

Saving with Premeditation: How Poor Households in Bangladesh React to Access to Commitment Savings Accounts [°]

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Abstract

Access to commitment savings products is known to increase poor households' savings. Our paper addresses the mechanism underlying this apparent behavioral anomaly, taking advantage of a unique dataset released by SafeSave, a Bangladeshi microfinance institution that launched the Long Term Savings commitment product in 2009. Our goal is to examine savers' attitudes before they take up this product, in order to detect when savings start to increase. Our results suggest that the rise in savings associated with entering commitment savings is intentional and premeditated, since it starts a few months before households open the commitment account. The existence of such contemplation and preparation stages is in line with the "transtheoretical model of behavior change" (Prochaska and DiClemente, 1982; 1983) found in the psychological literature. Our paper suggests that poor households are more forward-looking than previously thought.

Key words: Microfinance, Bangladesh, commitment, savings, household finance.

JEL classifications: D03, D14, G21, 016.

1. Introduction

Impact studies show that access to commitment products significantly boosts poor households' savings (Ashraf *et al.*, 2006; Brune *et al.*, 2016). Economists tend to attribute this change in saving behavior to impulsiveness and irrationality. In this paper we address the mechanism underlying this apparent behavioral anomaly, taking advantage of a unique dataset released by SafeSave, a microfinance institution (MFI) operating in Dhaka (Bangladesh). Since January 2004, SafeSave has offered clients an “ordinary” savings product, a fully liquid account where they can deposit and withdraw money freely with no restrictions. In October 2009, SafeSave launched the Long Term Savings (LTS) product, a commitment savings account in the form of a fixed-maturity savings plan with fixed monthly deposits. John (2014) provides evidence that the take-up of the SafeSave LTS account increases individuals' savings. In this paper, we examine savers' attitude before they adopt the LTS account, in order to detect when savings start increasing.

The initial SafeSave data comprise 634,002 monthly observations from 16,071 clients for the period from January 2004 to August 2012. We restrict this initial dataset to clients who were active (i.e., owned a liquid account) before October 1, 2009 and opened an LTS account at any time between October 1, 2009 and August 30, 2012. Excluding outliers, our definitive sample consists of an unbalanced panel of 77,518 monthly observations from 1,175 savers. For each client, we observe personal characteristics such as gender, age, occupation, duration of the relationship with SafeSave, and slum dwelling area. Among the financial variables, we observe monthly savings deposits, monthly withdrawals from savings, and end-of-month savings balances on both the liquid and the commitment accounts.

To detect when savings start increasing, we run panel regressions where the estimation period includes, for each saver, the period between entering SafeSave and opening the LTS account. We regress clients' savings balances on six-monthly dummies that indicate the first to the sixth month before LTS take-up (and after the LTS was launched), while controlling for a linear time trend, seasonal fixed effects, and time-invariant savers' characteristics. Then, to examine whether savers prepare themselves before opening an LTS account, we estimate our equation separately for clients who did so immediately (i.e., within the three months following the introduction of the LTS account) and for those who waited at least three months before proceeding. We analyze whether any differences emerge between the monthly dummies of these two groups, arguing that the first one could not prepare for the behavioral change.

Our results suggest that the increase in savings associated with entering LTS commitment accounts is intentional and premeditated, since it starts a few months before the account is opened. The existence of such “contemplation” and “preparation” stages is in line with the “transtheoretical model of behavior change” (TTM) (Prochaska and DiClemente, 1982; 1983) found in the psychological literature. According to the TTM, individuals go through five distinct stages of change: i) pre-contemplation, ii) contemplation, iii) preparation, iv) action, and v) maintenance.

The banking literature already uses the TTM to explain changes of financial behavior by rich people¹ (e.g., Xiao, 2008). Our paper takes a first step toward generalizing the TTM from the psychological literature to poor households' saving behavior and suggests that poor savers are more forward-looking than previously thought.

The remainder of the paper is organized as follows. Section 2 presents the related literature. We present the dataset in section 3, and describe our methodology in section 4. Section 5 is devoted to a presentation and discussion of how poor households behave regarding access to the LTS product. And section 6 concludes.

2. Related Literature

Behavioral economics tries to understand how human behavior (i.e. individuals' actual psychology) interacts with their economic decisions. One of the discipline's main contributions is theoretical and concerns the modeling of intertemporal utility functions. In this context, the hyperbolic discount function is meant to represent a lack of self-control and procrastination behavior (Laibson, 1997; O'Donoghue and Rabin, 1999; DellaVigna and Malmendier, 2004). It implies a decreasing discount rate over time and sets up a conflict between today's preferences and those that will be held in the future, inferring that preferences are time inconsistent. This mismatch between present and future preferences is a reason why agents have trouble fulfilling their plans. For example, an individual may decide today that in the future they should go to the gym regularly, limit credit card spending, quit smoking, and so on. However, when the future arrives and these intentions have to translate into actions, the person fails to carry through with them. Time-inconsistent agents who are aware of their lack of self-control (i.e. "sophisticated" agents) value commitment devices because, by binding their hands, these devices help them fulfill their plans.

Hyperbolic models applied to saving and borrowing explain a wide range of empirical anomalies: agents with self-control problems procrastinate and postpone the take-up of optimal savings plans (Choi *et al.*, 2011); they over-borrow in the short term while saving excessively for the long term (Angeletos *et al.*, 2001); they are willing to pay for illiquid savings accounts that offer no financial reward compared with liquid accounts (Beshears *et al.*, 2015). In a world without behavioral frictions, commitment devices should not affect individuals' savings decisions. In the real world, by contrast, automatic enrollment increases participation in pension savings schemes (Madrian and Shea, 2001), while fixed savings plans increase individuals' propensity to save (Thaler and Benartzi, 2004).

The evidence described above comes from rich countries. Like the rich, the poor face cognitive and psychological constraints. However, self-control problems related to savings decisions are much more serious for the poor (Banerjee and Duflo, 2011; Carvalho *et al.*, 2016). The reason is twofold. First, poverty

¹ For simplification, we use the terms "rich" and "poor" to refer to the populations analyzed by the banking literature and the microfinance literature, respectively.

damages the ability to exercise self-control (Bernheim *et al.*, 2015; Spears, 2011). The poor constantly face stressful expenditure decisions involving harmful trade-offs and conflicts (Bertrand *et al.*, 2004; Banerjee and Mullainathan, 2010). The problem is that acts of volition draw on limited resources, and self-control implies mental fatigue, which depletes a person's willpower stock (Ozdenoren *et al.*, 2012). Second, the poor do not have access to properly designed commitment devices, such as pension plans, for mitigating a lack of self-control (Mullainathan and Shafir, 2009). Left on their own, poor people unsurprisingly find it extremely hard to save. In extreme cases, repaying a loan is the easiest way for them to save (Morduch, 2010; Bauer *et al.*, 2012; Afzal *et al.*, 2017).

In this context, a host of experimental evidence from developing countries shows that, when the poor are offered commitment micro-savings products, their savings significantly increase. On the one hand, a group of authors focuses on withdrawal-restriction commitment products. In the Philippines, Ashraf *et al.* (2006) offer a commitment savings account where withdrawals are not allowed before maturity or before a fixed amount is reached. After 12 months, average savings balances increase by 81 percent for clients offered the commitment account (the treatment group) relative to those who were not (the control group). Similarly, Brune *et al.* (2016) offered farmers in Malawi a commitment savings account that disallowed withdrawals until a set date. The authors found that these accounts led to an increase in savings balances at the partner bank, as well as agricultural input expenditure, agricultural production, and per-capita consumption in the household. Finally, Dupas and Robinson (2013) document that providing poor Kenyan households with simple, informal commitment savings that restrict withdrawals can substantially increase investment in preventive healthcare and reduce vulnerability to health shocks.

On the other hand, John (2014) examines the impact of the SafeSave LTS account, a regular-deposit commitment product, and finds that it boosts savings sharply. John (2014) uses a difference-in-difference methodology, considering "early takers" as the treated group and "late takers" as the control group (the reason being that late takers were treated less than the early takers). For each of these groups, John (2014) examines the changes in savings contributions before and after LTS take-up (until the fifth month afterwards). Early takers (the treated group) increase their savings contributions by 523 Bangladeshi taka (BDT) more than late takers, which represents a 180 percent increase compared with average pre-LTS savings. Finally, in the Philippines, John (2016) compares the impact on savings of commitment accounts with fixed regular deposits and those with withdrawal restrictions. John's (2016) results show that the effect on bank savings of a regular-deposit product is roughly three times that of a restricted-withdrawal one, suggesting that a commitment product with fixed regular deposits is highly effective at increasing savings, on average.

Overall, evidence from developing countries shows that commitment devices are likely to have strong impacts on behavior (Atkinson *et al.*, 2013). Surprisingly, little is known about the dynamics that make poor households change their saving behavior. There are at least two possible ways behavioral changes may take place. First, the changes can be sudden and somewhat unexpected, even to the individuals in question. Such changes suggest impulsive—and therefore possibly irrational—reactions to a new situation. Second, the

changes can be premeditated, as exemplified by the psychological literature on health-related behavioral changes, such as smoking cessation, exercise acquisition, and weight control.

In this context, the TTM (Prochaska and DiClemente, 1982; 1983) construes behavioral changes as an intentional process that unfolds over time and involves progress through a series of five “stages of change.” During the first stage, pre-contemplation, individuals are not intending to take action in the foreseeable future, due either to a lack of awareness or to being demoralized about their ability to change. Contemplation is the stage in which individuals intend to change, not immediately but in the next six months. They experience a decisional conflict about whether to act or not: They are aware of the benefits of changing, but can also be acutely aware of the costs, such as having to give up favorite foods or risk failure. In the preparation stage, individuals are intending to take action in the next month. In the action stage, change is overt and observable, with individuals having quit smoking or started exercising. This is the busiest stage, where people have to work the hardest to keep from regressing or returning to an earlier stage, and it lasts for about six months (Prochaska and DiClemente, 1983). Because of the visibility of the action, this stage has often been equated with the behavioral change, although this is just one of the TTM stages of change. In the final, or maintenance, stage, individuals are free from their problem for six months to five years and do not have to work as hard, but they have to be prepared to cope with the most common causes of relapse (Prochaska *et al.*, 1992).

The TTM has already been applied to household financial behavior in the context of financial counseling and financial education programs in the U.S.² Among this literature, which relates to developed countries, Gutter *et al.* (2007) is related more closely to our paper, as it uses the TTM to assess individuals’ change in savings behavior. The authors distinguish between the intention to save (contemplation and preparation stages) and the moment the behavioral change is overt, i.e. when individuals start saving in the retirement savings plans as part of the action stage. From this, Gutter *et al.* (2007) examine the correlation between individual characteristics and being at one of the stages of change regarding participation in a retirement savings plan. The findings indicate that life-cycle characteristics, financial characteristics and personal preferences influence the likelihood that individuals are in specific stages of change. Specifically, they find that people with higher liquid savings are more likely to be in the preparation and contemplation stages and less likely to be in the pre-contemplation stage. While the goal of Gutter *et al.* (2007) goes beyond explaining the reason for the correlation, this paper highlights that individuals in the contemplation and

² On the one hand, Kerkman (1998) was the first to show that the TTM might provide direction for financial counselors in guiding clients through the process of changes, as well as in selecting interventions that are appropriate and effective for each particular stage. Specifically, Xiao *et al.* (2004b) show that the TTM can be used in the credit counseling setting in order to motivate debt-troubled consumers to change behavior and eliminate undesirable credit card debts. On the other hand, Xiao *et al.* (2004a) examine Money2000, a consumer education program implemented in the U.S. between 1996 and 2002 to encourage debt reduction and savings. In this context, the authors show that the TTM is a useful theory for developing financial education programs and obtain effective changes in consumers’ financial behavior. Finally, the paper of Shockey and Seiling (2004) tests the applicability of the TTM among low-income households participating in the Individual Development Account (IDA), a financial education program to inspire changes in financial management behavior and provide tools that will enable individuals to achieve their goals.

preparation stages—i.e. willing to take action in the future—gradually increase their (liquid) savings in order to adapt gradually to their new savings habit.

Our paper is the first to assess the extent to which the TTM from the psychological literature may be applied to a poor population group in a developing country. More specifically, we examine savers' attitudes before they take up the LTS product, in order to detect whether they prepare themselves before opening an LTS account.

3. Data

The individuals in our dataset are clients of SafeSave, a MFI established in 1996 by Stuart Rutherford and Rabeya Islam to offer micro-savings and microcredit products to poor people in the slums of Dhaka. SafeSave is one of the few MFIs worldwide that offer flexible financial products to the poor (Dehejia *et al.*, 2012; Labie *et al.*, 2017). Being a SafeSave client implies holding at least one no-maturity liquid savings account, where deposits and withdrawals can be made at any time and in any amount.

As of June 2012, SafeSave had nine branches serving 17,540 clients. Its savings balance amounted to BDT 75 million, with an average savings balance per client of BDT 4,152 (equivalent to approximately USD 60).³ About half of SafeSave's clients hold loans, worth a total of BDT 45 million, with an average outstanding balance of BDT 5,038 (USD 73) per borrower.⁴

In October 2009, SafeSave launched LTS, a commitment account in the form of a fixed-maturity savings plan with fixed monthly deposits, for a chosen amount (BDT 50 or a multiple of BDT 100) and a chosen period (3, 5, 7 or 10 years). When a saver misses more than three consecutive deposits or withdraws savings before maturity, the commitment account is automatically closed and the savings balance is transferred into the client's liquid account. The financial penalty is the interest rate spread between the commitment and the liquid accounts. The annual interest rate on liquid accounts is 6%; the annual rates on the commitment account are 7%, 8%, 9% and 10% respectively for maturities of 3, 5, 7 and 10 years.

Our empirical analysis is based on SafeSave administrative data including 634,002 monthly observations from 16,071 clients for the period from January 2004 to August 2012.⁵ For each client, we observe characteristics including: gender, age, professional occupation,⁶ duration of the relationship with

³ The average exchange rate over the period January 1, 2004 - August 30, 2012 is USD 1 for BDT 68.8 (<http://www.oanda.com/currency/historical-rates/>).

⁴ Figures are extracted from the SafeSave Annual Report 2010-11, the SafeSave Audit Report 2011-12, and www.safesave.org (accessed on May 31, 2013).

⁵ Out of the nine SafeSave branches, we consider only the four (Gonoktuli, Kurmitola, Millat, and Muslim) that offer the exactly same savings opportunities.

⁶ The professional occupation variable is time invariant, i.e. the occupation referenced is the one the client mentioned when they entered SafeSave. We classify SafeSave clients into three occupational categories: irregular workers, regular workers, and clients with no occupation. Irregular workers include the self-employed, who earn their income on a daily basis and often in irregular amounts. The self-employed are: transport laborers (e.g. rickshaw drivers), shop owners and shopkeepers, unskilled daily laborers (e.g. construction workers or brick breakers), handicraft workers, street traders,

SafeSave and slum dwelling area. Among the financial variables, we observe monthly savings deposits, monthly withdrawals from savings, and end-of-month savings balances, on both liquid accounts and commitment accounts.

Table 1 (column 1) reports descriptive statistics from our initial database: SafeSave clients are 26.1 years old on average when they enter SafeSave, 80.84% of them are women, 50.15% have no occupation, 11.38% have a regular job and 38.46% are irregular workers (i.e., self-employed). Mean length of time at SafeSave is 3.37 years, and 14.12% of the clients have opened at least one LTS account.

[Table 1: Descriptive statistics]

We then apply the following restrictions to our initial database. First, we eliminate outliers. The amount of money deposited monthly into the liquid savings account has a mean of BDT 213.75 and a median of BDT 18. For our analysis, we only keep the 15,526 clients who make monthly savings deposits into the liquid account below the 99.75th percentile (BDT 7,200) at any point in time. The exclusion of outliers reasonably reduces the mean of the monthly deposits on liquid accounts to BDT 133.02. Second, as our objective is to analyze savers' attitudes before they open an LTS account in order to detect when savings start increasing, we restrict our sample firstly to clients active before October 1, 2009 (thus reducing the sample to 10,822 clients), and then to those who took up an LTS account at any time between October 1, 2009 and August 30, 2012. Our definitive sample consists of an unbalanced panel of 77,518 monthly observations from 1,175 clients. Finally, for clients who opened more than one LTS account (14.89% of the final sample), we examine only the initial take-up.

Column 2 of Table 1 shows that in our final sample of 1,175 savers, the proportion of women is 89.79%. The average age when clients enter SafeSave is 26.15 years old and the banking relationship with SafeSave lasts for 5.55 years, on average. Clients are on average 29.81 years old when they first take up an LTS account. Among the 1,175 savers, 55.29% have no occupation, 9.98% have a regular job and 34.73% are irregular workers⁷. Savings balances are BDT 2,060.11 (roughly USD 30) on the liquid account and BDT 894.39 (USD 13) on the commitment account, on average.

Figure 1 depicts the distribution of LTS account take-up over calendar time. It provides an idea of the period of time that savers waited before opening an LTS account. If behavioral changes are impulsive and irrational, in principle all savers in the sample should be willing to open a commitment account as soon as it

and other small business owners. Regular workers have a job in the formal sector, earning a regular, fixed wage that is typically paid on a monthly basis. The vast majority (72%) of the formal sector is made up of workers in garment factories. The rest are school or hotel guards, teachers, hospital medical staff, or home servants. The "no occupation" category includes mostly housewives (95%); the rest are students (4%), unemployed and retired people. There are some missing values for this variable.

⁷ We might have expected that the proportion of workers, especially regular workers, would have been greater in the final sample, which is composed only of clients who took up a commitment account. But the professional occupation category is a time-invariant variable which thus indicates the occupation of the SafeSave client when they entered SafeSave. A client could therefore, for instance, have no occupation on entering SafeSave, but then have an occupation (regular or not) when subsequently taking up an LTS account. We are not able to observe this potential switch.

becomes available. From the 9% peak, which occurred when commitment accounts were launched in October 2009, we subsequently observe a drop-off: The remaining 91% of savers waited a few months before opening an LTS. In particular, 84% of savers waited at least three months (take-up in January 2010), while 51% waited 10 months or longer (take-up in August 2010).

[Figure 1: Take-up of LTS accounts]

Columns 3 and 4 of Table 1 report descriptive statistics separately for two subsamples: early takers (186 clients who took up the LTS account within three months of introduction) and late takers (989 clients who waited more than three months). This distinction is relevant because in the regression analysis we will look at differences in the savings profiles of these two client groups before take-up. Concerning individual characteristics (age, gender, occupation and length of banking relationship with SafeSave), the two groups are similar, on average. The early-taker group has a higher LTS savings balance. This is consistent with descriptive statistics on SafeSave LTS clients reported by John (2014).

Finally, Figure 2 presents the change in savings for our final dataset of 1,175 savers. In line with John (2014), Figure 2 shows that before LTS take-up, total savings balances—which coincide with liquid savings balances—increase steadily. In contrast, after take-up, total savings balances rise sharply, due to the LTS savings (in fact, liquid savings continue to grow at the same steady pre-LTS rate).

[Figure 2: Change in savings]

4. Methodology

The objective of this paper is to test whether the increase in savings associated with the opening of an LTS account at SafeSave (John, 2014) is intentional and premeditated. For this, we examine savers' attitude before LTS take-up, in order to detect when savings start increasing.

We estimate the following equation, where the estimation period includes, for each saver, the period since they enter SafeSave⁸ until the time they open the LTS account:

$$S_{it} = \beta_0 + \beta_1 \tau_{it} + \beta_2 T_{it} + \theta_t + \varepsilon_{it} \quad (1)$$

where S_{it} is the end-of-month savings balance of saver i at month t ; τ_{it} is a vector containing six monthly dummies (in line with the definition of the TTM contemplation stage), which take value one on the first to sixth months before LTS take-up (and after the LTS was introduced in October 2009), and zero otherwise; T_{it} is a linear trend which controls for the potential problem of non-stationarity of savings balances; θ_t controls for seasonality, as it represents time fixed effects (FEs) according to the Islamic calendar, and ε_{it} is the error term.

⁸ SafeSave was formed in 1996, but out of the four branches that we analyze, three were opened after 2004. The fourth (Kurmitola) was launched before 2004, so that at least some clients from that branch were already active with SafeSave before 2004.

From an econometric viewpoint, we initially estimate Eq. (1) by ordinary least squares (OLS). Yet, in order to control for saver FEs, we reformulate Eq. (1) as follow:

$$S_{it} = \gamma_0 + \gamma_1 \tau_{it} + \gamma_2 T_{it} + \theta_t + u_i + \omega_{it} \quad (2)$$

where u_i are individual FEs controlling for time-invariant savers' characteristics.

Our variables of interest are the six monthly dummies, as they indicate whether savings increase in the six months before LTS take-up relative to the savings in the previous months. In addition, to investigate whether this increase can be attributed to premeditation, that is to say, whether clients intentionally increase their savings before opening an LTS, we run the same regressions separately among two groups of savers: (i) savers who opened the LTS account immediately (i.e., within three months of introduction) and (ii) savers who waited more than three months before opening one. The idea behind this separation is that clients who immediately took up the LTS account could not prepare for the behavioral change.

5. Results

We first estimate Eq. (1) by OLS. The results—presented in column (1) of Table 2—show that the first two monthly dummies preceding LTS take-up are positive and statistically significant. We then run the same regressions on the two subsamples composed of (i) the 186 clients who took up the LTS account within three months of introduction (early takers) and (ii) the 989 clients who waited more than three months (late takers). Results are respectively reported in columns (2) and (3) of Table 2. No monthly dummy is still significant for the group of early takers;⁹ in contrast, the first two monthly dummies preceding LTS take-up are still positive and significant for the late-taker group.

[Table 2: Regression results]

For the above results, we control for a linear trend. We check the stationarity of the time series of savings balances. Since the panel is unbalanced, Baltagi (2005) suggests running a Fisher-type test based on an augmented Dickey-Fuller test for unit root. We also run an Im-Pesaran-Shin unit-root test, which is also feasible with unbalanced panel datasets. Both tests conclude that panels do not contain unit roots; in other words, savings balances are stationary. Still, as the linear time trend is significant, we control for it.

We then run a Breusch and Pagan Lagrangian multiplier test to examine the presence of saver-level time-invariant heterogeneity. The conclusion indicates that we cannot proceed with a standard OLS regression (chi-square statistic of 4.9e+05 and p-value of 0.0000). Next, we perform a Hausman test to examine whether to apply an FE model or a random-effect model. With a p-value of 0.0000 (chi-square

⁹ In the case of early takers, Stata omitted the monthly dummy variables three to six due to collinearity. Early takers opened the LTS account within three months after launch, hence the monthly dummy variables three to six are always zero.

statistic of 172.62), we can reject the null hypothesis that a random effects specification should be preferred (Greene, 2008).

The regression results from the FE model, reported in columns (4) to (6) of Table 2, show that for the full sample of savers, the first three of the six monthly dummies preceding LTS take-up are positive and statistically significant, the magnitude and the significance of the estimated coefficients tending to increase while getting closer to the month of LTS take-up. These estimates suggest that change in individual savings behavior occurs progressively. Furthermore, running our regressions separately on early takers and late takers, we found that no monthly dummy is significant for the group of savers who opened the LTS account within three months of introduction (early takers); in contrast, the first three monthly dummies are still positive and significant for the group who waited at least three months (late takers). This last group therefore drives our results.

As robustness checks, we first run the FE panel regressions controlling for the lag dependent variable, since savings could be persistent (Loibl *et al.*, 2011). As expected, the coefficient estimates presented in Appendix 1 (Table A1) show that current savings are related to their past value to a significant and important extent. In addition, in this dynamic specification of Eq. (2), the second and third of the six monthly dummies preceding LTS take-up have a positive and significant effect on savings balances, for the full sample of savers (column (1) of Table A1) and for the group of late takers (column (3) of Table A1). Interestingly, when we include lagged savings among the regressors, the one-month-before-take-up dummy has no significant effect on savings balances. This result suggests, on the one hand, that one-month-before-take-up clients feel prepared to adopt the behavioral change (in line with the TTM definition of the preparation stage). On the other hand, this result reduces the possibility that LTS take-up (for late takers) is due to a change in individual characteristics (for example, higher income).

Then, we estimate Eq. (2) with a vector containing nine—rather than six—monthly dummies indicating the nine months preceding LTS take-up. Appendix A2 presents the results, which on the whole confirm the previous ones. In line with the TTM, older (than three) monthly dummies do not have a significant influence on savings. In fact, in the contemplation stage of the TTM, individuals intend to change in the next six months, but not immediately.

In addition, we estimate Eq. (2) by considering that the group of late takers is composed of clients who opened an LTS between January 2010 and May 2010. The intuition behind this new separation is to reduce the length of time that savers waited before taking up the LTS account. An overly long period can introduce several disturbances (e.g. change of occupation, income shocks, educational attainment) that may influence the savings made during this period. Our results are reported in columns (1) and (2) of Table 3. Estimates indicate that the first two monthly dummies are still positive and significant for late takers, suggesting that this group drives our overall results, even if the analyzed period is shortened.

[Table 3: Robustness checks]

Next, to solve a potential multicollinearity problem, we estimate Eq. (2) in which τ is a unique “preparation period” dummy, rather than a vector containing the six monthly dummies preceding LTS take-up. For each saver, the preparation period is defined as starting when the LTS account is launched (October 2009) until LTS take-up. Columns (3) to (5) of Table 3 present the results. The preparation period dummy is significantly positive ($p < 0.1$) in the full sample and for the group of savers who waited at least three months before opening an LTS account, while it is not significant for the group of savers who took up the LTS within three months of its introduction.

Overall, these results suggest that depositors’ savings behavior starts to change long before the LTS account is taken up. We interpret these findings as evidence of premeditation: Before opening a commitment account, agents go through a contemplation and preparation stage which, according to our estimations, lasts around three months. This is in line with the TTM found in the psychological literature, where individuals in the contemplation (preparation) stage intend to act within the next six (one) months (Prochaska, 2013). Gutter *et al.* (2007)—who study participation in retirement savings plans by rich households in the U.S.—also find that contemplation and preparation stages are associated with higher liquid savings, relative to the pre-contemplation stage. As Gutter *et al.* (2007, p. 49) state, “it is important to consider that saving behavior would also include intent and preparation to save, in addition to actual account contributions and deposits. Using the TTM allows to expand the concept of savings beyond the dichotomy of savers and non-savers. The different stages allow not only actual savings to be measured, but also to capture measures of intent.”

Our results are consistent with previous work on the formation of economic habits. In particular, Thaler and Benartzi (2004) provide evidence that economic agents find it easier to future commitments than immediate commitments. Various explanations rationalize this point. First, agents exhibit inertia and status quo bias in savings behavior (Madrian and Shea, 2001). Second, entering commitment contracts requires self-control, which is easier to exert when making a future commitment (Noor, 2007). We provide an additional explanation: Behavioral changes are premeditated and individuals need a few months to prepare before making the commitment. The progressive increase in savings that characterizes the preparation stage allows individuals to adapt gradually to a new savings habit. Our results are also in line with findings showing that commitment contracts are useful in the action and maintenance stages, once the behavioral change is overt (Giné *et al.*, 2010; Royer *et al.*, 2015).

6. Conclusion

Access to commitment savings products is known to increase poor people’s savings. Economists tend to attribute this sudden change in savings behavior to impulsiveness and irrationality. Our paper addresses the mechanism underlying this apparent behavioral anomaly, taking advantage of a unique dataset released by SafeSave, an MFI operating in Dhaka, Bangladesh, for the period from January 2004 to August 2012.

Overall, our results suggest that depositors’ savings start to rise well before the take-up of the LTS account. We interpret these findings as evidence of premeditation: before opening an LTS, individuals go

through a preparation and contemplation stage lasting around three months, according to our estimations. The progressive increase in savings characterizing the preparation and contemplation stage allows individuals to adapt gradually to the new savings goal. This is in line with the TTM found in the psychological literature, according to which health-related behavioral changes occur through distinct stages and processes of change. This paper takes a first step towards generalizing the TTM from the psychological literature to poor households' saving behavior.

Implicitly, by calling them “behavioral anomalies,” economists tend to attribute sudden changes in behavior to impulsiveness and irrationality. In contrast, this paper shows that the increase in savings following access to a commitment account is probably more rational than previously thought. As stressed by Prochaska and DiClemente (1983, p. 394): “Rather than an emotional experience moving people to act, it is a cognitive reevaluation process that carries over from contemplation into action. Commitments are realized once the action is taken.”

Our paper has important implications for the design of optimal retirement savings plans. Authors including Choi *et al.* (2003) and Carroll *et al.* (2009) explore the socially optimal enrolment regime when agents face self-control problems. By reducing the initial cost, automatic enrolment helps overcome procrastination. In this paper, we highlight a downside risk of automatic enrollment: It may unduly push individuals to act. Psychological research shows that if one tries to pressure individuals into moving quickly from pre-contemplation to action, there can be unforeseen consequences, including drop-out (Prochaska, 2013). Commitment savings accounts are useful in the action and maintenance stages. In addition, if some individuals have a preference for commitment accounts but are unable to prepare for the behavioral change by themselves, incorporating a preparation phase into the product should have a positive impact on both take-up and the level of savings. For example, savings plans could incorporate two features: (1) a period of time between signing the contract and making the first deposit; and/or (2) in the start-up phase, a progressive increase in deposits up to a preset maximum.

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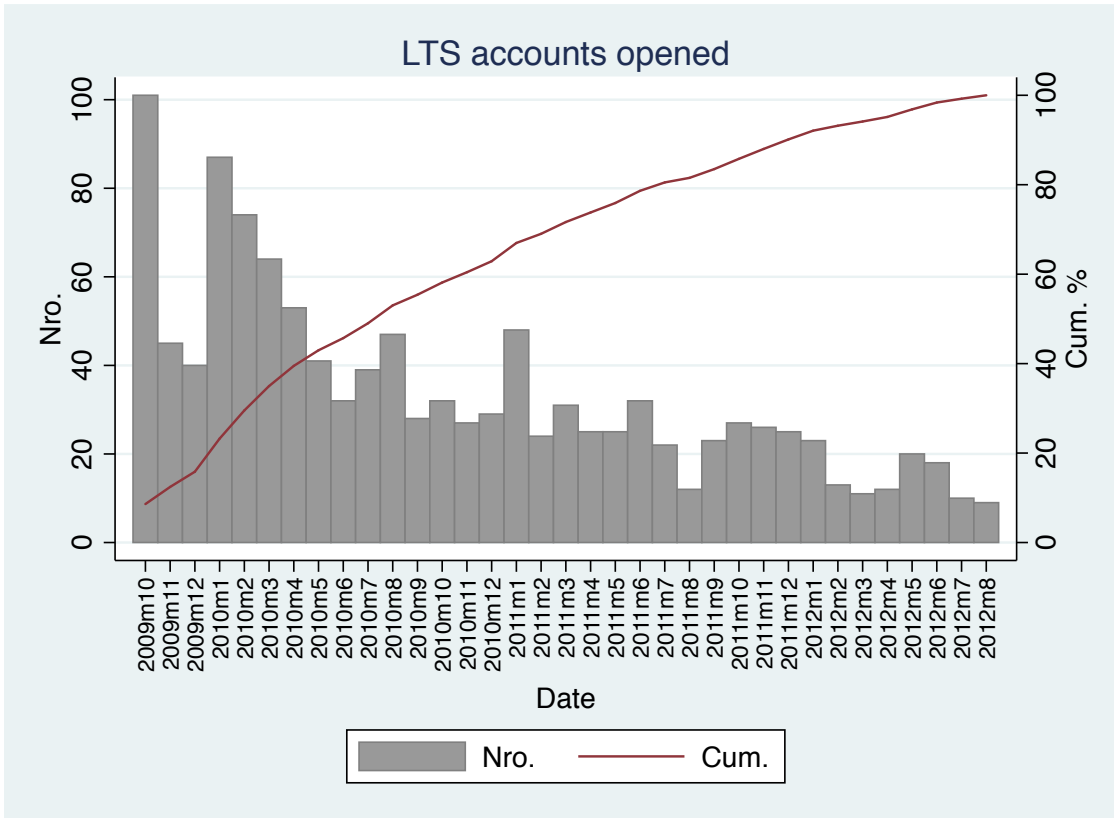
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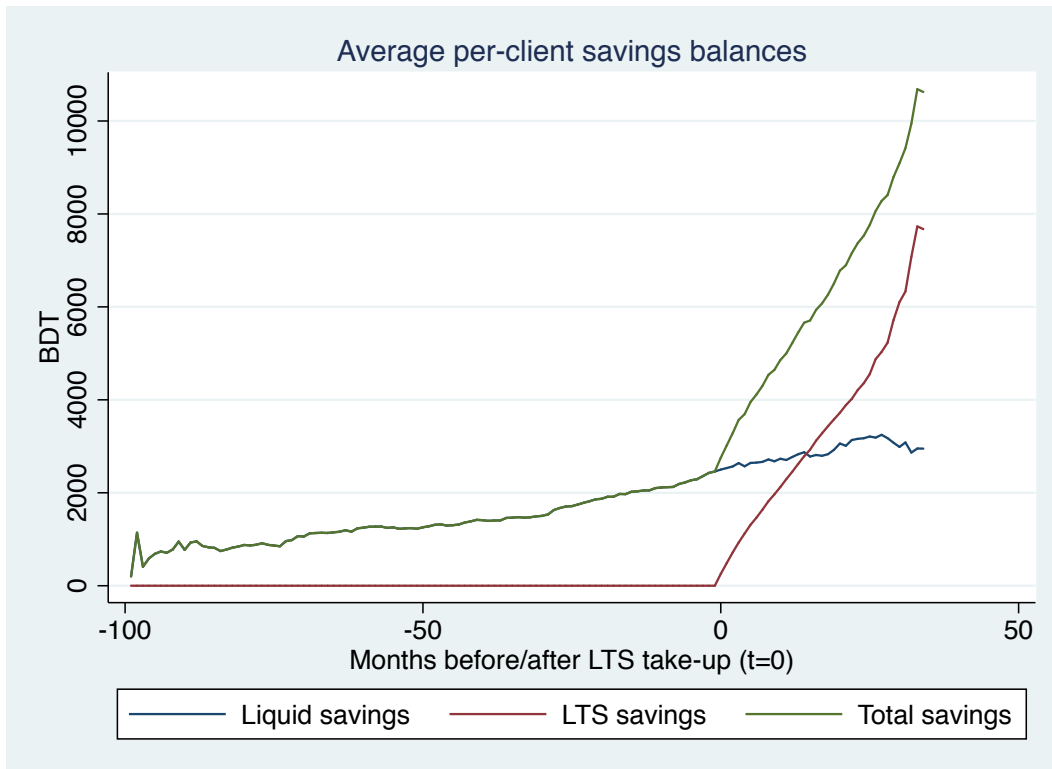
Tables and Figures

Figure 1: Take-up of LTS Accounts from October 2009 to August 2012



Notes: The first y-axis (on the left) represents the number of LTS accounts opened (Nro.). The second y-axis (on the right) indicates the cumulative accounts opened as percentage of the total accounts opened (Cum. %).

Figure 2: Change in savings



Notes: The x-axis represents the number of months before/after take-up of the LTS account. The y-axis is the average per-client savings balance (in BDT). Total savings is the sum of liquid savings and LTS savings. The graph shows that before LTS take-up, total savings coincides with liquid savings, which increase steadily. After LTS take-up, total savings increase dramatically, due to LTS savings (in fact, liquid savings continue to grow at the same steady pre-LTS rate).

Table 1: Descriptive Statistics of Selected Variables

Variables:	Mean (Standard Deviation)			
	Initial Database (1)	Final Sample (2)	Early Takers (3)	Late Takers (4)
Females (%)	80.84	89.79	88.17	90.09
Age when entering SafeSave (years)	26.1 (12.18)	26.15 (11.16)	27.14 (11.92)	25.96 (11.01)
Banking relationship with SafeSave (years)	3.37 (2.48)	5.55 (1.73)	5.46 (1.86)	5.56 (1.70)
Occupation (% ¹):				
No occupation	50.15	55.29	56.99	54.97
Regular occupation	11.38	9.98	10.75	9.84
Irregular occupation	38.46	34.73	32.26	35.19
Taking up an LTS commitment account (%)	14.12	100.00	100.00	100.00
Age when taking up an LTS commitment account (years)	28.00 (11.84)	29.81 (11.43)	29.85 (12.24)	29.80 (11.27)
Savings balance on the liquid account (BDT)	1,629.87 (10,240.62)	2,060.11 (1,847.41)	2,041.71 (1407.51)	2,063.57 (1919.48)
Savings balance on the LTS commitment account (BDT)	170.47 (1,099.61)	894.39 (1,609.12)	1,900.33 (3,083.01)	705.20 (1,034.7)
Number of observations	634,002	77,518	12,064	65,454
Number of clients	16,071	1,175	186	989

¹ Excluding missing values.

Table 2: Regression Results

Dependent variable:	Savings Balances					
	OLS			Fixed-effects		
	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Early Takers	Late Takers	Full Sample	Early Takers	Late Takers
Intercept	473.54*** (37.09)	503.05*** (80.63)	451.12*** (40.38)	-17.59 (113.85)	15.95 (189.88)	-22.04 (127.03)
Number of months before take-up						
1	206.94** (93.15)	112.60 (264.37)	214.61** (98.87)	169.75*** (60.03)	201.04 (196.25)	171.17*** (63.27)
2	192.89** (95.32)	-296.55 (281.86)	215.41** (98.77)	172.26*** (59.57)	106.99 (208.07)	179.69*** (61.63)
3	136.14 (95.94)	omitted	145.90 (96.15)	112.99* (59.87)	omitted	118.78** (60.33)
4	65.16 (95.25)	omitted	75.13 (95.46)	53.41 (60.51)	omitted	59.26 (61.04)
5	90.19 (102.86)	omitted	100.53 (103.06)	72.33 (57.39)	omitted	78.42 (57.32)
6	37.44 (106.34)	omitted	47.52 (106.53)	33.47 (56.05)	omitted	39.15 (55.94)
Linear trend	21.90*** (0.49)	22.89*** (1.19)	22.10*** (0.53)	30.44*** (2.01)	33.04*** (4.21)	30.15*** (2.17)
Mean dependent variable (BDT)	1,735.58	1,651.96	1,746.65	1,735.58	1,651.96	1,746.65
Control for seasonality ¹	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.05	0.05	0.05	-	-	-
R ² within	-	-	-	0.14	0.15	0.14
Sig. Model (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	51,579	6,029	45,550	51,579	6,029	45,550
Number of clients	1,175	186	989	1,175	186	989

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between brackets.

¹Time FEs according to the Islamic calendar included.

Table 3: Robustness Checks

Dependent Variable:	Savings Balances				
	Reduced Period for Late Takers		Preparation Period Dummy		
	(1)	(2)	(3)	(4)	(5)
	Oct – Dec 2009	Jan – May 2010	Full Sample	Early Takers	Late Takers
Intercept	15.95 (189.88)	-232.98 (236.51)	-0.97 (111.01)	15.46 (189.88)	1.30 (124.61)
Number of months before take-up					
1	201.04 (196.25)	217.15* (121.24)			
2	106.99 (208.07)	217.10* (125.89)			
3	omitted	136.19 (123.47)			
4	omitted	27.25 (147.05)			
5	omitted	235.43** (113.95)			
6	omitted	132.69 (152.72)			
Preparation period dummy			89.50* (53.48)	171.76 (184.32)	100.71* (53.88)
Linear Trend	33.04*** (4.21)	37.34*** (4.73)	29.88*** (1.20)	33.05*** (4.21)	29.39*** (2.21)
Mean dependent variable (BDT)	1,651.96	1767.15	1,735.58	1,651.96	1,746.65
Control for seasonality ¹	Yes	Yes	Yes	Yes	Yes
R ² within	0.15	0.14	0.14	0.15	0.14
Sig. Model (p-value)	0.000	0.000	0.000	0.000	0.000
Number of observations	6,029	11,047	51,579	6,029	45,550
Number of clients	186	319	1,175	186	989

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between brackets.

¹Time FEs according to the Islamic calendar included.

Appendix A1: FE Regression Results while Controlling for the Lag Dependent Variable

Dependent Variable:	Savings Balances		
	(1)	(2)	(3)
	Full Sample	Early Takers	Late Takers
Intercept	107.00*** (17.61)	112.79** (52.93)	107.03*** (17.99)
Lag savings balance	0.87*** (0.02)	0.74*** (0.04)	0.88*** (0.02)
Number of months before take-up			
1	6.75 (26.98)	-6.10 (117.93)	6.15 (28.03)
2	65.90*** (19.55)	-91.31 (149.37)	70.40*** (19.29)
3	49.88** (24.01)	omitted	49.01** (23.97)
4	-11.63 (38.41)	omitted	-12.69 (38.53)
5	20.49 (32.42)	omitted	20.08 (32.47)
6	-0.62 (30.12)	omitted	-1.24 (30.13)
Linear trend	3.04*** (0.58)	7.01*** (1.49)	2.70*** (0.59)
Mean dependent variable (BDT)	1,735.58	1,651.96	1,746.65
Control for seasonality ¹	Yes	Yes	Yes
R ² within	0.78	0.61	0.79
Sig. Model (p-value)	0.000	0.000	0.000
Number of observations	50,404	5,843	44,561
Number of clients	1,173	184	989

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between brackets.

¹Time FEs according to the Islamic calendar included.

Appendix A2: FE Regression Results with Nine Monthly Dummies before LTS Take-up

Dependent variable:	Savings balances		
	(1)	(2)	(3)
	Full Sample	Early Takers	Late Takers
Intercept	-18.26 (114.47)	15.95 (189.88)	-22.04 (127.03)
Number of months before take-up			
1	169.09*** (63.63)	201.04 (196.25)	171.56** (67.35)
2	171.59*** (63.66)	106.99 (208.07)	180.07*** (66.14)
3	112.31* (64.04)	omitted	119.16* (64.83)
4	52.72 (65.25)	omitted	59.64 (66.16)
5	71.63 (63.02)	omitted	78.80 (63.32)
6	32.76 (63.46)	omitted	39.54 (63.81)
7	33.51 (59.87)	omitted	40.24 (59.99)
8	-25.60 (59.74)	omitted	-19.44 (60.07)
-9	-25.62 (58.71)	omitted	-19.40 (58.92)
Linear trend	30.46*** (2.03)	33.04*** (4.21)	30.14*** (2.21)
Mean dependent variable (BDT)	1,735.58	1,651.96	1,746.65
Control for seasonality ^l	Yes	Yes	Yes
R ² within	0.14	0.15	0.14
Sig. Model (p-value)	0.000	0.000	0.000
Number of observations	51,579	6,029	45,550
Number of clients	1,175	186	989

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between brackets.

^lTime FEs according to the Islamic calendar included.