

Public vs. Private Mental Accounts: Experimental Evidence from Savings Groups in Colombia

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ABSTRACT

I designed and implemented a Randomized Controlled Trial to study whether relatively simple modifications to how a commitment savings product was framed and labeled could affect savings accumulations and other outcomes of low-income individuals in newly formed Village Savings and Loan Associations (VSLAs) in Colombia. Motivated by hypotheses from behavioral economics the experiment tests hypotheses that behavioral responses should vary depending on whether subjects are led to label and create 'mental savings accounts' in private or public ways. Individuals in the private-labeling treatment groups were led to label their savings as earmarked for a particular purpose and to state savings accumulation targets, information which was shared only privately with a member of the research team. Individuals in the public-labeling treatment groups received the same intervention but were then asked to publicly reveal and announce their chosen goals to other members of their savings group. The average treatment effects of the public-labeling intervention are very strong and significant. Savings accumulations increased by an average of 35% and savings goals were 21.5% more likely to be reached in comparison to those untreated. Further explorations strongly suggests evidence of differentiated behavioral responses of individuals in the private-labeling treatment group: private commitment to a savings goal is more effective for individuals who, after random assignment but prior to the intervention, had been measured to be less constrained by economic circumstances and institutional barriers. The analysis and interpretation of results was enriched by mixed

methods for data collection: households' survey data, administrative records and qualitative data from focus groups discussions.

Key words: Behavioral economics, micro-finance, randomized controlled trial, savings, mental accounting, labeling, self-control problems.

JEL Classification: C93, D03, D14, D91, O16

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I. INTRODUCTION

Savings is important to poor households. Capital and asset accumulation can help provide poor and extremely poor households with an improved ability to generate future income and more effectively fight poverty in the future, smooth consumption and investment plans in the face of adverse shocks.¹ Poor households save small amounts of cash flows via informal providers such as ROSCAs and deposit collectors; or save by holding risky assets (livestock, stored grain, durable goods).² In all forms of microfinance, high costs of monitoring and transaction relative to the size of the financial amounts involved have often worked to reduce both the supply and the demand for formal financial services or made access costly for clients.³ For this reason, innovations to bring down costs and improve the terms and usefulness of services offered to the poor are key to expanding service. I design and evaluate two modifications of a well-established methodology of self-help groups in Colombia called Village Savings and Loan Associations (VSLA), in order to understand if private or public commitment through the creation and salience of 'mental savings accounts', affects savings behavior. The results show that public commitment is very effective in increasing savings and private commitment has heterogeneous behavioral responses of treatment effects.

1. Karlan and Morduch (2009), and Burgees et al. (2005).

2. Duflo and Banerjee (2007), Dupas and Robinson (2010), Collins et al. (2009), Karlan and Murdoch (2009).

3. Karlan and Morduch, 2009; and Dupas and Robinson (2010).

Recent evidence suggests that self-control problems and time inconsistent preferences of individuals might prevent them from making optimal decisions in everyday scenarios such as waking up early, starting a diet, doing homework, or even saving.⁴ As a result, individuals often demand and rely upon commitment mechanisms to mitigate these problems. According to Bryan et al. (2010), commitment mechanisms provide individuals with tools to help them stick to a plan that might otherwise be repeatedly postponed because of a disparity between our long and short run intentions. Frequently, individuals' preferences for future choices are valued disproportionately lower over current ones⁵ leading to situations such as clicking the snooze button of the alarm clock or delaying our workout one more day. As a result, individuals end up running anxious to catch the last train and a lecture from the boss, or having to bear that back pain that have not managed to escape from. These situations are common when making financial choices. Consequently, savings rates and assets accumulation are often low, and this is not just the result of lack of access to formal financial services. A *commitment* mechanism is something that helps us *promise* our current selves to behave according to our future best interests. In the context of under-savings, a *commitment* device is an arrangement used by individuals to incentivize higher savings or penalize failure to making deposits. These rewards or penalties could be economic (*hard commitment*) or psychological (*soft commitment*). In this study I use a *soft commitment* device to evaluate how individuals respond to self-control problems associated to savings decisions.

This study describes the design and implementation of a Randomized Controlled Trial to evaluate if relatively simple modifications to how an existing savings product was framed and labeled creates a commitment mechanism and how it affects savings accumulations and other outcomes of low-income individuals in newly formed Village Savings and Loan Associations (VSLAs) in Colombia.⁶ Under the existing VSLA methodology, individuals are encouraged to save but make no explicit statement of a commitment to reach particular savings goals. Motivated by hypotheses derived from behavioral economics, the designed experiment explores how *private-* and *public-labeling* alternatives in the ways in which individuals are asked to declare their savings as earmarked for a particular purpose might affect program outcomes hypothesizing that this might work via differences in how mental accounts are created and labeled. Individuals in the *private-labeling* treatment create and label a 'mental savings account' and state a savings goal privately. In the *public-labeling* treatment, label and state savings goals individually but were then asked to publicly reveal and announce their chosen goals to other members of the savings group.⁷

4. Laibson (1997), Angeletos et al. (2001), Shefrin and Thaler (1981).

5. Angeletos et al. (2001), Bryan et al. (2010).

6. In Colombia, more than 4,500 VSLAs have been formed with over 70,000 beneficiaries up to date. The program targets more than 5 million poor and extremely poor households registered at Red Unidos, the largest anti-poverty intervention in the country. The global outreach of the VSLA clients is of over 8.7 million in the five continents (Source: VSL Associates).

7. I will use the words VSLA or savings groups interchangeably.

In this way individuals in both treatment groups are able to label their 'mental savings account' and create private or public commitments to reaching individual savings goals.

Behavioral economics has been increasingly accepted to be able to make predictions of field phenomena.⁸ An important result in behavioral economics is that mental accounting is a commitment mechanism that individuals use in inter-temporal decision-making in order to constrain their own behavior.⁹ Mental accounting was originally defined by Richard Thaler (1985) to be the process of mentally coding and categorizing transactions that individuals create to mentally separate the money available make plans and keep track of their spending. Individuals assign their available income to different expenditure accounts and put labels such as rent, pension, entertainment, etc. This violates the classical principle of fungibility of money in which money should not have labels attached,¹⁰ thus, one should be able to transfer money from one account to other accounts without any (implicit or explicit) costs.

Individuals often rely upon mental accounts as a commitment device to mitigate self-control problems associated with inter-temporal choices.¹¹ For this reason, by implicitly or explicitly categorizing mental accounts, individuals impose constraints to their behavior, are often better able to achieve initially chosen savings goals and use financial services more effectively to raise incomes and welfare.¹² As a result, individuals may save more when they save for a declared purpose. Relatively little evidence however has been collected from actual field experiments to indicate how much practical and policy importance such strategies might have on individual behavior.

Thaler (1999) argues that how mental accounts are framed, labeled and evaluated are key components in the decision-making process. If fungibility is violated, the way in which savings choices are framed can have significant impacts on actual savings outcomes. This finding provides a framework for thinking about how individuals evaluate (open and close), frame and label mental accounts in a way to maximize their utility when making financial choices. For this reason, studying further these elements help us understand better how the process in which mental accounts, as a commitment device, are created actually matter for savings decisions. The contribution of this study is to investigate if opening mental accounts publicly, instead of privately, increases savings through additional constraints imposed to the behavior of individuals as a result of the 'public' nature of commitment. A recent field experiment by Kast et al. (2012) shows that commitment is effective at increasing savings. It uses peers as a commitment device, while this study uses mental

8. Camerer et al. (2004).

9. Thaler (1985).

10. Thaler (1985 & 1999), Hastings and Shapiro (2013).

11. Bryan et al (2010), Shefrin and Thaler (2004) and Kast and Pomeranz (2009).

12. Thaler (1985).

accounting as a commitment device to constrain savings behavior and investigates if such accounts could be artificially created by labeling their 'savings' account privately or in the presence of their peers.

The RCT randomly assigned 137 newly formed VSLA, mainly in rural areas from nine municipalities of Colombia into two treatments and a control group. Individuals in the control group were exposed to the standard VSLA model.¹³ In the *private-labeling* treatment members received an additional module with a short organized guided conversation aimed at discussing and highlighting the difficulties of committing to a savings path and the potential role and use of mental accounts in strengthening those commitments. I asked participants to voluntarily state in writing a savings purpose and weekly savings goals. This was intended to help guide individuals to form and label their mental 'savings' account to privately commit to achieving that savings purpose. Goals were not stated publicly. The *public-labeling* treatment was similar except that the group discussion encouraged members to make commitments to themselves as well as to others in their group in order to explore the possibility that this might lead to different outcomes. As in the *private-labeling* treatment members were asked to voluntarily state a savings purpose and weekly savings goals in writing, but in this intervention, those commitments were shared with all members of the group. By doing this, individuals explicitly label their 'mental savings account' and publicly commit to their own decision. Prior to the public announcement, individuals were not informed about the (public) nature of the treatment or their commitment.¹⁴ This module included a trust building game and a guided conversation aimed at highlighting the achievements of group commitments.¹⁵

With the experimental design I studied how labeling mental accounts in a social environment (publicly) gives rise to higher savings rates and to higher achievement of savings goals in comparison to labeling mental accounts privately. Public commitment of savings goals creates implicit agreements that may affect or even change the behavior of some members of a group.¹⁶ The anticipation of "social punishment", in the form of a shame act or harm to reputation acts as a mechanism to induce individuals to save more and

13. Members of the VSLA meet every two weeks to make contributions to a self-managed and self-capitalized savings fund by purchasing shares of the fund. In addition to savings individuals are able to take small loans on terms set by the group at interest rates that are typically much lower than available from other sources. The duration of the savings cycle is from 8 to 9 months at the end of which the funds are distributed according each individual's accumulated shares.

14. Although individuals seemed shy when the experimenter invited to share their commitments, 100% of those in the treatment intervention decided to share it with other members of the group.

15. The trust building activity played at the beginning of the *public-labeling* treatment is called "Game with balloons". One balloon was distributed to each member of the VSLA and they were challenged to push the balloon up and keep it in the air. Once they were able to hold them up in the air, I added more balloons, so that each participant had to keep an eye not only on their own balloon but also on the balloons of the others. The purpose of the game was to build a cooperative environment within members of the VSLA.

16. Gächter and Fehr, 1999; Fehr and Gächter, 2000; Fehr and Fischbacher, 2002; Carpenter et al. 2010.

achieve their commitments more often. As a result, higher savings balances and goal achievement rates in the *public-labeling* treatment group support this idea because individuals fear breaking commitments made to other members of the group more than commitments made only to themselves.

If money were fungible or perfectly substitutable, the marginal propensity to consume ought to be the same out of all sources of income and assigning labels to specific expenditures or accounts would not have any impact on how the money is spent. Individuals would just transfer money from, say, the 'rent' account to the 'leisure' account without imposing any psychological or monetary costs.¹⁷ If this were the case, labeling savings accounts (privately or even publicly) would not affect individual's savings decisions in the experimental sample. On the other hand, the classical approach to decision-making under uncertainty assumes a self-interested behavior of individuals. Therefore, choices should not be unaffected by other people's decisions (neglecting any motivation of reciprocity and fairness that induce cooperation and enhances group oriented behavior). If this were the case, social networks wouldn't be relevant for decision-making and individuals in the *public-labeling* treatment will not make any additional effort to achieve their savings goals and therefore, savings rates would be the same as in the other experimental groups.

However, the results demonstrate very significant and strong results for treated individuals in the *public-labeling* intervention. Savings increased by an average of 35% (effect size of up to .38 standard deviations) and individuals were 8.5% to 21.5% more likely to achieve the initially established savings goals. The results for the *private-labeling* treatment intervention on savings heterogeneous. The quantitative and qualitative data indicates that such heterogeneity comes from intrinsic ability to save of individuals and on institutional features of the VSLA methodology that impose restrictions on individual savings behavior. In sum, treatment effects are very significant for individuals who are less economically constrained in their ability to save and insignificant for individuals that are less able to save, even prior to the intervention. This uncovers the fact that individuals experience different abilities to respond to the treatment interventions and must be considered in the analysis. The results are robust to different specifications, as described in more detail below.

I used mixed methods for data analysis at different stages of the research project. During July to November of 2011 I administered a baseline survey to 670 individuals from the experimental sample to measure a set of characteristics and choices prior to their exposure to the treatments. The second-stage surveying was administered in the fall of 2012, when I followed-up the same group of individuals interviewed at baseline. I also use administrative records of 1,663 members of the VSLA gathered from two organization which I worked with: IED/Vital and Plan International. Table 1 summarized the data used in the study. Fina-

17. Thaler (1999), Hastigs and Shapiro (2013).

lly, I collected qualitative data from focus group discussions to gather information about the experience and perspectives of participants in the study.

This intervention translates recent theoretical insights into experimental strategies implemented in the field to both test the theory and possibly improve the impacts of a large-scale public policy program. The experimental design contributes to the understanding of how different strategies used to create mental accounts affect choices and contributes to the growing literature in behavioral economics and microfinance. The methodology represents a new approach to the study of individual behavior and provides valuable insights and information to program administrators and policy makers involved in the design and diffusion of commitment-savings products. The increased availability of these and other products with similar features may serve to increase savings, improve financial literacy amongst poor households, which may contribute to generate income to fight poverty.

II. RELATED LITERATURE

In a recent popular press book, which summarizes findings from a body of work, Richard Thaler and Cass Sunstein (2009) explain how to move people in a preferred direction by providing “nudges” to their decision-making process. They describe a series of field experiments in which the so-called “choice architects” construct a “choice environment”¹⁸ that influence the decisions of individuals in a certain direction. An example of this is the voluntary retirement savings plans (SMarT) created to increase savings rates of workers by setting default choices (Benartzi and Thaler, 2004).

A still small but fast expanding body of theory and evidence has focused attention on how behavioral economics might affect the design of microfinance products and how economists think about household pathways out of poverty. A recent survey by Bryan, Karlan and Nelson (2010) points out some theoretical and empirical concerns about the design and implementation of commitment devices. They discuss the effectiveness of different types of products and different types of individuals in determining the demand of commitment devices, and the ability to generate long run impacts on the behavior of its clients (Bryan et al. 2010). Commitment is an important tool that is able to help individuals to stick

18. Choice environments are defined by setting starting points, incentives or defaults that draw the attention of individuals toward better choices.

to the plan that is constantly delayed because the valuation of present choices is much larger to the valuation of future choices.¹⁹ In other words, a demand for commitment is created when individuals cannot reconcile present with future decisions. In a series of papers, Karna Basu studies take up rates, sustainability and welfare impacts of informal savings products for individuals with different types of preferences (Basu, 2008, 2010 and 2011). Individuals with time inconsistent preferences obtain commitment products in order to deal with the conflict between present and future decisions. Richard Thaler (1980) also establishes "pre-commitment" as an alternative to solve self-control problems for activities with a time dimension (i.e. consumption and investment).²⁰ In this study, I designed and implemented an intervention that offered a *soft commitment* device to encourage participants of VSLAs to create and label a 'mental savings account', privately and publicly, in order to increase savings.

The following studies provide evidence from the field on different types of commitment products. In a randomized field trial, Ashraf et al (2006) found that sophisticated hyperbolic discounters (more likely to commit) were actually more likely to open restricted access savings accounts and to hold a higher level of deposits. Other studies show that small variations in product design can increase uptake and savings. In the Philippines, Dean Karlan and others evaluated other types of commitment products that mitigate the "limited attention" problem of under-savings. Using an RCT they found that sending text message with gain or loss oriented reminders affected their savings goals. These experiments were repeated in similar setting in Bolivia and Peru.

Dupas and Robinson (2009) found an increase in productive investment and consumption as a result of an RCT in which they offered clients to pay fees and minimum balance to entrepreneurs in Kenya. In another study (2010) the same authors measured the impact of a savings product on changes in consumption and investment rates. They found that opening interest-free bank accounts increased savings rates, investment level, private expenditures among entrepreneur women, and found them to be less vulnerable to illness shocks. Bertrand et al. (2005) and Bertrand et al. (2006) provide excellent discussions of the role of psychology on the behavior of economic decisions in the credit market for the poor. The first study argues the ability of frames and signals to induce behavior among loan clients. They found that incorporating psychology features (such as offers framed in loss vs. gain contexts) into lender's offers resulted more effective than standard monetary incentives, such as lower interest rates or longer repayment periods.

Another way of dealing with self-control problems of individual behavior is mental accounting (Thaler, 1985). The concept of creating or categorizing mental accounts as a

19. Individuals with such preferences are called "hyperbolic discounters", present bias or time inconsistent. See Rabin and O'Donoghue (1997). See also Laibson (1997).

20. See also Mullainathan (2006).

commitment device has been tested in some experimental settings in the microfinance agenda. “Mental accounting matters” for the consumption, savings and investment decisions of all individuals (Thaler, 1999). A growing theoretical literature, as well as evidence from the lab and field suggests that individuals often rely upon mental accounts as a commitment device to respond to self-control problems associated with inter-temporal decision-making. Mental accounting allows individuals to mentally separate the money available, make plans and track expenses. As a result, mental accounting may change consumption and expenditure habits to smooth consumption and it may even increase savings. Financial decisions are influenced by the way in which mental accounts are created and evaluated. The decision-making process may depend on the scope and framing of mental accounts and the period of time in which they are evaluated (Soman, 2004). For this reason it is important to study all these elements of how mental accounts are formed in order to better understand how they actually matter. If mental accounting matters, it implies that the classical principle of fungibility of money is violated (Thaler, 1999; Shefrin and Thaler, 2004; Hastigs and Shapiro, 2013), and individuals do not, in fact, transfer money from one account to other accounts without any costs, use budgets and make plans to how to assign money to specific accounts.

Kast et al. (2012) evaluate the use of peers as a commitment device in two field experiments among micro-entrepreneurs in Chile. The study implemented two experiments. The first experiment tests whether peer pressure acts as a commitment device to encourage savings among microcredit clients that meet regularly to make repayments to their jointly liable loan. The second experiment adds to the reminders through text messages to unbundle the mechanism behind the peer pressure effects on savings. The intervention is successful in demonstrating that microentrepreneurs save more as a result of their participation in the self-help peer group. However, the authors show that the change in savings behavior is not necessarily related to the in-person meetings common in self-help groups, but in regular follow-ups, present in those. The effect of sending regular text messages to participants is as effective as in-person meetings.

Bertrand et al. (2006) analyses two features of mental accounting: labeling and setting defaults. By setting defaults or “irrelevant starting points” financial institutions and governments can increase the participation of the poor in financial services and improve welfare. Second, labeling accounts help individuals spend their savings in what they initially planned. By assigning labels or specific names to certain accounts individuals will be less likely to spend it in something else (i.e. temptation goods).²¹

I framed the experimental design in the context of labeling and categorizing mental accounts privately and publicly and measures its effects on investment and savings decisions

²¹ Shefrin and Thaler model of behavioral life cycle defines a hierarchy for mental accounts (consumption, wealth and income) from more to less tempting. By making individuals transfer money to less tempting accounts will achieve higher savings rates.

and other outcomes. I evaluate whether labeling mental accounts in a social environment gives rise to higher savings rates and to higher achievement of savings goals in comparison to the privately created accounts. Public commitment of savings goals creates implicit agreements that may affect or even change the behavior of some members of a group.²² Individuals who participate in collective interactions value other people's opinions and use them in their own decision-making process. The creation of an implicit agreement among subjects in the *public-labeling* treatment group imposes informal (non-monetary) sanctions or rewards on the behavior of others that motivates the enforcement of such agreements and helps stick to their initial plan. Similar to Kast et al. (2012), this study shows that the in-person meetings are powerful in promoting higher savings rates. However, in this case, the implicit agreement created within the savings group is the mechanism by which behavior is changed. Although the two studies aim to prove the effectiveness of commitments devices linked to peer pressure, in particular savings goals, this study incorporates *labeling* savings goals or mental accounts and is able to separately identify the peer mechanism that gives rise to higher savings rates. The effect of putting *labels* to accounts allows transferring money to less tempting accounts, in addition to creating commitment and mentally categorizing expenses, as mental accounting has proven to be effective.

Others describe the effect of social relations on the effectiveness of contract enforcement in group-oriented behavior. Theoretical as well as empirical findings contradict the pure self-interested behavior assumption and predict that fairness and reciprocity motivations enhance collective actions and therefore induce the enforcement of social norms. Social interactions achieve higher levels of cooperation among individuals.²³ Also, Masclet et al (2006) finds that informal sanctions that affect non-monetary payoffs motivate cooperation if monetary payoffs are unaffected. This result is reinforced by the findings of Carpenter et al (2006) in which reciprocity motivates mutual monitoring and attenuates contracting problems associated with imperfect information. Barr (2001) validates the effectiveness of social sanctions in inducing cooperation, in particular when there is some level of "familiarity" among members of the group.²⁴

In the microfinance agenda, a large body of evidence shows that poor households use informal financial services to smooth consumption, start up new businesses, save to purchase a durable good, or finance festivals and other events. Collins et al (2009) find that a relatively large portion of household incomes in Bangladesh, India and South Africa flows through financial products. Poor households use different informal savings products (self-

22 Gächter and Fehr (1999), Fehr and Gächter (2000), Fehr and Fischbacher (2002) and Carpenter et al. (2010).

23. Fehr et al. (1997), Fehr and Schmidt (2007), Fehr and Gächter (2000), Fehr and Fischbacher (2002), Gächter and Fehr (1999).

24. This result was also obtained by Gächter and Fehr (1999), Fehr and Gächter (2000) and Carpenter et al. (2010). The later study makes several predictions about the effect of various degrees of connectedness on cooperative behavior, in a lab setting.

help groups, ROSCAs and other providers) but they might be inadequate. Holding livestock or durable goods might be too risky because animals may die and goods may break, in which case savings are lost. Also, real returns on savings are often negative because the interest paid on deposits is usually zero and in many cases they have to pay a deposit fee;²⁵ and some people borrow money from one provider to be able to deposit a specific amount in a savings account or in a savings group.²⁶

Informal financial contracting is common in developing countries, where the supply of financial products is limited. Poor households save small amounts of cash flows that are too costly to collect for formal providers as well as for savers. This might reduce the effective use of financial products to these people and their ability to manage and accumulate assets. Even though bank accounts are offered, it is still costly to poor households to deposit their savings. Bank branches are usually far away from their homes or workplace, in particular in rural areas, where the cost of transportation is sometimes higher than the amount deposited.

Besides transaction costs associated with the use of financial services, managing financial products is difficult. Individuals lack the willpower to reconcile present and future decisions. Decisions that involve a time dimension may require immediate costly actions that individuals postpone, leading to suboptimal decisions.²⁷ This is the case of savings. People are aware that anticipating costs by reducing the consumption of temptation goods today may lead to benefits in the future. Even extremely poor households save and can often choose to save more by reducing the consumption of temptation goods (alcohol, tobacco, coffee and tea) and social or religious events.²⁸ However, the value that individuals impose on the delayed gratification of saving today sometimes is lower than the cost associated with reducing consumption today. This is particularly true for individuals with limited and unstable incomes, who disproportionately spend a larger fraction of their income on the consumption of unnecessary (temptation) goods and for whom saving becomes harder than for wealthier individuals.²⁹

This reveals a demand for commitment products for time inconsistent clients, especially designed for the poor to increase access to credit markets. Expanding financial access

25. For further discussion see Ashraf et al. (2006).

26. This seems to be a common practice among women who participate in Spandana, a Micro Finance Institution that provides financial services to individuals in poor villages from India, which helps solve self-control problems. Banerjee and Duflo (2011), Chapter 8 pp 196-197.

27. Basu (2009) explains how different types of individuals with time inconsistent preferences may "renegotiate" with themselves in order to reach a different equilibrium.

28. According to Duflo and Banerjee (2007, 2011) 56% to 78% of poor and extremely poor households' income is spent in food. However, a large amount is spent in the consumption of temptation goods (alcohol, tobacco), celebrations and festivals. This is also discussed in Dupas and Robinson (2010).

29. Banerjee and Mullainathan (2010) and Karlan (2010) discuss this issue and its implications for the take-up of commitment savings products. Also, Banerjee and Duflo (2011) provide evidence of how individuals declare spending too much of their incomes in these types of goods.

can help the poor increase saving and investment in productive activities and allow them to take advantage of new opportunities. For example, Dupas and Robinson (2010) provided evidence that a campaign to increase take-up rates of interest-free accounts led to accumulation of productive investments and an increase in income for women entrepreneurs in Kenya.

Designing and offering commitment savings products contributes to improving the financial capability of individuals and wellbeing, by increasing savings, empowering in their ability to manage and accumulate assets, smoothing consumption, improving their ability to cope with unexpected shocks, developing financial literacy and improving inter-temporal consumption decisions. Innovations to bring down costs and improve the terms and usefulness of services offered are therefore the key to expanding service. However, the design and impact evaluation of new innovative commitment devices to this population remains a relatively new and under-studied topic in the microfinance agenda. Product innovations might work to expand financial access to help the poor manage their income and asset accumulation strategies at a lower cost.

III. MICROFINANCE IN COLOMBIA

Informal contracting is common in Colombia, predominantly in poor neighborhoods. A recent study of low and middle-income households in Colombia shows that 90% of the surveyed families have borrowed money at least once.³⁰ Of these, 83% used informal lenders (family, neighbors, friends or informal lenders) and less than 30% have used formal financial institutions (banks, cooperatives).³¹ Interest charges and other terms of financial access vary greatly. Almost all families reported holding liquid savings (e.g. saved cash at home, purchase of durables or through deposit collector). Yet fewer than 2% saved in a bank.³² Another study shows that that less than 4% of poor women save in a bank and over 70% save in liquid asset holdings, generally to cover daily, unexpected, expenses.³³

30. The sample represents approximately 75% of lower income Colombian households. USAID-Econometria S.A (2007).

31. Duflo and Banerjee, 2007 also find that almost all extremely poor households in their sample of one region of India borrowed money from expensive informal lenders. Only 6.4% of extremely poor households borrowed from a formal lending institution. In contrast, one third of the Indonesian poor population borrows from a bank. In their book, *Portfolios of the Poor*, Collins et al (2009) use financial diaries data to document the extensive use of informal lenders (mostly relatives and friends, some at no interest) by households to finance expenditures in South Asia and South Africa.

32. Duflo and Banerjee, 2007 also found that few extremely poor households have a savings account, and if save, they do it through savings collectors or savings clubs like ROSCA or Self-Help Groups.

33. Preliminary report of impacts. Mujeres Ahorradoras, Familias en Acción.

Although many non-profit and government institutions have designed products to increase the access to microcredit, its beneficiaries are small entrepreneurs and households with income levels higher than the poverty line. The government is shifting the focus from microcredit to providing alternatives for savings and insurance targeted to poor and extremely poor households. However, the design of innovative commitment devices to this population is a relatively new topic in the microfinance agenda.

One component of *Red Unidos*, the largest Colombian governmental anti-poverty initiative, offers households access to specialized financial mechanisms linked to transfer payments including savings, microcredit and micro-insurance.³⁴ Information collected in the baseline of *Red Unidos* (nearly 600,000 households) suggest that 80% don't know how to use the formal financial services available, and only 1.5% define a savings amount within the household. From these, 90% had a bank account but was not used to deposit savings, but mainly for transactional use. Only 7% save in a savings club or through deposit collectors. *Red Unidos* initiated a pilot operation in 2007 in 37 municipalities, and started its expansion to all the regions of the country in June 2008 to enroll 1.5 million families (1.2 million households classified by the SISBEN index as extremely poor, and 300 thousand displaced from violence).³⁵

In the banking and financial inclusion component of *Red Unidos*, *Banca de las Oportunidades* provides assistance to *Red Unidos* families to get access to both formal and informal forms of microfinance. In 2008, Banca de las Oportunidades pilot the program Village Savings and Loan Associations (VSLA) in 34 municipalities. The VSLA methodology has been implemented in at least 30 developing countries around the globe and has proven to be effective in providing savings and loan services to local communities that have not access to formal services. To date, VSLA has almost reached 9 million clients worldwide.³⁶ Preliminary results from the pilot in Colombia show that individuals consistently save small amounts of money. It reached almost 7,000 clients with an average savings of USD 78 over an 8 to 9 months period. Loans were on average of USD 67 each and less than 25% of participants took a loan, at least in the first savings cycle.³⁷ The successful experience of the pilot program motivated the expansion of this initiative to other regions in the country. In June 2011, the government started the expansion to organize 600 new VSLA in cities and rural areas with high poverty levels and limited access to formal financial services. I used this expansion to carry out the RCT designed in this study. In 2013, the government and

34. *Red Unidos* aims to help 16 million people who live under the national poverty line and 5.3 million under the extreme poverty line. These numbers represent 32.7% and 10.6% of the Colombian population in 2012. Source: Departamento Administrativo Nacional de Estadística - DANE.

35. *Red Unidos*.

36. VSLA Global Outreach report. Hugh Allen (October 2013).

37. Banca de las Oportunidades report, VSLA pilot project. January, 2011. VSLAs are commonly operated by CARE, Oxfam America and Plan International, as well as other local organizations. In Colombia are mostly operated by IED/Vital and Plan International.

other multilateral organizations are funding the promotion of the program in more regions of the country and are planning to form over 2000 new VSLAs.

Village Savings and Loan Associations

VSLA are community based savings commitment products, built on the ROSCA model and other self-help savings groups as an alternative to formal microfinance that offers access to insurance, savings and small loans to the poor with limited or non access to formal financing.³⁸ Individuals self-select and participate in a voluntary basis to form a self-managed and self-capitalized fund to save and borrow periodically. Members make small and regular contributions to the savings fund by purchasing up to 5 shares in each meeting. Savings are invested in a fund that is soon used to provide small, short-term loans to participants, used for consumption, making small investments in their businesses, and frequently for emergencies. This is complemented by a social fund that is much smaller but provides insurance to members in the form of grants for fatalities and other unexpected circumstances. All the purchase of shares takes place with all members of the group in biweekly meetings and recorded in each member's passbook. Funds are securely stored in the safe box and kept by one member of the group until the next meeting. In Colombia, VSLA are formed by up to 19 members, usually neighbors, friends or family.

The VSLA has a structured methodology and a set of rules that members establish in the first "training" meeting, before starting making contributions. All members of the group form a General Assembly, which elects a Management Committee consisting of 5 positions (chairperson, record-keeper, box-keeper, and 2 money-counters). The General Assembly also sets the rules and conditions stated in a *constitution* of the fund that every member must agree and sign. The constitution contains information of rules of governance, dispute and resolution, conditions for purchase of shares, uses of the social fund, interest rates and price of the share. There is a limit in the number of share purchased in each meeting. Each member cannot purchase more than 5 shares per meeting. However, occasionally, the group allows extraordinary purchase of shares by all members or sometimes the group purchases additional shares using money from group activities such as selling food at a fair, raffles, etc. The share price, interest rate on loans, value of the contribution to the social fund and other rules are defined prior to the first purchase of shares and are maintained throughout the first savings cycle. This methodology helps households to manage their cash flows and be able to accumulate larger amounts of money for investment in businesses, education, improving housing conditions, or unexpected expenses. At the end of the savings cycle (8 to 9 months), the fund is closed and the accumulated savings are distribu-

38. Over the last 3 decades, the VSL methodology has been implemented by anti-poverty organizations such as CARE, Oxfam America, Plan International and others, in different countries, namely: India, Bangladesh, many African countries and recently, in some Latin American countries. For more information visit VSL Associates. <<http://vsla.net/>>.

ted according to the shareholdings. The VSLA methodology encourages savings and use of loans but does not make any activity to explicitly state savings goals or use of savings.

VSLA targets individuals that live under the national poverty line. During the fieldwork, I collected information on 142 poor households that participate in *Red Unidos*, the largest Colombian anti-poverty initiative. I randomly selected households in neighboring municipalities with similar social and economic characteristics to the municipalities where the VSLA program was operating. In order to understand what types of households sign up to participate in a VSLA, I compare socioeconomic characteristics of households in the experimental sample with a sample of households from *Red Unidos*.³⁹ The reported data shows that although VSLA targets poor households, only 66% of the beneficiaries in the study sample are registered at *Red Unidos*. Individuals that participate in VSLAs have higher level of education (completed high school), more physical assets at home, and less number of children (3.3 vs. 3.9) than those in the *Red Unidos* sample. Participants in VSLA report having more experience with both formal and informal financial services (such as lending and savings, and even having a bank account). They also account having households' investments in the last year more frequently than those who do not participate in a VSLA.

Regarding their work experience, individuals in the non-experimental sample work more often in a paid job and work on average 8 hours a week more. Despite these differences, more than 60% of households in both samples are recipients of the Conditional cash Transfers program, *Familias en Acción*, and participate in the same proportion in community activities. This information illustrates that individuals in the VSLA, and therefore in the study sample, can be classified in a group of disadvantaged population but does not fall into the lowest level of income.

39. Recall that *Red Unidos* targets poor and extremely poor households across the country in order to offer the national and municipality level supply of social programs to alleviate poverty. It also covers disadvantaged groups of population such as indigenous and displaced by the armed conflict.

IV. EXPERIMENTAL DESIGN

I designed and implemented an RCT to study whether a *commitment savings product*, private or publicly created, may affect savings decisions of low-income individuals that participate in newly formed VSLA in Colombia. Under the existing VSLA methodology, individuals are encouraged to save but make no explicit statement of a commitment to reach particular savings goals. Motivated by hypotheses derived from behavioral economics, the designed experiment explores how *private-labeling* and *public-labeling* alternatives in the ways in which individuals are asked to declare their savings commitments might affect program outcomes hypothesizing that this might work via differences in how mental accounts are created. In the *private-labeling* treatment, individuals label their mental “savings” account and state a savings goal individually and in the *public-labeling* treatment, individuals label and state savings goals individually, but then share their goals with all the members of the group. In this way individuals are able to label their mental “savings” account and create private or public commitments to reaching individual savings goals.

Hypotheses

People often find it valuable and practical to form “mental accounts”⁴⁰ as a device to constrain their own behavior. As a result, individuals often save more when they save for a

40. Thaler and Benartzi (2004), Thaler and Sunstein (2009) and Kast and Pomeranz (2009).

declared purpose. This result indicates a violation of the classical assumption of fungibility of money. If money were fungible or perfectly substitutable, the marginal propensity of consuming all sources of income should be the same and assigning labels to specific expenditures or accounts would not have any impact on how the money is spent. Individuals would just transfer money from, say, “rent” account to “leisure” account without imposing any psychological or monetary costs (Thaler, 1999; Hastigs and Shapiro, 2013). If this were the case, labeling savings accounts (privately or publicly) would not affect savings decisions of individuals in the experimental sample. The standard utility maximization model suggest that accounts are perfectly substitutable, thus the marginal cost of using one dollar to purchase unnecessary or unplanned goods should be the same to the marginal benefit of one dollar in the established savings goal. As a result, in this experimental setting, labeling mental accounts doesn't matter and savings rates should be the same for control and treated individuals. In addition, achievement of savings goals should be the same for all.

Another classical approach to decision-making under uncertainty is that individual's are self-interested utility maximizers. This indicates that their choices are unaffected by other people's choices, and always choose an optimal action that yields the highest monetary payoff (neglecting any motivation of reciprocity and fairness that induce cooperation and enhances group oriented behavior). If this is the case, social networks don't matter. Consequently, the experimental design predicts that (self-interested) individuals in the *public-labeling* treatment will not make any additional effort to achieve their savings goals and therefore, will not have larger savings rates or achievement of savings goals in comparison with the control group or the *private-labeling* treatment group.

According to these interpretations I evaluate the following hypotheses: (i) Individuals in the *public-labeling* treatment group have the same savings rates than those in the control group. (ii) Although individuals in the *public-labeling* treatment create their savings goals in a more cooperative environment, they save the same amount than those in the *private-labeling* treatment group. (iii) Conditional on savings commitments (labels), individuals in the *public-labeling* treatment are equally likely to achieve their initially established savings goals than the control and *private-labeling* treatment.

Assignment to treatment and experimental groups

I randomly assigned newly formed VSLA to two treatments and one control group in 9 municipalities of Colombia. The assignment of the VSLA was carried out using a simple lottery and the method is called spot-randomization in which the assignment to treatment was random at the time when the VSLA was formed. For example, if 5 new VSLA were formed in a week in Cartagena, I draw the type of intervention that the VSLA would be assigned to (private, public or control). This status is maintained throughout all the experimental period. The unit of randomization is the savings group (VSLA) and the unit of analysis is at the individual level.

Individuals in the control group are exposed to the standard VSLA model which uses a well-scripted model to organize eligible beneficiaries, and allows individuals to save and borrow for any group-approved purpose. Individuals in the *private-labeling* treatment group are subject to an added discussion module aimed at highlighting and discussing the difficulties of committing to a savings path and the potential role of using mental accounts in strengthening those commitments. The session ended by asking members to voluntarily state in writing a savings purpose and weekly savings goals. In the *private-labeling* treatment individuals create (open) and label their mental “savings” account that may contribute to higher savings rates.

The *public-labeling* module is similar except that it encouraged members to make commitments both to themselves as well as to others in their group in order to explore the possibility that this might lead to different outcomes. This module includes trust-building games and a guided conversation aimed at highlighting the achievements of group commitments. As in the *private-labeling* treatment members were asked to voluntarily state a savings purpose and weekly savings goals in writing, but in this intervention those commitments were also shared with all members of the group. By doing this, individuals explicitly label their mental account and publicly commit to their own decision. In this session, individuals seemed shy when the experimenter invited to share their commitments. However, 100% of participants agreed to share their goals with other members of the group. The experimenter verified the accuracy of the written commitments and participants were very enthusiastic about sharing their dreams with everyone in the group. In addition, other members committed to help each other to reach their goal. For this reason I am able to calculate Average Treatment Effects of the treatment intervention on the outcomes of interest.

The RCT compares the situation of individuals who are statistically equivalent at the baseline but are exposed to different interventions. For this reason, any difference observed across the treatments and control groups is attributable to the intervention. The random assignment allows controlling for selection bias present in the estimates and allows determining causal effects of the interventions on the outcomes of interest. The hypotheses allow investigating how small variations in the information provided, and how it is framed, may affect savings behavior, their ability to commit (privately or publicly) to a savings product and their ability to use financial products more effectively. Other dynamics inside the VSLA may also be evaluated, such as whether individuals punish or reward the behavior of other members of the group, according to their performance throughout the savings cycle.⁴¹

41. It may be possible to observe what happens when a group member is always purchasing the maximum number of shares, or those who are unable to raise their contributions to more than one share. In this sense, social taxation may be implicitly imposed within the group. Despite the interest of evaluating such behaviors, the quantitative data does not provide enough information. For that reason, in the focus groups discussion, I raised this discussion.

Experimental subjects

The target population is extremely poor individuals with limited access to financial services that participate in the largest Colombian anti-poverty intervention, *Red Unidos*. Using a national system of identification index (SISBEN), families are classified to receive benefits from social programs offered by national and local governments in a preferential basis. Some of the programs and projects offered to this population are: housing subsidies, conditional cash transfers (CCT), training programs, health and nutrition workshops and vaccination, etc. The VSLA are an important part of the financial inclusion strategy to help extremely poor families to manage and accumulate assets and capital, and improve their well-being.

Using data from the baseline survey, more than 65% of the sample population belongs to *Red Unidos* and are recipients of the CCT program, *Más Familias en Acción*. However, comparing the sampled population with an average individual from *Red Unidos*, I found that participants in the experiment have higher level of education, report having more assets and more experience and use of different types of financial services such as a bank account, loans and savings (although through informal providers).

V. DATA COLLECTION AND SAMPLE SIZE

Sample Size

To select the sample size I used a (Multi-Site) Cluster Randomized Trial model from the Optimal Design software.⁴² I introduced an additional level of randomization, by stratifying the sample of new VSLAs in blocks or different sites in the country and assigning each VSLA to an experimental group (*public-labeling*, *private-labeling* or control). The randomization was performed within blocks in order to reduce heterogeneity in the estimates in each site. Sites or blocks were defined as municipalities (9 in total). The randomization uses a cluster design because of the nature of the savings groups program and the nature of the interventions testes. As a result, treatment assignment is at the group level (VSLA) while the unit of analysis is at the individual level. For this reason, I need to account for the within-group correlation.⁴³

42. Spybrook et al. (2011).

43. The (standardized) parameters used for this calculations were as follows: Significance level: $\alpha=0.05$; Intra-cluster correlation in the range of: lower bound $\rho=0.05$ and an upper bound of $\rho=0.25$. This parameter was assumed considering an intra-cluster covariance of 0.75 to 0.95 based on information from the pilot. The variance explained by the introduction of the controls not larger than 0.5. An effect size or Minimum Detectable Effect (MDE) of 0.3 standard deviations of savings balances among those in the *public-labeling* treatment versus those in the control group and MDE of 0.2 standard deviations more savings for the *public-labeling* treatment over *private-labeling* treatment group. The number of individuals per cluster to be treated is $n = 13$; however, only 5 individuals from each cluster were chosen for the household survey. I also carried out power analysis for sample size calculation using the commands `Sampsi` and `Samclus` in Stata and the results did not change.

The sample needed to achieve a statistical power of 80% in each site is approximately 15 clusters.⁴⁴ In total, I selected 137 VSLAs. One third is assigned to each experimental group (control, *public-labeling* and *private-labeling*). From each selected VSLA, all individuals were part of the experimental sample, but I randomly chose 5 members to be surveyed at their house to collect demographic characteristics.⁴⁵ In total, the study surveyed 670 experimental subjects at two points in time but uses administrative records of savings balances for all 137 savings groups, which allowed having a much larger sample to measure treatment effects. In total the study sample to measure treatment effects is of 1,663 individuals distributed across the three experimental groups.

Quantitative data

I use two sources of data in the study. First household surveys collected to the sample of 670 individuals at two points in time:

- i. Baseline: Prior to the intervention, I had the list of members of the newly formed VSLA. I randomly chose 5 individuals to be interviewed. The survey took place before the intervention at the place of residence of the individual. I measure a set of individual and household variables in order to evaluate the impact in well-being of the household and other outcomes as a result of participation in the intervention. I collect data on demographic characteristics, use and experience of financial services, housing, poverty, food security, household income and expenditures, social capital, ability to cope with unexpected shocks and time preferences.
- ii. Follow-up: I administered a follow-up survey after the first savings cycle was closed and savings were distributed among the members of the VSLA. The follow-up survey allows comparing the situation of participants at two points in time, but given the random assignment of the experimental groups, any difference in the outcomes of interest across treatments and control after the intervention should capture the average treatment effect. Attrition could be a potential bias of the estimates of this study, however, in cases when the VSLA was dissolved before the pre-established period or a member decided to defect, I was able to reach them during the follow-up. Despite this, the loss in sample was very small, less than 5% of the individuals interviewed at baseline did not participate in the follow-up.

I also use administrative records from program officials. To complete the sample I worked along with two practitioner institutions in the study. IED/Vital and Plan International. Two-thirds of the experimental sample was chosen in IED/Vital sites and one-third in Plan International sites. Although the VSLA methodology in the field followed by each organization was exactly the same, the information systems and management of data differ. In particular, the level of detail differs across organizations' records throughout the first savings cycle. But overall the information is very useful to evaluate the hypotheses of the study.

Interventions

During the interventions, savings goals were handed in a piece of paper to the experimenter and kept in a safe place without access to any field operator or anybody different to the principal researcher. I collected the responses and typed them for analysis. In total, I have data on savings purposes and weekly savings goals from 903 individuals that participated in the *public-labeling* and *private-labeling* interventions.

Reminders

Treatment effects may cease after some time. For that reason I decided to visit the treatment groups before the end of the savings cycle to remind participants about their commitments. In the reminder's session, I maintained the *public* or *private* nature of the interventions. Individuals were able to update their savings goals in a short survey that I conducted at the end of the session.

Qualitative data

I collected qualitative information from 4 focus groups discussions with the purpose of exploring further questions related to the understanding of achievement of goals in treatment and control groups. I also explored other behaviors and perceptions of individuals as a result of the interventions. The focus groups discussions took place in two of the nine experimental sites and recruited 30 individuals from the experimental sample. The sample was split between men and women to perform the discussion separately.

VI. RESULTS

Baseline survey

Data gathered at baseline suggest that the outcomes of interest and other covariates related to savings are balanced across experimental groups. This implies that the randomization was effective. Table 3 provides evidence on this statement. It shows no statistical differences across control, *public-* and *private-labeling* in most pre-treatments characteristics. As a result, any difference in outcomes post-treatment can be attributed to the intervention. Table 3 also shows descriptive statistics of the studied sample.

The household size of subjects is between 4.55 and 4.72. Over 60% are married or live with their partner and have less than 2 children of 15 years or less living at home. As shown in Table 3, I find significant differences in the number of children between the *private-labeling* treatment and the other experimental groups. It is also important to note that most VSLA participants are women. The percentage of women varies from 77% to 82% across treatments and control but its difference is not significantly different from zero. Another variable that illustrates a difference between the experimental groups is whether a family is recipient of Conditional Cash Transfers (CCT). The number is significantly lower for the private treatment group. However, the numbers are large. Around 60% of households in the sample receive CCTs of *Más Familias en Acción*. In contrast, a very small number of

households receive in-kind or cash transfers from *Adulto Mayor*, a popular elderly transfers program in Colombia.

The data also reveal that 27% to 33% of the sample held any type of savings before participating in the VSLA program. Their weekly savings rates varied on average from USD 5.4 for the *private-labeling* treatment to USD 7.1 for the control groups. Although the averages are different, they are not statistically different from zero, implying that on average, individuals in the experimental sample saved more or less the same amount prior to the treatment intervention.

An interesting result is that around 50% of all subjects report having a bank account. However, they don't use it for savings, mostly for transactions. Households commonly use bank accounts to receive their CCT payments or to receive their salary. In fact, over 60% of those who have a bank account declared to open the account exclusively to receive their CCT payments of *Más Familias en Acción*. I asked individuals in the sample if someone in the household took a loan or made an investment in the past 12 months. 13% to 17% took a loan and 33% to 39% of the sample made an investment in purchase of animals, house improvements, new or existing businesses, etc. Although households use (mostly informal) financial services, they are not familiar with writing a budget. Household incomes vary greatly over time; in fact, only 40% of respondent report having a paid job in the last month. As it is commonly observed in this population, they work mainly in informal jobs.

Surprisingly over 60% of individuals own the house where they currently reside. This result is very noteworthy because most savings goals are related to home improvement or acquisition of a new home, suggesting that the conditions of their homes are suboptimal for living. A smaller number of individuals reported participating in community activities such as sports clubs, political party, community organization, women's clubs, etc.

I included in the set of variables the average of an index that measures trust in financial institutions. From 1 to 5, I asked surveyed individuals how much they trusted banks and financial institutions where 1 is untrustworthy and 5 is completely trustworthy. On average, the level of trust is larger than 3. This may inform us that there are other reasons different than trust why these individuals are not using formal financial services. Finally, the average number of members of the VSLA is over 13 across all groups. The second panel of the Table 3 presents the mean difference of a set of variables that measure the perception of individuals about the ability to save of their households. I asked if they think their households could save "much more", "more", "the same" or "not save at all". I carried out a Pearson's chi-squared test to evaluate the associated values for each possible response for the different experimental groups. The joint test is not significantly different from zero across all experimental groups (the *p-value* is 0.294). However, I observe a difference in the perception that households could save the same. It is much larger for the control than

for both the *private-* and *public-labeling* treatment groups. These results indicate that prior to the intervention, households across experimental groups are similar in their perception about their ability to save.

Savings commitments

After the baseline survey was administered, individuals received the standard training of the VSLA methodology. During one of these sessions I performed the treatment interventions in which individuals set savings goals and label mental accounts privately or publicly. After a short discussion, I asked each individual from the *public-labeling* and *private-labeling* treatments to write down in a piece of paper their individual commitment for their savings. I asked: "What is your plan for the funds saved in this savings group?" The responses varied from home improvements, education expenditures and investment in businesses, to health, travel and unexpected expenditures.

Table 4 disaggregates the responses between *public-labeling* and *private-labeling* treatment groups. The data show that about 34% to 43% of participants plan to save in the VSLA for home improvements or purchase of a new home, around 25% for education for children or other members of the household, and 25% to 28% to invest in an existing or a new business.⁴⁶ Other savings purposes are: consumption of non-durables such as clothing, food, celebrations and events (8% to 16%); consumption of durable goods such as computers, appliances or jewelry (7% to 12%); for an unexpected expenditure or for emergencies (3% to 4%) and other expenses accounts for less than 3%.⁴⁷ The third column of the table displays the t-statistic resulting from the mean comparison of the responses between the treated individuals. As shown in the table, there are no statistical differences across treated subjects for most of the stated savings goals. Only the average savings goal specific to the purchase of a non-durable good such a bicycle, motorbike, computer, jewelry, etc. is statistically different for the treated groups.

The second set of variables in the table illustrates the amount of savings that individuals plan to contribute every meeting during the first savings cycle and the willingness of taking up loans. Individuals from the *private-labeling* treatment set a biweekly savings goal of purchasing approximately 3.06 shares in the VSLA meeting, while individuals from the *public-labeling* treatment define a savings goal of purchasing approximately 3.1 shares. In contrast, I observe differences between *public-* and *private-labeling* treatments in what individuals express to save in terms of money, prior to the intervention. The discrepancy between the differences in the number of shares and the savings balances can be potentially explained by the price of shares in each experimental group.

46. This category includes also a retirement plan or to continue saving.

47. Such as traveling, purchase of a gift, insurance, etc.

Reminders

During this session, individuals were given the opportunity to update or change their savings purpose. The data collected show that 22% of participants updated their goals while the remaining 78% decided to stick to their initial plan. Also, there isn't any statistical difference in this variable between *private* and *public-labeling* treatment groups. Those who opted to change the savings goal earmarked the savings account mostly for home improvements, children's education, paying debt and household expenditures (mainly food).

Treatment effects on savings

If money were fungible or perfectly substitutable, and if individuals behaved in a selfish manner, savings choices should not be affected by labeling savings accounts or by other people's decisions. However, the results show very significant and strong results for treated individuals in the public-labeling intervention. Savings increased by an average of 35% (effect size of up to .38 standard deviations) and individuals were 8.5 to 21 percentage points more likely to achieve initially established savings goals. For individuals in the private-labeling treatment intervention results on savings are heterogeneous. The quantitative and qualitative data indicates that such heterogeneity comes from intrinsic ability to save of individuals and on institutional features of the VSLA methodology that impose restrictions on individual savings behavior. In sum, treatment effects are very significant for individuals who are less economically constrained in their ability to save and insignificant for individuals that are less able to save, even prior to the intervention; however, are insignificant on average. This uncovers the fact that individuals experience different abilities to respond to the treatment interventions and must be considered in the analysis. The results are robust to different specifications, as described in more detail below.

The random assignment of subjects to experimental groups allows estimating the causal effect of the interventions. Differences in the variables of interest capture the average treatment effect of labeling 'mental savings accounts' (that was opened in the beginning of the VSLA) *privately* or *publicly* on savings and other behaviors of treated subjects. I estimate a simple (OLS) model of differences in savings rates and on the number of shares purchased over the first savings cycle, after exposure to the intervention. The model estimated is:

$$(1) \quad Y_i = \alpha + \beta_R T_{i,R} + \beta_U T_{i,U} + \epsilon_i$$

where, T_i is the dependent variable, represents the treatment status for each individual in the sample, R represents *private-labeling* treatment, U represents *public-labeling* treatment and ϵ_i is the disturbance term.

Selection bias is eliminated because of the random assignment of VSLA into different groups (Angrist and Pischke, 2009). The coefficients measure the average treatment effects (ATE) of participating in the *public-labeling* or *private-labeling* intervention. The coefficients β_R and β_U measure the average or mean difference in the outcome for individuals in *private-labeling* and *public-labeling* treatment intervention, respectively (or treated), in comparison with individuals in the control group (or untreated). Table 5 presents the treatment effects on savings from estimating equation (1) using administrative records. All regressions are estimated with robust standard errors by clustering at the VSLA level. I estimated the treatment effects on savings accumulations measured with the number of shares purchased by each individual under various scenarios: first (column 1) during the entire savings cycle, second (column 2) during the first 6 meetings,⁴⁸ lastly (column 3) during the entire savings cycle but for only those with the exact same share price.

The regression results in panel A show that both *private-* and *public commitment* is successful in increasing savings accumulations (measured by the number of shares purchased by participants in each meeting). In the total savings cycle individuals in the *private-labeling* treatment saved on average 6 shares more, representing a 17% (0.3 standard deviations) increase in savings in comparison with the controls. Moreover, the increase in shares purchased by those in the *public-labeling* treatment was 12.4 shares or 35 percentage points (0.61 standard deviations) more than the controls.

The significance level of the coefficients for specifications 2 and 3 is robust. This implies that if we estimate the model for the first few meetings only, the treatment effects are very strong for both interventions, although the point estimates are smaller. On the other hand, estimating the ATE for the subsample with the same share price ($P = \text{COL } 5,000$) provides evidence of the effectiveness of the interventions for all individuals under the same conditions. In this case, I isolate the possible heterogeneity in opportunities to save across savings groups. The findings show that private commitment increases savings by 25% while public commitment increases savings by 34%.

The last row shows the F-statistic corresponding to testing the joint significance of the *private* vs. *public* treatment effect. The effect on savings of publicly announcing savings goals is almost 50% larger than the effect of private commitments. The point estimates are statistically significant at the 1% level in specifications (1) to (3).

Columns 4, 5 and 6 show the treatment effects for the total amount of money saved over the savings cycle. This variable is constructed by multiplying the total number of shares purchased during the savings cycle by the price of the share in the VSLAs where the indivi-

48. This specification is used in order to check for persistence of the treatment interventions on individual's savings behavior. The average number of meetings in the first savings cycle is 15.8. However, I only have this information for two thirds of the sample. For the remaining, I have detailed information of until the sixth meeting.

dual belongs. Interestingly the coefficients representing the ATE for the public and private labeling interventions are insignificant in specifications 4 and 5. But once I isolate the differences in share prices across savings groups (specification in column 6), the coefficients are significant for both interventions. As shown in column 6, the private-labeling treatment increases savings balances during the first savings cycle by USD 22.5 while the public-labeling treatment increases savings balances by USD 31.1. These point estimates represent an increase of 25% and 34% respectively. These results show that the share price is important in predicting savings because it affects the behavior of individuals by imposing constraints on their ability to save in the VSLA. In order to understand better the behavior of individuals and the true effect of the treatment intervention, I explore further the effect of these constraints by incorporating heterogeneity in the model. Figure 1 depicts the number of shares bought on average by individuals in each experimental group. The trend in savings shows that the treatment effect persists for a certain number of periods, but then it stabilizes.

For some individuals the behavioral response to treatments runs up against institutional features that restrict the optimal savings, such as the maximum of shares allowed to purchase in each meeting, individuals can only purchase discrete number of shares and the rigidity in share prices during the entire savings cycle. These restrictions are observed when an individual is willing to purchase 1.5 instead of 2 shares and ends up purchasing a single one, or in cases in which a participant is capable of purchasing 5 shares but is only allowed 5. As a result, individuals within a VSLA face different constraints that depend not only on their own capability to raise money to make contributions to the fund, but on the savings capability of other members and the rules set in their own VSLA (mainly price shares).

I then explore in more detail the situation of individuals in all experimental groups pre and post- treatment interventions. I look at the share prices, the number of shares purchased in the first meeting and the trends of savings over the entire savings cycle. The results show very interesting patterns. Figure 1a depicts trends of the number of shares purchased during the savings cycle by experimental groups. The graph shows that, on average, all individuals purchase the same number of shares in the first meeting but after the intervention, this number is increased for both *private-* and *public-labeling* treatment groups relative to the control. The increase is noticeable larger for the *public-labeling* treatment. After approximately meeting 9, public and private get closer together, reaching a similar level to those in the control group. These trends illustrate potential positive treatment effects on the number of shares purchased as a result of the interventions. For total savings, I plotted the cumulative savings for individuals during the savings cycle in Figure 1b. It shows that by adding up the total amount of money that individuals contribute on average to the savings fund, total savings are consistently larger for those in the *public-labeling* treatment than those in the control group and private-labeling treatment intervention. The later is the lowest amongst all. This does not necessarily implies that *private commitment* doesn't

work, but that there are other characteristics, such as the share price, that should be incorporated in the analysis before making any conclusions about individual savings behavior.

Figure 2 plots the distribution of pre-treatment variables for each experimental group. Panel A illustrates the distribution of share prices in all savings groups. Recall that the first purchase of shares was performed prior to the interventions, which allows us to compare the pre-treatment situation across experimental groups. There is a high frequency in the price of shares at $P = \text{COP } 5,000$ (approx. USD 2.8) across all groups. This provides an opportunity to compare treatment effects at this price, when individuals are more or less equally economically able to save. In the *private-labeling* treatment, there is large concentration of prices below COP 3,000 (approx. USD 1.66) relative to the other experimental groups, suggesting lower average share prices in this treatment group. Panel B presents the frequency of savings groups according to the number of shares bought only in the first meeting. The figure shows that the majority of individuals purchased up to 2 shares in the first meeting, while a smaller number bought 3, 4 or 5 shares.

To explore further the statistical significance across experimental groups, I calculated the average values of these measures for treatment and control groups. Table 6 shows that the price of shares is statistically different for all experimental groups. The average share prices are USD 2.30, USD 1.90 and USD 2.18 in the control, *private-labeling* treatment and *public-labeling* treatment, respectively. This is consistent with what we observed in Figure 2, where the price of shares of VSLAs in the *private-treatment* intervention was concentrated in lower values. Although these differences represent from 12 to 24 cents across groups, they are statistically different from zero. This creates an imbalance in the pre-treatment variables, but does not invalidate the results, because as shown in Table 5, the results are mainly the same when I estimate ATE for individuals under the same conditions ($P = \text{COP } 5,000$). However, identifying these differences in prices help explaining the sign of the *private-labeling* treatment estimates when I estimate total savings balances. Differences in the price of shares impose a restriction in the total amount of money saved throughout the savings cycle, because no one can purchase more than 5 shares in each meeting. Even if individuals in the *private-labeling* treatment purchase the maximum amount of shares permitted in all meetings, total savings would be smaller in comparison to the control and *public-labeling* treatment groups, which have significantly higher share prices.

I do not observe any statistical differences in the average number of shares purchased during the first meeting across experimental groups, indicating that, conditional on share prices, individuals have a similar ability to save, on average. The last rows of the table show statistically significant differences across experimental groups in the total number of shares purchased and total savings balances under different scenarios.

I estimated a second model to include pre-treatment variables in the model in order to control for imbalances in the sample previous to the intervention. The model estimated is:

$$(2) \quad Y_i = \alpha + \beta_R T_{i,R} + \beta_U T_{i,U} + \gamma X_i + \mu_i$$

where Y_i is a vector of coefficients and X_i a matrix of covariates.

Table 7 displays the results of estimating equation (2). The covariates included in the regressions are consecutively the price of shares, dummies for facilitator and the number of shares purchased in the first meeting.⁴⁹ All regressions are estimated with robust standard errors. Columns 1, 2 and 3 show that estimating total number of shares purchased in the savings cycle is robust to including different covariates as controls. However, the *private-labeling* treatment effect and the price of shares are insignificant. Columns 4, 5 and 6 show that controlling by the share price, the treatment effect for individuals in the *public-labeling* intervention is significant in explaining higher savings balances of about USD 18 more relative to the controls. Average total savings of individuals in the control groups is USD 82.52. The point estimates predict an increase of 22% in total savings reaching out over USD 100 for the *public-labeling* treatment. Treatment effects for the private-labeling intervention are still insignificant but now the sign of the point estimates is positive. The results are similar across specifications.⁵⁰

To provide more evidence of the heterogeneity observed as a result of differences in ability to save and share prices, Figure 3 plots the average number of shares purchased in every meeting by experimental group and by the number of shares bought in the first meeting. Individuals that, prior to the intervention, were more economically constrained (purchased 0 to 2 shares in the first meeting) exhibited more difficulties to purchase a larger amount of shares during the savings cycle, regardless of the treatment intervention received, whereas those with more ability to save (purchased 3 to 5 shares prior to the intervention) were more responsive to the treatment interventions, indicating differential treatment effects for all types of individuals. As shown in the graphs, the trend in savings is larger for individuals in the *public-labeling* treatment in all meetings. These pictures provides evidence of potential heterogeneous treatment effects that I explore by estimating the following model:

$$(3) \quad Y_i = \alpha + \beta_R T_{i,R} + \beta_U T_{i,U} + \delta_R T_{i,R} * InitialCondition_i + \delta_U T_{i,U} * InitialCondition_i + \zeta_i$$

49. I included dummies for facilitator in order to control whether they have any influence in the determination of share prices.

50. The statistical difference in the share prices across experimental groups may indicate an imbalance in the pre-treatment characteristics of individuals. For that reason, I estimated difference in difference models for total savings balances with and without controlling for such imbalance using various periods of time for post-treatment (second to sixth meetings). The results for the *public-labeling* treatment are consistent with what we have obtained in previous models. In the case of *private-labeling* treatment, the price of shares is important in explaining the change in savings behavior of individuals during various periods of time after the intervention, and the treatment is significant 3 and 5 periods after the intervention. Detailed results are available upon request.

where ***InitialCondition_t*** represents a set of dummy variables of the number of shares purchased in the first meeting by each individual. Results are reported in Table 8 and in Table 9. Table 8 shows the coefficients of estimating equation (3) for the dependent variables: *total number of shares and total savings balance* during the savings cycle. As in the results for the first model the coefficients indicate that *public-labeling* treatment is very strong and effective in increasing savings for all individuals, but are mixed for individuals in the *private-labeling* intervention. In order to see this more clearly I calculated the joint significance of the total treatment effects for each type of individuals. The computations suggest that the *private-labeling* intervention significantly increases savings accumulations for those who initially bought 3 or 5 shares. For all other types of individuals, the treatment effect is positive but insignificant.

Figure 4 illustrates the total heterogeneous effects estimated above. The effect of *public commitment* is increases monotonically, whereas the impact of *private commitment* fluctuates along the different levels of ability to save but it's increasing. Setting a *soft commitment* to save is highly effective in increasing savings accumulations for individuals without economic restrictions or with some ability to save. The treatment intervention is not very significant for those more constrained financially. However when adding peer affects to *commitment* the economic restriction does not prevent individuals to increase savings accumulations.

Treatment effects on goal achievement

The last set of calculations exhibit the effects of the interventions on goal achievement. First, I calculated the impact on goal achievement using data from the baseline survey. At that point, I asked all subjects what they wanted to use their savings from the first savings cycle for. I compared this information with the responses from the follow-up survey. The results show that *public* commitment highly affects achievement. However, the impact is not statistical significant in the case of *private* commitment. This result is robust to all specifications, even when I condition the achievement of goals with the initially established goal and I add municipality level control.

In the second estimation I estimate goal achievement, but now I compare the responses in the follow-up survey with the information reported at the intervention session. In other words, this specification compares the effect across treatments (excluding the control group). The coefficients are significant at the 5% and indicate a larger achievement of goals of *public* commitments relative to *private* commitment. Lastly, in row 3 I explore goal achievement comparing not only savings in the first savings cycle, but also money used by individuals from household investments or loans made in the last year. The results are significant for the *public* treatment and indicate an increase of 21 percentage points in the likelihood of achieving the initially established savings goal.

Qualitative results

The purpose of this analysis is to explore further the behavior of treated individuals after exposure of the intervention and to identify whether the interventions contributed somehow to the way participants earmarked transactions and as a result, change consumption and savings choices. I performed 4 focus groups discussions in 2 sites of the study and explored the experience of participants in the following: (i) savings as a member of VSLA, (ii) the savings goals, (iii) challenges in reaching goals, (iv) dynamics within VSLAs, and (v) social taxation among members of the group.

Individuals report that before being part of VSLAs their level of savings was very small, irregular, mostly informal and used frequently in unnecessary spending, despite of understanding that savings is a mechanism to reaching goals, smooth consumption and face difficult times in the future. Participants informed us that sharing publicly their savings goals creates a competitive environment within the group that motivates each other to making greater effort to save a larger amount of money. In all cases individuals felt and put pressure from one another to buy shares, actively participate in group activities and achieve commitments. In a few situations the group penalized members that were not making regular contributions by expelling them from the group.

In terms of savings goals, men were more likely to set long run savings goals that require more funds and possibly other sources of funding than the savings from the group. Women set goals that are more feasible and easier to achieve, but are more like to reach those goals. The most common motivations answered by all to reaching goals were personal challenge, pressure from the VLSA members (mainly to purchase the maximum number of shares) and family-related goals (make it less likely to deviate).

During the discussion sessions I found out evidence of social taxes in two contexts: First, penalization to those VSLA members that fail to contribute to the savings fund or failed to comply with the rules of conduct of the VSLA. Second, at the household level I found that men usually tease their wives and underestimate their ability to save in the beginning of the savings cycle; but once they realize their engagement with savings, husbands reduced the money transferred to their wives for household expenses because women are now able to raise money on their own. These statements provide some insights to study further the dynamic created at the household level as a result of changes in individual's savings behavior.

VII. CONCLUSION

I designed and implemented a Randomized Controlled Trial (RCT) to study how two modifications of a commitment savings product, in which individuals open *private* or *publicly* a 'mental savings account' affect savings decisions of low-income individuals that participate in newly formed VSLAs in Colombia.

The results show that labeling 'mental savings accounts' is effective in increasing savings for different types of individuals. The RCT demonstrates very strong and significant results for treated individuals in the *public-labeling* intervention. Savings increased by an average of 35 percentage points (effect size of up to .38 standard deviations) and individuals were 8.5% to 21% more likely to achieve the initially established savings goals. The results for the *private-labeling* treatment intervention are very interesting also. The effect on savings is heterogeneous and depends on intrinsic characteristics of individuals and on institutional restrictions imposed by the VSLA methodology. However, the impact on goal achievement is statistically irrelevant.

The results also provide evidence that treatment effects are very significant for individuals who are less economically constrained in their ability to save and insignificant for individuals that are less able to save, even prior to the intervention. For that reason, individuals experience different ability to respond to the treatment interventions that must be considered in the analysis.

In terms of goal achievement, individuals in the *public-labeling treatment* are more likely to use other sources of income flows, such as investments and loans to achieve savings goals. This could be explained because individuals anticipate social punishment when they fail to meet their promises.

Self-help groups such as VSLA are an alternative to poor and extremely poor households to help them manage financial assets and smooth consumption. Creating commitments exogenously enable individuals to think about strategies to improve the use of assets and financial decisions in the future in order to maximize their utility. This intervention translates recent theoretical insights into experimental strategies implemented in the field to both test the theory and possibly improve the impacts of a large-scale public policy program. The methodology represents a new approach to the study of individual behavior and provides valuable insights and information to program administrators and policy makers involved in the design and diffusion of commitment-savings products. The increased availability of these and other products with similar features may serve to increase savings, improve financial literacy amongst poor households, which may contribute to generate income to fight poverty.

The results from the quantitative and qualitative analysis in this study open additional questions that are subject of future research. Some ideas that arise from this study are: to explore how does the change savings habits affect other behavior at the household and community level, such as bargaining power within the household, participation in social and community activities, social penalties and rewards to savings behavior, etc. Also, further analysis will be done in terms of heterogeneous treatment effects for men vs. women, young vs. adults, and for long vs. short run commitments.

Table 1.
Experimental sample

		Bolivar	Choco	Cundi-Boyaca	Total
Experimental groups (VSLA)	Public	13	15	19	47
	Private	13	15	17	45
	Control	12	14	19	45
	Total	38	44	55	137
Treated Individuals	Public	128	131	196	455
	Private	139	135	174	448
	Total	267	266	370	903
Experimental subjects (household survey)	Public	65	73	91	229
	Private	67	75	76	218
	Control	57	70	96	223
	Total	189	218	263	670
Administrative data	Public	143	179	256	578
	Private	149	183	231	563
	Control	104	166	252	522
	Total	396	528	739	1663

Source: Survey Data, Administrative Records.

Notes: The first panel contains the number of VSLAs that were subject of the experiment; the second shows the number of individuals exposed to the treatment intervention (recall that the control group is not exposed to the treatment intervention, but only to the VSLA methodology); panel 3 details the number of individuals randomly chosen to be interviewed to administered the households survey; and panel 4 summarizes the total number of individuals in the experimental sample and for which I have administrative records on savings.

Table 2.
Power calculations

	Min. Observations	Min. Cluster per site
<i>Experiment 1. Public vs. Control, MDE=0.3 sd</i>		
Rho=0.05	702	6
Rho=0.15	819	7
Rho=0.25	1053	9
<i>Experiment 2. Public vs. Private, MDE=0.2 sd</i>		
Rho=0.05	1287	11
Rho=0.15	1755	15
Rho=0.25	2223	19

Note: Author's calculations using a Multi-site cluster randomized model at the individual level with Optimal Design software. Results are verified using Stata commands sampsi and sampclus with savings data from the pilot of the VSLA program in Colombia.

Table 3.
Baseline comparison of covariates across experimental groups

	Untreated (CTRL)	Public (U)	Private (R)	Mean Diff (CTRL-U)	Mean Diff (CTRL-R)	Mean Diff (R-U)
Household size	4.72	4.72	4.55	0.008	0.174	-0.166
% female	0.77	0.82	0.78	-0.053	-0.014	-0.039
Number of children (< 16 yrs of age) at home	1.80	1.76	1.48	0.040	<u>0.32**</u>	<u>-0.28**</u>
% married	0.69	0.65	0.64	0.038	0.046	-0.008
% CCT recipient	0.62	0.66	0.58	-0.034	0.043	<u>-0.077*</u>
% receive cash & in-kind transfers (elderly)	0.04	0.04	0.04	-0.004	0.000	-0.003
% households that hold any type of savings	0.27	0.27	0.33	-0.008	-0.064	0.056
Weekly savings (USD)	7.1	6.4	5.4	0.750	1.750	-1.000
% households with a bank account	0.49	0.50	0.49	-0.014	0.000	-0.014
% open bank account to receive CCT	0.67	0.64	0.61	0.028	0.056	-0.028
% had loan in last year	0.17	0.16	0.13	0.006	0.037	-0.031
% households that write a budget	0.03	0.07	0.03	-0.033	0.000	-0.033
% made an investment last year	0.39	0.35	0.33	0.036	0.055	-0.019
% with paid job	0.4	0.4	0.4	-0.029	0.036	-0.065
% independent	0.53	0.48	0.50	0.047	0.024	0.023
% own home	0.66	0.62	0.63	0.037	0.032	0.005
% participate in community organizations	0.09	0.11	0.14	-0.020	-0.049	0.029
Trust in banks and financial institutions	3.39	3.36	3.49	0.027	-0.106	0.134
Size of the VSLA	13.60	13.57	13.56	0.035	0.039	-0.004
Perception that household could save...:						
<i>Much more</i>	0.36	0.37	0.40	-0.008	-0.035	0.027
<i>More</i>	0.32	0.36	0.32	-0.045	0.001	-0.046
<i>The same</i>	0.16	0.08	0.10	0.073	0.056	0.017
<i>Nothing</i>	0.16	0.18	0.18	-0.020	-0.022	0.002
<i>Pearson's chi-squared</i>	7.29	<i>P-value:</i>	0.29			
Number of observations	223	229	218			
Number of VSLAs	45	47	45			

Source: Baseline survey. Significance level: * 10%; ** 5%; *** 1%.

Table 4.
Saving commitments

Saving goals (percentages)	Private-labeling Mean	Public-labeling Mean	t-statistic
Home	43	34	1.71
Education	25	22	0.53
Investment	28	25	0.64
Consumption of non-durables	8	16	-2.15
Consumption of durables	7	12	-1.47
Pay debt	1	2	-1.34
Unexpected expense	4	3	0.32
Other	2	3	0.33
Biweekly savings (no. of shares)	3.06	3.1	-0.24
Biweekly savings (USD)	5.94	6.93	-2.92
Would like to take a loan	15	10	2.22
Number of participants	448	455	

Source: Treatment interventions. T-statistic calculated from the mean difference of averages between groups.

Table 5.
Treatment effects on savings

Dependent variable:	A. Number of Shares Bought			B. Savings Balance		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	First 6 meetings	p=COL 5,000	Total	First 6 meetings	p=COL 5,000
Private tmt	6.03* (3.45)	1.99* (1.01)	8.12* (4.5)	-5.764 (11.72)	-2.07 (4.05)	22.55* (12.51)
Public tmt	12.35*** (3.47)	3.26*** (1.113)	11.19** (4.58)	14.11 (11.19)	3.12 (3.68)	31.09** (12.71)
Constant	35.03*** (2.02)	12.83*** (.722)	32.72*** (1.9)	82.53*** (8.702)	29.79*** (2.96)	90.9*** (5.27)
Observations	1474	1474	654	1474	1474	654
F for (Public-Private)	10.76	8.46	7.85	0.18	0.02	7.85

Source: Administrative data. Significance level: * 10%; ** 5%; *** 1%. Robust standard errors are in parenthesis.

Table 6.
Pre- and Post-treatment averages for savings outcomes

	Control (C)	Private (R)	Public (U)	C-R	C-U	R-U
Share price (USD)	2.30	1.90	2.18	***	*	***
Shares purchased first meeting	1.78	1.82	1.75			
<i>Total Shares</i>						
All	35.03	41.06	47.39	***	***	***
First 6 meetings	12.83	14.83	16.09	***	***	**
P=COL \$5,000	32.72	40.84	43.92	***	***	***
<i>Total savings (USD)</i>						
All	82.53	76.76	96.64		***	***
First 6 meetings	29.79	27.71	32.91		**	***
P=COL \$5,000	90.90	113.45	121.99	***	***	

Source: Administrative data. Significance level: * 10%; ** 5%; *** 1%.

Table 7.
Treatment effects with controls

Dependent variable:	Total share prices			Total savings balance		
	(1)	(2)	(3)	(4)	(5)	(6)
Private tmt	5.11 (3.49)	4.92 (3.37)	5.08 (3.33)	7.91 (7.05)	8.49 (7.11)	7.85 (6.68)
Public tmt	12.15*** (3.41)	11.28*** (3.417)	12.39*** (3.25)	18.122*** (8.67)	18.43* (8.44)	1864* (8.26)
Share price	-2.30 (1.71)	0.19 (1.83)	-1.81 (1.549)	34.23*** (6.03)	37.64*** (7.24)	35.24*** (5.74)
Shares meeting 1			6.70*** (.58)			13.78*** 1.418
Constant	40.32*** (4.53)	32.51*** (6.09)	27.24*** (4.11)	3.92 (13.35)	-6.1 (15.06)	-96 (12.58)
<i>Includes facilitator dummies</i>		X			X	
Observations	1474	1474	1474	1474	1474	1474
F for (Public-Private)	8.71	8	9.45	3.76	4.1	4.08

Source: Administrative data. Significance level: * 10%; ** 5%; *** 1%. Robust standard errors in parenthesis. Specifications (2) and (5) include facilitator dummies as controls. All regressions also include municipality controls.

Table 8.
Heterogeneous treatment effects

<i>Dependant variable</i>	Total shares		Total savings	
	<i>Coeff.</i>	<i>Std. Err.</i>	<i>Coeff.</i>	<i>Std. Err.</i>
Private tmt	-2.231	(3.49)	-4.464	(6.95)
Public tmt	7.689	(3.22)	10.3	(7.75)
Private tmt*1 shares dummy	0.221	(3.37)	-0.485	(7.47)
Private tmt*2 shares dummy	5.892*	(2.9)	12.19*	(5.13)
Private tmt*3 shares dummy	21.44***	(5.95)	30.85***	(8.85)
Private tmt*4 shares dummy	9.652*	(4.09)	13.38*	(7.72)
Private tmt*5 shares dummy	32.61***	(5.95)	59.97***	(11.57)
Public tmt*1 shares dummy	-6.413	(2.69)	-16.66**	(6.29)
Public tmt*2 shares dummy	6.498	(3.8)	15.71	(8.78)
Public tmt*3 shares dummy	18.53**	(5.48)	38.04	(12.18)
Public tmt*4 shares dummy	29.81***	(7.13)	82.17***	(20.64)
Public tmt*5 shares dummy	30.05***	(2.99)	59.14***	(9.8)
Share price (USD)	-1.3806	(1.39)	28.92***	(7.21)
Avg. share first meeting	3.262*	(1.44)		
Avg. savings (USD)			4.471*	(1.95)
Constant	31.39***	(4.8)	-1.949	(10.31)
Number of observations	1474		1474	

Source: Administrative data. Significance levels: * 10%; ** 5%; *** 1%. Robust standard errors in parenthesis.

Table 9.
Total heterogeneous treatment effects

Mean for Control group	Total shares		Total savings (USD)	
0 shares in first meeting	30.0		73.8	
1 share in first meeting	28.6		66.2	
2 shares in first meeting	37.7		90.1	
3 shares in first meeting	43.1		105.9	
4 shares in first meeting	41.7		112.8	
5 shares in first meeting	50.7		101.3	
Total effects [^]	Total shares		Total savings (USD)	
	Private	Public	Private	Public
0 shares in first meeting	27.7	37.7 **	69.3	84.1
1 share in first meeting	26.6	29.9 ***	61.2	59.8
2 shares in first meeting	41.4	51.9 ***	97.8	116.1 **
3 shares in first meeting	62.3 ***	69.4 ***	132.3 ***	154.2 ***
4 shares in first meeting	49.1	79.2 ***	121.8	205.3 ***
5 shares in first meeting	81.1 ***	88.4 ***	154.8 ***	170.8 ***

Source: Administrative data. Joint significance level: * 10%; ** 5%; *** 1%.

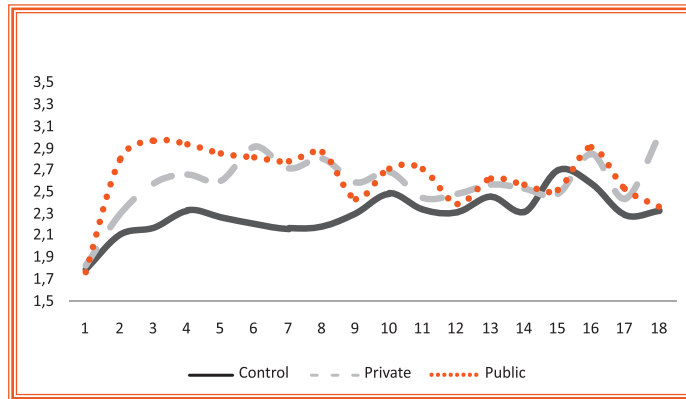
[^] These numbers are calculated using the coefficients from estimating the heterogeneous treatment effects from model 2. Robust standard errors are used in the estimation.

Table 10.
Treatment effects on goal achievement

Goal achievement (percentages)	Mean control	Robust SE		Robust SE + controls	
		Public	Private	Public	Private
<i>depar:</i>					
Achieved savings goal (BL)	0.159	0.085** (0.04)	0.013 (0.04)	0.098*** (0.04)	0.032 (0.04)
Achieved savings goal (TMT)		0.098*** (0.05)		0.064 (0.05)	
Achieved savings goal (incl. Investment and loans)	0.250	0.215*** (0.06)	0.056 (0.05)	0.210*** (0.06)	0.036 (0.05)
Number of observations	670				

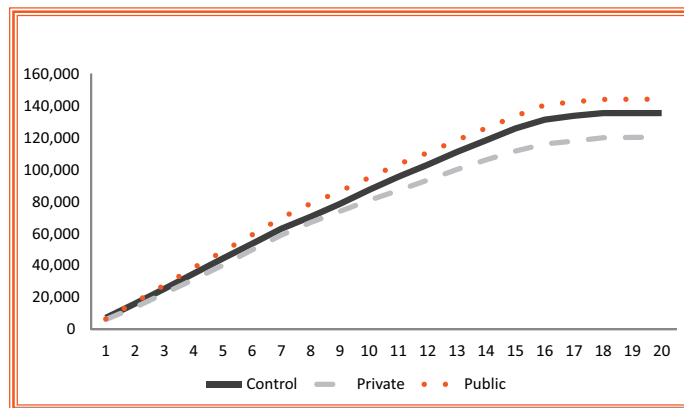
Source: Baseline and interventions data. Significance level: * 10%; ** 5%; *** 1%. Robust SE in parenthesis

Figure 1a.
Trend of the number of share purchased over the entire savings cycle



Source: Administrative data.

Figure 1b.
Cumulative total savings per meeting by experimental group



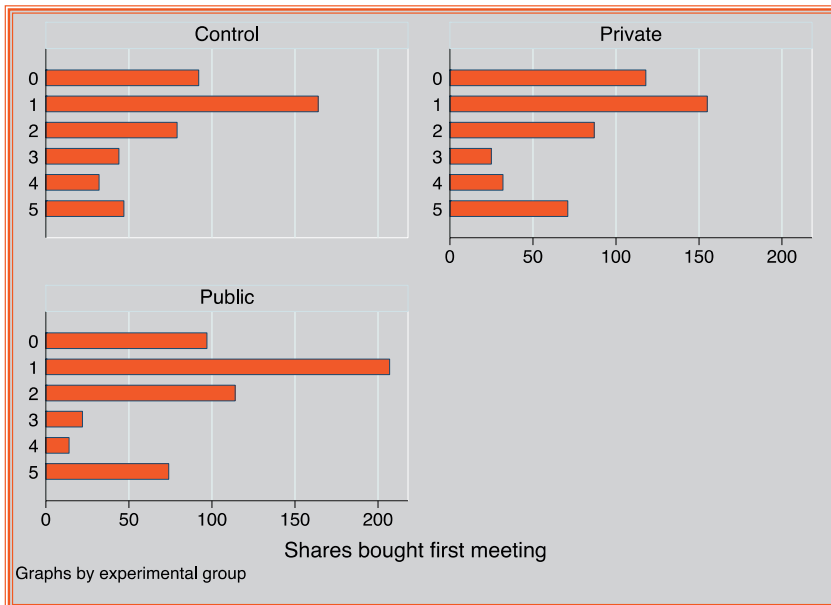
Source: Administrative data

Figure 2.
Pre-treatment variables

A. Share prices

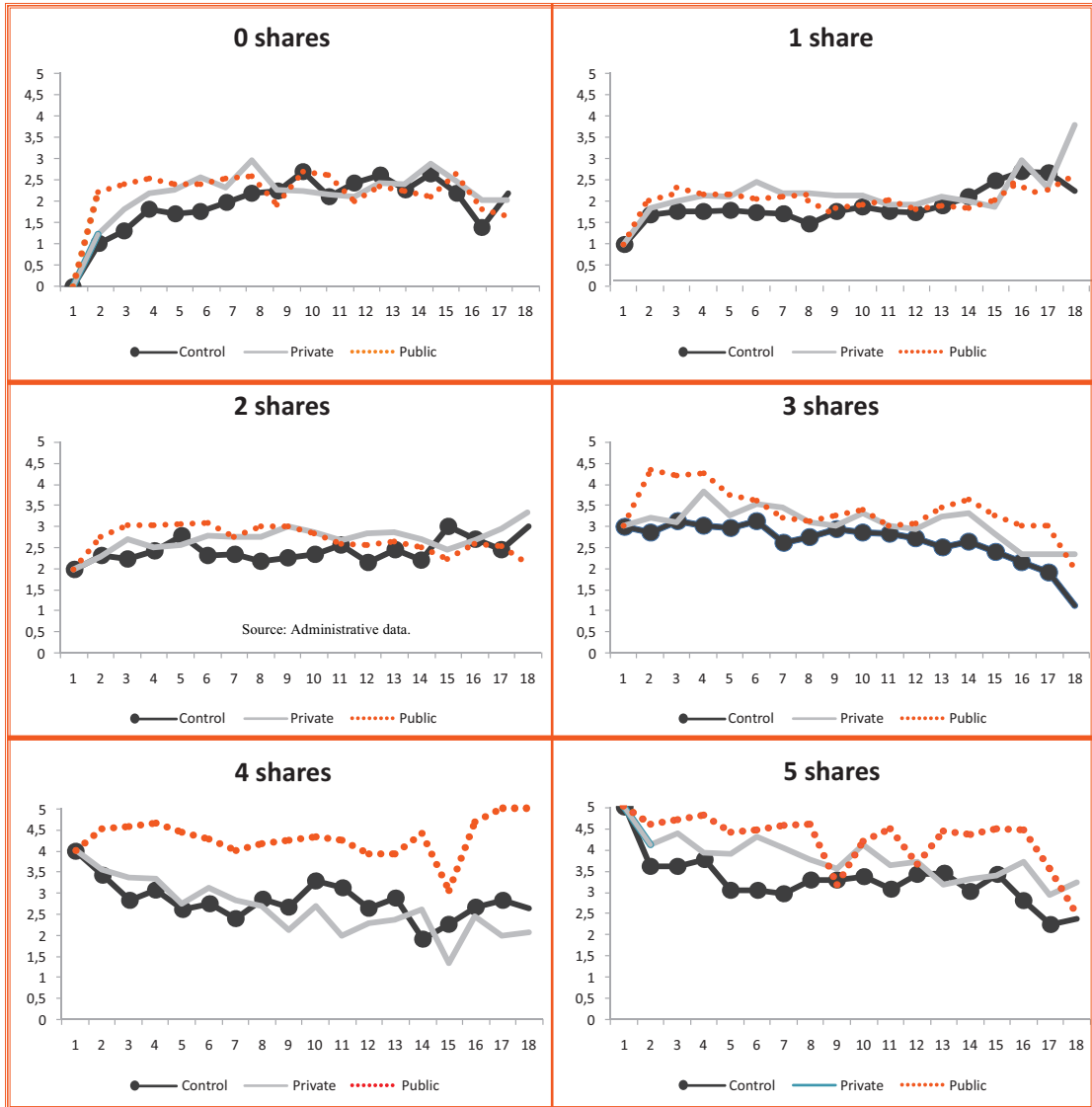


B. Shares bought in first meeting



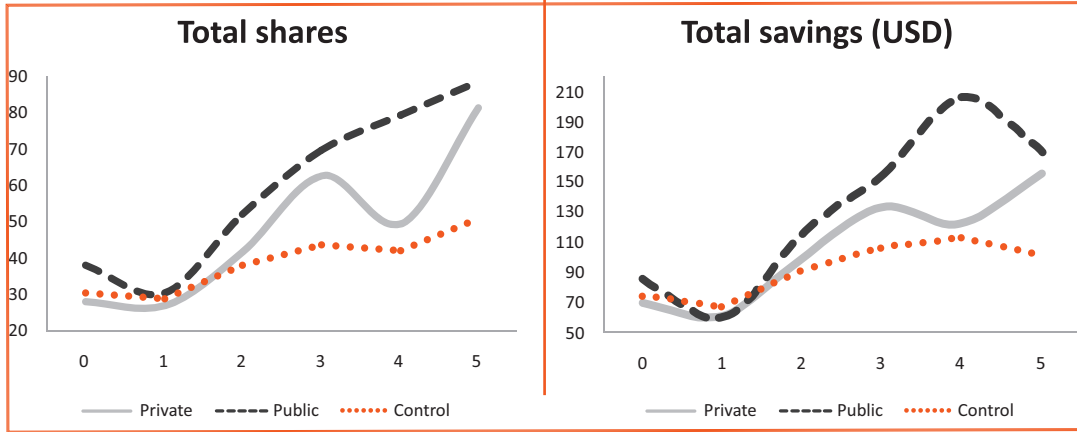
Source: Administrative data.

Figure 3.
Trends of shares purchased in each meeting by number of shares bought in the first meeting



Source: Administrative data.

Figure 4.
Total heterogeneous effects on savings



Source: Administrative data. The data plotted corresponds to the coefficients of the heterogeneous treatment effects.

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