

Saving for a (not so) Rainy Day:

A Randomized Evaluation of Savings Groups in Mali

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PRELIMINARY AND INCOMPLETE – PLEASE DO NOT CITE

Abstract

Savings groups are part of a micro-savings movement quickly expanding across most of the developing world. Most often organized by NGOs, members of these groups save together, generating funds they then lend out to group members, generating interest on their savings. This paper reports on the randomized evaluation of one prominent program, Saving for Change (SfC) by Oxfam America-Freedom from Hunger-Stromme Foundation, in Mali. We find little evidence that these groups expand business activities, investments in agriculture, or increase expenditures at endline. However, households in treatment villages report improved food security and high frequency surveys demonstrate that consumption variability across seasons is reduced in villages offered SfC. We find no evidence of improvements in health, increased enrollment of children in school, or in women's social capital, community involvement and intra-household decision-making power.

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1 Introduction

Most of the world's poor do not have ready and affordable access to banking services. For centuries, informal, often collective mechanisms (rotating savings and credit associations, ROSCAs, or accumulating savings and credit associations, ASCAs) have evolved to simulate savings services. Yet even when such practices are present, they are effusive, often not reaching the poorest. And often, perhaps relatedly, the structure is often not flexible, not precisely meeting the financial service needs of the poor.

Microcredit is at the forefront of development policy, partly to address this gap in access to formal financial services. Despite receiving massive attention and funding, microcredit institutions, whether a bank or a nongovernmental organization, often find between 10% and 30% of communities want to participate (Angelucci, Karlan, and Zinman 2013; Crepon et al. 2011; Banerjee et al. 2009; Attanasio et al. 2011).

In response to low participation rates and often high interest rates of microcredit, many NGOs began promoting "savings groups", which basically are improved versions of ROSCAs and ASCAs. The response has been clear: takeup has been in the millions, and at relatively low cost. Oxfam-FFH-Stromme Foundation has introduced savings groups Mali, Senegal, Niger, Burkina Faso, Benin, Cambodia, El Salvador, Honduras, Mexico, Colombia, Uruguay, Brazil, Peru, and Guatemala with over 400,000 members. The worldwide number of people participating in savings groups is estimated to be close to 7 million, up from 2.3 million in July 2010 (Allen 2013).

Naturally this prompts the obvious question: what exactly is new? How can something that resembles existing informal arrangements have takeup in the millions? The new method of informal finance requires no infusion of outside capital, and thus no rents paid to outside entities. It bears a lot of resemblance to preexisting informal mechanisms but offers a couple of key benefits: flexibility combined with commitment, and the involvement of NGOs themselves. The NGOs' role may be important for providing technical support but may also serve as a quality signal or persuasion effect from a belief that NGO advice should be followed. The financial product itself offers flexibility combined with commitment, factors which have been shown to be important to promoting savings (Ashraf, Karlan, and Yin 2006; Dupas and Robinson 2013; Ben Feigenberg, Field, and Pande 2009). In particular, SfC allows members to take out loans from the accumulating fund, instead of having to designate an individual to take home the entire pot each week as in traditional ROSCAs. Since literacy in Mali is very low, particularly among women, SfC technical agents also train women on an oral accounting system in order to keep track of outstanding loans and total savings balances of each woman. SfC is, however, less flexible than a ROSCA in one dimension: the entire group has to agree upon a common time in

which to receive the lump sum payout at the end of the yearly savings cycle. The groups also set their own rules about weekly contributions, the interest rates on loans and penalties for late contributions. SfC is also designed to promote new groups being formed after the NGO employee leaves the village: local village women are trained on how to form new groups.

Using a randomized evaluation in 500 villages with a household survey covering over 6,000 households in central Mali, we study the impacts of the SfC program on women's access to finance, economic activities such as small business operations and farming, food security and consumption smoothing and on social capital and intra-household bargaining power. Of the 500 study villages, 209 villages were offered SfC while the remaining villages served as control communities. About 37% of women in the baseline sampled had joined SfC at endline, three years after the baseline. We also observe an increase in total savings of 30% and a three percentage point increase in the likelihood of receiving loan in the last month among respondents in treatment villages. We find little evidence however of increased investment in small businesses and agriculture, but households do increase their livestock holdings – the most important form of buffer stock savings for Malian households. Households in the intervention villages report higher food security and consumption data collected every 3 to 4 months reveal that treatment households are able to better smooth food consumption over the year, though the level of consumption at endline is no different across treatment and control. We do not find any evidence of increased investments in education; health or health expenditures; women's bargaining power, involvement in the community or social capital.

But why does this “new” thing change behavior? In other words, what is the mechanism through which these changes shifted actual behavior? We do not think there is a single mechanism. The changes in behavior, and economic outcomes, are important, and the scale of this “movement” promoting savings groups has been huge. Given that, we think of potential mechanisms in two main categories: market failures, including information asymmetries and information costs for starting flexible savings groups, and changes due to cognitive biases and preferences. We put forward some tests of these mechanisms. For example, to examine whether we see evidence of shifting in time preferences, we examine responses to time preference questions in the baseline and follow-up surveys, and do find some evidence that women become more future oriented. We do not, however, show evidence that individuals who are measured to be more time inconsistent join SfC groups more often. Using treatment variation in the intensity of training of the local women organizers, we also show that a sustained role of the NGO is necessary for the program's benefits to expand – suggesting a reason why these savings groups did not already exist.

This paper proceeds as follows. Section 2 describes the intervention and section 3 gives an overview of the experimental design and the available data. Section 4 presents discusses adoption, how women use SfC and its impacts on savings and use of credit. We then present the main impact estimates in section 5. In section 6 we discuss the potential underlying mechanisms, referring back to the results presented in section 5 with a few auxiliary results on specific mechanisms. Section 7 concludes.

2 Intervention

Saving for Change (SfC), is a community-based savings group program developed by Oxfam America in collaboration with Freedom from Hunger. The SfC program builds on the ASCA model, enabling women to organize themselves into simple savings and credit groups. The objective is to improve savings and credit opportunities, especially for those who are not reached by institutional lenders and ROSCAs. Twenty or so women voluntarily form a group that democratically elects officers, sets by-laws, meets weekly, and collects savings from each member. At meetings, each woman contributes a savings amount (previously established by the members) to a communal pool, which grows in aggregate size each time the group meets. When a woman needs a loan, she proposes the desired amount to the group. Once all demand has been voiced, the group collectively discusses whether there are enough funds and how to divide funds, and prioritizes requests if there is more demand than funds. Loans must be repaid with interest, at a rate set *ex ante* by the members. Each group manages its own funds which are entirely internally generated (with no matching or external loans provided), and all transactions occur in front of the group for full transparency. In Mali, literacy rates – particularly among women – are very low.² ASCAs which enable women to take out loans from an accumulating pot are quite rare, perhaps because keeping track of each women’s credit and debits is challenging without written records. SfC in Mali uses an oral accounting system to keep track of savings amounts and outstanding loans. This likely facilitates more flexibility in terms of savings and loans than could otherwise be accomplished in traditional ASCAs.

At a predetermined date, the cycle ends and the group divides the entire fund among members, which is referred to as a share-out. The timing can coincide with times of high cash flow requirements such as festivals, the planting season, or the “hungry” season. The interest from the loans gives each member a positive interest rate. The group then decides whether to start a new cycle, and under what conditions. At this time, groups sometimes opt to increase their weekly contributions, accept new members, or change leadership positions.

² In our baseline survey, 14% of women reported being able to read or write.

SfC offers significant technical support to its members, particularly during the first year after which the program is introduced in a village. However, the NGOs do not introduce any outside capital into the groups. In the first year, the SfC agent is an employee of a local, SfC-promoting NGO (a “hired agent”) and responsible for introducing and teaching the process to the community members. Through that process, the hired agent trains a woman local to that village to also be an agent (a “replicating agent”). The program aims to generate many replicating agents, thus giving the program independence from the activities (and thus subsidies) of the NGO. In practice, however, hired agents often assist replicating agents with creating and training new groups.

3 Experimental design and data

The experiment was implemented as SfC expanded into new geographic territory. The study sample was comprised of 500 villages in the Segou region.³ Study villages were divided into 209 treatment villages and 291 control villages.⁴ We stratified the randomization by commune and used a re-randomization procedure to ensure balance on a number of village characteristics.⁵

Treatment villages were divided into catchment areas of about 15 villages each by Oxfam America-FFH-Stromme Foundation and local partner NGOs. As described above, hired agents work intensively in a given village for one year before transitioning to a role where they support the replicating agent. This enables the hired agents to continuously expand the number of villages with SfC over time. In the study area, each hired agent was assigned a catchment area and was instructed to target 10 villages in the first year of implementation (May 2009-April 2010). In the following year (May 2010-April 2011), hired agents continued to support villages targeted the first year and also introduced SfC in the remaining villages in their zone. During the

³ The 500 villages were spread across four administrative “cercles”: Segou, Bla, San and Tominian. There are 7 cercles in the Segou region and 49 in all of Mali. The four in the study are those were of the regional capital and form a contiguous geographic area. The villages were selected from government lists of villages in almost all communes (a unit larger than the village and smaller than the cercle) in those four cercles. 11 of 84 (6 of which are in San) were removed from the sample frame because other NGOs had already been promoting savings groups there.

⁴ More control than treatment villages were selected in order to improve statistical power for measuring spillovers to control villages (using variation in proximity to treatment). However, we found little correlation between distance to treatment village and the existence of SfC-like savings groups in control villages.

⁵ The village-level variables for which balance was checked were: number of households in the village, distance to paved road, distance to market, availability of electricity and the presence of formal credit, schools, a health center and tontines. We re-randomized until for none of these variables a test for the equality of means between treatment and control villages yielded a p-value smaller than 0.35.

third year (May 2011-April 2012), the number of hired agents decreased and the territories expanded somewhat. Hired agents continued to support existing replicating agents, added extra groups in neighborhoods of big villages/towns, and implemented follow-up to strengthen groups that were one year old.

In order to investigate the way in which the training method of the replicating agent affects program impacts, treatment villages within each catchment were randomly assigned to one of two replication types. Replicating agents in *structured replication* villages participated in a formal, three-day training. As part of the training, replicators received a pictorial guide and a certificate stating they are certified to form SfC groups. In *organic replication* villages, replicating agents were not provided with the formal training and material resources. However, as in the structured replication villages, hired agents provided support to replicators as they started their first groups by answering questions and giving advice. Hired agents were instructed to target an equal number of villages from each group within the first year.

3.1 Data

We collected panel data with a comprehensive household survey at baseline and endline on almost 6,000 households (representative at the community level). For 606 households of the 6,000 households, we also conducted higher frequency surveys, either every two to three weeks or every three to four months over a 20 month period, in order to examine consumption smoothing outcomes.

3.1.1 Full-sample surveys

We conducted a comprehensive household panel survey on almost 6,000 households (baseline survey in February-May 2009, and endline survey three years later, February-May 2012). To generate the sample frame, we first conducted a census survey of all adult women in the 500 villages in the study. In each village, 12 women from the census list were randomly selected for inclusion in the baseline survey, totaling a sample of 5,993 women in 5,954 households.⁶

The endline survey targeted the same households and women. Of the 5,954 households in the baseline sample, 5,602 (94.1%) were resurveyed in the endline survey. As a number of sections in the survey were administered to only one woman in the household (the primary female respondent), we tried to interview these same women in the endline. If the baseline female primary respondent could not be re-interviewed after repeated visits, she was replaced by another randomly selected female from the same household. For 5,094 of the 5,602

⁶ As we sampled women randomly from the census list and households often have multiple adult women, there are about 40 households from which more than 1 woman was drawn.

households surveyed in the endline, we managed to re-survey the same baseline female primary respondent; in 386 households, the baseline primary respondent was replaced by another woman in the same household; and in the remaining 122 households no adult woman could be interviewed. The percentage of baseline primary respondents who were re-surveyed in the endline survey was thus 85.9% (5,094 out of 5,954) and the total endline sample of primary respondents 5,462 (see Table 1 for an overview).

At the household level, we failed to resurvey 5.91% of the control group and 6.56% of the treatment group (p-value of 0.07); at the level of female primary respondents, we fail to resurvey 14.92% of the control group and 15.11% of the treatment group (p-value of 0.92). We also tested for compositional differences in attrition by regressing an attrition indicator on a set of baseline covariates and the interactions of these covariates with a treatment indicator. As shown in Table 1, we cannot reject the null that the interaction coefficients jointly equal zero (p-value of 0.48 and 0.43 for household and primary respondent attrition, respectively).

The baseline and endline surveys included an adult, household and village questionnaire. The *adult questionnaire* was administered individually to the primary female respondents and the primary female respondent's husband, and included sections on savings, credit, risk aversion, time preferences and cognitive ability (digit span and raven's test). For primary female respondents, there were additional sections on malaria knowledge, social integration, intra-household decision making, social capital and food security. As households in Mali can be very large and complex, comprising multiple married men, each with one or more wives, the *household questionnaire* used two modules: a *small household* and a *big household* module. The *small household* is made up of the primary female respondent, the person she defers to (i.e., her authority figure, most often her husband), and this person's immediate dependents. This would include other wives if the respondent's husband (i.e. her authority figure) is polygamous, for example. In about 75% of cases, the small household is embedded in a larger household structure. When the members of the small household share meals, conduct economic activities, or share a grain storage facility with people outside the small household, the small household is a sub-unit in a *big household*. Most of our data collection focused on the small household. The *small household* module included sections on migration, education, health, livestock, agriculture, other economic activities, housing, assets, transfers, food consumption and non-food expenditures. The *big household* module asked about the composition of the big household and agricultural production and food consumption at the level of the big household (the big household module focuses only agricultural production and food consumption because these are the main activities that the members of the big household conduct together).

3.1.2 High-frequency surveys

Between the baseline and endline surveys, we conducted high frequency surveys on a subset of about 600 randomly selected households (from both the treatment and control groups). The high-frequency questionnaires included fixed modules on financial transactions, transfers, health, non-agricultural income, expenditures and asset transactions and a variable component that, on a rotating basis, asked about agricultural production, crop stocks, food consumption, food security, and education. In 48 villages (24 control and 24 treatment villages), 309 households were visited every two to three weeks over a 20-month period (June 2010-January 2012) – resulting in 5,815 completed interviews. In addition, 297 households in 71 villages (35 treatment and 36 control villages) were visited every 3 to 4 months over the same period - with 989 interviews completed for this sample.

3.2 Baseline sample characteristics and balance check

A number of baseline descriptive statistics are presented in Table 2. On average, a study village has about 1,000 inhabitants, is 23 kilometers from the nearest tarmac road and 8 kilometers from the nearest market. About 70% of villages have a primary school in the village, and 20% have a health center. Prior to the intervention, approximately 22% of women were members of a ROSCA. Approximately 35% of primary respondents had received a loan in the last 12 months while 29% had given a loan. Of all female adults in the household aged 20 to 65, 22% received at least one transfer (either cash or in-kind) from another household in the last 12 months while 17% had given a transfer. Approximately forty percent of primary respondents had a business and a small portion (5%) engaged in paid labor. Over the past year, households invested \$27.13 in agriculture and \$18.22 in education. Livestock holdings averaged \$761.71. Just over half of the primary school aged boys (54%) were enrolled in school, while slightly under half of the girls were (45%).

A comparison of the treatment and control groups at baseline was conducted to verify that there were no important differences in observable characteristics. As can be seen in Table 2, households in the treatment and control villages were very similar prior to the introduction of SfC along key dimensions, with differences significant at 10% observed only in average household health expenditures for the last 30 days and the intra-household decision making power index scores. We fail to reject the joint equality of the treatment and control means of the vector of variables presented in Table 2 (p-value of 0.80).

3.3 Econometric specification

Given that treatment assignment was random, the main identification strategy is straightforward. Our principal estimating equation for impacts on outcome measures in the full-sample survey is the following:

$$Y_{i1} = a + b * T_i + c * Y_{i0} + d * X_i + c_i + e_i$$

where Y_{i1} is the outcome variable of interest at endline, T_i indicates treatment status, Y_{i0} is the lagged (baseline) value of the dependent variable, X_i is a vector of variables – used in the re-randomization procedure – and c_i are commune dummies, which we stratified on. Throughout, standard errors are clustered at the village level, i.e., the unit of randomization.

4 Adoption, savings and use of credit

4.1 Adoption rates and usage of SfC

Participation in an SfC is not simple to define, as there are different intensities of participation, and different definitions for what an SfC is. We thus use two definitions, a loose one and a stricter one. Loosely defined SfC groups are savings groups that women report as being “applause groups”.⁷ The stricter definition applies additional criteria: the group must hold regular meetings and have received training from someone outside the group. Using the loose definition, take-up of the SfC program in treatment villages (36.5%) was triple the take-up rate found in control villages (12.0%). When the stricter definition is applied, take-up is still higher in treatment villages than control villages, but slightly lower overall: 29.7% in treatment villages and 6.3% in control villages (Table 3).

Take-up increased steadily over the study period: whereas by April 2010 (one year into the program) about 17% of women in treatment villages had joined an SfC group, by April 2011 almost 30% had participated and by April 2012, the time of the endline survey, 37% reported participating. Average weekly savings contributions were \$0.48. Given that women joined SfC at different points in time, not all women had completed a savings cycle by the time of the endline survey: 83% of SfC members report having received at least one share-out (i.e., end-of-cycle withdrawal of savings by all participants). The average number of share-outs was 1.68 and the amount of the most recent share-out averaged \$30.64. Most share-outs (53.5%) occurred in April-June, i.e. the months preceding the lean season (July-October). The most frequently reported uses of the share-out proceeds were food (47%) and small businesses (27%). A little

⁷ Because of a characteristic clap performed at the end of each meeting by most groups, SfC groups are known as “tegereniton” or “applause groups” in Mali.

under half of the SfC members reported having received a loan from the group in the last 12 months before the survey, for an average loan amount of \$20.39.⁸ The most frequently reported uses of the SfC loans are food (38%) and small businesses (42%).

4.2 Characteristics of SfC adopters

Table 4 compares baseline characteristics of adopters and non-adopters in treatment villages. Adopters tend to come from somewhat larger and somewhat wealthier households, as measured by food consumption per capita (\$2.92 versus \$2.68). No differences in participation rates were observed based on the gender of the household head or household ethnicity. SfC adopters were also more likely to report in the baseline survey that they had had to resort to a costly strategy to cope with a shock within the last year (16% versus 20%). This could mean that these households, on average, faced more serious shocks, that these households had fewer coping mechanisms to deal with shocks, or that these households were more open to trying new coping strategies. There were no noticeable differences in levels of food-insecurity between adopters and non-adopters.

SfC adopters were more somewhat older and more likely to be a leader in the village (22% compared to 15%). More adopters were involved in tontines (29%) compared to non-adopters (20%). Additionally, 40% of SfC adopters had taken a loan in the past year at the time of the baseline survey, compared to only 31% of non-adopters. SfC adopters were not only financially more active but also economically: they are more likely to operate a business and to own livestock. Women who adopted SfC scored considerably higher on the social integration index, the community action index, and the intra-household decision making power index⁹. Given the communal nature of SfC groups, it is not surprising that women who opted to participate in the program had stronger or more frequent social ties prior to joining the group. Scores of financial patience and “time inconsistency” were similar between adopters and non-adopters.

⁸ The number of SfC loans in our survey data is much lower than the number of loans in Oxfam’s administrative data. It is likely that loans are under-reported in our survey data since taking loans is considered a shameful activity in Malian culture.

⁹ The components that make up these indices are enumerated in Table 10. The index is constructed – as in Kling, Liebman, and Katz (2007) – by first normalizing (subtracting the mean and dividing by the standard deviation of the control group) each individual variable, and then adding all the normalized variables together. This summed variable is then normalized. The resulting index has a mean of 0 and a standard deviation of 1 for the control group.

4.3 Did SfC increase financial savings and use of credit?

We now check whether the introduction of SfC into a village led to increases in financial savings and use of credit. As can be seen in table 5, respondents from the treatment villages are 4.9 percentage points (se = 1.6) more likely to be members of any type of savings group¹⁰. Overall, savings in treatment villages increased, on average, by \$3.65 (se = 1.32, mean in the control group of \$11.96) over the course of the study period. This is driven by the increase in savings in ASCAs, including SfC groups (\$3.21, se = 0.84). There is a small, but statistically significant decrease, in the amount of savings held in formal institutions (-\$1.10, se = 0.56), but very few women have formal savings accounts (1% of the control group).

A woman involved in savings groups prior to SfC may opt to participate in SfC rather than continue with her existing savings group. We find that ROSCA participation decreases slightly (-1.8 pp, se = 1.4) but this decrease is not statistically significant, whereas participation in ASCAs other than SfC does significantly decrease by 8.3 percentage points (se = 1.9). This suggests that the SfC program does crowd out other types of savings groups, and thus some of the changes in economic outcomes are coming not from the introduction of a completely new concept, but rather an improvement in the organization and terms and conditions of the savings groups.

Significantly more women reported receiving a loan in the last 12 months in the treatment group (3.3 pp, se = 1.6, mean in the control group of 56%). Of women who received loans, the total amount received as loans in the last 12 months did not differ between the treatment and control villages (\$1.33, se = 1.23). However, respondents from treatment villages did borrow significantly larger amounts from savings groups, on average, compared to control respondents. Women in treatment villages were 12.4 percentage points (se = 1.4) more likely to receive a loan from a savings group and 4.4 percentage (se = 1.6) less likely to receive a loan from family and friends (see Figure 9). In Malian culture, it is often considered shameful or embarrassing to ask friends or family members for a loan, particularly if it is a woman asking this of a non-relative man. Therefore, the impacts point to a benefit of the SfC program that is difficult to quantify but likely quite important: SfC groups provide a less stigmatized source of credit while simultaneously normalizing lending within the community.

5 Impacts

Savings groups may impact a wide set of outcomes, and at the start of the experiment there was no simple and linear mechanism of change. Our partners anticipated increases in economic activities and income, increased investments in health and education, increased consumption

¹⁰ This includes all ROSCAs and ASCAs – as defined above.

and improvements in women's bargaining position and women's social capital. We will present a wide range of outcomes in the following order: economic activities (investments and incomes, in agriculture, livestock and microenterprise); food consumption and non-food expenditures; food security and consumption smoothing; health and education; and, social capital and household decision-making power.

5.1 Economic activities

Table 6 presents estimates of impacts on economic activities (agriculture, livestock and small businesses).

5.1.1 Agriculture

Impacts on agriculture were examined both at the level of the primary female respondent and the level of the (small) household. Overall, we see no significant changes in agricultural inputs as a result of the intervention. A similar fraction of *women* in both treatment and control groups reported cultivating land (39% compared to 41%, a difference of 2.1 pp, se = 1.5). Total expenses on inputs were also similar in treatment and control villages (a difference of -\$0.10, se = 0.43). Respondents in treatment villages did report a significant increase in the values of both output (\$5.93, se = 2.37, mean in the control group of \$25.88) and sales (\$1.97, se = 0.97, mean in the control group of \$6.95). Given that agricultural inputs (which are generally better measured than outputs) did not change, this is a somewhat puzzling finding and may be due to chance rather than a true impact of the program.

These patterns are mirrored in the agricultural outcomes of the *small household* as well. Seventy-one percent of households in the control group cultivated land, which is similar to the treatment group (a difference of 0.2 pp, se = 1.4). Expenses on agricultural inputs too were similar between the two groups (a difference of \$4.49, se = 3.79). The value of output and sales did not change at the household level, as they did at the women's level.

5.1.2 Livestock

In West Africa, livestock is both a productive activity and an important form of buffer stock savings (Kazianga and Udry 2006). We find a large increase in the value of livestock held by households in treatment areas (\$119.94, se = 41.33, mean in control group of \$895.78). This is a large, 13 percentage point increase, driven mainly by increased holdings of male cows (\$49.73, se = 20.64) but also of goats (\$11.47, se = 4.57) and sheep (\$12.28, se = 4.70). Consistent with the increase in holdings, yearly expenditures related to livestock increased as well (\$6.22, se = 3.38) in treatment villages.

5.1.3 Small businesses

We find no statistically significant changes in most outcomes related to business development or expansion. A similar fraction of women in control and treatment groups had a business (a difference of 1.8 pp, se = 1.3, mean in the control group of 43%). On average, women in control villages reported business profits of \$41 per year, which was similar to those of women in the treatment area (a difference of \$5.13, se = 3.82). In addition to asking women directly about their business profits, we also asked detailed questions about sales and expenses and constructed an alternative profits measure as the difference between sales and expenses. Using this profits measure, there are no differences between control and treatment villages either (a difference of -\$0.33, se = 2.35, mean in the control group of 36.71).¹¹ While we see no change in profits, we do find suggestive evidence of increases in both expenses and sales for businesses in treatment villages compared to businesses in control villages: on average, treatment businesses spent \$35.66 (se = 20.77) more (mean in the control group of \$131 per year) and sold \$38.56 (se = 22.75) more. These differences are significant at the 10% level. Taken together, there is only weak and limited evidence of improvements in business outcomes.

5.2 Consumption and expenditures

As can be seen in Table 7, overall monthly household expenditures per equivalent adult on non-food items did not differ in treatment and control villages (a difference of -\$0.04, se = 0.11). We do find suggestive evidence of a small increase in total food consumption per adult in treatment villages. Food consumption per equivalent in the past week increased by about \$0.13 (se = 0.07, mean in the control group of \$3.89), a 3% increase. This is a modest effect, significant only at the 10% level.

5.3 Impacts on food security and consumption smoothing

5.3.1 Food security

As SfC increases access to loans and improves savings by helping women to save regularly, a portion of these funds may be used to purchase food, resulting in greater food security. We find indeed that food insecurity in treatment villages was lower compared to control villages (Table 7). Treated respondents were 2.8 percentage points less likely to report they did not have enough to eat (se = 1.6, mean in control group of 37%). In addition, a food insecurity index developed by FFH dropped by 3.6 percentage points in treatment areas (se = 1.6, mean in the

¹¹ de Mel, McKenzie, and Woodruff (2009) examine different methods of measuring micro-enterprise profits and conclude that simply asking profits provides a more accurate measure of firm profits than detailed questions on revenues and expenses. In our data, the correlation between self-reported and calculated profits is high (.78).

control group of 51%). Another more stringently defined index that measures chronic food insecurity showed a decline of 3.9 percentage points (se = 1.6, mean in the control group of 43%).¹²

5.3.2 Consumption smoothing

While very detailed and complete, the FFH food insecurity measure may reflect respondents' *perceptions* of how food secure they are, which is important but may differ from actual food shortages. To cross-check this finding, we verified whether households in fact are better able to cope with seasonal fluctuations and maintain their food consumption at approximately the same level throughout the year, without having to resort to skipping meals or eating less. The high frequency surveys allow us to observe respondents' food consumption in multiple seasons throughout the year. We examine whether households are better able to smooth consumption over the year using the following estimating equation:

$$Y_{it} = a + b1 * T_i + b2 * lean_{it} + b3 * T_i * lean_{it} + c * year_{it} + d * type_i + c_i + e_{it}$$

where $lean_{it}$ indicates whether the outcomes was measured in the lean season (July-October), $year_{it}$ is a vector of year dummies, $type_i$ indicates whether the household is in the two-week or three-month sample and c_i is a household-level random effect. Because the full-sample and high-frequency survey instruments are quite different, constructing variables in exactly the same way is often impossible – so we do not include baseline and endline data as rounds when analyzing the high-frequency data.

Results are reported in Table 8. We find that weekly food consumption per equivalent adult falls in the lean season for all households (-\$0.50, se = 0.22). However, we find evidence that households in treatment villages experience a smaller decline in food consumption in the lean period. The coefficient on the interaction term $T_i * lean_{it}$ is positive but not statistically significant for total food consumption (\$.035, se = 0.28). However, when breaking down food consumption by the level at which the food is consumed, we find a statistically significant interaction effect for food consumed at the level of the small household (\$.039, se = 0.16) but no effect on food consumed at the level of the big household (-\$0.22, se = 0.36). If SfC is helping households to smooth consumption over the lean season, it is not surprising to find that the

¹² The full FFH food security module is comprised of 18 questions, 9 of which are core yes/no questions that ask whether a person has experienced a certain food insecurity phenomenon (e.g., "In the last 12 months, did you worry that your food would run out before you had money to buy more food?"). Nine additional questions ask how often this phenomenon occurred: 'rarely,' 'sometimes,' or 'often.' Whereas the basic FFH food security index is based on the number of positive answers to the yes/no questions, the chronic food insecurity takes into account only phenomena that occurred sometimes or often.

effect is driven by increased consumption of the small household. If the program makes more resources available to women in the lean season, women are likely to use those resources primarily for themselves, their children and immediate dependents. While statistically we cannot exclude that SfC is merely causing food consumption to shift from the big to the small household in the lean season, we interpret our findings as evidence that households in treatment villages are better able to cope through the hungry season – consistent with the food security finding.

The fact that no important differences were seen in levels of food consumption may seem contradictory to findings that food security increased in treatment villages. However, it should be noted that the time period for these two outcomes are not the same: food consumption is measured for the past seven days, whereas food security is measured for the past 12 months. Endline data collection occurred shortly after the harvest, during a season of relative plenty, when we would expect to find smaller effects of SfC on food consumption. As we have seen above, the high frequency data provide evidence that SfC did have positive effects on food consumption levels in the lean season. Thus this is consistent with SfC contributing to important reallocation of resources, to consumption smoothing, but not to higher levels of aggregate income over the year.

5.4 Health and education

5.4.1 Health

The most frequent type of shocks households face is illness. We do not find that the SfC intervention affected the likelihood of illness or changed the way in which households dealt with health shocks (Table 9). Treatment and control households are equally likely to consult a health facility, reported similar amounts of health expenditures from the last month (a difference of \$0.21, se = 0.38) and financed health expenditures in the same ways: they were equally likely to sell households assets or take a loan from a savings group or other source in order to pay for a health expense.

5.4.2 Education

Our partners predicted that households would be better able to pay for school supplies and fees, leading to improved education. However, we do not find changes in school enrollment. The rate of both primary and secondary enrollment for boys and girls was the same, on average, for treatment and control villages (Table 9). We see a slight increase in educational expenses per capita in the treatment group; the treatment group spends, on average, 8% more than the control group (\$0.50, se = 0.28, mean in the control group of \$6.06), which is significant at the 10% level.

5.5 Social capital and intra-household decision-making power

5.5.1 Social capital

We see no significant differences between treatment and control respondents along various measures of social capital (Table 10). Our measures of social capital include a battery of questions on engagement in the community, such as speaking to the village chief or councilor, participating in village meetings, or voting, as well as questions on social networks, such as asking others for help, being willing to help others, going to the market with other women, etc. The point estimates are small in magnitude and precisely estimated, suggesting that there were no changes in social capital along the dimensions we measured.

5.5.2 Female decision-making power

We also find no impact on women's decision-making power. We asked a number of questions, including e.g., whether the woman is free to decide on her own about food expenses, about education expenses, or about business decisions. In no individual measure, nor in the index of all questions (a difference of 0.02, se = 0.03), do we find a significant change.¹³

6 Mechanisms

SfC is a simple intervention that seems to have increased savings (in cash and in livestock), the use of credit and improved household's ability to smooth consumption. As SfC does not rely on outside capital, the question is, therefore, how does SfC change behavior. In this section we discuss a number of underlying constraints and potential mechanisms for the impacts we measured on household finance and consumption smoothing. We do not put forward one particular mechanism as "the" answer. Most likely a number of mechanisms are at work. Instead, we outline a number of potential mechanisms and provide the evidence that we have for each.

6.1 Market failures

6.1.1 Screening, monitoring and enforcement

Formal market institutions most often fail to provide flexible financial products, and in rural Mali such institutions are rarely available. Informal institutions are common in rural Mali, as in most developing country settings. However, households rarely achieve complete insurance due to asymmetric information failures such as limited screening, monitoring and enforcement

¹³ Note that the balance check indicated that the average household in the treatment villages scored somewhat higher on the index of intra-household decision making power. If this were to bias the impact assessments in any way, we would most likely expect to find an erroneously large effect of the SfC program on decision making.

(Townsend 1994; Kinnan 2012; Ligon, Thomas, and Worrall 2002). As a result, there is then a mismatch between household's cash flow needs and those offered by either formal or informal financial alternatives. We can think of SfC as the introduction of an organization "technology," which helps mitigate the asymmetric information constraints that have historically prevented individuals from having access to complete markets. The increased borrowing and savings from SfC may have led to a reallocation of resources within the community over time as well as over risky states of the world.

As highlighted by Feigenberg, Field, and Pande (2013), increased frequency of meetings can increase social capital which in turn helps alleviate constraints stemming from asymmetric information. However, as shown in table 10, we find no evidence of women's social networks – in an extensive nor intensive margin – expanding. Instead it would appear that the program relies on the strength of the existing social networks in these villages, consistent with more connected women being more likely to join groups¹⁴, rather than building up that social capital¹⁵. Without an improvement in social capital to improve information flows within the village, it is not likely that SfC helped smooth away constraints related to asymmetric information.

6.1.2 Information costs on organization an ASCA

As mention in section 3, the experimental design included two different treatments: "structured" and "organic" replication. In structured replication village, replicating agents were formally trained by the program, given a pictorial guide and given a certificate of training. By contrast, organic replicating agents were only provided with on-the-job training by the technical agent. This allows us to see how easy it is to implement SfC once people know the general concept, thereby getting at whether there are high information costs of organizing such an ASCA – perhaps due to low literacy (though we do not have a treatment with and without oral accounting since it is an integral part of the program).

We examine whether impacts differ between villages with structured versus organic replication. If SfC is difficult to implement without a lot of support, we anticipate the benefits to be higher in structured than organic treatment villages. Table A3 shows that this is indeed the case. First, villages where replication was structured had significantly more SfC members, on average, than organic villages. We also observe that structured replication is significantly more

¹⁴ This is only suggestive as the connected women are also richer on average.

¹⁵ The tandem anthropological work in 8 villages conducted by Deubel et al (2012) suggests an increase in social capital in villages which were offered SfC. Women reported feeling more of a sense of solidarity with other women in the group, which they attribute to SfC.

effective at raising women's livestock ownership than organic replication (though we do not see differences in livestock ownership by the household overall). Furthermore, only households in villages with structured replication scored lower on the FFH food insecurity index. Overall, these results suggest that even with some NGO support, these groups were not capable of improving food security¹⁶. It is therefore not surprising that these groups did not spontaneously develop without outside assistance.

6.1.3 Intra-household markets

Anderson and Baland (2002) suggest that women participate in ROSCAs in order to impose female preferences over consumption and savings onto husbands, altering the resource allocation within the household. If women used SfC in order to better implement their preferences vis-à-vis the men in their households, we would expect to see women reporting being more able to decide about food expenses for example. However, as discussed in section 5.3.2, we find no evidence of changes in women's decision-making power. The point estimate is very small (-0.01 pp, se = 0.02, mean in the control group of 0.41), as is the overall index of measures capturing intra-household bargaining power. We have a limited number of measures of intra-household bargaining, so it is possible that there were changes not captured by the survey instrument. Nevertheless, we find no direct evidence on this channel with what we expected to be a directly related measure of women's ability to influence food security.

6.2 Cognitive Biases and Preferences

6.2.1 Time preference

SfC offers a commitment device to save weekly, which may help households to use savings to better smooth their consumption throughout the year. The saving cycles are often structured so that the lump-sum payout occurs leading up to the lean season. Gugerty (2006) highlights that informal savings groups, particularly ROSCAs, offer participants a commitment device to save. Dupas and Robinson (2013) suggests that savings groups which combine commitment with the flexibility of loans, as does SfC, can increase saving and investment. Commitment savings products have been shown to increase savings particularly among those with time inconsistent preferences (Ashraf, Karlan, and Yin 2006) as recent theory also predicts (Basu 2011). In table 4, we find no evidence that female respondents who demonstrate time inconsistent preferences, as measured by the survey question in Ashraf et al (2006), predicts participation in SfC. However, our measure of time inconsistency is far from perfect. The

¹⁶ Unfortunately we do not have sufficient sample size in the high frequency surveys to analyze the smoothing results by the two different treatment arms.

correlation in responses between the baseline and endline is low. We therefore have little direct evidence on the role of commitment as a mechanism.

A consistent reminder to save may also affect participant's time preferences, though we most often assume that preferences are fixed over time. In table 11, we find that female respondents in treatment villages are slightly more likely to be patient (2.2 percentage points, $se=.012$, mean in the control group of 19%) than respondents in the control village at endline.

6.2.2 Other cognitive biases

The weekly meetings may also affect other cognitive biases, such as attention and task management. However, we have no proxy for attention or risk management in our survey instruments. Future research

7 Conclusion

This paper reports the results of a randomized experiment of a micro-savings project in 500 villages in rural Mali. By promoting a specific form of an accumulating savings and credit association, which is more flexible than existing informal savings groups, our partner NGOs facilitated an increased access to financial management tools. This led to increases in savings and access to loans in treatment villages. While we do not observe any increase in investments in agriculture or small enterprise activity, as anticipated by the NGOs, access to SfC in treatment villages did increase investments in livestock and improve food security and consumption smoothing. We found no evidence of changes in health or education investments or in women's standing in the village.

The micro-savings movement is a quickly expanding one, with millions of participants worldwide, which is inexpensive compared to microfinance which requires outside capital and generates higher administrative costs borne by implementers. Using financial and administrative data from Oxfam America-FFH-Stromme Foundation and our take-up data, we estimate implementation costs per household to be under \$20. The structure of the savings groups promotes replication of other savings groups, though this experiment has shown the replication process does require some involvement by the NGOs. Future research should further disentangle the underlying mechanisms of how savings groups improve households' consumption smoothing, at least in Mali, beyond the first steps taken in this paper.

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Tables

Table 1: Number of observations and sample attrition

	Nb. of villages	Nb. of households	Nb. of primary women
Observations			
Baseline	500	5,954	5,993
Resurveyed at endline	500	5,602	5,094
Endline	500	5,602	5,462
Attrition			
Control villages	0%	5.91%	14.92%
Treatment villages	0%	6.56%	15.11%
		p-value	p-value
Test for differential attrition between treatment and control			
Mean attrition		0.07	0.92
Composition of attrition		0.48	0.43

Table 2: Descriptive statistics and balance check using baseline survey data

	Pooled		
	Mean Control Group	Difference Control- Treatment	Obs.
A. Financial management			
<i>Female primary respondent</i>			
Member of a tontine (0/1) ¹	0.22	0.01	5,956
Total Savings Amount (\$)	7.78	-0.30	5,952
Received a loan (12 mths, 0/1)	0.35	-0.01	5,938
Gave a loan (12 mths, 0/1)	0.29	0.01	5,940
B. Economic activities			
<i>Female adults (20-65)</i>			
Has business (0/1)	0.41	0.01	8,193
Engaged in paid labor (0/1)	0.05	0.00	8,193
<i>Household</i>			
Total input expenses for agriculture (\$)	27.13	-3.20	5,952
Value of agriculture output (\$)	245.31	-3.57	5,951
Total value of livestock (\$)	761.71	11.40	5,952
C. Consumption			
<i>Household</i>			
Consumption per adult equivalent - total (\$)	2.72	0.06	5,918
D. Shocks and food security			
<i>Household</i>			
Resorted to costly strategy to cope with shock (0/1)	0.18	-0.01	5,930
Household experienced shock with big impact (0/1)	0.42	-0.02	5,928
<i>Female primary respondent</i>			
FFH food insecurity index (0/1)	0.40	-0.01	5,953
E. Health and education			
<i>Household</i>			
Health expenditures - past 30 days (\$)	5.36	-0.59	* 5,937
Educational expenses - past year (\$)	2.14	-0.01	5,948
Primary school enrollment (girls, 0/1)	0.45	-0.01	4,078
Primary school enrollment (boys, 0/1)	0.54	0.01	4,026
F. Empowerment and social capital			
<i>Female primary respondent</i>			
Index of intra-household decision making power	0.00	0.06	* 5,972
Index of community action	0.00	0.01	5,962
Social integration index (0-1)	0.00	0.02	5,952

G. Village Characteristics

Village population	1,019.83	-8.48	483
Distance to closest tarmac road (km)	22.55	1.85	491
Presence of a primary school (0/1)	0.71	0.00	494
Presence of a health center (0/1)	0.21	-0.03	498
	p-value		
F-test for joint equality of means in treatment and control	0.80		

Table 3: Take-up

	Control villages	Treatment villages		
		All	Structured	Organic
Member of SfC (0/1) ¹	12.04%	36.53%	40.47%	32.48%
Member of SfC - more strictly defined (0/1) ²	6.27%	29.65%	33.56%	25.73%

¹ "Tekereni/Applause Group".

² "Tekereni/Applause Group" that has regular meetings and received training.

Table 4: Comparison of baseline characteristics of SfC members vs. non-members in treatment villages

	Non-Members	Members	Difference from regression with commune-fixed effects
A. Household characteristics			
Household size	6.79	7.55	***
Household head is a woman (0/1)	0.06	0.07	
Bobo (0/1)	0.38	0.25	
Food consumption per adult equivalent (\$)	2.68	2.92	***
Resorted to costly strategy to cope with shock (0/1)	0.16	0.20	**
FFH food insecurity index (0/1)	0.27	0.31	*
B. Characteristics of primary female respondent			
Age	33.73	36.68	***
Can read and write (0/1)	0.13	0.14	
Married (0/1)	0.95	0.95	
Not first wife (0/1)	0.15	0.15	
Leader in the village (0/1)	0.15	0.22	***
Involved in a tontine (0/1)	0.20	0.29	***
Held savings other than in tontine (0/1)	0.42	0.41	
Took a loan in past year (0/1)	0.31	0.40	***
Had a business (0/1)	0.44	0.56	***
Owned livestock (0/1)	0.50	0.51	***
Index of intra-household decision making power	0.05	0.14	***
Index of community action	-0.08	0.22	***
Social integration index (0/1)	-0.05	0.20	***
Patient (0/1)	0.36	0.36	
Time inconsistent (0/1)	0.08	0.11	
Observations	1,384	839	

Table 5: Impacts on financial management

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<i>Savings environments</i>					
<i>Female primary respondent</i>					
Member of any savings groups (0/1)	0.049 (0.016)	*** 0.76	5,437	0.02	0.08
Member of a ROSCA (0/1)	-0.018 (0.014)	0.19	5,437	-0.04	0.01
Member of an ASCA (0/1)	0.061 (0.018)	*** 0.68	5,437	0.03	0.10
Member of an ASCA that meets regularly (0/1)	0.190 (0.019)	*** 0.34	5,437	0.15	0.23
Member of SfC (0/1) ¹	0.255 (0.018)	*** 0.12	5,437	0.22	0.29
Member of SfC - more strictly defined (0/1) ²	0.246 (0.017)	*** 0.06	5,437	0.21	0.28
Member of an ASCA not SfC (0/1) ¹	-0.083 (0.019)	*** 0.62	5,424	-0.12	-0.04
Holds any savings at home (0/1)	0.016 (0.017)	0.40	5,435	-0.02	0.05
Holds any savings in formal environment (0/1)	-0.001 (0.002)	0.01	5,435	-0.01	0.00
<i>Savings amounts</i>					
<i>Female primary respondent</i>					
Total savings amount (\$)	3.65 (1.32)	*** 11.96	5,437	1.07	6.24
Savings amount in ASCAs (\$)	3.21 (0.84)	*** 2.31	5,262	1.57	4.86
Savings amount at home (\$)	1.50 (0.92)	7.23	5,432	-0.31	3.30
Savings amount in formal institutions (\$)	-1.10 (0.56)	** 1.23	5,435	-2.20	0.00
<i>Loans received</i>					
<i>Female primary respondent</i>					
Received a loan (last 12 months, 0/1)	0.03 (0.02)	** 0.56	5,435	0.00	0.07
Total amount borrowed (last 12 months, \$)	1.33 (1.23)	13.42	5,383	-1.08	3.74
Loan sources					
Took a loan from saving groups (0/1)	0.12 (0.01)	*** 0.10	5,435	0.10	0.15

Took a loan from family/friends (0/1)	-0.04 (0.02)	***	0.42	5,435	-0.08	-0.01
Took a loan from formal sources (0/1)	0.00 (0.00)		0.02	5,435	-0.01	0.01
Amount borrowed from saving groups (\$)	3.83 (0.53)	***	2.29	5,436	2.80	4.87

¹ "Tekereni/Applause Group".

² "Tekereni/Applause Group" that has regular meetings and received training.

Table 6: Impacts on economic activities

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<u><i>Agriculture (woman)</i></u>					
<i>Female adults (20-65)</i>					
Cultivates (0/1)	0.02 (0.01)	0.41	8,604	-0.01	0.05
Total input expenses (\$)	-0.10 (0.43)	4.00	8,598	-0.94	0.73
Value of output (\$)	5.93 ** (2.37)	25.88	8,379	1.29	10.58
Value of sales (\$)	1.97 ** (0.97)	6.95	8,429	0.08	3.86
<u><i>Agriculture (small household)</i></u>					
<i>Household</i>					
Cultivate (0/1)	0.002 (0.014)	0.71	5,574	-0.02	0.03
Total input expenses (\$)	4.49 (3.79)	41.75	5,574	-2.94	11.92
Value of output (\$)	6.41 (14.68)	270.45	5,572	-22.36	35.19
Value of sales (\$)	0.83 (5.32)	67.59	5,574	-9.59	11.26
<u><i>Livestock</i></u>					
<i>Household</i>					
Holds livestock (0/1)	0.01 (0.01)	0.88	5,572	-0.01	0.03
Total expenditures on animal care (\$)	6.22 * (3.38)	43.05	5,572	-0.41	12.85
Total value of livestock (\$)	119.94 *** (41.33)	895.78	5,572	38.94	200.95
Total value of livestock (\$, trimmed)	87.71 *** (32.81)	819.22	5,517	23.39	152.03
Value of male cows (\$)	49.73 ** (20.64)	373.39	5,572	9.28	90.17
Value of female cows (\$)	22.76 (15.18)	123.89	5,572	-6.99	52.50
Value of goats (\$)	11.47 ** (4.57)	104.30	5,572	2.52	20.43
Value of sheep (\$)	12.28 *** (4.70)	96.17	5,572	3.07	21.49
Value of poultry (\$)	1.23 (1.08)	23.16	5,572	-0.88	3.35

<u>Business (past 12 months)</u>					
<i>Female adults (20-65)</i>					
Has business (0/1)	0.018 (0.013)	0.43	8,595	-0.01	0.04
Profits (self-reported) (\$)	5.13 (3.82)	41.20	8,458	-2.36	12.62
Profits (calculated) (\$)	-0.33 (2.35)	36.71	8,306	-4.94	4.29
Expenses (\$)	35.66 * (20.77)	131.04	8,501	-5.05	76.37
Sales (\$)	38.56 * (22.75)	176.47	8,464	-6.02	83.15

Table 7: Impacts on consumption and food security

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<u>Consumption and expenditures</u>					
Monthly non-food expenses per adult equivalent (\$)¹	-0.04 (0.11)	2.85	5,555	-0.27	0.18
Weekly food consumption per adult equivalent - total (\$)	0.13 * (0.07)	3.89	5,535	-0.02	0.27
Weekly food consumption per adult equivalent - small hh (\$)	0.06 (0.04)	1.33	5,550	-0.03	0.14
Weekly food consumption per adult equivalent - ext. hh (\$)	0.11 (0.09)	3.80	3,736	-0.07	0.29
<u>Food Security (last 12 months)</u>					
<i>Household</i>					
Not enough to eat (0/1)	-0.03 * (0.02)	0.40	5,425	-0.06	0.00
FFH food insecurity index (0/1)	-0.04 ** (0.02)	0.51	5,428	-0.07	-0.01
FFH chronically food insecurity index (0/1)	-0.04 ** (0.02)	0.43	5,428	-0.07	-0.01

¹ Includes expenses on non-durable household assets, transport and communication, energy and tobacco.

Table 8: Weekly per capita food consumption (high-frequency sample)

	Consumption per adult equivalent - total (\$)		Consumption per adult equivalent - small hh (\$)		Consumption per adult equivalent - ext. hh (\$)	
Lean season	-0.50	**	-0.38	***	-0.11	
	(0.22)		(0.12)		(0.25)	
Treatment*lean season	0.35		0.39	**	-0.22	
	(0.28)		(0.16)		(0.36)	
Year 2011	-1.01	***	0.06		-1.47	***
	(0.20)		(0.07)		(0.25)	
Year 2012	-1.58	***	-0.38	*	-1.83	***
	(0.32)		(0.20)		(0.32)	
Constant	4.69	***	1.57	***	4.10	***
	(0.15)		(0.05)		(0.18)	
Obs.	1,936		1,936		1,503	

Table 9: Impacts on health and education

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<i>Health (past 30 days)</i>					
<i>Household</i>					
Experienced serious illness (0/1)	0.00 (0.01)	0.15	5,547	-0.02	0.02
Consulted health center (if sickness, 0/1)	0.00 (0.02)	0.45	4,824	-0.03	0.03
Health expenditures - past 30 days (\$)	0.21 (0.38)	6.35	5,570	-0.53	0.95
Financing of health expenses					
Sale of assets (0/1)	-0.01 (0.01)	0.30	5,570	-0.03	0.02
Loan from saving groups (0/1)	0.00 (0.00)	0.00	5,570	0.00	0.00
Loan from other sources (0/1)	0.00 (0.00)	0.01	5,570	-0.01	0.00
<i>Education</i>					
<i>All members</i>					
School enrollement ¹					
Primary school enrollment (girls, 0/1)	0.00 (0.02)	0.40	5,559	-0.03	0.03
Primary school enrollment (boys, 0/1)	0.02 (0.02)	0.48	5,448	-0.02	0.05
Secondary school enrollment (girls, 0/1)	-0.01 (0.02)	0.36	3,144	-0.05	0.03
Secondary school enrollment (boys, 0/1)	0.01 (0.02)	0.43	3,663	-0.02	0.04
Educational expenses (\$) ¹	0.50 * (0.28)	6.06	17,639	-0.06	1.05

Table 10: Impacts on social capital and intra-household decision making

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<u>Community action</u>					
<i>Female primary respondent</i>					
Index of community action	-0.03 (0.03)	0.00	5,425	-0.09	0.04
Talked to village chief in past year (0/1)	-0.01 (0.02)	0.37	5,397	-0.04	0.02
Participated in a village meeting in past year (0/1)	-0.02 (0.01)	0.34	5,424	-0.05	0.01
Spoke at a village meeting in past year (0/1)	-0.01 (0.01)	0.13	5,424	-0.03	0.01
Voted in last elections (0/1)	-0.02 (0.01)	0.70	5,419	-0.04	0.01
<u>Social Networks</u>					
<i>Female primary respondent</i>					
Social integration index (0-1)	0.02 (0.04)	0.00	5,421	-0.05	0.10
Would ask other woman in sample for money (0-1)	0.00 (0.01)	0.44	5,370	-0.02	0.02
Would give money to other woman in sample (0-1)	0.01 (0.01)	0.65	5,370	-0.02	0.03
Go to market with other woman in sample (0-1)	0.01 (0.01)	0.24	5,370	-0.01	0.03
<u>Intra-household decision making</u>					
<i>Female primary respondent</i>					
Index of intra-household decision making power	0.02 (0.03)	0.00	5,425	-0.04	0.09
Free to decide about food expenses (0/1)	-0.006 (0.016)	0.41	5,415	-0.04	0.03
Free to decide about educational expenses (0/1)	0.010	0.23	4,440	-0.02	0.04

	(0.014)				
Free to take decisions about business (0/1)	0.012 (0.02)	0.43	4,180	-0.02	0.05

Table 11: Impacts on time preferences

	Treatment Effects			95% Confidence Interval	
	Treatment Effect	Mean Control	Obs.	Lower bound	Upper bound
<i>Female primary respondent</i>					
Time-inconsistent	-0.003 (0.007)	0.07	5,375	-0.02	0.01
Patient	0.022 * (0.012)	0.19	5,375	0.00	0.05

Appendix

Table A1: Characteristics and uses of SfC

	Mean	Obs.
<i>Contributions</i>		
Number of months since respondent joined SfC group	23.68	813
SfC weekly contributions (\$)	0.48	839
<i>Share-outs</i>		
Ever received a share-out (0/1)	0.83	844
Number of share-outs	1.68	844
Most recent share amount (\$)	30.64	685
<i>Share-out uses (0/1)</i>		
Food	0.47	696
Education	0.01	696
Livestock	0.12	696
Agriculture spending	0.06	696
Business	0.23	696
House repairs	0.06	696
Health	0.04	696
<i>Loans</i>		
Received at least one loan from SfC (0/1)*	0.83	844
Received at least one loan from SfC in last 12 mths (0/1)	0.43	853
Number of loans (last 12 mths)	0.59	853
Loan amount (\$)	20.39	368
Interest payment (\$)	2.82	361
<i>Loan uses (0/1)</i>		
Food	0.38	356
Education	0.02	356
Livestock	0.05	356
Agriculture spending	0.02	356
Business	0.42	356
House repairs	0.05	356
Health	0.06	356

* Since first participation in SfC.

Table A2: Distribution of SfC share-outs by month

	% of share-outs by month
January	8.5
February	8.2
March	8.9
April	9.7
May	18.6
June	16.3
July	5.9
August	4.0
September	3.0
October	5.0
November	3.0
December	9.0
Total	100

Table A3: Treatment effects in organic vs structured replication villages

	(1) Organic	(2) Structured	p-value (1) = (2)
A. Financial management			
<i>Female primary respondent</i>			
Member of SfC - loosely defined (0/1)	0.21 *** (0.02)	0.28 *** (0.02)	0.01 **
Total Savings Amount (\$)	2.08 (1.42)	5.21 (1.83)	*** 0.11
Received a loan (last 12 months, 0/1)	0.02 (0.02)	0.04 (0.02)	** 0.45
Net saving (\$)	3.24 (2.39)	4.43 (2.67)	* 0.70
<i>Female adults (20-65)</i>			
B. Economic activities			
<i>Household</i>			
Total input expenses for agriculture (\$)	4.36 (4.30)	4.63 (5.39)	0.96
Value of agriculture output (\$)	14.28 (18.91)	-1.46 (18.54)	0.50
Total value of livestock (\$)	89.55 * (48.95)	150.35 *** (57.09)	0.37
Educational expenses per capita (\$)	0.12 (0.18)	0.23 (0.18)	0.64

Index of assets per capita (ext. hh)	0.00 (0.04)	0.06 (0.04)		0.27	
Housing index	0.02 (0.04)	0.10 (0.04)	***	0.08	*
C. Consumption and food security					
<i>Household</i>					
Consumption per adult equivalent - total (\$)	0.06 (0.10)	0.20 (0.10)	**	0.26	
<i>Female primary respondent</i>					
FFH food insecurity index (0/1)	-0.01 (0.02)	-0.06 (0.02)	***	0.08	*
E. Health and education					
Health expenditures - past 30 days (\$)	0.17 (0.49)	0.25 (0.45)		0.89	
Primary school enrollment (girls, 0/1)	0.01 (0.02)	-0.01 (0.02)		0.40	
Primary school enrollment (boys, 0/1)	0.01 (0.02)	0.02 (0.02)		0.82	
F. Empowerment and social capital					
<i>Female primary respondent</i>					
Index of intra-household decision making power	0.01 (0.04)	0.04 (0.04)		0.43	
Index of community action	-0.05 (0.04)	0.00 (0.04)		0.30	
Social integration index (0-1)	-0.03 (0.05)	0.08 (0.05)	*	0.06	*
Nb of observation in treatment villages (small hh)	1,230	1247			
