinance clients. Additional treatments test *ex ante* demand for soft commitment (in the form of reminders, either to respondents or to their families), hard commitment (in the form of a penalty for missing an instalment), and flexibility (an option to postpone an instalment) to save or pay loan instalments on time. We find substantial demand for fixed-repayment contracts in both the credit and savings domains, in ways that imply that respondents value the commitment required. While we find little or no *average* demand for additional contractual features, we nonetheless observe that different combinations of contractual add-ons are preferred depending on the respondent's level of financial discipline. Respondents with high financial discipline prefer flexibility in credit contracts when combined with reminders to self while those with low discipline value penalties in savings contracts only when paired with reminders. Our results imply that, for the average microfinance client, demand for commitment is met through the regular payment schedule built into standard microcredit or commitment savings contracts. However, combining penalties or flexibility with reminders may appeal to certain subsets of clients.

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1 Introduction

In this paper we investigate how the take-up of microfinance products reacts to contractual add-ons that increase or decrease commitment. It has been shown that adherence to a pre-agreed plan improves with the introduction of commitment devices, such as penalties for deviating from the plan, and with the addition of reminders, either to self or to family members. This has been shown for credit and savings contracts (Czura, 2015; Karlan et al., 2016; Barboni and Agarwal, 2021; John, 2020), health and exercise plans (DellaVigna and Malmendier, 2006; Dupas and Robinson, 2013a; Bai et al., 2021), medical treatment (Fenerty et al., 2012; Banerjee et al., 2021), and utilities contracts (Allcott and Kessler, 2019; Bonan et al., 2020). What is less clear is whether clients welcome these contractual add-ons. Indeed, there is also some evidence that introducing contractual flexibility can encourage or discourage take-up. One example of the latter is the combination of credit with insurance (Giné and Yang, 2009); an example of the former relates to loans with performance-contingent repayment (Cordaro et al., 2022).

To cast light on the demand for add-ons, we conduct an experiment that randomizes these different elements in credit and savings contracts and we compare take-up with basic contracts without these add-ons. In particular, we test whether clients are more likely to take a contract with a penalty for non-adherence or added flexibility only when they are combined with reminders. It is reasonable to expect that someone who takes a commitment contract would recognize the self-disciplining benefit of a penalty for default, but only if this penalty does not result from lack of attention (Karlan et al., 2016; Stango and Zinman, 2014). A similar reasoning applies to contractual flexibility: it can help the client deal with shocks, but can increase the likelihood of default if it exacerbates inattention problems. If this is a concern, we expect take-up to depend on whether reminders are included in the contract, as protection against client inattention.

The evidence on commitment and inattention problems in financial decisions comes from two largely distinct streams of research, which often treat saving and borrowing as two separate behavioral realms, both conceptually and practically. Microfinance providers also manage savings and credit products differently, given the different consequences of default. However, when individuals struggle to hold savings over time and wish to incur lumpy expenditures, saving and borrowing may be substitutes (Afzal et al., 2018; Mukherjee et al., 2021) and individuals may 'borrow to save' (Rutherford, 2000; Morduch, 2010; Collins et al., 2009; Armendáriz and Morduch, 2010; Pomeranz and Kast, 2022). Recent work explores the unintended consequences of nudges to save on increasing demand for credit (Medina and Pagel, 2021; Bachas et al., 2021), but little work has been done to explore the implications of this idea for the design of financial instruments using behavioral insights to address commitment and inattention issues.

We run a two-pronged field experiment in Pakistan in which existing microfinance clients randomly receive, in three waves, access to archetypal savings and credit contracts. Contracts vary both in terms of the size and timing of the lumpsum payment, and in terms of their com-

mitment features. Specifically, some of our offers take the form of a standard credit contract, with a lumpsum disbursed at the outset followed by a sequence of regular instalments to be repaid. Others take the form of a commitment saving contract, with a sequence of regular instalments followed by a lumpsum disbursed at the end. Both contracts offer the same commitment device – that is, a regular instalment schedule – but differ in the timing of the lumpsum disbursement. Contracts also vary in their rate of return, *i.e.*, in whether the lumpsum is larger, smaller or equal to the sum of the instalments. We term these variations in the timing and the size of the lumpsum payment as '*contractual variations*'.

We then augment this standard product with a set of contractual add-ons to address the main barriers to saving and timely debt repayment identified in the literature: self-commitment issues, inattention, and intra-household dynamics. The design of the add-ons draws from the major tools found to be effective by studies on saving and borrowing. We vary the level of commitment built into the contract in two ways: in some offers, we increase commitment through the introduction of a penalty for missing an instalment (John, 2020); in other offers, we decrease commitment by allowing higher flexibility in the repayment schedule through the possibility of deferring one instalment (Field et al., 2013). We also vary the salience of the repayment schedule by sending reminders to the clients. Finally, we vary the extent to which household members can influence clients' repayment efforts by targeting reminders to family members.

We conduct this experiment in two phases, with contractual terms adapted to the relevant population, and nearly 3200 current and past microfinance borrowers. The decision to work with microfinance borrowers – as opposed to, say, a random sample from the general population – is deliberate. Our objective is a better understanding of the behavioural barriers to saving and borrowing in microfinance. Since MFI contracts are unlikely to appeal to households already served by formal financial institutions, this is a question for which current and past borrowers constitute the relevant sample. Indeed, Brune et al. (2022) find no differences in take-up between a standard and a flexible MFI contract when it is offered to a new sample of people who were not previous clients. Moreover, a novelty of our experimental design is to offer a range of behavioural add-ons – something that is only financially viable through an established microfinance institution and a sample that is already known to the lender. We nonetheless acknowledge that the contractual innovations that we introduce may appeal to lower middle-class Pakistani households *not* currently served by existing MFI products. Our findings should therefore be seen as conservative.

Our experimental design allows us to address a series of questions to understand product demand within this microfinance sample. In order to make sense of the demand for add-ons, we first need to ascertain the nature of the demand for financial products in our sample. To do this, we exploit *within-subject* contractual variations in the timing and size of the lumpsum payment to test directly how demand for a financial product varies with its price and on whether it is embodied in a saving or credit contract. We find substantial demand for credit contracts and, to a lower extent, saving contracts. Take-up rates are on average about 30% for our credit

contracts, and about 8% for saving contracts. This is in line with demand for similar commitment saving products (Cole et al., 2011), although somewhat lower than the average take-up rate of financial products with commitment features found in the literature (Karlan et al., 2014). When offered both a credit and a saving contract, 46% of the participants who take up at least one offer accept another separate offer. We also find that some subjects take up savings contracts with a negative return, while others do not take credit contracts with an interest subsidy. This combined evidence is consistent with a stylized model in which subjects face substantial costs of holding cash and have occasional and sometimes unforeseen need for a lumpsum. This creates a demand for commitment contracts, either in the form of credit or savings, which however does not manifest itself all the time. This explains the observed variation in take-up across waves by the same subject. Further, unanticipated financial needs favour take-up of the credit contract, while only non-urgent needs foster demand for commitment savings contracts. A decision-maker who can hold on to cash would deal with this situation by accumulating precautionary savings – and would not take up some of our less appealing products. But this need not apply to many of our subjects, who face substantial impediments to accumulating on their own and are thus more willing to take otherwise-unappealing contracts when the need arises.

Having clarified the nature of the demand for our financial products, we use *between-subject* variation in contractual add-ons to provide evidence of how this demand responds to variations in commitment and flexibility, assistance in keeping track, and exposure to intrahousehold pressure. Crucially, we test whether demand for add-ons (Bryan et al., 2010) varies within the same sample when added to a credit or a saving product. We are able to investigate the effects of a rich set of interacting treatments across the two domains. These tests help our understanding of the behavioral foundations of microfinance (Bauer et al., 2012), determining the combination that is preferred by different subject types (Muralidharan et al., 2022; Banerjee et al., 2021).

We find no demand for contractual add-ons – such as flexibility, default penalty, and reminders. This is particularly in evidence for credit contracts, where take-up falls when additional commitment features are imposed. This negative effect is particularly strong when a default penalty is coupled with family reminders. For savings contracts, we cannot reject that average take-up is the same with or without add-ons. These results indicate that, in isolation, commitment devices added to the contract are not valued by clients: the commitment built into a fixed-repayment credit or savings contract seems sufficient for the needs of our subject population.

We do, however, uncover evidence that certain *combinations* of add-ons appeal to some participants. In credit contracts, high-discipline participants only like the flexibility add-on if it is combined with reminders-to-self. This confirms our expectation that flexibility exacerbates inattention concerns, and that participants see reminders-to-self as a way to mitigate these concerns. In contrast, low-discipline participants like the default penalty only if it is offered with reminders. This is consistent with the hypothesis that MFI clients with financial discipline issues

may recognize that adding a penalty increases commitment, but fear incurring this penalty as a result of inattention – a concern that is mitigated by reminders. These findings would not have been made, had we not crossed the two types of treatments with each other.

Together, we see our results as making several distinct contributions. By presenting the same set of clients with both debt and credit products, we show that, in developing countries, many microfinance clients 'borrow to save' – or more precisely to accumulate a lumpsum, when doing so on their own may be difficult, inconvenient, unsafe or costly – thereby demonstrating a demand for commitment. In previous work, we showed this pattern of behavior for small financial products with daily repayments (Afzal et al., 2018). This paper substantially extends that result in several key ways. First, in the earlier paper, we focused on daily repayment contracts only – a contract quite unlike standard microfinance products offered on the market[1] – and we were left to speculate as to the generalisability of our result. To the best of our knowledge, our current experiment is the first to randomly offer the same client pool both credit and savings products of instalment and size of lumpsum over the duration of study comparable to standard microfinance products – and, therefore, confirms that, for such products, many of the same clients who face difficulties holding on to cash on their own will accept both credit and savings products.[2] Second, the earlier experiment did not involve any cross-cutting contractual add-ons and was therefore unable to speak to features targeting lack of financial discipline and inattentiveness impacting demand in the credit and saving domains. Third, the earlier work said almost nothing about correlates of take-up, whereas the current paper uses recent machine learning techniques to provide a rich characterisation of heterogeneity patterns. Finally, our earlier work did not involve any follow-up interviews – and was therefore unable to provide any estimates of the consequences of being offered this kind of rotating product. This shortcoming is corrected here, allowing us to benchmark our results to a growing literature on the impacts of microfinance (Meager, 2019).

More generally, our paper makes a contribution to a second generation of microfinance experiments: after a first generation of RCTs showing low take-up of microcredit and, partly because of this, limited poverty impacts on average, a more recent wave of papers aims to understand how adjusting standard microfinance contracts might help boost take up and, perhaps, poverty impacts. The current paper takes a systematic approach to this question by assessing the potential attractiveness of major forms of soft and hard commitment, and their combinations, in both a basic savings and credit context.[3] Our results can inform not only the design of effective

[1] As we note in Section 2, certain design aspects require offering atypical products, for instance, those that provide a net negative balance on a savings product; and offering products to the same clients over multiple waves, which meant contracts had a shorter duration than typical microfinance products.

[2] This complements recent work by Pomeranz and Kast (2022) showing that, for many microfinance clients, provision of savings accounts reduces levels of debt. It also supports the literature already cited on borrowing to save among microfinance clients (Morduch, 2010; Collins et al., 2009; Armendáriz and Morduch, 2010). The paper also relates to a recent literature on formalisation of informal savings products (Dupas and Robinson, 2013a,b). Similarly, Brune and Kerwin (2019) find a positive effect of deferred income streams designed as lumpsum payments.

[3] We thank an anonymous reviewer for this insight.

microfinance products, but also the theoretical debate on the main barriers to financial discipline. On the policy front, recent evidence has underscored the importance of evaluating the combined effects of different policy instruments (Banerjee et al., 2021) and of considering interaction effects between treatments for correct estimation (Muralidharan et al., 2022). Our results suggest that offering formal flexibility, added penalties for cancellation, reminders, or intra-household pressure, in isolation or combined, holds little potential for improving take-up, and potentially impact, of microfinance products. Theoretically, each form of commitment device addresses more than one barrier at the same time. For instance, reminders represent a tool against both inattention and self-commitment issues; and flexibility can both reduce commitment and increase the cognitive cost of meeting payment obligations. By cross-cutting different contractual add-ons, we are able to isolate the influence of specific barriers. For instance, the fact that the demand for reminders falls when they are coupled with hard commitment suggests that reminders help address self-commitment issues.

Further, our results complement existing evidence on individuals' demand for commitment devices. Such evidence is mixed, both in terms of demand for commitment and of the welfare impacts of commitment contracts (Kaur et al., 2015; Schilbach, 2019; Augsburg et al., 2022; Ashraf et al., 2006; Allcott and Kessler, 2019; Damgaard and Gravert, 2018; Allcott et al., 2022; Bai et al., 2021; Laibson, 2015; Karlan et al., 2010). Our results suggest that demand for commitment is not just driven by the level of commitment offered (Battaglia et al., 2021; Barboni and Agarwal, 2021), but also by the client type. Our results also complement a recent literature documenting the hidden welfare cost of nudges through evidence of avoidance behavior (Allcott and Kessler, 2019; Damgaard and Gravert, 2018).[4]

Finally, we join a growing set of papers in microfinance by measuring the impact of our financial product on a wide range of household and business outcomes. Consistent with previous studies in the literature, we do not find transformative effects of standard microcredit products on either business outcomes or household material welfare (Meager, 2019; Angelucci et al., 2015; Attanasio et al., 2015; Augsburg et al., 2015; Banerjee et al., 2015; Crépon et al., 2015; Tarozzi et al., 2015; Karlan and Zinman, 2011; Liu and Roth, 2022). We also contribute to a smaller and more recent literature showing similarly limited effects of microsaving (Dupas et al., 2018; De Mel et al., 2022; Castellanos et al., 2019).

[4] In a related literature, experimental studies on 'avoiding the ask' and 'moral wiggle room' demonstrate how individuals avoid information or requests that make them feel morally obliged to act in a certain way, when such actions are costly (Andreoni et al., 2017; d'Adda et al., 2018; Dana et al., 2007). Other relevant phenomenon, 'control aversion' and 'ambiguity aversion', cause incentives and regulations to backfire when they are perceived as overbearing or ambiguous (Falk and Kosfeld, 2006; Fehr and List, 2004). See also the recent work of Bryan (2019) on the role of ambiguity aversion in explaining take-up of insurance.

2 Experimental design

2.1 The basic contract

In the experiment, each respondent is offered an individual-liability microfinance product at the beginning of each of three sequential waves; the respondent then makes a take-it-or-leave-it decision on the basis of that offer. If the respondent accepts the contract, payment starts the following week (Week 1). Participants pay a weekly instalment of size M in $(N-1)$ of the N weeks, and receive a lump-sum payment of size L in the remaining week. Within this basic design we experimentally vary the contract terms randomly offered to treated participants at the beginning of each wave along two dimensions: the week in which the lumpsum payment is made; and the amount of the lumpsum payment L. Since there are three possible lumpsum values and two possible disbursement weeks, there are six possible contractual variations. Three of these contracts have a lumpsum paid in Week 1: they are a form of commitment credit contract. Three have a lumpsum paid in Week N: they are a form of commitment savings contract. Note that some credit contracts provide a positive net balance: credit is subsidized. Similarly, some saving contracts yield a negative net balance: subjects pay to save. This latter feature seeks to mimic the fact that savings instruments made available to the poor often yield a negative return, either because of fees and charges (e.g., Dupas and Robinson (2013a)), or because of inflation. More generally, the variation in total remuneration allows us to understand subjects' willingness to pay for such products.

A missed payment is considered a default and results in cancellation of the contract. In case of default, the participant has to return any payment owed as soon as possible and, at the latest, by the end of Week N. If not, the participant is not offered any contract in the following wave. In case the participant has a positive balance at the time of default, this balance is returned to the subject at the end of the wave – that is, after Week N. Consequences of default – and therefore the motivation for takeup and payment of instalments – are different in the saving and credit domains. Subjects who renege on a commitment saving contract only face mild penalties: their paid-in instalments are kept until the end of the contract cycle, at which point they are returned. On the other hand, default in credit contracts is much lower because NRSP's collection effort is much more stringent. The logic is simple: the subject has already received the lumpsum, so reneging has to be disincentivized by a deliberate debt recovery effort.

2.2 Contractual add-ons: Flexibility and reminders

Beside traditional explanations relying on credit constraints, transaction costs and lack of financial literacy, the recent behavioral literature on saving and borrowing by the poor has focused on three main explanations for undersaving and take-up of microfinance products: commitment issues, inattention and intra-household dynamics. Existing evidence on these barriers typically

tests one – or at most two – of these factors within the same design, or relies on the analysis of heterogeneous treatment effects to assess their empirical relevance (Dupas and Robinson, 2013a; Karlan et al., 2016). Moreover, the existing evidence focuses either on saving or borrowing behavior. Given the different consequences of default in credit and saving contracts just discussed, behavioral barriers may play varying roles across domains. We explore this fully by augmenting our basic contracts with several add-ons in a cross-cutting design, with the aim of isolating each of these factors.

Commitment features. Our commitment arm involves either adding a cancellation fee (we term this the 'sunk' treatment), or allowing for additional contractual flexibility (we term this the 'flex' treatment).

The 'sunk' treatment adds a cancellation fee of *PKR* 500 for defaulting on a contract. This penalty is added to the total amount owed by the participant to the bank. If subjects demand harder commitment contracts, we expect more take-up in this treatment. How this penalty operates depends on whether the contract is a credit contract (*i.e.*, lumpsum paid in Week 1) or a savings contract (lumpsum paid in Week N). For instance, under the basic contract – as noted earlier – if a respondent has paid three instalments totalling *PKR* 1500 and then defaults, she receives *PKR* 1500 in Week N. Under the 'sunk' treatment, she receives only *PKR* 1500 minus the cancellation fee: that is, *PKR* 1000. This is equivalent to making the first instalment 'sunk' (e.g., John (2020)). In case of default in a credit contract, the remainder of the debt becomes immediately due. For instance, if a subject had repaid *PKR* 1500 on a *PKR* 3500 loan granted in Week 1 but stops paying in week 5, the unpaid portion of the loan becomes due in that week, *i.e.*, *PKR* 2000. In the 'sunk' treatment, the cancellation fee of *PKR* 500 is added to this amount.

In the 'flex' treatment, in contrast, more repayment flexibility is added to the contract. In this treatment, we give participants the flexibility of delaying *one* instalment by *one* week only.[5] To illustrate, the subject may decide not to pay the instalment *PKR* 500 in Week 3. In this case, the subject will have to pay the regular instalment of *PKR* 500 in Week 4 plus the delayed instalment of *PKR* 500 from Week 3 – *i.e.*, a total of *PKR* 1000 in Week 4. Other instalments remain unchanged. Note that the subject in the 'flex' treatment decides when to use the option to delay an instalment. It can be applied to any instalment between the first instalment and the last – or to none at all. All other rules regulating default continue to apply.

The design of the 'sunk' and 'flex' treatments draws from existing studies introducing hard commitment features to saving products (John, 2020) or adding flexibility to the rigid repayment schedule typical of microfinance products (Field et al., 2013; Czura, 2015; Barboni and Agarwal,

[5] Subjects are told that 'We understand that it is not always possible to pay instalments every week. Therefore, over the course of eight weeks, we will allow you on one occasion only to delay a payment by one week.'

2021; Battaglia et al., 2021).[6] While these features are primarily addressing commitment issues, they arguably also affect the salience of the payment schedule. Combining these features with add-ons more directly targeted to inattention, e.g., reminders, can allow us to test the impact of these different barriers to take-up and default both in the saving and credit domains.

Reminders. Reminders are a common tool studied in the behavioral literature on savings. Their purpose is to increase the salience of saving goals or payment obligations and of the benefits from meeting them, and through this to help participants follow a regular schedule of payments. In our experiment, we send reminders one day before an instalment is due. Reminders are transmitted through phone calls. In the 'respondent reminder' treatment, the call is made directly to the participant; in the 'family reminder' treatment, the call is made to a family member of the participant. Subjects are told that the financial product offered to them includes reminders. For instance, if a subject is assigned to a respondent reminder treatment, she is told that she will receive a reminder before each instalment is due.[7] This is different from other experiments that have externally introduced reminders and observed how these reminders affect payment patterns (see, for example, Karlan et al. (2016) who introduce reminders via letters and text messages). Here we investigate whether subjects are more willing to accept a financial contract that includes reminders.

Respondent reminders and family reminders are primarily targeted to two different sources of saving or repayment issues: inattention and intra-household pressures. Inability to meet financial obligations may derive from their lack of salience: in such instances, personal reminders increase commitment attainment (Karlan et al., 2016). The influence of household members on financial discipline can be positive or negative: peer pressure and demands from household members to share available resources may limit individual ability to save or repay a loan (Squires, 2021; Jakiela and Ozier, 2015; Ashraf, 2009), but household members may also act as 'saving monitors', to help the respondent to stick to the savings commitment (Breza and Chandrasekhar, 2019). Reminders are also a form of soft commitment device (Karlan et al., 2014). By comparing the impact of reminders on take-up and repayment when sent to the respondent or to a household member, in isolation or combined with other add-ons varying the commitment of the payment schedule, we are able to assess the direction and relative weight of these different constraints.

[6] Our 'flex' treatment is closest to the flexibility option in Barboni and Agarwal (2021), with the key difference that customers have to pay in full the instalment that they decide to skip with the following instalment, rather than spreading out the outstanding balance over the remaining loan instalments.

[7] The experimental protocol stipulates that subjects are told: 'To help you commit to a regular schedule of payments, we will call you on the day before an instalment is due... This call will be directed to you personally, on a phone number that you will provide to us if you take up the product.' For family reminders, the text is: 'To help you commit to a regular schedule of payments, we will call a member of your family on the day before an instalment is due.' Staff were instructed that, for reminder calls to respondents in the 'family reminder' treatment, it was not permissible to leave reminder messages with any other person who might answer the call.

2.3 Implementation

Recent literature has emphasized the value of replicating similar experiments in different variations and across different contexts; this is valuable for providing a breadth of contexts, for understanding the generalizability of results, and whether they are sensitive to specific aspects of design (see, for example, Dupas et al. (2018), Karlan et al. (2016) and Banerjee et al. (2015)). With this principle in mind, we implemented our experiment in two distinct phases. These phases used different sampling frames (one focusing on microenterprises, the other focusing on households), with contractual terms adapted to the respective respondent population.

In both phases, we implemented our experiment with the National Rural Support Programme (NRSP), a microfinance institution with extensive experience offering credit to women across Pakistan. Participants were drawn from past and current clients of microfinance products offered by NRSP.[8] As already discussed, we chose this sample both for the purpose of academic insight and the purpose of potential external policy validity: indeed, the ideal sample comprises of precisely the kind of people with whom microfinance institutions will engage, making our results relevant for predicting demand among already-takers of microfinance products. Having said this, we acknowledge that taking-up and successfully repaying a microfinance loan entails a process of selection that crucially depends on individual features, such as financial discipline, sophistication and preferences for commitment, which are likely to influence the demand for our product and for the contractual add-ons that are the main outcomes of our study.[9]

In the first phase, we restricted participation to female NRSP clients – past and current – whose household owns a business. For this group, we set $N = 6$ and $M = PKR$ 1000 and we let the lumpsum payment take three possible values: PKR 5000, PKR 4500 or PKR 5500. Since participants pay $N - 1 = 5$ instalments of PKR 1000 each, a lumpsum of PKR 5000 simply returns the five instalments to the subject. A lumpsum of 4500 is equivalent to deducting 10% from the lumpsum, while a lumpsum of 5500 means adding 10% to the sum of instalments received. Table 1 illustrates the payment schedule for a basic contract with a lumpsum payment on Week 1 and a net balance of -10%; it also presents a second example of a savings product with a positive net balance of 10%. The zero balance instalment amounts to 20% of the monthly consumption expenditure reported at baseline. The first phase was conducted from 25 August 2014 to 1 March 2015 in two districts of Pakistan Punjab: Bhakkar and Chakwal. The endline survey was completed by 30 March 2015.

In the second phase, we drew our sample from past and current female NRSP clients, whether or not their household owned a business. Following guidance from local partners, we decided for this broader sample to use more payments, with smaller amounts: specifically, we set $N = 8$ and

[8] 13% of the participants in the first phase and 31% of the participants in the second phase were current NRSP borrowers.

[9] This is conceptually similar to understanding moral hazard and adverse selection in borrowing using a sample of borrowers who have successfully repaid previous loans (Karlan and Zinman, 2009).

$M = PKR$ 500. In these sessions, the lumpsum takes three values: PKR 3500, 3200, or 3800. As in the first phase, the middle value is equivalent to setting a zero interest rate, and is approximately equal to 17.5% of the monthly household expenditure. The other two values are equivalent to adding or subtracting 8.6% to the total instalments paid by the participant. The second phase was implemented from October 2015 to May 2016 in four districts of Punjab: Jhelum, Rawalpindi, Khushab and Mandi Bahuddin. The endline survey was carried out in July-August 2016.

In Table 2, we summarize the experimental design, and report the share of participants assigned to each treatment. In Phase 1, we used a simple treatment/control division (with 50% of our sample in each). In Phase 2, we assigned 25% of participants to the control group; the remaining 75% were then assigned in a 3×3 factorial design, covering all combinations of (i) sunk, flex or no commitment feature, and (ii) respondent reminders, family reminders and no reminders. As showed in the table, Phase 2 respondents faced a single form of treatment throughout the experiment (that is, we introduce *between-subjects* exposure to either the basic contract or one of the contractual add-ons), and this was known in advance of the wave 1 take-up decision. Respondents then faced random wave-to-wave variation in contractual terms (that is, the timing of the lumpsum and the contractual balance varies by design *within subjects*); this was known in advance of the take-up decision for each wave.[10] We explain the specific details of randomization and implementation in B.1.

Appendix Tables A18 and A19 describe the main characteristics of the sample in the two phases. Monthly household consumption averages PKR 25,000 (at the time, equivalent to about \$250 and 5 times the zero-interest lumpsum amount in basic contract) in Phase 1 and PKR 20,000 (approximately \$200 or 5.7 times the zero-interest lumpsum contract amount) in Phase 2. A large proportion (60%) of the sample in Phase 1 is self-employed but this proportion is much smaller in Phase 2. On average, a third of the respondents in the two samples report finding it difficult to save. A small proportion – 11.2% in Phase 1 and 5.3% in Phase 2 – report having money in the bank at time of baseline, but a majority – 90% in Phase 1 and 84% in Phase 2 – keep some cash at home. At baseline, the median cash at home was PKR 2400 (\$24) in Phase 1 and PKR 1300 (\$13) in Phase 2. Appendix Tables A18 and A19 also report p-values for randomization balance across treatments and across contract terms. This is done by regressing each variable on the assigned treatment status in a saturated specification. We test for randomization balance across contract terms, using a similar saturated specification that regresses each variable on randomly assigned interest rate and week of payment. We find strong balance across treatment status and contract terms in Phase 1. In Phase 2, we find four variables that are not balanced at the 90% confidence level. To address this issue, we first show in Appendix Table A20 that the magnitude of the

[10] NRSP does not require its clients to make instalments at the NRSP office necessarily. Borrowers, especially women, can specify if they would prefer for a NRSP loan officer to collect instalment at respondent's home or place of work. In line with usual practice, and to minimize transaction costs, at the time of offer, respondents were asked to specify where they would prefer to meet to make instalments.

differences across treatments is quite small for these four variables. Furthermore, in Appendix Section C5 and Figures A8 and A9, we use a post-double LASSO estimation to check whether our main estimation results are affected when we include this set of baseline variables as controls. We find that they are not.

3 Demand for commitment in our basic product

To analyse take-up patterns, we consider both average behaviour, and also exploit the panel dimension of our experiment to analyse within-respondent take-up patterns. Take-up may be driven by a need to smooth consumption, make arbitrage gains, or access a lumpsum payment. We consider each of these in turn. To foreshadow, we argue that take-up patterns can only be understood through an important role for the time-varying need to access a lump sum payment.

A detailed conceptual framework to the empirical analysis is provided in Appendix D. We consider three stylised benchmark scenarios. Scenario 1 represents the case where subjects can hold on to cash. Under this scenario, a simple arbitrage argument implies that a saving contract with a zero or negative return can never be optimal, as individuals could accumulate the lumpsum on their own at the same or lower cost. Similarly, credit contracts where the lumpsum exceeds the value of the instalments should always be accepted, as individuals could simply use the lumpsum to pay the instalments and keep the remaining amount.

Scenario 2 examines the stylised case of a subject who *cannot* hold on to cash, for instance due to self-commitment issues, and for whom the contracts we offer are the only available way of moving funds across periods. Using a standard framework of expected utility with exponential discounting and a weekly discount parameter, we predict that, with no particular demand for a lumpsum and no transaction costs, the take-up rate of the positive-balance saving contract and that of the negative-balance credit contract should sum to approximately 100 percentage points across the sample: subjects whose rate of time preference makes them want to save for a return r or below are also those who do not want to borrow at an interest rate of r or above, and vice versa.

Scenario 3 focuses on the case where subjects cannot hold on to cash but may need a lumpsum to finance lumpy expenditures. The model for this scenario shows that, when the demand for a lumpsum is high, the proportion of subjects willing to take a credit contract with a negative payout ratio is substantially larger than the proportion of subjects who reject a savings contract with a positive return. Alternatively, when the need for a lumpsum is low, a costly loan will be taken up by very impatient subjects while a saving contract with a positive return will be taken by very patient subjects. If preferences for a lumpsum vary across waves – for example, because of fluctuations in the utility of lumpsum accumulation or in the anticipated utility cost of instalments – the model predicts that we could observe subjects borrowing in some waves and

saving in others.

Testing strategy on take-up: Our analysis of the take-up data is organized around the above ideas. We first check whether observed choices contradict the predictions of the pure arbitrage argument of scenario 1 – *i.e.*, subjects take savings contracts with negative returns or refuse credit contracts with positive returns. Such evidence indicates that some subjects find it difficult to hold on to cash, thereby justifying a closer examination of scenarios 2 and 3. We then test whether the predictions of scenarios 2 and 3 are consistent with observed choices: to do this, we exploit the fact that within our experiment we observe the behaviour of the same individuals over multiple waves.[11]

3.1 Average take-up

We start by documenting average take-up frequencies for the six combinations of lumpsum amount and lumpsum week offered in the two phases of experimental sessions. Control respondents are omitted since they were not offered the contracts. Take-up frequencies are obtained by estimating a linear probability model of the form:

$$a_{it} = \sum_{w=1}^{2} \sum_{r=1}^{3} \beta_{wr} \cdot T_{it}^{w} \cdot T_{it}^{r} + \varepsilon_{it}, \tag{1}$$

where $a_{it} = 1$ if individual i accepts the contract in wave t and 0 otherwise. Variables T_{it}^{w} and T_{it}^{r} are dummies equal to 1 if individual i in wave t is offered a contract with payment in week 1 or N and with a negative, zero or positive net balance.[12]

Table 3 shows results for all subjects, from both experimental phases.[13] We observe high take-

[11] Our empirical analysis – both of product demand and consequences of adopting – follows two Pre-Analysis Plans. Our pre-analysis plan for Phase 1 (filed on 10 May 2015) is available at https://www.socialscienceregistry.org/trials/684, and the extensive implementation of that analysis is available at http://www.simonrquinn.com/Microfinance_PreAnalysis_Phase1.pdf; our pre-analysis plan for Phase 2 (filed on 15 January 2017) is available at https://www.socialscienceregistry.org/trials/1916, with extensive implementation available at http://www.simonrquinn.com/Microfinance_PreAnalysis_Phase2.pdf.

[12] In both phases, some subjects said they were not interested in any contract and, consequently, staff members did not insist that they draw out a card to determine T_{it}^{w} and T_{it}^{r}. These subjects thus refused all six possible contracts, each of which they would have been offered with probability 1/6. We treat these cases as six different refusal observations each given a weight of 1/6. Standard errors are clustered at the individual level. We examine the characteristics of automatic refusers in both phases in Tables A2 and A3 and find that automatic refusal is less likely among subjects who are currently participating in a committee, those who have higher debt and, in the case of Phase 1, those who are currently running a business.

[13] In the Online Appendix (Table A4) we show the same analysis excluding 'automatic refusers' – that is, respondents who refused the contract before learning the contractual terms. The proportion of automatic refusers in each wave of each phase is reported in Table A21. Across all three waves, automatic refusers account for one-third of Phase 1 observations, and two-fifths of Phase 2 observations. In phase 1, the proportion of automatic refusers increases slowly across waves; in phase 2, the proportion of automatic refusers is twice as high in the first wave than in the other two. 58% and 29% of subjects are never automatic refusers in phase 1 and 2, respectively. The proportion of subjects who automatically refuse in all experimental waves is 25% and 20% in phase 1 and 2, respectively.

up for contracts with a high-lumpsum provided in week 1: 47% in Phase 1 and 37% in Phase 2. As anticipated, demand falls sharply for lower lumpsums and for later payouts. We also find that the sensitivity of take-up to the size of the lumpsum is larger for credit than savings contracts, in line with existing evidence (Karlan et al., 2010). This is consistent with our earlier results in Afzal et al. (2018) using a similar contract design but a much shorter contract duration.

3.2 Arbitrage and ability to hold on to cash

Next we examine the observed take-up behaviour in light of the three stylised scenarios described earlier. We begin by considering arbitrage and the ability to hold cash across periods.

We first note that a non-negligible fraction of subjects take a savings contract that simply accumulates their instalments: 8.9% in Phase 2 and 4.3% in Phase 1. Subjects could have accumulated the money themselves and saved the time and effort of making regular repayments. We even see take-up of savings contracts with a *negative* net return: in Phase 1, we observe a 2.7% take-up for contracts offering a payment of *PKR* 4500 in week 6 after five payments of *PKR* 1000, and in Phase 2, 4.1% of participants accept a contract that pays *PKR* 3200 in week 8 after 7 instalments of *PKR* 500. In both cases, participants could have accumulated the instalments themselves and end up with a surplus. By the arbitrage argument presented earlier, take-up of any of these contracts requires that the subjects be unable to save cash on their own.

Similar evidence (in reverse) can be found for subsidized credit. In Phase 1, more than half of the subjects (53%) refuse to receive *PKR* 5500 in week 1 in exchange for *PKR* 5000 in 5 instalments of *PKR* 1000; in Phase 2, 62.8% of subjects refuse *PKR* 3800 in week 1 in exchange for *PKR* 3500 in seven instalments. This suggests that a large proportion of subjects either face substantial costs of holding cash, or consider that the time cost of visiting the MFI to pay the instalments exceeds the value of the subsidy. Taken together, the evidence rejects the stylised arbitrage model discussed in scenario 1.

3.3 Implied discount factors for subjects who cannot hold on to cash and consistency of behavior across waves

Next we turn to scenario 2 – namely, when subjects cannot save on their own but react to contract offers in a way consistent with a standard model of saving and borrowing with stable time preferences. We have seen in Table 3 that take-up responds to contractual terms. However, contrary to predictions of the second scenario, take-up of the positive-balance saving contract and take-up of the negative-balance loan contract do not sum to anything close to 100 percentage points. For instance, take-up of the low-balance loan is 8.2% in Phase 1 while take-up of the positive-balance savings contract is 11% – *i.e.*, a sum of 19.2%, very far from 100%. In Phase 2, the corresponding proportions are 11.0% and 11.3% – a sum of just 22.3%. Similarly, for the zero-balance loan contract, the sums are 30.2% + 4.3% = 34.5% in Phase 1 and 26.0% + 8.9% =

34.9% in Phase 2. This suggests that subjects have a stochastic demand for lumpsums; that is, their behaviour is not well captured by a framework with stationary utility functions and a stable discount factor.

In Appendix E, we verify this conjecture by using the the pattern of take-up to infer the distribution of the time preference parameter (β) under different scenarios regarding the value of the parameter that captures demand for lumpsum accumulation (θ). We do so separately for credit and savings contracts. Since contract offers are randomized across the same subjects within each wave, the populations of subjects offered credit contracts and savings contracts are comparable and thus they should have a compatible distribution of time preference parameters. As we show in the Appendix, if we impose that the demand for lumpsum accumulation θ is constant across waves, the only values of θ that generate a meaningful distribution of the β's across credit and savings contracts is actually inconsistent with a positive demand for lumpsum accumulation. Since we do observe demand for lumpsum accumulation at least in some waves, θ cannot be constant across waves, which in turn means that demand for lumpsum accumulation is present in some waves but not in others.

A further implication of the presence of a constant demand for lumpsum θ smaller than one is that subjects should not switch between credit and saving contracts across waves: either they only take loans, or only saving contracts, or neither. On the contrary, if demand for lumpsum accumulation is high ($\theta > 1$), a key prediction of the model for scenario 3 is that subjects can demand both credit and savings contracts.

To investigate this idea, we report in Table 4 the proportion of cases in which the same subject takes both a saving and a credit contract across waves. In the first panel of the graph, we consider individuals who are offered a loan charging a zero or positive interest – implying some desire to speed up consumption – as well as a savings contract with a zero or negative return – implying a strong desire to postpone consumption. We have 107 individuals in Phase 1 and 350 in Phase 2 who were offered each type of contract at least once during one of the three product cycles. The majority of subjects reject both contracts – in line with the generally low take-up of low payout contracts documented in Table 3. Of those who take at least one loan contracts with zero or positive interest, 20 to 24% also take the low payout savings contract. Similarly, of those who take at least one saving contract with a zero or negative return, the majority (86% in Phase 1 and 51% in Phase 2) also take a loan contract with a zero or positive interest. This kind of behavior cannot be accommodated by a model with a constant $\theta \leq 1$.[14] It follows that these subjects must have had, in at least one of the waves, a desire for lumpsum accumulation, that is, $\theta > 1$.

In the second panel of Table 4, we consider individuals who accept either of the two costly contracts discussed in panel 1, while at the same time refusing a credit contract with a negative interest – i.e., a loan contract with $L > (N-1)M$. We have already argued that refusing such

[14] As shown in Appendix Figure A10, when $\theta \leq 1$ there is no overlap in the ranges of β's that allow taking up both borrowing and savings contract.

a contract violates the standard model – except for the existence of transaction costs. However, individuals who face transaction costs large enough to deter them from taking a credit contract with negative interest, should a fortiori refuse any other contract, especially contracts with a low payout. We have 101 individuals in Phase 1 and 399 individuals in Phase 2 who are offered both types of contracts. As noted in Table 3, a large proportion of individuals who are offered the negative interest credit contract take it. There is, however, a majority of the subjects who refuse this contract. Among those, all (100%) take the lower payout contract – a behavior that rules out time-invariant transaction costs as the reason for refusing the negative interest loan. Similarly, among those who take the low payout credit or savings contract, two thirds (67% in Phase 1 and 68% in Phase 2) refuse the attractive credit contract. The only way to account for these findings within our conceptual framework is to assume that, when they refuse the high payout credit contract, subjects are primarily concerned with smoothing consumption ($\theta < 1$) while when they take a low payout credit or savings contact, they are more concerned with lumpsum accumulation ($\theta > 1$). In other words, their θ changes over time.

3.4 Demand for lumpsum accumulation

The evidence presented so far suggests that demand for our products is driven by an occasional desire to accumulate a lumpsum. If so, we should observe that respondents use the contract payout to cover a lumpy expenditure.

To investigate this idea, we examine respondents' description of how they used the lumpsum payments in Phase 2. The top responses are shown in Figure A19 in Appendix. The top eight categories together cover about 80% of respondents. Of them, seven unambiguously correspond to lumpy purchases, whether in the form of consumption durables (home appliances and clothing), investment (home repairs and assets for a business), wedding and festival expenses, or medical expenses. The only category among the top eight that does not necessarily fit this categorization is 'food purchases', which represents 20% of respondents. We do not know the specific form of the food purchases, but food purchased in bulk often attracts quantity discounts and thus also produces a return to lumpsum accumulation (see, for example, Brune and Kerwin (2019) and Attanasio and Pastorino (2020)). Though a non-negligible proportion of the study sample in both Phases are current NRSP borrowers, only about 1% of respondents who adopt the product use the lumpsum to pay off existing loans. We further note that several expenditure categories may be unforeseen and urgent (e.g., home repairs, medical expenses) or driven by anticipation of an income shortfall (e.g., food), as in Frederick et al. (2002). This can account for the variation in demand for lumpsum accumulation across experimental waves.

We therefore conclude that, taken altogether, our findings suggest that the take-up of our contracts is best explained by an occasional – and sometimes unforseen – desire to accumulate a sum of money to cover a lumpy expenditure or a sudden cash need by individuals unable to

save cash on their own.

3.5 Correlates of take-up

To conclude this section, we conduct a heterogeneity analysis of the demand for our product. We have argued that our savings and credit contracts open an avenue to lumpsum accumulation for individuals who find it difficult to hold on to cash. To examine individual correlates of take-up, we adapt the machine learning method proposed by Chernozhukov et al. (2018) – see Appendix Section F for details. Following Chernozhukov et al. (2018), we describe the characteristics of the 20% of respondents with the highest adoption rate, and the 20% with the lowest.[15]

Across both Phase 1 and Phase 2 samples, take-up increases with self-employment, income, family size, inability to save, and pressure to share. In particular, in Phase 2, across the 58 baseline characteristics that we examine, we observe large and highly significant differences in covariates most likely to indicate a respondent's inability to hold cash, such as baseline saving difficulties, pressure to share, and low self-efficacy proxied by inability to keep track of tasks and finances. Consistent with the idea that our basic contract provides a useful commitment device for individuals with low financial self-efficacy, we find that 88% of the highest adopters stated at baseline that they find it hard to save, compared to 58% of low adopters (see table A13). Similarly, we find that the highest adopters are significantly *less* likely to describe themselves at baseline as: good at keeping track of time or finances; as following a strict schedule on finances or a tight routine; and as acting early to avoid forgetting (either generally or with respect to finances). We also find that demand for our contracts is correlated with pressure to share as reported at baseline: 88% report it among the highest adopters compared to 61% among the lowest adopters. The highest adopters are also more empowered at baseline: they report a significantly higher share of household decisions in which the woman's view is always considered, and are more than twice as likely to agree that it is appropriate for a woman to invest in her business without consulting her husband or to go shopping for a personal item on their own. All these findings for Phase 2 are in line with theoretical expectations about financial self-efficacy and self-discipline, pressure to share, and female empowerment.[16] However, this analysis cannot reveal the role of each of these factors separately in shaping the demand for our contracts, an issue we address in the next Section through the analysis of contractual add-ons.

[15] A similar exercise has been conducted by Bryan et al. (2022) to predict low and high enterprise loan borrowers in Egypt.

[16] Results are somewhat different for Phase 1, a fact that we attribute to the different characteristics of the two samples. We discuss this in Appendix F.

4 Demand and contractual add-ons

We now turn to the various add-ons. We have seen that the behavior of many participants is consistent with a demand for lumpsum accumulation and an inability to save at home, which leads them to accept contracts that commit them to the payment of a sequence of regular instalments. Heterogeneity analysis further confirms that demand for commitment is at least partly motivated by peer pressure to share and the lack of financial self-discipline. We also concluded that the much higher take-up of credit contracts is best explained by a desire to cover a sudden and possibly unforeseen cash need by individuals unable to save on their own, and thus without precautionary savings. The obligation to repay the debt can then be used as a commitment device to save, *ex post*, what could not be saved *ex ante* due to a lack of self-discipline or to other saving impediments.

Equipped with this better understanding of demand for our contracts, we now investigate whether features, that are commonly added to financial contracts to target perceived pressures to share or lack of financial discipline, would increase demand of our commitment credit or saving products. Before presenting our empirical findings, we summarize the theoretical reasoning behind the demand for our contractual add-ons by building on the conceptual framework of Section 3. We do so separately for credit and savings contracts, given the differential treatment of these two types of contracts by our partner MFI, which likely mirrors that of other similar institutions. A detailed presentation of the model is given in Appendix D. We summarize here its main predictions.

Credit contracts. For credit contracts, as discussed in section 2.1, default is *de facto* not allowed by our partner MFI. Default on credit contracts is indeed not observed in our data. It immediately follows that we should observe no increase in demand for credit contracts with sunk instalments: should a subject fail to spontaneously pay one of the instalments on time, the MFI would insist that the instalment be paid immediately to avoid the entire debt becoming due. A borrower would thus derive no immediate benefit from an outright default, something that would not be affected by the penalty added by the sunk treatment. Participants may, however, fear that, in practice, the sunk instalment may turn into a financial penalty for the late payment of an installment, a concern that would reduce demand for such contracts.

In contrast, a flexible credit contract may be beneficial if the borrower benefits from delaying an instalment by a week, for example, because of a large negative income shock or because of an emergency that requires an urgent outlay. Borrowers who anticipate such occurrences would express a higher demand for a flexible credit contract than for a standard one. In practice, as in standard microfinance contracts, clients are sometimes offered some *de facto* flexibility with respect to the exact date of repayment. Based on these observations, we expect, other things being equal, the take-up of credit contracts to (weakly) increase in the flexible treatment and to

fall or, at best, remain unchanged in the sunk treatment.

Reminders are useful when people suffer from limited attention, i.e., they forget things but remember when reminded – and when reminders are sent to a family members, they include an additional component of social pressure and social image concern. In our setting, reminders may be particularly helpful for individuals who anticipate the possibility of undesirable default, for instance if they anticipate forgetting about their payment obligations in the face of a tempting but unjustifiable purchase. Since our commitment contracts are designed to appeal to sophisticate agents, reminders may increase take-up among our target population.

Reminders, however, serve little purpose in our standard *credit* contract. Since the MFI vigorously pursues instalments in arrears, reminders do not add anything of value for subjects with a self-commitment problem. Moreover, reminders are not without cost – for example, because they are perceived as unnecessary or insulting; or because the implied threat is emotionally draining. Negative effects are more likely to dominate for people who have more financial self-discipline. To sum up, we expect no additional take-up of standard credit contracts with reminders by subjects lacking self-discipline, and a possible fall in take-up by self-disciplined subjects.

Our experimental design combines reminders with variations in flexibility. Should we expect the demand for reminders – and thus for contracts with reminders – to vary across sunk and flex contracts? For credit contracts in the sunk treatment, missing an instalment may theoretically result in a penalty (the loss of the first instalment). But the diligent debt recovery behavior of the MFI *de facto* rules it out. For this reason, we do not expect reminders to increase demand for the credit contract in the sunk treatment relative to the base treatment.[17]

What about combining the flex treatment with reminders? Reminders may be seen as beneficial in this case because the flex treatment creates more risk of missing an instalment when used. It is therefore possible that take-up of the flex treatment is higher with than without reminders among subjects with little or no repayment discipline problems, who may be attracted to the flexible contract in order to better deal with shocks. While subjects who lack self-discipline are less likely to be attracted to the flex treatment, they may nonetheless prefer it accompanied by reminders.

The prediction concerning reminders to family members is more nuanced: while peer pressure may add further encouragement to follow through with contractual obligations, family members' demands on clients' money may interfere with their payment goals. It is therefore possible that take-up with reminders may be higher among less disciplined respondents when sent to family members. Otherwise we expect reminders to family members to lower take-up relative to reminders to self.

[17] This prediction is specific to settings such as ours in which the lender is active and diligent in collecting instalments. If the lender relies instead on penalties for arrears to incentivise timely repayment, we expect a demand for reminders.

Saving contracts. Things are different for savings contracts. This is because, if a subject fails to pay one instalment on time, the MFI regards the savings contract as breached and stops collecting the remaining instalments. If this occurs, in week N the MFI simply returns to the subject the sum of the instalments already collected. The behavior of the MFI therefore means that, unlike for credit contracts, default is possible. In this context, subjects who have a desire to accumulate the lumpsum may have a demand for contractual features that reduce the likelihood of commitment failure. Whether this is the case or not depends critically on whether they see future default as desirable or not. Intuitively, if the probability of a desirable breach of contract is high and the probability of *ex ante* undesirable breach is low, at take-up the subject values the flexibility offered by the possibility of breaking the contract. This is because, in this case, the savings contract is most likely to be breached in situations that are regarded as optimal from an *ex ante* point of view – for example, because of a negative income shock or an unanticipated but welfare-enhancing expenditure. In contrast, if the probability of an undesirable breach is high relative to that of a desirable breach, a sophisticated subject will reject a flexible contract and welcome a contract that reduces the probability of breach.

Based on this reasoning, the take-up of flexible savings contracts should increase if subjects believe a justifiable breach is more likely than an undesirable one – and fall if the reverse is true and they are sophisticated about it. Similarly, we expect more take-up of savings contract in the sunk treatment if subjects believe an undesirable breach is more likely than a desirable one, *and if* the sunk treatment reduces the probability of undesirable breach. (We investigate this formally in Appendix A).

Similarly, reminders are useful in the savings domain because the MFI regards being in arrears as a breach of contract. Based on this, we expect reminders to increase the take-up of savings contracts among those unsure they will remember to make the instalments on their own and those worried about indulging in an undesirable expenditure instead of meeting an instalment. For this reason, we predict that combining flexibility with reminders will increase take-up by clients with self-discipline problems in the savings domain.

4.1 Contractual add-ons and average take-up

The rest of this section takes the conceptual framework's predictions to the data. We start by reporting the effect of the different contractual add-ons on average take-up across the full sample in the credit and saving domain. We then show the effect of combining reminders with different levels of flexibility. Finally, we divide the subjects into two groups, based on their predicted likelihood of undesirable breach and test heterogeneous effects of the add-ons on take-up of these two groups.

Panel (a) of Table 5 reports estimates from a saturated regression model of contract take-up on

indicators for the sunk and flex treatments, the two reminder treatments, and their combination.[18] We do this separately for credit and saving contracts. Average treatment effects for each for treatments across the whole sample are provided in the bottom panel of the Table. Standard errors are clustered at the individual level and observations from all three product waves are combined.

For credit contracts, results show that, on their own, none of the four treatments increase take-up. Both reminder treatments in isolation are associated with a 5 percentage point fall in the take-up of credit contracts, but their effect is not statistically significant. For the flex and sunk treatments in isolation, we find an 8 percentage point reduction in take-up, relative to a mean take-up of 31% among participants who were offered the basic contract. In both cases, the reduction is statistically significant. However, we also note that combining these treatments with reminders largely cancels this reduction. When combined with the flex treatment, reminders to family members eliminate the reduction in take-up, and reminders to self increase take-up relative to the basic contract by close to 8%. The difference in take-up between flex alone and flex with reminders to self is 11.2 percentage points higher and is statistically significant at the 5% level (see Table A22). Average treatment effects reported in the bottom panel of Table 5 illustrate these conflicting effects: on average across the sample, the effect of flex treatment is not statistically significant. Regarding the sunk treatment, we similarly find that combining it with reminders to self eliminates the fall in take-up, although the difference is not large enough to be statistically significant. Across the whole sample, the average effect of the sunk treatment is negative, as shown in Panel (b).

Turning to savings contract, the relatively low take-up makes it difficult to identify statistically significant effects. We nonetheless observe similar effect signs, which are negative (but small in magnitude) for reminders and the sunk treatment on their own. The sunk treatment on its own has a small, non-significant negative sign, but this sign is reversed when combined with reminders – significant at the 10% level for reminders to family members. We find no such pattern for the flex treatment. Averaged across the sample (see Panel (b)), none of the four treatments is statistically significant on the take-up of savings contracts.

Figure 1 presents these results graphically. The Figure shows (on the far left) take-up rates for the basic contract (that is, the product with neither the 'flex'/'sunk' variation nor the 'self reminder' / 'family reminder' variation); it then shows take-up rates for each of the eight possible contractual add-ons. Error bars show 90% and 95% confidence intervals on the difference in take-up relative to the basic contract. These take-up rates – and confidence intervals – are obtained from Table 5. Pairwise significance tests are taken from Table 5 and from Appendix Tables A22 and A23. Panel A of Figure 1 (at the top) shows these results for credit contracts; Panel B (at the bottom) shows the results for savings contracts.

[18] Because of randomization, virtually identical results are obtained if we add control dummies for interest rates.

The implications of the figure are stark: in general subjects do not like contractual add-ons. This is particularly evident for credit contacts. Here, of the eight variations on the 'basic, no reminders' product, demand is lower in seven cases; in three of these cases ('flex, no reminders', 'sunk, no reminders', and 'sunk, reminder to family'), the demand reduction exceeds 25% (*i.e.* 5 percentage points), and is significant. A joint test that take-up is equal across all nine contracts is rejected with $p = 0.011$ (see Table A22). In the saving domain, demand does not appear to decrease with the added contractual features and we cannot reject the null hypothesis that the relative take-up pattern that we observe for credit is the same pattern as for saving.[19]

Overall, these results on take-up by contractual add-ons provide direct evidence on the most empirically relevant obstacles to holding on to cash faced by women in our sample, which are consistent with those emerging from the heterogeneity analysis. We note that there is increased demand for flexibility only when flexibility is coupled with reminders; this supports the notion that inattention is empirically relevant in our setting. This result suggests that the rigid repayment structure of the basic product also serves the function of reducing the attention costs of meeting payment obligations.[20] Finally, the negative effect of family reminders on demand suggests that intra-household dynamics are perceived by individuals as having a negative rather than a positive influence of repayment: especially when the cost of missing an instalment is high, as in the sunk treatment, knowing that your family members will be informed of your payment obligations significantly reduces take-up of the product (see Panel 2B of Table A23). These obstacles appear to exert a larger impact on demand in the credit than in the saving domain, which may be explained by the more severe consequences of defaulting on a credit contract than on a saving contract.

Our finding – that our respondents value the commitment bundled in microfinance, but do not value additional behavioral features – not only indicates that the level of commitment built into the basic product is probably right for our sample of participants. It also suggests that microfinance products with a fixed repayment schedule – an extremely common form of contract across developing countries – may represent an important form of what Laibson (2018) refers to as 'shrouded paternalism'.[21] Similarly, although studies from other domains show significant demand for contracts featuring explicit commitment (Kaur et al., 2015; Bai et al., 2021), existing evidence on soft and hard commitment devices in the saving domain confirms the greater success of the former (in the form of 'labeled savings accounts') over the latter (both in

[19] When we conduct a joint test here of the null hypothesis that the take-up rate is equal across all nine contracts, we find $p = 0.321$ and we do not reject; see Table A23. When we conduct a joint test, across Panel A and Panel B, of the null hypothesis that the estimates in Panel B simply scale down those in Panel A by a common ratio, we also do not reject: we obtain $p = 0.206$.

[20] This result echoes findings from the behavioral literature on planning prompts, showing that planning is valued and effective when the cognitive cost of following through is higher (Rogers et al., 2015); see also Bonan et al. (2020).

[21] As Laibson explains: "...lots of thriving institutions have bundled commitment features that appear to be specifically designed to help agents overcome their self-control problems. On the other hand, these institutions generally don't market these commitment features – *i.e.*, the forcing mechanisms are shrouded."

terms of demand and impact on outcomes) (Karlan and Linden, 2014; Benhassine et al., 2015). The lower demand for explicit commitment features is also consistent with a related behavioral literature on 'avoiding the ask' and control aversion (Andreoni et al., 2017; Falk and Kosfeld, 2006; Fehr and List, 2004). Our results on demand for flexibility also emphasize the importance of the specific details of flexibility, in the context of the particular contract being offered. In particular, both Barboni and Agarwal (2021) and Battaglia et al. (2021) find significantly higher demand for contracts with more flexible repayment schedules than the one we offer – provided in the form of the possibility to take a three-month repayment holiday and spread the outstanding balance over the remaining monthly instalments (in the former); and of the option to delay up to two monthly instalments with a corresponding increase in the duration of the loan cycle (in the latter).

4.2 Heterogeneous treatment effects by financial self-discipline

We now compare the average treatment effect of the contractual add-ons across two equally-sized groups of observations: subjects classified as less likely to engage in undesirable breach, and subject classified as more likely to do so. To do this, we use a subset of 58 baseline covariates that measure of self-commitment and financial self-discipline (examined earlier in section 3.5). Specifically, we use these measures to classify subjects as having either a high or low likelihood of engaging in undesirable breach. Using principal component analysis (see Appendix H for details), we extract the first principal component across these variables and rely on it as proxy for the likelihood of undesirable breach as perceived by respondents about themselves. We then replicate the results presented in Panels A (credit) and B (savings) of Figure 1, by a median split on that first principal component. Detailed theoretical predictions can be found in Appendix A.3 and are summarized in Table A1. We then re-estimate the regression models from Table 5 separately for high and low discipline participants. Results are presented in Table A15 and summarized here graphically in a manner similar to Figure 1 .

Credit contracts and contractual add-ons: Figure 2 compares the take-up of credit contracts between subjects with above-median financial self-discipline (transparent bars) and below-median financial self-discipline (opaque bars).

We note that, among high-discipline subjects, take-up of the credit contract is always lower under the sunk treatment. This finding is in line with theoretical predictions: in a setting where commitment add-ons are not necessary given the behavior of the MFI and the high-discipline of the client, the sunk treatment is clearly dominated since it only penalizes situations of justifiable default. We also observe that take-up is lower for the flex treatment unless it is accompanied by reminders. The low demand for flexibility is contrary to theoretical predictions for high-discipline borrowers, but may arise from the concern that, in a flex contract, the MFI need not monitor instalments as closely, thereby causing the borrower to unwillingly miss an instalment,

only to have to pay twice as much in the following week. The fact that take-up of the flex credit contract is higher when combined with reminders is consistent with this interpretation. We also see that demand for the basic and the sunk credit contracts is significantly lower when reminders are sent to family members, confirming our prediction that such reminders are disliked by our study population. The only exception is for flex contracts, but even there borrowers prefer reminders to self.

We see that among low-discipline borrowers, take-up is also lower for the flex and sunk treatment, although not significantly so. We also find that take-up of the flex credit contract is higher when it is associated with reminders to self than when it is not – a difference that is borderline statistically significant. This is consistent with a fear of missing instalments when the MFI need not monitor borrowers as closely. Other differences are small and not statistically significant.

Saving contracts and contractual add-ons: We now turn to savings contracts. Results are presented in Figure 3. Since the take-up of these contracts is smaller across the board, the magnitude of the differences in treatment effects are small – and not always significant.

Among high discipline savers, we see 3 that the flex treatments, with or without reminders to self, are the only contracts for which take-up is not smaller than for the basic contract. This pattern is consistent with theoretical predictions in the sense that high-discipline savers may value flexibility if it is associated with reminders to self to avoid missing instalments. Demand for the sunk treatment is low throughout, also consistent with theoretical predictions for this group. All these differences in take-up, however, are small in magnitude and not statistically significant.

For low discipline savers, take-up is significantly higher with the sunk treatment, indicating a demand for strong commitment in savings contracts. The result is consistent with our theoretical model predictions and suggests that contracts with sunk instalments appeal to some savers with desire to save but aware of their difficulties to stick to a financial plan. Other differences are small and not statistically significant.

Further, we explore heterogeneity by several other dimensions – specifically, those dimensions highlighted by the earlier machine learning analysis in Section 3.5. Specifically, we look at characteristics that may capture experience with standard credit and informal saving products – if the respondents are currently participating in a ROSCA or have an existing loan, and those who are experienced clients of the NRSP. Take-up patterns by these dimensions are in line with those outlined here and discussed in detail in Appendix G. To summarize, individuals who are able to save on their own or no longer feel the need to borrow from NRSP – those who are likely to have high financial discipline – do not particularly value contractual add-ons.

Taken together, these findings support some of the model predictions for savings and credit contracts – albeit with low statistical significance for savings contracts, due to the loss of power

induced by low take-up in general. The key findings are as follows. In credit contracts, high-discipline participants only like the flex add-on if it is combined with reminders to self, and they strongly dislike the penalty added by the sunk treatment across the board – suggesting they do not demand additional commitment devices. A similar pattern is present for savings contract, but is not statistically significant. In contrast, low-discipline participants do not respond much to add-ons in credit contracts but, in the savings contract, they like the sunk treatment, provided it is offered with reminders either to self or to a family member.

4.3 Contractual add-ons and payment of instalments

How do contract features affect the payment of instalments? This question is important for shedding light on our earlier take-up analysis. If, for example, late payment problems are widespread, this would have implications for the practical viability of the products studied; similarly, if late payment rates do not differ between the basic contract and the 'sunk' variation, this might suggest that respondents are naive about the value of the commitment device for their future behavior (DellaVigna and Malmendier, 2006; John, 2020). Our design, which allows us to identify the causal impact of contract features on product takeup, implies that we cannot answer this question, as differences in repayment by contract features are also driven by selection into the different contracts. In other words, in our experiment, we see the effect of these contractual add-ons only for those subjects who do accept them, thereby allowing us to see the combined effect on both take-up and repayment performance. While not causal, this evidence is important for policy makers.

With this caveat in mind, in Figure 4, we show the rate of late payment by contractual add-ons. The structure of the figure mirrors that of the earlier Figure showing take-up rates (Figure 1): we show the rate of late payment both for the basic contract and for the contractual add-ons, and we divide the analysis between credit contracts (Panel A, top) and savings contracts (Panel B, below). The figure shows late payments that are not authorised by the contract – so, for example, a respondent under the 'flex' contract who is exercising her right to delay one payment by one week is not considered here to be late.[22]

Several stylized facts deserve noting here. First, on average, the probability that at least one of a client's payments is late is about 12%. As predicted, this rate generally decreases with the various contractual add-ons – and is significantly lower in several of those cases. If we compare different basic treatments with or without reminders, we see that, in both the credit and the saving domains, the frequency of late payment falls with reminders. Although not statistically significant, this result is in line with the literature. When reminders are combined with the sunk or flex treatment, the lower frequency of late payment becomes statistically significant – often by quite a large margin relative to the basic contract. In particular, subjects who choose to take up

[22] Figure A22 (appendix) repeats the analysis, but recording those women as making a late payment.

the product when it is combined with family reminders do appear to respond to the pressure to repay coming from their family members. As anticipated in Section 4.1, differences in late payment by contractual add-ons are larger in the savings domain, where the MFI is more lax in collecting payments.

Second, we note that, as asserted earlier, the flex treatment shows relatively little appeal. When we include late payments allowed by the flex contract (see Figure A22 in appendix), we find that, if anything the flex treatment leads to *more* late payments – although the difference remains small and is never statistically significant. This impressionistic finding is consistent with those of Brune et al. (2022) who observe an increase in loan defaults when delayed repayments are allowed. Our theoretical conjecture is that once a subject has delayed one instalment in the flex treatment, it is difficult to make up for it in the following week. Given that our flex treatment does not, by itself, improve average take-up – showing clients don't care for it – and that it possibly increases late payments – which raises collection costs for the lender – it is not a desirable feature in a setting where *de facto* flexibility may be prevalent.

Third, we note that – with the important exception of the 'sunk' contracts – the rate of late payment is higher under saving contracts than under credit contracts. This makes intuitive sense, for two related reasons explained in section 2.2. On the one hand, if a client reneges on a credit contract, the MFI will exert considerable effort on debt collection to recover the funds. On the other hand, when there is a default on saving contract, the MFI incurs little or no costs, and can gladly walk away from the contract. It follows that, as argued in the theoretical section, clients not facing the 'sunk' contract have the option to walk away from the contract.[23] While these findings are not particularly surprising, they bring to light the inherent difficulty of getting a third party to enforce a commitment savings contract, as opposed to a credit contract. This simple dichotomy may go a long way in explaining the predominance of credit contracts in microfinance, in spite of the fact that an important purpose of microfinance is to provide a commitment device allowing households to save for a lumpsum purchase.

5 Robustness

5.1 Respondent understanding

In this section, we test the robustness of these results. First, we check for respondent misunderstanding of the contract; is it possible, for example, that our earlier results are driven by respondents having been confused about the contracts being offered?

[23] Disaggregating default rates by waves provides results that generally in line with pooled results, with decreasing default over subsequent waves and experience with the product. Behavioral features have the expected effect on default in the disaggregated analysis, though we lose statistical power to detect significant difference from the basic contract when we split the sample by wave.

In our view, there are several reasons to have a strong prior against this interpretation. In particular, we were well aware of this issue from the outset, and took several steps to ensure that the products were well understood. First, the products we offered are broadly analogous, in their repayment structure, to a class of contract that is familiar to almost all of our subjects: namely, the ROSCA. In particular, variation in the timing of lump-sum payout occurs naturally in ROSCAs; variation in interest rates similarly occurs naturally.[24] Second, we conducted the experiment in close collaboration with an established microfinance organisation, already known and trusted by our subjects – who were, at the time of the experiment, all current or recent clients of that organisation. Third, the general forms of behavioral variation that we introduced have been tested in other related field contexts, without generating evidence of substantial subject confusion; this is true for reminders (see, for example, Karlan et al. (2016)), for repayment flexibility (see, for example, Field et al. (2013), Czura (2015), Barboni and Agarwal (2021), Battaglia et al. (2021) and Castellanos et al. (2019)) and for the sunk repayment feature (for example, see John (2020) – and, by analogy to life insurance contracts, Anagol et al. (2017)).

Empirical evidence supports this prior. First, when asked at baseline, our respondents overwhelmingly agreed that they were familiar with the concept of a savings committee (96% agreed in Phase 1; 92% in Phase 2). Indeed, a substantial share had participated in a committee themselves: 51% in Phase 1, and 27% in Phase 2. Second, when we asked respondents directly for reasons that they refused the product, the overwhelming majority (about 85% in Phase 1 and 75% in Phase 2) attributed this to a lack of funds on hand to pay; almost nobody blamed a lack of understanding of the product.[25] Third, we conducted an explicit "right/wrong" test for a hypothetical contract in Phase 1; despite asking this question approximately six months after the product was initially explained (and at least six weeks after the final take-up decision had been elicited), we found that about 85% of respondents answered correctly. Similarly, at the same time, we asked respondents whether they agreed with the statement that "I understand how the new contracts work"; about 60% agree or strongly agreed, while only 18.7% disagree or disagree strongly.[26] We provide further details on these figures in Online Appendix B. Fourth, in the heterogeneity analysis in Appendix F, we find that current borrowers familiar with NRSP and those who have experience of participating in a a ROSCA, are more likely to take-up the product.[27] In Appendix G we note further that both groups dislike add-ons, preferring the standard features

[24] In many ROSCAs, this variation tends to occur at the time of the payout, which introduces uncertainty; in this respect, at least, our contract is actually simpler than many ROSCAs.

[25] Of those giving reasons, about 2% provided this reason in Phase 1. In Phase 2, respondents had the option to report this in the 'other' category, but not a single respondent did so.

[26] The higher proportion of reported lack of understanding for this question may be related to its different wording, which refers to the legal implications of the contract. In a sample population vulnerable to contractual abuse due to its low education and socio-economic status, denying full understanding of a contract may simply be a sign of caution when dealing with financial institutions.

[27] A higher take-up of these products among current borrowers may also imply a high demand for lump sum accumulation that is catered by the products offered, sometimes at high implied costs, e.g., consider individuals who take up zero return savings product and do not use it to pay off existing loans.

of the basic product.

5.2 Dynamic effects

In the same appendix, we provide further analysis on the dynamics of respondent behavior. First, we disaggregate our take-up patterns by experimental wave – and show that the general take-up patterns observed in the aggregate are also observed for each experimental wave separately. Second, we test for persistence effects across waves; to do this, we regress take-up in a given wave with take-up in the previous wave (instrumenting this lagged take-up by the contract terms randomly offered in the previous wave). We find a significant causal effect of lagged take-up; respondents who take up in a given wave are about 50 percentage points more likely to take up in the following period as a result. We interpret this as a strong familiarity effect (Mehrotra et al., 2021). This is an interesting separate finding in its own right – but has no implications for our earlier estimates on sensitivity to offered contractual terms. Because we randomized the contractual offers in each wave, the offer terms are uncorrelated to lagged take-up – and, therefore, the inclusion or omission of lagged take-up does not change our regression results. We show this empirically in the same appendix. We show the effect of dropping individuals who ever defaulted (to check that our conclusions are not driven by defaulters having been progressively excluded from the experiment). We show that overall take-up patterns are unaffected by this. Finally, we test if default in a given wave is strategic – less likely in wave 1 than in subsequent waves when the threat of not being offered the product in the next wave is lower (wave 2) or zero (wave 3). We find, if anything that default decreases over waves in both credit and saving domains, which is consistent with overall patterns of lower take-up and increased familiarity with the product over time.[28]

6 Consequences of adopting

Finally, we estimate the impact of treatment on business and household outcomes. We do this by exploiting the random assignment to the control group: we compare outcomes for control participants (who were not invited to take up any of our commitment contracts) with treated participants (who were). Given the relatively small size of our lumpsum – and given previous experimental results in the literature on microfinance – it would be surprising if this product were to have large effects on business or household outcomes. However, were we to find that product has large effects, this would shed a different light on our earlier explanations for product demand; for this reason, it is important to estimate these impacts.

We provide a detailed analysis in Online Appendix C. In short, we find no robust effects on business or household outcomes of having been offered our treatment; this is consistent with a

[28] Results available upon request.

growing body of evidence on the effects of microfinance (see, for example, Meager (2022) and Meager (2019)).[29]

7 Conclusions

The optimal design of commitment features remains an open question for empirical research. This paper makes progress on that issue by testing the role of commitment devices in microfinance, in two distinct ways. First, we test directly whether a rotating structure of lumpsum payment timing can be implemented as an individual commitment-saving product. In previous pilot work, we established this fact for small product sizes with daily repayments (Afzal et al., 2018). In this paper, we show that the same structure can be used for a product with larger payments, over a longer period. Our choice of sample makes the empirical results of our study representative of the population interested in, and familiar with, standard microfinance products. We do, however, acknowledge that our contracts may appeal to households who are not currently served by existing MFI products, thereby increasing aggregate demand. Our results should therefore be seen as conservative.

We find substantial demand for such a product. Many microfinance clients 'borrow to save' (Collins et al., 2009; Armendáriz and Morduch, 2010; Bauer et al., 2012; Pomeranz and Kast, 2022; Afzal et al., 2018). But take-up is higher for credit contracts than for commitment savings contract, a finding we attribute to the unforeseen and urgent demand for lumpsum accumulation. We find a significantly higher incidence of repayment difficulties with commitment savings contract and a lower willingness of MFI staff to enforce such contracts. Taken together, these findings explain why MFI's offer primarily credit contracts to serve their clients' demand for lumpsum accumulation. In addition, we find that demand for lumpsum accumulation varies by subject type - the highest adopters are likely to report finding it hard to save and express lower levels of financial self-efficacy at baseline.

Second, we use additional 'behavioral' add-on features in the form of reminders (both for respondents and for respondents' family members), formal flexibility in instalments, and a cancellation fee. Our design allows to compare how demand for these features varies between the saving and credit domain. Our findings show that our contract add-ons are seldom valued by clients – on the contrary, each on their own, they tend to be actively disliked, particularly when combined with credit contracts. However, the combination of flex or sunk treatment with reminders seem to appeal to some participants. In credit contracts, high-discipline participants only like the flex add-on if it is combined with reminders to self while low-discipline partici-

[29] Further, we check for heterogeneity in these effects, by the quintiles of take-up rates estimated earlier. Specifically, we estimate treatment effects separately for each of those quintiles, using the bootstrap method of Chernozhukov et al. (2018) both for obtaining point estimates and for inference. We do not find, for example, that some quintiles are benefiting from being offered the treatment while others are not.

pants like the sunk treatment only if it is offered with reminders. These findings would not have been possible if we had not crossed the two types of treatments with each other.

These results have important policy implications for thinking about the future design of microfinance products, highlighting important combination of features that may be cater to the demand of different client types. Specifically, our results imply that microfinance institutions should *not* be seeking to build additional commitment features ex-post into their products – not because their existing clients have no demand for commitment devices, but because that demand is already met through the regular payment schedule built into a standard microcredit or into a savings commitment contract of the type studied here. However, combinations of features may be appealing to certain client types.

Tables and Figures

Table 1: **An illustrative contract structure**

	Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Participant pays	*take-up decision*		1000	1000	1000	1000	1000
Bank pays		4500					
Participant pays	*take-up decision*	1000	1000	1000	1000	1000	
Bank pays							5500

The top panel of the Table shows a payment schedule for a basic credit contract with a lump-sum payout in week 1 and a loan charge of -10%*. The bottom panel of the Table shows a payment schedule for a basic savings contract with a lumpsum payout in week 6 and a return of* $+10\%$*.*

Table 2: **Structure of treatments**

Phase 1

Basic treatment (1/2) n = 394
Control group (1/2) n = 396

Phase 2

Basic treatment with **no reminders** (1/12) (n = 197)	**Basic treatment** with **respondent reminders** (1/12) (n = 204)	**Basic treatment** with **family reminders** (1/12) (n = 199)
Sunk treatment with **no reminders** (1/12) (n = 201)	**Sunk treatment** with **respondent reminders** (1/12) (n = 202)	**Sunk treatment** with **family reminders** (1/12) (n = 207)
Flex treatment with **no reminders** (1/12) (n = 202)	**Flex treatment** with **respondent reminders** (1/12) (n = 204)	**Flex treatment** with **family reminders** (1/12) (n = 198)

Control group (1/4) n = 602

This table shows the structure of treatments: a simple treatment/control division in Phase 1, and a 3×3 *factorial design with controls in Phase 2. In each treatment cell, the fractions (1/2, 1/4 and 1/12) show the proportion of respondents in each Phase who were intended for random assignment to that cell while the actual number 'n' reported in each cell is the actual number of participants assigned to that cell. The lumpsum value and and the timing of the lumpsum payout constitute an additional six treatment cells that were randomly allocated to individual subjects at the time an offer was made to them and are not reported here.*

Table 3: **Average take-up by contract terms**

PHASE 1

Lumpsum amount:	4500	5000	5500
Net balance:	-10%	0%	10%
Lumpsum paid in...			
Week 1	8.2%	30.2%	47.0%
	(2.1%)	(3.3%)	(3.6%)
Week 6	2.7%	4.3%	11.0%
	(1.2%)	(1.5%)	(2.3%)

PHASE 2

Lumpsum amount:	3200	3500	3800
Net balance:	-8.6%	0%	8.6%
Lumpsum paid in...			
Week 1	11.0%	26.0%	37.2%
	(1.1%)	(1.5%)	(1.6%)
Week 8	4.1%	8.9%	11.3%
	(0.7%)	(1.0%)	(1.1%)

This table shows the average take-up rates by contractual terms (lumpsum value and timing), i.e. *estimated marginal effects from a regression of take-up on terms (N = 1,182 and N = 5442 over 3 waves in Phase 1 and Phase 2, respectively). Standard errors of estimated take-up rates (in percentage points) are reported in parentheses. Reported estimates are Weekly instalments were PKR 1000 in Phase 1 (paid in five of six weeks) and PKR 500 in Phase 2 (paid in seven of eight weeks); the lumpsum is paid in the first week in a credit contract and the last week in a saving contract; week 6 and 8 are the last week of the contract in Phase 1 and Phase 2, respectively. The table reports take-up for each combination of lumpsum amount (where we report both the lumpsum value and the net balance implied by that lumpsum amount) and the time of lumpsum payout. PKR 100 = $ 1 at the time of implementation.*

Table 4: **Proportion of Respondents who Display Preference Violations**

	Phase 1	Phase 2
*Subjects who were offered at least one high-interest **loan** (*i.e.*, with $L < (N-1)M$) and a zero- or low-payout **savings** contract (*i.e.*, with $L \leq (N-1)M$):*		
took neither	76	225
took the high interest loan	30	102
took the low payout savings contract	7	47
took both	6	24
Total:	107	350
conditional on taking the loan at least once, the subject takes the savings contract	20%	24%
conditional on taking the savings contract at least once, the subject takes the loan	86%	51%
*Subjects who were offered at least one high-payout **loan** ($L > (N-1)M$) and at least one zero- or low-payout contract ($L \leq (N-1)M$) – either a loan or a savings contract:*		
took both	6	39
took the high payout loan	89	315
took the low payout loan or saving contract	18	123
took neither	0	0
Total:	101	399
conditional on taking a low payout contract once, refused the high payout loan	67%	68%
conditional on refusing a high payout loan once, took a low payout contract	100%	100%

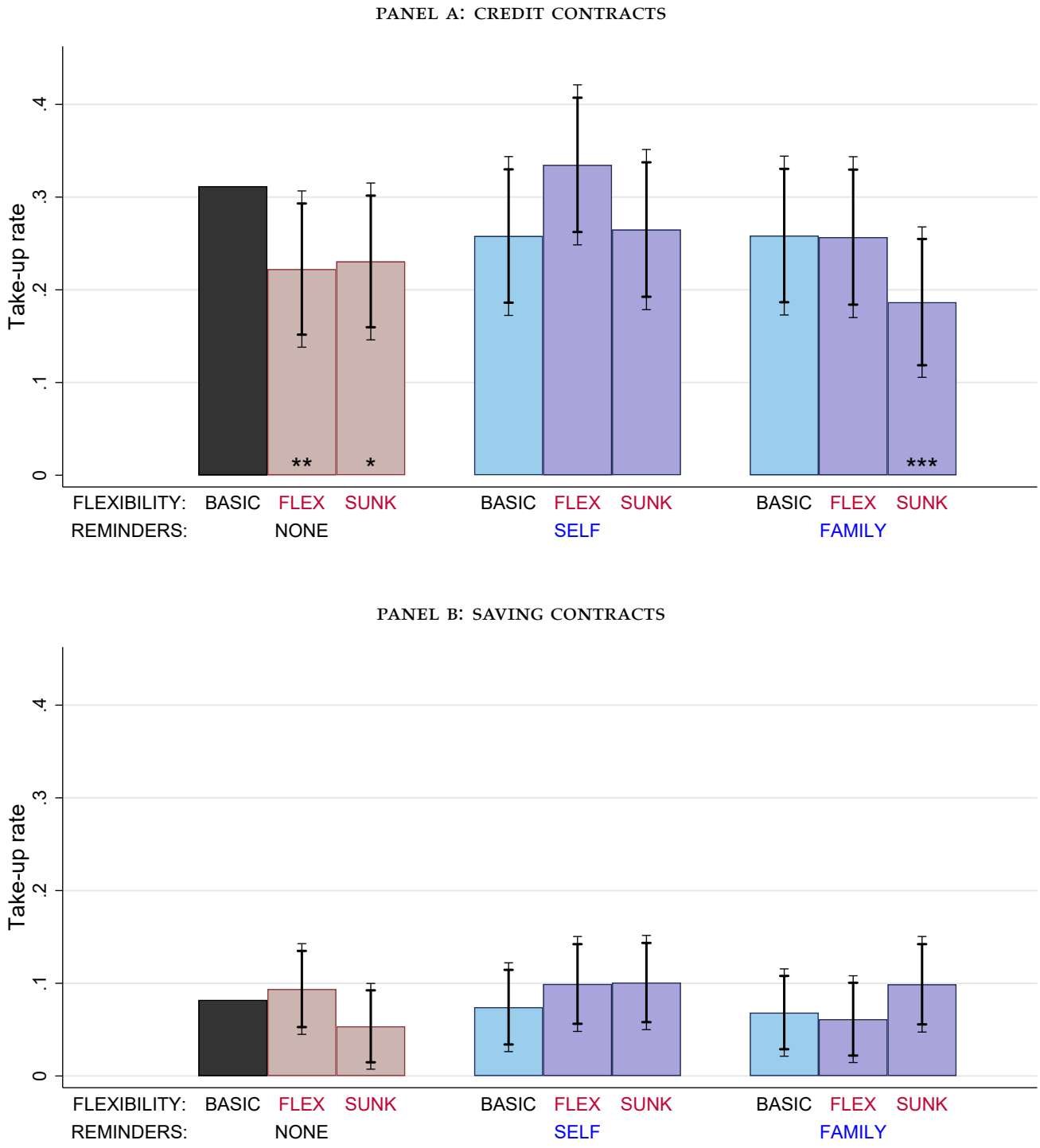
This table reports the take-up decisions made by subjects across contract waves. Automatic refusers are omitted from these calculations.

Table 5: **Treatment effects on take-up for credit and saving contracts**

Contract	Credit	Saving
Panel (a) Average treatment effects		
Basic	0.312***	0.082***
	(0.033)	(0.018)
Respondent reminder	-0.054	-0.008
	(0.044)	(0.024)
Family reminder	-0.053	-0.014
	(0.044)	(0.024)
Flex	-0.089**	0.012
	(0.043)	(0.025)
Sunk	-0.081*	-0.029
	(0.043)	(0.024)
Respondent reminder*Flex	0.166***	0.013
	(0.060)	(0.035)
Respondent reminder*Sunk	0.088	0.055
	(0.060)	(0.034)
Family reminder*Flex	0.088	-0.019
	(0.060)	(0.033)
Family reminder*Sunk	0.009	0.059*
	(0.058)	(0.034)
Panel (b) Aggregated average treatment effects		
Respondent reminder	0.031	0.015
	(0.024)	(0.014)
Family reminder	-0.021	-0.000
	(0.023)	(0.014)
Flex	-0.004	0.010
	(0.024)	(0.014)
Sunk	-0.048**	0.010
	(0.024)	(0.014)
N	16839	15813

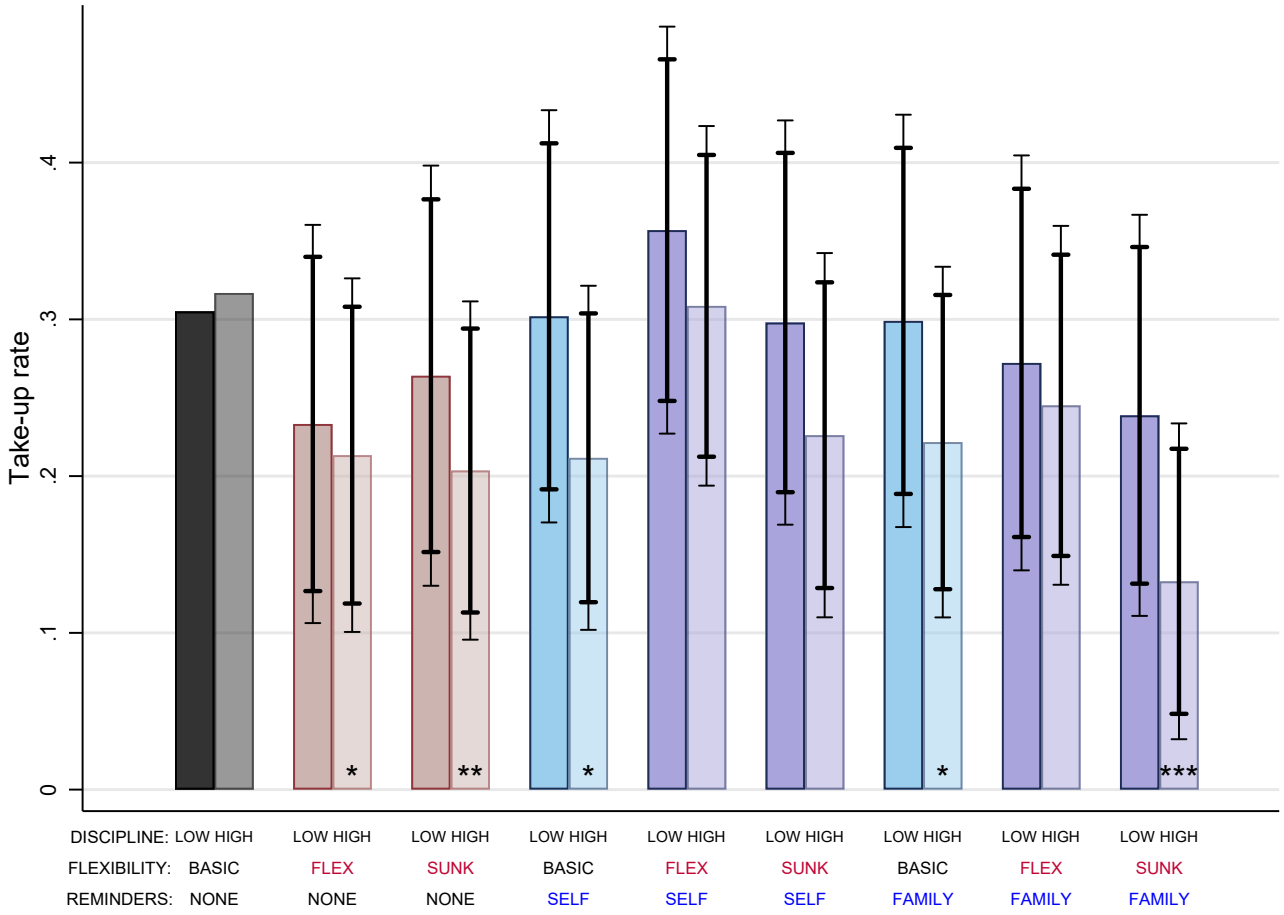
*Note: Average effects for each of the nine treatment cells are estimated using a regression of the dependent variable on a fully interacted set of dummies for each treatment type, shown in panel (a). The regression is estimated separately for credit and saving contracts. The aggregated average effects of the main treatments that are reported in panel (b) are obtained using the 'margins, dydx' command in Stata. The reported number of observations is larger than actual because some subjects said they were not interested in any contract and are thus regarded as refusing all six possible contracts, each of which they would have been offered with probability 1/6. We treat these cases as six different refusal observations each given a weight of 1/6. Standard errors (in percentage points) are clustered at the individual level and in parentheses. *** p<0.01, ** p<0.05, * p<0.1..*

Figure 1: **Average take-up by contractual add-ons**



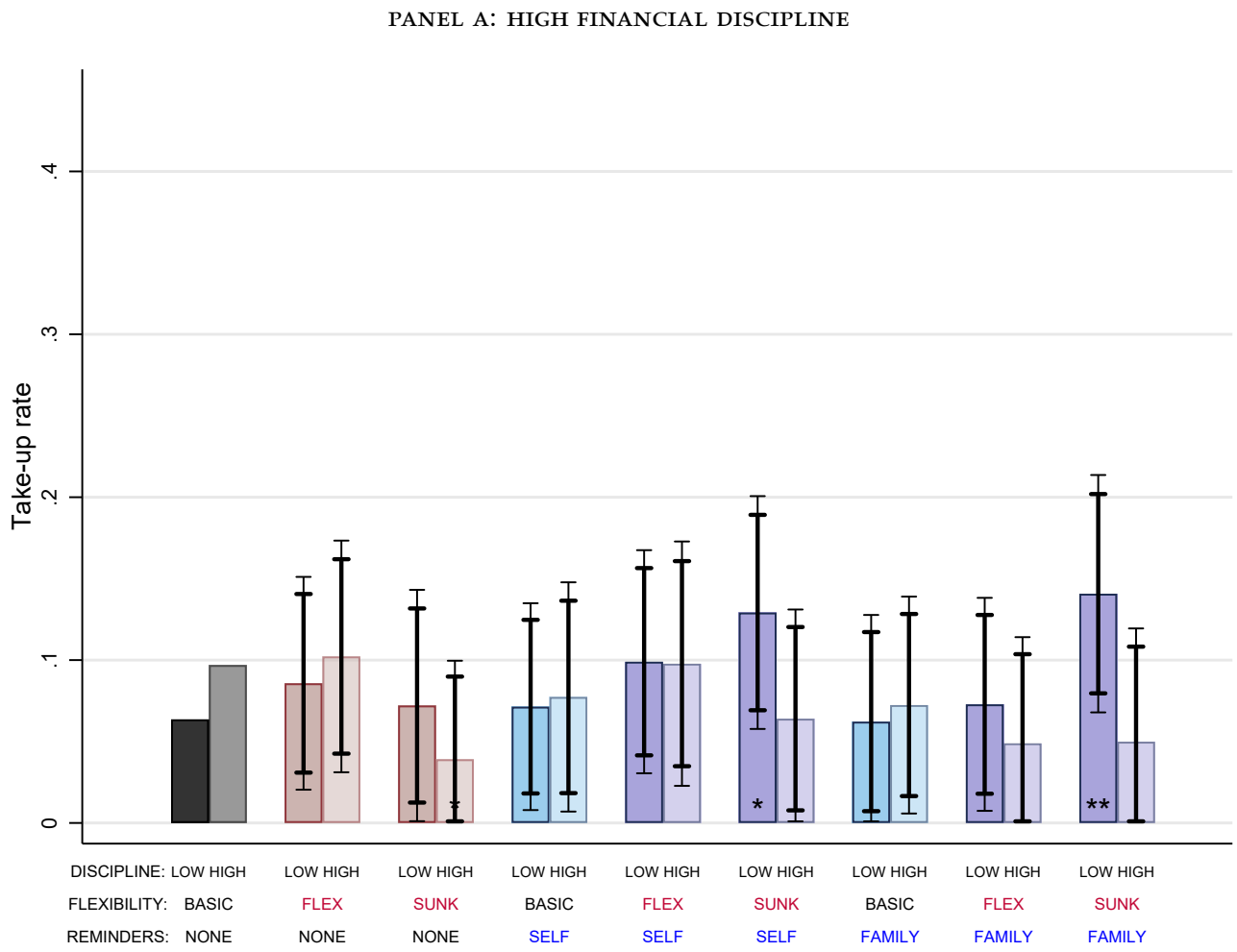
*This Figure shows the average take-up for the basic product in the first bar, followed by average take-up for each of the eight possible add-ons that include one of the sunk, flex, reminder to self, or reminder to a family member – as well as combinations thereof. Error bars show 90% and 95% confidence intervals on the difference in take-up relative to the basic contract. Stars indicate the level of significance of the statistical difference between a particular treatment cell and the take-up of the basic contract, with p-values 0.01 for ***, 0.05 for ** and 0.1 for *. Pairwise comparisons between treatment cells can also be done visually from the position of the confidence intervals.*

Figure 2: **Average take-up for credit products by contractual add-ons among individuals with high and low financial discipline**



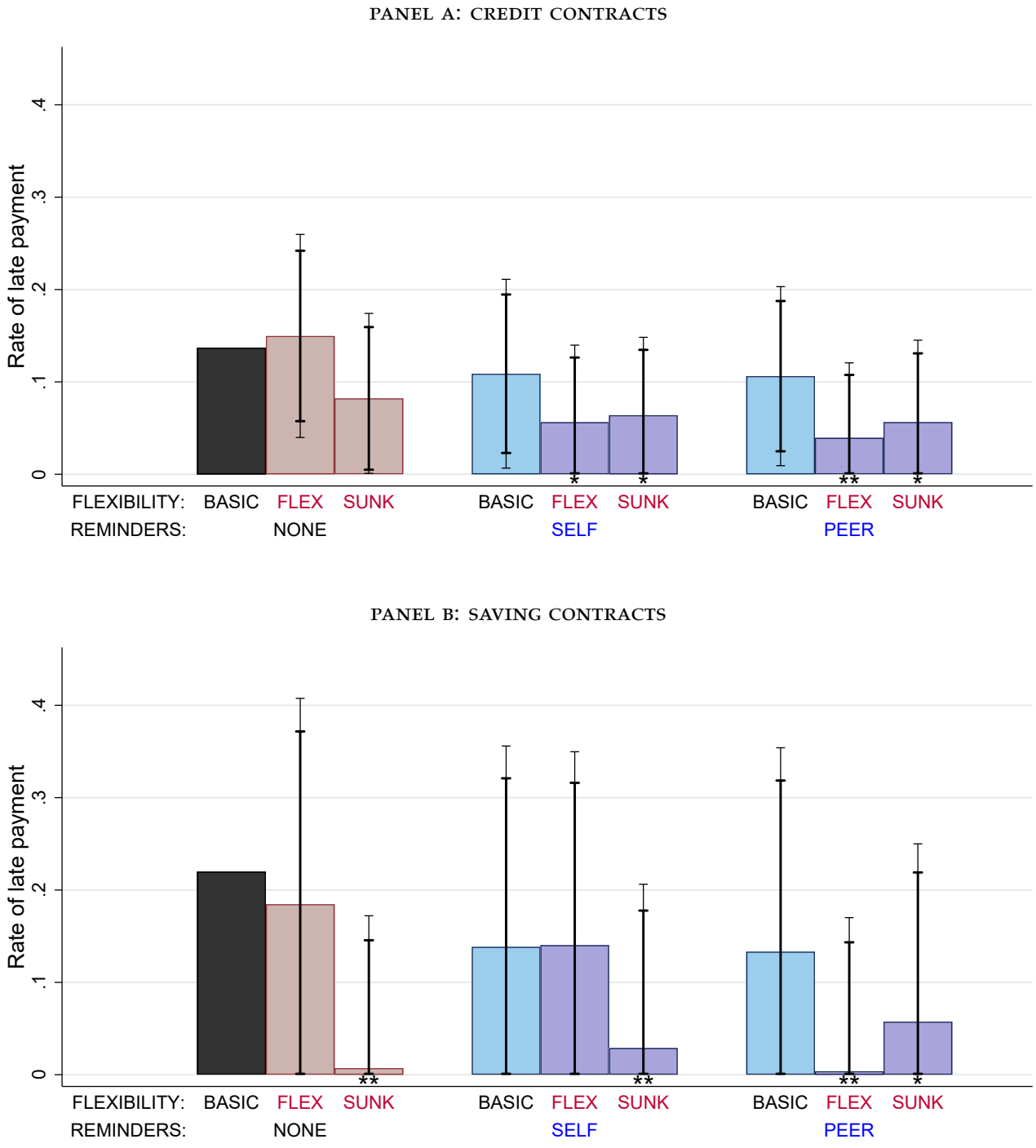
*This Figure shows the average take-up of credit products among individuals with low financial discipline in opaque bars, and individuals with high financial discipline in transparent bars, for all contract types. The take-up of the basic product by individuals with low and high financial discipline, respectively, is shown by the first pair of bars, followed by average take-up for each of the eight possible add-ons that include one of the sunk, flex, reminder to self, or reminder to a family member – as well as combinations thereof. Error bars show 90% and 95% confidence intervals on the difference in take-up relative to the basic contract for the relevant discipline group. Stars indicate the level of significance of the statistical difference between a particular treatment cell and the take-up of the basic contract in that group, with p-values 0.01 for ***, 0.05 for ** and 0.1 for *. Pairwise comparisons between treatment cells can also be done visually from the position of the confidence intervals.*

Figure 3: **Average take-up for saving products by contractual add-ons among individuals with high and low financial discipline**



*This Figure shows the average take-up of saving products among individuals with low financial discipline in opaque bars, and individuals with high financial discipline in transparent bars, for all contract types. The take-up of the basic product by individuals with low and high financial discipline, respectively, is shown by the first pair of bars, followed by average take-up for each of the eight possible add-ons that include one of the sunk, flex, reminder to self, or reminder to a family member – as well as combinations thereof. Error bars show 90% and 95% confidence intervals on the difference in take-up relative to the basic contract for the relevant discipline group. Stars indicate the level of significance of the statistical difference between a particular treatment cell and the take-up of the basic contract in that group, with p-values 0.01 for ***, 0.05 for ** and 0.1 for *. Pairwise comparisons between treatment cells can also be done visually from the position of the confidence intervals.*

Figure 4: **Rate of late payment by contractual add-ons**



*This figure shows the rate of late payment for the basic product in the first bar, followed by average late payment for each of the eight possible add-ons that include one of the sunk, flex, reminder to self, or reminder to a family member – as well as combinations thereof. The reported values are obtained from a linear probability model in which the dependent variable takes value 1 if the respondent delayed repayment, and 0 otherwise. This regression only uses the sub-sample of observations for which the respondent agreed to the contract. Error bars show 90% and 95% confidence intervals on the difference in the likelihood of late payment relative to the basic contract. Stars indicate the level of significance of the statistical difference between a particular treatment cell and late payment in the basic contract, with p-values 0.01 for ***, 0.05 for ** and 0.1 for *. Pairwise comparisons between treatment cells can also be done visually from the position of the confidence intervals.*

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