Savings Groups in Rural Settings: Impacts on Household Well-Being, Female Empowerment, and Access to Formal Credit*

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Abstract

This study uses a clustered randomized control trial to evaluate the impact of savings groups on household and individual well-being and formal credit access in rural Peru. While the intervention did not significantly affect monetary poverty, food security, or consumption smoothing strategies, it led to increased housing investments and agricultural specialization. The treatment also fostered female empowerment. First, although program rollout was gender-neutral, take-up and retention were higher among women. Second, treated women faced reduced domestic workloads. Finally, we find gendered credit effects: treated men relied less on formal lenders, while treated women improved their use of formal productive loans.

Keywords: Saving Groups, Village Savings and Loans Associations, Poverty, Financial Inclusion, Financial Services, Female Empowerment, Cluster Randomized Controlled Trial.

JEL Codes: : C93, D14, G20, J16, O12, O13, O16, Q12.

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1 Introduction

Most of the rural poor around the world remain excluded from the financial system, which limits their capacity to access savings, credit, and insurance services to invest in their productive activities or to manage idiosyncratic risk and seasonality [Collins et al., 2009]. Formal financial institutions are often absent in remote areas due to high screening and transaction costs that threaten the sustainability of their operations [Lopez and Winkler, 2018]. Even when present, they may charge high fees, impose stringent collateral requirements, and offer products and services that do not satisfy the flexibility required by the seasonal demand for credit among the rural poor [Bauchet et al., 2011].

Village Saving and Loan Associations (VSLAs), also known as savings groups or self-help groups, are a popular mechanism for delivering informal financial services in the developing world.[1] VSLAs are a savings-led, self-managed microfinance group, very similar to Rotating Savings and Credit Associations (ROSCAs) [Besley et al., 1993]. They consist of 10 to 30 community members who agree to save and lend out this common pool to members who request funding. VSLAs around the world may differ in terms of operational details, but two basic features of the model are particularly attractive. On one hand, the interest paid on the loans granted is proportionally shared among the members according to individual savings balances. On the other hand, VSLAs do not rely on external capital, but instead all funds come from the group's savings. According to Gash and Odell [2013], between 75 and 80% of VSLA members worldwide are female, which reflects women's limited access to financial services, particularly in rural settings.

Relying on a clustered randomized control trial in rural Peru, this study evaluates the effectiveness of VSLAs in improving households and individual well-being and their spillover effects on access to formal financial services. The treatment was randomized across 240 villages in Ayacucho, an impoverished area in southern Peru, between 2014 and 2016. We focus on a myriad of outcomes measured at the household level including monetary poverty, food security, housing quality, and investment in productive activities. Access to the VSLA model may also have impacts on individual behavior and choices, particularly those linked to productive activities. Our data allow us to assess the effect of access to VSLAs on labor market participation and credit performance. We look at both of these outcomes by sex due to the large gender gaps recorded at baseline. While previous studies have looked at the effect of VSLAs on poverty, wealth, resilience [Karlan et al., 2017; Ksoll et al., 2016; Beaman et al., 2014; Gash and Odell, 2013; Demont, 2022] and child labor, schooling and gender empowerment [Baland et al., 2020], the focus on individual labor market outcomes and the spillover effects on access to credit from formal lenders are two novel features of our paper.

Our study complements survey data with credit bureau records as well as detailed administrative information on VSLAs' operations. Access to VSLAs' rosters and transaction records provides

[1] VSLAs provide informal financial services in 77 countries and serve over 20 million active participants worldwide. See www.vsla.net, last accessed on September 25, 2020.

valuable individual-level data on take-up, retention, and rotation rates, as well as the savings and loan transactions. Leveraging these datasets allows us to explore the internal dynamics of VSLAs and assess the relative utilization of VSLA credit and savings services, in the lines of [Burlando et al., 2021]. Furthermore, these records enable us to investigate gender differences in take-up and tenure within VSLAs. Endline survey data and credit bureau records allow us to study a variety of social and financial indicators up to two years after the introduction of the VSLA model. While most outcomes in our study are measured at the household level, we also collected individual survey data on labor market participation for all household adults and credit bureau data for the household head and their spouse. This comprehensive data collection approach allows us to examine the gendered impacts of the treatment on time allocation to productive activities and the utilization of external credit sources. This analysis is particularly pertinent in rural settings, where gender differences in preferences, bargaining power within households, and initial credit constraints or business size may be pronounced.

Administrative records on the operations of the VSLAs show that there was demand for the informal financial services offered: about a quarter of the households in treated villages joined a local savings group. Despite the gender-neutrality of the rollout of the program, take-up rates were 9 percentage points higher when the household head was a woman, which represents a 42% increase relative to average household take-up rates. This pattern is in line with large gender gaps in loan approval among agricultural producers in Peru: conditional on requesting a loan, 8% and 16% of women and men get loans approved, respectively [Arbulu and Sissi, 2019]. Also, both retention and rotation rates are higher among female members: less women leave and relatively more women join the groups. Indeed, 58% of the members at the beginning of the intervention were women and this number steadily increased to up to 66% by the end of the third year. These results suggest that the hard commitment device paired with peer pressure to comply embedded in the VSLA model are more useful for women. Finally, data from the VSLAs operations shows that group members tend to cover their financing needs through loans rather than withdrawing their savings. This pattern signals that members are willing to pay an extra cost, the interest for the loan, to render the VSLA sustainable as the group's funds must be lent out at all times.

We find that access to VSLAs does not have any significant effect on household income, expenditures, or wealth two years after their introduction. We do not detect significant changes in households' food security or their ability to smooth their consumption either. However, the treatment led to average improvements in housing quality, namely the quality of the floors and ceiling in the house. Without an income effect, we may interpret this result as consistent with the idea of savings groups helping females increase control over their money and facilitating the use of resources for investments connected to the health of household members. Households in treated villages also increased their levels of specialization in agricultural activities, at no expense of income or reliance on high value crops. Indeed, the treatment significantly reduced the probability of owning a non-agricultural business and led to a 17% decline in the number of harvested crops, the latter mostly

driven by a lower number of low value crops. The reduction in income diversification suggests that treated households perceive that their ability to manage risk is improved with access to the VSLA.

When focusing on individual labor market outcomes, we find no average effects of the treatment on the extensive or the intensive margins. However, there are important gendered effects on the distribution of the number of working hours across activities. Treated women substituted working hours devoted to household businesses with time allocated to work as dependents and less so to work in agricultural activities. The treatment also reduced female dedication to household chores, which was unmatched by an increase in the number of working hours and suggests an increase in leisure time or time dedicated to the VSLA's activities. Treated men do not record any statistically significant effects, but the results suggest a tendency to reduce dedication to agricultural activities vis-à-vis an increased time allocation to the household businesses and dependent work.

Lastly, we find gendered effects of access to VSLAs on the use of loans from the broader formal financial system. Two years after the intervention was launched, treated men decreased their likelihood to have a formal loan. This drop hides a substitution pattern: men reduce their likelihood to borrow from banks and credit unions (-6.4 pps) and increase their probability of borrowing from cooperatives and NGOs (3 pps). In turn, treated women significantly increased their likelihood to borrow from banks and credit unions for productive purposes by 4 pps (a 45% increase relative to the control). In sum, these results support a graduation story for women, though not for men. Among women, improvements in access to formal credit complement funding obtained from the savings groups. In turn, men in our setting (as well as in several other rural settings in the global South) have greater access to formal financial services at baseline. Therefore, the VSLA may play a minor role in expanding such access, but it leads them to reduce their reliance on banks and credit unions in favor of credit from cooperatives and NGOs. This switch is likely to come at higher interest rates, but with a reduced burden of collateral requirements.

Our study makes several contributions to the literature on rural development. Firstly, it adds to the growing body of literature examining the impacts of savings groups on rural poverty. Despite its increasing popularity in the rural developing world and among donors, there are only a few rigorous experimental studies that are able to address endogeneity and selection issues in program roll-out and treatment take-up to accurately measure the role of VSLAs on household well-being [Gash and Odell, 2013]. Our study shows that access to informal financial services generates relevant adjustments in productive activities, though not enough to lead to significant income or expenditure effects in the short run. The latter result is consistent with most of the previous studies [Karlan et al., 2017; Beaman et al., 2014; Baland et al., 2020] except for Ksoll et al. [2016], who report positive effects on household expenditures and meals consumed per day in northern Malawi. Even in the absence of income effects, the evidence shows that savings groups can help households manage risk, either through consumption smoothing or food security [Karlan et al., 2017; Beaman et al., 2014; Demont, 2022]. While we fail to report any effects on these dimensions, we find that treated households deepen their productive specialization, reducing crop diversification in favor

of high-value crops and reducing the likelihood of running a non-agricultural business, a result consistent with the findings reported by [Ksoll et al., 2016] in rural Malawi.

Second, our paper relates to the strand of the literature that links financial inclusion strategies and female empowerment. The evidence shows that convenient savings products affect the way households spend, increasing expenditures in nutrition and education [Baland et al., 2020; Prina, 2015]. Our study builds on this literature, reporting not only higher female VSLA take-up and retention, but also higher investments in housing infrastructure which are often connected to improved health. We also provide novel results on labor and credit outcomes by sex which are particularly relevant in rural settings, where large labor market participation and credit access gender gaps are found. Our study is the first to record a positive impact of VSLAs on female labor force participation as well as a female graduation effect in terms of access to formal financial services.

This paper leverages the introduction of the VSLA model in Peru and poses at least two key contributions relative to previous experimental studies. First, our study is unique in terms of its ability to complement survey-based data with administrative datasets that yield novel outcome variables as well as detailed information on the internal workings of VSLAs. On one hand, our study links individual respondents to credit bureau financial reports, which provides a novel measurement of the spillover effects of VSLAs in the financial market. On the other hand, we have access to VSLAs' rosters and individual transactional records from each group for up to 36 months, which allow us to provide a rich description of group performance and to investigate further into the mechanisms driving the impact of the intervention. Second, our paper studies the Latin American context, expanding the focus of previous studies beyond sub-Saharan Africa. Despite Latin America having higher average income levels than the rest of the developing world, limited use of digital technologies and the region's geographical accessibility continues to restrict access of the rural poor to quality financial services.

This paper is organized in five sections including this introduction. Section 2 explains the VSLA model implemented by COFIDE in Peru, which is the program we evaluate, and discuss its potential effects on the welfare of Peruvian rural households, drawing on insights from the previous related literature. Section 3 details the experimental design employed to establish causal effects, describes the data sources and indicators employed, and presents the estimation strategy. In turn, section 4 analyzes the administrative data to examine the uptake, retention, and utilization of savings and credit services by VSLAs, while section 5 discusses the primary outcomes related to living conditions, asset ownership, productive strategies, and consumption smoothing. Section 5 concludes with an exploration of gender-specific impacts, particularly in relation to labor choices and access to formal credit. Finally, section 6 summarizes and discusses the main results as well as some of their implications for the policy and research agenda.

2 VSLAs and its expected effects

2.1 The VSLA Model in Peru

Savings and credit associations are an increasingly popular way to provide financial services to the poor. These organizations are based on each member's commitment to save a pre-determined amount at regular intervals throughout a cycle, while allowing some of the members to borrow from the fund. An early savings group model was known as Rotating Savings and Credit Associations (ROSCAs). Under this methodology, members deposit a fixed amount weekly or monthly and progressively borrow the pooled funds following a predetermined random rule or specific expressions of need [Besley et al., 1993]. The ROSCA's commitment device helps members, mostly women, sustain their savings goals throughout the cycle against spending pressures (e.g., individual temptations and/or demands from relatives and friends). However, they do not provide a pecuniary return for the savings or charge an interest rate for the loans [Anderson and Baland, 2002].

More recently, development practitioners have promoted more structured versions of the ROSCAs that provide both savings and credit services: Village Savings and Loan Associations (VSLAs) or Self-help groups (SHGs). VSLAs or SHGs also tend to include an emergency fund that can be used to help members cope with idiosyncratic risks. This model, which serves more than 100 million members around the world, has become particularly popular in Asia and Africa [Greaney et al., 2016]. VSLA promoters describe their technology as a transparent, democratic and structured version of informal savings groups, that emphasizes forming groups with accountable governance, standard procedures and simple accounting that everyone can understand and trust.[2] Like ROSCAs, VSLAs serve mostly women and build on a mechanism of self-selection and social pressure to sustain savings commitments and foster loan repayment. However, VSLAs put greater emphasis on loans as the interests borrowers pay return to members by the end of the cycle via interests paid on savings [Karlan et al., 2017; Cassidy and Fafchamps, 2020].[3]

A typical VSLA is formed by 10 to 25 self-selected individuals from a village with limited access to formal financial services. They meet monthly to make their deposits and allocate loans to some of their own members, based on demand. Deposits represent purchases of shares of the group, while withdrawals imply selling shares. The management of the VSLA is usually in charge of a committee that includes a chairperson, a secretary, and a record-keeper. The committee is democratically elected every cycle (year). For each cycle, the committee determines the price of the shares, the minimum amount of shares each member needs to buy each month, the list of members that can receive loans and its amounts, and the use of the emergency fund, among others. The committee is also responsible for keeping the cash that is not lent out in a locked box, keeping records of all

[2] See https://www.vsla.net.

[3] Another popular microfinance methodology that is based in the formation of groups is the village banking methodology. A key difference is that they focus much more on credit services and thus include an external funding source that helps increase the size of the lending pot beyond the group's accumulated savings [Westley, 2004].

transactions, and calculating cash balances for each member.[4]

VSLAs have more flexible rules than ROSCAs. First, members can save more than the minimum, by buying more shares at any given month. The interest rate to be paid for the loans is set at the beginning of the cycle, but the duration of the loans and the number of payments vary across members. As borrowers pay interest for their loans, the fund generates profits that are distributed among members at the end of each year-long cycle according to their savings balance. Since the return on savings depends on the placement of loans, VSLAs are interested in matching members with high demand for savings with those that have high demand for credit [Cassidy and Fafchamps, 2020]. However, as the fund grows, it often becomes necessary for VSLAs to require all members to borrow money from the pooled fund to keep all savings lent out and sustain some level of return on savings. The shares purchased as well as profits accumulated by each member during the cycle can be reinvested into the next cycle. This tends to be an extended practice that contributes to the fund's rapid growth. On average, after 2-3 years, VSLAs around the world double their capitalization and also the average size of their loans. The average VSLA has 74% of their accumulated funds lent to 63% of their members.[5]

A Peruvian version of a VSLA are the Credit and Savings Unions (UNICAs, due to its name in Spanish), promoted by the national development bank, the Development Finance Corporation (COFIDE). COFIDE supports financial inclusion in rural areas of the country through the Inclusive Program for Rural Business Development (PRIDER). This program has been promoting the formation of UNICAs since 2005, and has worked in nine different regions of the country, sponsoring 1,384 savings groups with up to 18,600 members. Once a province is identified as a target area, PRIDER promoters select candidate villages to introduce the VSLA model, assessing the community's degree of interest and identifying potential members. An UNICA is set up when officers find at least ten people in the village interested in becoming members. UNICAs follow, for the most part, the basic VSLA methodology described above, but two key differences are noteworthy. First, UNICAs are required to lend out all funds at all times, since the group is not allowed to keep funds in a locked safe box or in a formal savings account. Second, members of the UNICAs are strongly encouraged to reinvest their profits unless they decide to exit the group. These two features indirectly induce members to rely on loans rather than savings whenever they need to fund productive or consumption needs.

To evaluate the impact of VSLAs on their members' well-being, this study seizes the expansion of PRIDER's UNICAs between 2014 and 2016 in four provinces of Ayacucho, one of the poorest departments in Peru. Access to credit services in the study area was typically promoted through

[4]The self-management of the group explains the alternative denomination of VSLAs as self-help groups. Typically, these groups do not spontaneously emerge, but are promoted by a sponsoring institution that trains members on basic financial concepts and the VSLA model and provides support via promoters in the field. A relevant question explored in the literature is whether VSLAs can be truly self-managed; that is, if they can afford paying for initial training and supervision and survive after promoters stop monitoring the group [Greaney et al., 2016].

[5]See https://www.vsla.net.

credit unions and microfinance banks, although village banks run by NGOs were also relevant. Credit bureau data shows that 28% of the study sample had a loan from microfinance banks and credit unions in the year prior to the exit survey and only 8% borrowed from an NGO.

2.2 Expected effects of VSLAs

Traditional banking institutions tend to be far from rural population, both geographically and culturally, and fail to offer adequate products for the rural poor [Chong and Valdivia, 2017]. Rural households often rely on informal saving mechanisms (e.g., keeping money or jewelry at home or buying livestock holdings), which are riskier and less suitable for longer-term savings commitments [Lee et al., 2012]. Savings groups offer rural households the possibility to replace these means to save with a safer, more structured and convenient methodology. The mandatory savings rule imposed by the VSLAs works as a peer-based commitment device that can help time-inconsistent individuals sustain their individual savings goals against temptations and pressures from other household members. Women's lack of agency and relatively lower bargaining power within the household in traditional societies make family pressures particularly salient for them [Ashraf et al., 2010; Anderson and Baland, 2002; Breza and Chandrasekhar, 2019; Cassidy and Fafchamps, 2020].

Additionally, saving groups unlock access to loans among rural households who tend to be excluded from formal financial markets. Even when formal lenders serve rural markets, their collateral requirements expose households to the risk of losing valuable assets in case of a negative income shock [Boucher et al., 2009]. UNICAs can relax credit constraints among risk-rationed households as they offer more flexible arrangements in case of a bad idiosyncratic shock.

Improved access to informal, yet affordable and flexible savings and credit services can have positive effects on household well-being, particularly among credit-constrained rural households. For instance, VSLA's financial services can fund profitable agricultural and non-agricultural investments, that can then lead to increased household income and consumption [Ksoll et al., 2016]. However, most recent studies looking at the effects of VSLAs show important effects on credit use and business investments, but no effects on household income or consumption [Beaman et al., 2014; Karlan et al., 2017; Baland et al., 2020]. These lack of impact on monetary poverty may respond to the timing of the measurement of outcomes (i.e., too early to reflect the results of business investments).

Previous studies report that VSLAs lead to key adjustments in rural households' productive structures, with heterogeneous effects depending on attitudes towards agricultural risk management (see Table A3). Karlan et al. [2017] report increased investments away from agriculture to help cope against aggregate shocks for which savings groups offer less effective protection. However, Ksoll et al. [2016] report specialization effects, with households concentrating investments in the most productive crops, suggesting that these households perceive that savings groups offer them greater

protection against agricultural risks. The technical agricultural guidance provided by PRIDER in the Peruvian case may lead households to specialize and shy away from other market activities, especially if the latter were performed by necessity, to complement family income. Improved access to financial services can also facilitate the accumulation of lump-sums that can foster investments in agricultural and/or non-agricultural activities.

Even in the absence of large, sustainable income effects, savings groups can have impacts on food security and consumption smoothing [Beaman et al., 2014], women's empowerment [Karlan et al., 2017], school enrollment [Baland et al., 2020], and housing quality [Ksoll et al., 2016; Burlando and Canidio, 2017]. Improved food security and consumption smoothing tend to be attributed to the role of savings and loans as a buffer, especially against idiosyncratic shocks. However, Beaman et al. [2014] suggest that improvements in food security may be in turn connected to an important increase in livestock holdings. This pattern is consistent with the fact that savings groups promote investments in assets that can help households cope with aggregate risks and fluctuations that rural economies are particularly vulnerable to.

Recent studies evaluating savings-promotion interventions find effects on investments in housing quality. Ksoll et al. [2016] report that savings groups increase the number of rooms, although they find no effect on the quality of floor, walls and roofs. Chong and Valdivia [2017] evaluate an edutainment intervention promoting savings among the rural poor in the Peruvian highlands. They find that treated households empowered women and increased their usage of savings accounts, allowing them to invest in building an extra room and allowing households to separate dormitories from the rest of the house. Ashraf et al. [2010] supports the result that savings innovations can empower women, leading to a shift towards female-oriented durable goods even in the absence of meaningful income effects. The use of savings or loans to fund household improvements may lead to significant benefits on mental and physical health of their members. Cattaneo et al. [2009], for instance, find that better floors or access to better sanitation and clean water increase life satisfaction and mental health in Mexico. They also show that improved roofs and walls provide protection against parasitic infestations and infections.

These investments in housing quality may respond to the VSLA model fostering women's empowerment through increased participation in household and business decisions and access to an expanded network. On one hand, the commitment device imposed by the VSLA helps females save by isolating resources from the pressures of other household members, specially their partners [Anderson and Baland, 2002; Ashraf, 2009; Schaner, 2015]. Even if the partner knows about the women's savings in the VSLA, they can argue that the rules impede early withdrawals before the end of the cycle. Several studies report that women may be willing to take costly actions to sustain those mechanisms that increase control of their resources [Riley, 2024; Schaner, 2015]. On the other hand, the monthly group meetings structured under the VSLA technology allow women to exchange experiences with similar peers. Those with limited bargaining power within their households can benefit from the example set by more empowered peers in the savings group. Baland

et al. [2020] explicitly highlight this mechanism to explain the positive effect of savings groups on the enrollment rates of children in secondary school.

Access to the VSLA methodology may also be an important stepping stone in terms of deeper financial inclusion levels. Self-management of the savings groups allows individuals to learn important financial concepts, which can help them overcome financial literacy and trust issues that restrict their demand for credit from external financial institutions.[6] VSLAs may thus foster borrowers' progression up the lending ladder, promoting graduation into access to credit from formal financial institutions.[7] For instance, CARE's VSLA model in Africa promotes linkage to formal financial institutions at the group level as a graduation step [Hendricks and Chidiac, 2011].

The effect of VSLAs on access to external credit usage will depend on the role of the treatment on rural households' demand for credit and the reaction function of other relevant actors in rural credit markets. On one hand, savings groups may discourage borrowing from financial institutions by relaxing non-price rationing demand-side constraints (e.g., reduced social distance between borrowers and lenders). Additionally, VSLAs lift collateral constraints that restrict credit demand from risk-rationed households that cannot afford the risk of losing valuable assets in case of a negative income shock [Boucher et al., 2009]. Access to VSLA also offers rural households a cheaper alternative to obtain funding, especially considering that loan interest payments are returned to the savings group as share outs.[8]

On the other hand, local external lenders may be willing to expand their supply based on the credit information that the savings groups generate on potential borrowers. As local financial institutions learn about borrowers who develop good credit histories through their loans with the UNICAs, they may relax the use of collateral to guarantee loans or offer better contracts. However, credit by the UNICAs is not regulated (i.e., the groups' operations are not reported to the Superintendency of Banking and Insurance (SBS) in Peru), which implies that credit histories developed within the group are not shared with a credit bureau. This limits the flow of credit histories in the financial market and the supply-side response to the presence of VSLAs.

[6] Once a VSLA was created, PRIDER trained the leaders on the management of the group's finances. But even members who are not trained may learn from their participation in the periodic meetings of the UNICA.

[7] This was indeed the initial expectation of several microfinance institutions working with poor populations: graduating their clients from lending on a joint-liability basis to lending on an individual basis, either within the institution or with another formal lender [Haldar and Stiglitz, 2016].

[8] Informal conversations with members of the UNICAs often referred to village banks that operate in the region. Members reported that the nominal interest rate paid for such loans was similar to the one charged by the UNICAs. But, under the UNICA, those interest payments returned through the share outs at the end of each cycle.

3 The Experimental design

3.1 Elegibility and randomization of villages

This study takes advantage of PRIDER's expansion of the UNICA's model in rural Ayacucho. In an effort to understand and disseminate the effects of its intervention, COFIDE agreed to implement a randomized selection of villages for the promotion of VSLAs. Power calculations suggested a sample size of 240 villages to reach standard statistical power, with a total of 120 of them to be served by PRIDER. To accommodate this requirement, the expansion plan had to be initially extended over two years in two provinces of Ayacucho: Huamanga and Huanta. GRADE used administrative data to pre-identify 260 eligible villages in 23 districts, located in the two target provinces. A village was eligible only if it was defined as rural, as per the 2007 Population and Housing Census, and recorded population size above 150. PRIDER team in Ayacucho visited several villages and recommended excluding 14 of them due to their extreme remoteness or the high risk of violence associated with local narcoterrorist groups in the area.

The 246 villages were defined as the sample for the study. The survey firm applied the baseline survey to the 122 villages selected to be part of the first round.[9] At the same time, randomization was performed by the research team, stratifying by roll-out round and district. More specifically, for each round, we first randomized the treatment at the village level a hundred times and measured the differences across control and treatment groups in terms of their pre-program characteristics.[10] We randomly chose one of the randomization trials among those that did not generate significant differences across groups.

The survey firm was able to apply the scheduled baseline surveys in the 122 villages in the first cohort. But, after visiting the intervention area, PRIDER recommended that 30 other treatment villages assigned to the first cohort were dropped due to access or exposure to violence. The research team agreed to exclude from the study sample the districts that included those villages, including those assigned to the control group (i.e., 60 villages). At the same time, they agreed to extend the fieldwork to three rounds and to include two extra provinces: Cangallo and Vilcashuaman. With this addition, 54 more villages were added and the implementation load corresponding to the second and third rounds was redistributed.

The final sample includes 240 villages: 62 villages in the first round, 54 in the second and 124 in the third. Figure A1 shows the map with the geographical distribution of treatment and control villages. Columns (1)-(3) in Table A1 show the distribution of villages by round at baseline.

[9] Villages were assigned to the first and second round according to their geographical location. Indeed, most of the villages assigned to the first round were located in the province of Huanta, while those assigned to the second round were located in the province of Huamanga.

[10] We measure village characteristics using census data. The variables we construct are: presence of a health center or a school, total population, percentage of households with adequate drainage service, percentage of households with electricity provided through a public network, and literacy rate.

3.2 Data and Measurement

This study uses three key sources of data to document the effects of savings groups on the economic and financial behavior of Peruvian rural households. Baseline and follow up survey data are complemented with transactional data from the VSLAs as well as credit bureau records that document access of our sample to credit from formal financial institutions.

Figure 1 chronologically organizes the intervention activities (in bold) as well as the data collection activities (in italics) by round. The baseline survey was applied in the treatment and control villages on a rolling basis before the introduction of the savings groups in each study cohort. The follow-up survey was conducted two years after the roll-out of each implementation round.

To implement the baseline survey, we randomly chose an average of 10 households per village. The actual number of surveys conducted in each village was proportional to the population size. The sampling procedure depended on the geographical extension and spatial distribution of dwellings in the village. Due to the lack of updated maps at the village level, we implemented an ad-hoc protocol to select households. Villages were each divided into four zones, which were in turn divided into blocks. Blocks were randomly chosen within each zone to build an ordered roadmap for the surveyors to follow. The surveyor began the process at a corner and picked houses following certain direction around the block. The first house willing to respond became the first observation in the village. Whenever there was no response, the surveyor skipped a number of houses to get to another potential respondent household. For each block, the starting corner, direction of movement, and initial number of households to be skipped were randomly chosen. Once a household was interviewed in a block, surveyors were instructed to go to the next block on their roadmap and start the same process. At the household level, the respondent was randomly chosen between the household head and their partner.

The baseline survey covers topics such as characteristics of the respondent; characteristics of the household; employment and time use; non-agricultural business activities; agricultural and livestock activities; savings and credit history; business attitudes; social networks; household vulnerability; and financial knowledge. The questionnaire also gathers basic information about other household members such as relationship with respondent, age, gender, and education level. A total of 2,369 households were surveyed during the three rounds of baseline survey, with 1,169 in the treatment group and 1,200 in the control group.

Two years after each baseline survey round was completed, we revisited the 240 villages in the experimental sample and retraced the sample of households originally surveyed. The follow up questionnaire was similar to the baseline instrument and targeted the same respondent who was initially interviewed.[11] While most modules collected data at the household level, the respondent

[11] Surveyors received a list including the full names of people surveyed at baseline, as well as those of their partner, and contact information (address, reference, telephone number of the person to be surveyed, and a person who could help to contact them). Upon reaching each village, surveyors contacted a key informant, either a local authority or

was asked to provide individual data on the labor participation outcomes of all adult household members. The final full sample in the follow up survey consisted of 1,827 households (see column (6) in Table A1), which implies a 23% attrition rate. However, the attrition rate was much higher in the villages of round 1 (34%). More importantly, Panel A in Table A2 shows that the treatment status affected the capacity to reach households at follow up. Indeed, we find that attrition was 18 percentage points lower in treatment villages of round 1. Conversations with surveyors and PRIDER field officers suggest that a key explanation for these attrition patterns may be connected to the fact that some of the localities left in round 1 were still too remote and unsafe (see the discussion in the previous sub-section). These conditions may have restricted the chances to conduct the follow up survey, particularly in the control group, as these villages did not have a link with PRIDER. In any event, we decided to restrict the analysis included in the main text to the sample of rounds 2 and 3, which had a much lower attrition rate (19%). Panel A in Table A2 shows that there is no differential attrition by treatment status in these rounds. As a robustness check, we present the analysis with the full sample in Appendix C.

Figure A2 in the Appendix provides basic descriptive statistics, as well as balancing tests of the randomization for the study sample, restricting to rounds 2 and 3.[12] Consistent with the random treatment assignment, we found few significant differences between the groups. Focusing on the control group, the average age of the respondent in the sample is 42. Only 17% of the control reported having at least completed secondary school, while 89% said that the language most used at home was Quechua. Over 90% of the households reported engaging in agricultural activities while 74% engage in livestock activities. Only 37% reported selling at least part of their production in the market in exchange for money. On average, households in the sample spent 25 hours per week working on the family farm. Household members in the control group allocate 7 and 41 weekly hours to paid and unpaid work, respectively. The baseline data also reveals interesting patterns in terms of households' attitudes and preferences towards saving: almost 65% of the experimental sample regrets spending money instead of saving it, while 48% of those surveyed want to save more than their spouse.

A second source of data are the transactional records of the savings groups' operations between October 2014 and October 2018 provided by PRIDER. These data provide information on all individuals that were members of a group during that period. We can observe their entry date, tenure at the UNICAs, and all their financial transactions, including savings deposits and loan history. The records show detailed information on the loans such as the size, maturity date, and interest rates. The administrative data also record the share-outs that each member obtained at the end of each cycle, which correspond to the interest payments on savings. We rely on the full

someone from the community, to obtain detailed information about the location of the households to be surveyed. The protocol called for up to three attempts to interview the same individual who participated in the baseline. If such respondent was not reached, they proceeded to interview the partner/spouse. The household was removed from the sample if neither the original respondent or his/her spouse were reached.

[12] Figure A2 also reports the balancing test for the full sample, including all three survey rounds.

sample of UNICAs' members to describe the patterns of retention and financial transactions. For the take up analysis, we match PRIDER administrative records with survey data from treated villages at baseline.

A third source of data are credit bureau administrative records with monthly frequency. We relied on national identification numbers and names collected in the baseline and endline surveys to search both household heads and their partners, irrespective of the identity of the survey respondent. Panel B in Table A2 shows that we were able to search for 83% of the households surveyed at baseline, although only in 80% of the those cases we were able to search for both members of the couple.[13] Credit bureau data include monthly individual-level information on outstanding debt at both traditional banking institutions (i.e., banks; municipal and rural credit unions; and financial institutions targeting micro and small businesses) and most of the NGOs and cooperatives offering microloans and microsavings intermediation. The latter are not supervised by the national banking regulator as they are not allowed to capture deposits. They also tend to relax the minimum requirements to get a loan relative to banks and other financial institutions (e.g., no collateral requirement) at the cost of higher interest rates [Campion et al., 2010].

For each loan, credit bureau records report pending type of loan, source, status, and outstanding balance. Loans with banks and credit unions come from the public credit bureau run by the Superintendency of Banks (SBS). These records are observed between August 2012 and April 2020 and cover banks and other supervised financial institutions. Data from cooperatives and NGOs were obtained from two private credit bureaus, EQUIFAX and SENTINEL. Data coming from SENTINEL covers the periods August 2014 through August 2019; data from EQUIFAX, the months between March 2015 and March 2020. In general, access to credit is limited in our sample (see Figure A2): only 30% of the households from the control group record having a loan in the formal financial system in the previous 12 months. Most formal lending came from banks and credit unions, with only 8% of the control group holding outstanding debt with a microfinance lender such as NGOs or cooperatives. Within the category of banks and credit unions, 61% of the credit supply in the control group comes from lenders who specifically target rural populations: two rural credit unions (39.6%) and MiBanco (21.3%), which specializes in providing funding to micro and small enterprises. Traditional commercial banks are virtually absent as credit providers in our sample.

3.3 Outcome Variables

The treatment impacts on living conditions and consumption smoothing are measured at the household level to assess the welfare of the family unit. Similarly, we look at the household's outcomes in terms of the net effects on productive activities. However, we understand that access to the VSLA, via one or more household members, may have gendered effects within the household, particularly on labor and time allocation choices. Men and women have differential starting conditions in terms

[13] Panel B in Table A2 shows that such attrition is not correlated with treatment status.

of access to financial services, bargaining power within the household, and the burden of domestic work, among others. Therefore, the provision of savings and credit services through the VSLA can have differential impacts by sex. In particular, since women are relatively more prone to join the VSLA, we expect the treatment to have more salient effects on their time allocation to both paid and unpaid work. Moreover, depending on the size of female-led and male-led projects, access to informal lending and savings may trigger differential responses in terms of access to and usage of credit from external formal lenders.

The VSLA model directly fosters access to financial services which could then trigger effects on household income or consumption as well as on household and productive investments (see Subsection 2.2). We rely on survey data collected two years after initial exposure to the intervention to measure poverty and living conditions, consumption smoothing, coping strategies, and investment in agricultural and non-agricultural activities.

First, we rely on four main outcomes to measure poverty and food security: monthly expenditures (total and disaggregated by food, health, and other categories), gross monthly income, wealth, and the probability that the household experienced hunger in the past 12 months. The endline survey measures food expenditures in the week prior to the survey, health expenditures on a yearly basis, and other expenditures (e.g., utilities, home repair, education, and clothing expenditures) either on a monthly or yearly basis. Expenditures and income were recorded in soles and converted to 2014 US dollars. We then apply the inverse hyperbolic sine transformation to monetary outcomes to deal with the skewness present in their distribution. Wealth levels are measured using an asset index based on data on the ownership of assets such as telephone, internet, cell phone, cable TV, radio, blender, bicycle, stereo, computer, television, and sewing machine. The index is standardized to the control group. To measure improvements in housing conditions, we construct two variables: a housing quality index and the number of rooms in the dwelling. The former is constructed using survey data regarding the materials used in the walls, floor, and roof of the dwelling.

Second, we construct two main outcomes to look at households' ability to smooth their consumption and cope with shocks: the probability of facing liquidity problems and the likelihood to rely on diverse coping strategies. In the first case, we measure the share of months in which the household faces liquidity constraints relative to three time frames: (i) the entire year, (ii) the harvest season (May-July), and (iii) the planting season (September-December). To measure any changes in households' coping strategies due to affiliation to a VSLA, we capture households' responses to a negative shock such as a family loss, job loss, health shocks, among others. Conditional on experiencing a negative shock in the past 12 months, we focus on a set of dichotomic variables capturing the likelihood to work longer, temporarily migrate, use savings, borrow, and sell valuable assets (including livestock).

Third, we measure the effect of access to the VSLA technology on household's investment and diversification in terms of productive activities, focusing on both non-agricultural and agricultural

activities. We look at the probability of running a non-agricultural business as well as the number of such businesses. Moreover, we try to capture changes in agricultural and livestock activities, which are the main source of support for households in the area. We focus on the number of harvested crops, distinguishing by their commercial value. Crops are classified as low, medium or high value based on prices and performance (kg/ha), according to the Agricultural Annual Compendium [MIDAGRI et al., 2018]. We also look at the number of hectares used for production (winsorized at the 95%) and the number of animals owned.

Fourth, survey records at the individual level for all adult household members are used to construct labor market outcomes. We are particularly interested in the gendered impacts of the intervention on time allocation to productive activities and household chores. We construct a dichotomic variable to measure the effect of access to VSLAs on the probability of providing labor supply in the seven days prior to the survey. We further disaggregate this probability by activity: agricultural and livestock, household business, and working as dependent. We also create a dummy to capture participation in domestic work. Furthermore, we measure the weekly number of hours working in productive activities as well as domestic work.

Access to credit from other lenders is measured relying on credit bureau records collected after two years of exposure to the intervention. We focus both on the extensive and intensive margins of impact as well as on repayment outcomes. Recall that we look at the household head's and their partner's credit history to measure the gendered impacts of access to VSLAs in terms of credit usage from other lenders. First, we measure the probability of having a loan in the previous 12 months. We also look at this probability by type of lender (banks and credit unions vs. cooperatives and NGOs) and loan type (consumption vs productive).[14] Second, we measure total debt balances at the time of observation (i.e., two years after the launch of the intervention), conditional on having outstanding loans at that point in time. Debt balances are also measured by lender category and loan type. We winsorized debt levels at the 99%, converted all amounts to 2014 US dollars, and transformed these outcomes using the inverse hyperbolic sine transformation. Finally, households' ability to repay is proxied by the probability that either the household head or their partner had at least one loan in arrears at some point in time during the previous 12 months. We also look at the probability of having arrears by type of lender.

The survey also offers information to construct intermediate outcomes such as the size and nature of the respondent's key information network and financial literacy. More specifically, access to networks is proxied by the total number of people (censored at four) that are consulted by the respondent whenever she needs to get information to make important decisions. We further break down the size of the network by type of relationship (family, non-family) and place of residence (same village, other village) of the informants. In turn, financial literacy is proxied using an index

[14]The decomposition by type of loan does not apply to loans granted by NGOs and cooperatives as this is not reported in the credit bureau records. This does not pose a major issue as most loans held by households in our sample come from banks and credit unions.

that captures survey respondent's answers to questions on compound interest, real interest rates, and risk diversification.

3.4 Estimation Strategy

To measure the effect of VSLAs, we estimate the intention to treat (ITT) from an OLS regression:

$$Y_{ijkl} = \alpha + \beta T_j + \gamma X_{ij} + \delta_{kl} + \varepsilon_{ijkl} \tag{1}$$

where Y_{ijkl} is the outcome variable for household i located in village j, district k, targeted in round l. T_j is a dummy variable that equals one when the household belongs to a village selected to be supported by PRIDER to introduce the savings group methodology. X_{ij} is a matrix that contains individual and village-level characteristics, including the value of the outcome variable at baseline.[15] Implementation of an analysis of covariance (ANCOVA) to estimate the treatment effects leads to large improvements in power compared to a difference-in-difference specification [McKenzie, 2012]. Considering the stratified randomization process, the model also includes fixed effects at the round-district level, δ_{kl}. ε_{ijkl} denotes the error term, which we assume is independent between villages, but not within a village and thus we implement the Huber-White correction at the village level.[16]

Following Clarke et al. [2020], Romano–Wolf multiple-hypothesis correction step-down adjusted p-values robust to multiple hypothesis testing are computed for each family of outcomes to deal with the potential issue of simultaneous inference. The Romano-Wolf correction (asymptotically) controls the familywise error rate (FWER), that is, the probability of rejecting at least one true null hypothesis in a family of hypotheses under test.

The main estimation sample we use to evaluate the effectiveness of the program consists of all households from the second and third roll-out rounds with records in the follow-up survey. Even when looking at credit outcomes that come from administrative records and do not face non-response issues, we still focus on households surveyed during the follow-up survey for consistency.[17]

[15] We also include as a control a dummy equal to one to indicate that the informant at follow up is different from the one at baseline. Online Appendix 6 presents the results when no controls are included in the regression model. In general, the results do not exhibit substantive differences.

[16] Treatment on the treated (TOT) are not informative in this setting since VSLAs could have had spillover effects in non-treated villages.

[17] Table A5 in the Appendix presents the results for credit outcomes estimated for the survey baseline sample.

4 Engagement with VSLAs: Take-up, Retention, Savings, and Borrowing Patterns

In this section, we combine administrative and survey data to report the way households and individuals in treated villages took up and used the financial services offered by the UNICAs promoted by COFIDE. If households and individuals place significant value on the informal financial services provided by these associations, this should be reflected in their likelihood to join and stay in a group and their persistence in savings.

By January 2017, 171 savings groups were formed in the 120 treatment villages of the three rounds of the intervention, with a total of 2,176 members. That is, 1.4 savings groups were created in each treatment village with an average size of 12.7 members. The average UNICA started with 11 members who committed to save 10 soles per month (about USD 4 at the time) by purchasing shares of the association. Typically, an UNICA would accumulate shares for 3 or 4 months before starting lending operations. Figure 2 shows that take-up rates in the baseline survey sample experienced a steep boost during the first months after the introduction of the program and a posterior flattening of the growth pattern. Average take-up rates in the treatment group reach 23.5% when we consider participation of any member of the households interviewed at baseline. This take-up rate is similar to that achieved in related studies of savings groups in Africa [Beaman et al., 2014; Karlan et al., 2017], where a 32-37% probability of affiliation has been recorded. Ksoll et al. [2016] report a 45% take-up rate in treatment areas of Northern Malawi, but control areas reached a 21% take-up rate.

Table 1 tries to assess if observable characteristics are good predictors of take-up rates.[18] Column 1 focuses on participation measured at the household level, while column 3 repeats the analysis for the sample of individuals interviewed within each household. Recall that the respondent was chosen among the head of the household and their partner so as to have gender parity in terms of the individual sample.

Focusing on the sample of households in treated villages, column 1 in Table 1 shows the results of a simple logit model that estimates the probability of joining a savings group as a function of household head characteristics (age, gender, marital status, and education), household-level variables (language spoken at home, number of children, ratio of household members to bedrooms, wealth index, previous participation in village banks and access to formal credit), and respondent characteristics (level of entrepreneurship, level of financial knowledge, savings attitudes, patience, and trust in others) as measured at baseline. The results show that having a female household head is the only relevant characteristic for predicting adoption of the savings group methodology. Take-up rates are almost 10 percentage points higher when the household head is a woman, which represents a 42% increase relative to average household take-up rates. Column 2 repeats this

[18] We measure take-up of PRIDER-sponsored VSLAs at the household level, relying on the match of the baseline survey and administrative records on the groups' operations.

analysis, but dropping respondent characteristics, since their identity does not necessarily coincide with that of the household head. The results remain almost unchanged, which only highlights the minor role of other explanatory variables beyond household head's gender. Column 3 focuses on the determinants of the individual take up rates among the sample of survey respondents from the treatment group. In this case, the logit model takes as determinants respondent characteristics (in panels A and C) and household-level variables as measured at baseline. Once more, female respondents are 8 percentage points more likely to join a VSLA, which implies a 61% increase relative to the average respondent. Moreover, respondents with higher formal education and more children in the household are significantly more likely to join a savings group.

Women were not only more likely to join the VSLA, but also more likely to stay in a group. Relying on UNICAs administrative records, we find that VSLAs started with 58% of their members being women, and this number steadily increases to 66% by the end of the third year. Indeed, when we follow members over time and identify their entry and exit patterns, we find that female founding members are slightly more likely than men to stay in the groups they joined (see panel A in Table 2). By the end of the first year, the gap in retention rates among male and female founding members amounts to 3 percentage points, but it gradually expands to 15 percentage points by the end of the third year (see columns (2) and (3)). Column (4) in panel B shows that, during the first three years of operation, the VSLAs do not face difficulties to replace any of the members that leave the group. On average, the ratio of new participants over the number of dropouts is always above 1. In the first year, this ratio is as high as 2.61. Interestingly, the ratio of entries to exits is also much larger among female than male members (see columns (5) and (6)).

The difference in retention patterns by gender can be seen graphically if we look at the Kaplan-Meier estimate of the survival function. Figure 3 presents the survival functions of female and male founding members, showing an increasing gender gap in terms of the probability to exit the savings group. Since less exits are recorded among women, the corresponding gender gap in rotation rates is driven by a higher volume of female clients' entries.

These take up and retention results reinforce the intuition that women are much more interested in the services provided by the UNICA. This is consistent with the idea that they have different savings and consumption goals relative to their spouses [Anderson and Baland, 2002] and maybe lower bargaining power to sustain their savings goals under the pressure to share with the male partner and other family members or friends [Schaner, 2015; Browning, 2000; Ashraf et al., 2010]. In that context, the hard commitment device paired with peer pressure to comply are especially welcomed by women as it likely helps them escape pressures to spend by relatives and friends with different intertemporal preferences. Even if the size of each member's accumulated funds is known to their relatives and closest friends, members can argue that their money in the VSLA cannot be easily withdrawn, first because the rule is that withdrawals are allowed only at the end of the yearly cycle, but in practice, because all VSLA funds are always lent out to some of the other members.

Even though membership is free, there is an implicit cost that members pay to belong to an UNICA. As shown in panel A in Table 3, the estimated monthly return for the money saved at the UNICA (2.56%, on average) is extremely high in comparison to any other savings option available locally. Nevertheless, there is a positive interest rate spread that amounts to 0.8%. The average positive net cost of the funds reinforces our claim that members of the VSLAs value this technology and are willing to "pay" to sustain access to a mechanism that improves their control over their own resources [Riley, 2024; Schaner, 2015].

Column 1 in Panel C in Table 3 shows that the average member accumulates economically important savings balances in the UNICA. By the end of the first year, the average member has saved US$ 93, amount that is more than doubled (US$ 197) by the end of the second year. The average savings balance at the end of the third year is about US$ 300, roughly equivalent to the monthly minimum wage in Peru. This is a significant cash amount considering that the study sample includes several ultra-poor farmers. Looking at the differences by sex, we note that both men and women start off with similar balances in the first year, but this gap widens in favor of men over time. These differences are not driven by tenure differences, as those favor women (see panel B in Table 3).

Column 1 in Panel D in Table 3 shows that the average loan size grows exponentially between the first and the third year, going from US$ 159 to US$ 441. Note that VSLA members can get multiple loans over a one-year cycle. During the first year, the average member gets 1.43 loans. For instance, a simple calculation based on the average loan size and the average number of loans reveals that total average debt during the first year is US$ 228. These balances translate into a debt to savings ratio of 2.45 by the end of the first year, which stays relatively constant over time. By the end of the third year, average total debt during a cycle is US$ 665, 2.2 times the corresponding savings balance. The gender gap in terms of loans' balances is always present in favor of men, but is inverted in the case of number of loans. These differences by sex net off and yield very similar annual debt levels for both men and women (in the first year, US$ 242 vs. US$ 218 and in the third year, US$ 686 vs. US$ 652 for men and women, respectively).

On average, UNICAs start out with US$98.7 of total capital. Panel (a) in Figure 4 shows that, within three years, total funds of the average UNICA reach USD 4,150, which represents an average monthly growth rate of 11%. This growth puts pressure on the UNICA members to obtain loans, since the group is only sustainable if all capital is lent out at all times. We show below that members are willing to comply with this requirement, but only because it is compatible with their own financial goals.

First, notice that almost 60% of the members have an outstanding loan a year after the creation of the UNICA. This number grows to 80% by the end of the third year, but only 50% of the borrowers get loans that exceed their own accumulated savings (see panel (b) in Figure 4).

Second, we observe that VSLA members avoid withdrawals (sales of shares) and prefer to take a loan to satisfy their cash needs, paying the corresponding interest rate. Panel (a) in Figure 5 shows

the trends of individual purchases and sales of stocks (i.e., savings deposits and withdrawals) as well dividends pay outs. In most periods, average monthly stock purchases amount to US$10. This pattern holds over the three-year period following the creation of the group, with a few peaks in savings deposits at the end of each yearly cycle (i.e., at 12, 24, and 36 months since the creation of the VSLA). Panel (a) also shows that the average member almost never sells his/her stock. Withdrawals (i.e., sales of shares) stay mostly flat at zero throughout the 36 months following the creation of the group. This pattern is even more marked among women. But even if men are slightly more likely to withdraw their savings at the end of a cycle, the sales of their stock are almost exclusively linked to drop out (see panel (b)). Among female members, average monthly sales of stock are much lower and tend to be driven both by continuing and exiting members.

Third, the timing of savings deposits coincides with the periods in which savings groups distribute the dividends that result from the interest charged for the loans. Indeed, panel (a) also shows that savings deposits closely track the evolution of dividend payments. That is, even when given the opportunity to partially withdraw funds, the average member *voluntarily* saves more than the mandatory requirement by reinvesting a significant portion of the dividends shared out every 12 months. After one year, the excess amount of shares purchased above US$10 amounts to the dividends shared out at the end of the cycle. And in the second year, reinvestments above US$10 amount to 80% of the dividends shared out.

All in all, the results in this section show that individuals value the services provided by the UNICAs model, especially women, as they are more likely to join and stay in. Furthermore, they are willing to assume some monetary costs, the interest rate paid fro the loans, to sustain the financial services offered by the savings group, as they are willing to comply with the requirement to take loans to keep the savings capital lent out at all times. However, it is important to note that sustaining the VSLA allows members to obtain a return that is very competitive in rural markets.

5 Results

5.1 Treatment Impacts on Household Living Conditions and Consumption Smoothing

Previous evidence on the effectiveness of the VSLA model to lift households out of poverty has focused on Africa. As discussed in section 2.2, most of the studies have shown important effects on food security or risk coping and investments in housing quality and non-agricultural economic activities. However, the evidence does not find an income effect large enough to take treated households out of poverty [Beaman et al., 2014; Karlan et al., 2017; Baland et al., 2020]. The only exception is Ksoll et al. [2016], who identify significant expenditure effects in northern Malawi.

In the Peruvian setting, we find no significant treatment effects on monetary poverty or food

security. Table 4 presents the estimated ITT effects on monthly expenditures, gross household monthly income, wealth, and the household's probability of experiencing hunger in the past 12 months. The lack of impact on monetary poverty is in line with previous findings in Mali, Ghana, Malawi, and Uganda [Beaman et al., 2014; Karlan et al., 2017]. Table 4 also presents the estimated treatment effects on housing investments. Relative to the control group, treated households improve the quality of their dwelling by 0.17 S.D. The treatment does not have an impact on the number of rooms in the dwelling.

The results on housing quality suggest that savings groups may facilitate the accumulation of lump sums of money required to make investments in indivisible projects such as those related to housing upgrades [Kaboski and Townsend, 2011]. They may also reflect gendered preferences for household well-being given that women are disproportionately likely to join VSLAs, pattern that is confirmed in the Peruvian case (see Subsection 4). There is considerable evidence showing that women have stronger preferences for child welfare and the provision of public goods [Miller, 2008; Miller and Mobarak, 2013]. Since housing quality is linked to significant health benefits as discussed in Section 2.2, the effect identified in Table 4 may be driven by the greater weight that women place on the potential benefits of investing in better dwelling materials.

Table 5 shows that VSLAs did not affect the likelihood of treated households to face liquidity constraints and the coping strategies they tend to use. As discussed in 2.2, VSLAs may foster improved food security and consumption smoothing either through access to financial services that serve as a buffer or increases in livestock holdings or earnings. Consistent with our previous findings for income and expenditures, we find that access to savings groups in Peru did not have a significant impact on households' ability to smooth their consumption. Panel A in Table 5 shows that the treatment did not affect households' probability of facing liquidity constraints throughout the year. Even when focusing on the planting season, when income flows are very limited, access to the VSLAs did not help alleviate liquidity constraints. Panel B confirms these results by showing that VSLAs barely affected households' coping strategies in the presence of negative shocks. Even though we would expect that access to savings and credit would reduce reliance on other coping strategies, we find null impacts of the treatment on households' probabilities of working longer, relying on temporary migration, using savings, or borrowing. The treatment slightly reduced the probability of selling an asset to deal with a shock, yet this effect does not survive multiple hypothesis testing.

5.2 Treatment Impacts on Households' Productive Activities

Lack of an impact on income or expenditures may hide effects on the allocation of time to different productive activities, especially if the latter take time to mature and yield higher income flows. Table 6 presents the treatment impacts on the likelihood to perform a non-agricultural activity and the way households use land for agricultural activities. Panel A shows the effect on both on the extensive and the intensive margins of running a non-agricultural business, and shows that the

treatment significantly reduces the probability of owning a non-agricultural business, as well as the number of non-agricultural businesses. Compared to a baseline of 5.8% in the control group, the share of households that had a non-agricultural business dropped by 3.6 percentage points among treated households. Panel B shows that providing access to VSLAs yielded a significant 17% reduction in the number of harvested crops without a reduction in the area under production. This effect was mostly driven by a drop in the number of low value crops, which signals that households are shifting investment towards more profitable crops. On average, treated households also reduce the number of livestock and small animals by 17%.

All in all, the results in Table 6 suggest that treated households are specializing in agricultural activities, at no expense of income (see Table 4) or reliance on high value crops. These results are consistent with the idea that access to the VSLA reduced households' needs to mitigate risk through crop diversification. The safety net that the group provides allows households to better manage risk.

It is plausible that the social capital and networks developed within the group and across savings groups in the village foster greater job stability and increased job opportunities, both in the agricultural and non-agricultural sectors. Interactions with the group may also have the added advantage of access to information about market opportunities, prices, and technology, among others. Additionally, participating in a VSLA could foster the development of financial literacy skills either through direct training when the group is set up or by participating in the group meetings where savings and loan operations are conducted. Table A4 in the Appendix shows that the treatment did not expand households' information networks. Access to the VSLA technology had no effect on the number of people the household relies on to get information or to consult on important decisions. Similarly, the treatment did not have an impact on financial literacy.

5.3 Gendered Treatment Impacts

The specialization results presented in Table 6 may reflect intra-household changes in allocation choices to productive activities. In particular, access to the VSLA via one or more members of the household may lead to differential effects on labor supply choices by sex. Table 7 uses data on labor participation outcomes for all household members to look at the impact of the intervention on intra-household allocation of labor to competing productive activities. On average, the results in column (2) show null effects on the probability of working and the probability of performing household chores in the past seven days. Similarly, the number of weekly hours allocated to work or domestic chores remained unchanged.

If we focus on the effects on labor outcomes by sex (see columns (4) and (6)), a few interesting patterns emerge. On one hand, the treatment did not affect the likelihood of neither women or men to engage in labor market activities or domestic work. However, access to the VSLAs led to

a gendered reallocation of time, which was particularly pronounced for women. Female members of treated households significantly reduced the time allocated to the household business (typically an unpaid activity) vis-a-vis an increase in their dedication to work as dependents (and less so to agricultural activities). Access to the VSLAs is also linked to a 11.5% reduction in the number of weekly hours women devote to domestic work relative to the control group. This drop in women's dedication to household chores was unmatched by an increase in the number of working hours and suggests an increase in leisure time or time dedicated to the VSLA's activities. Treated men do not record any statistically significant effects, but the results suggest a tendency to substitute hours allocated to agricultural activities with increased participation in the household business and dependent work.

In general, access to financial services through the savings groups reduced the burden of domestic and unpaid work that fell on women. This reduction seems to be compensated by increased participation in other paid productive activities, particularly dependent work. The exit of women from unpaid work in household businesses is aligned with the drop in the probability of having a non-agricultural business recorded in Table 6.

As discussed in Section 2.2, access to the VSLA technology can either become an important stepping stone into greater financial inclusion or it may displace demand for formal credit. Relying on access to credit bureau records, we analyze potential substitution and complementarity effects in terms of access to credit from external financial institutions. Since women tend to accumulate lower levels of capital in agricultural economies and have higher levels of risk aversion [Reuben et al., 2017; Kebede, 2022], looking at the impact of the treatment on credit outcomes by sex becomes particularly relevant in our setting.

Columns 2 and 4 in Panel A in Table 8 show that, on average, the treatment had gendered effects both on access to and usage of loans from the rest of the financial system. On one hand, access to VSLAs decreased men's likelihood to take up loans outside the UNICA. This reduction is the product of a 6.4-percentage-point drop of the probability of having a formal loan with a bank or a credit union and a 3-percentage-point increase of the likelihood to hold a loan with a cooperatives or an NGO. On the other hand, the treatment slightly increased women's likelihood to have an external loan. This effect is driven by a significant 4-percentage-point increase in the probability to have a productive loan with a bank or a credit union. This an economically important effect given that only 9% of women in the control group had access to such loans (compared to 29% among men in the control group).

The results in Panel B show that the treatment also had gendered effects on the indebtedness levels kept with external lenders. Conditional on having outstanding loans in the past 12 months, treated men did not record changes in the size of their borrowing portfolios, while treated women significantly reduced their outstanding debt. In general, both men and women experienced a recomposition of their portfolios, deepening their borrowing levels with NGOs and cooperatives

and foregoing funding from banks and credit unions. However, women reduced considerably more their reliance on consumption credit from traditional lenders, while men expanded relatively more their outstanding debt levels with cooperatives and NGOs.

Panel C shows that access to the VSLA methodology did not have significant impacts on repayment outcomes. The probability of having a loan in arrears in the past 12 months was left unaffected by the treatment for both men and women. This result holds across types of lenders.

All in all, the results in Table 8 fail to tell a story about graduation into credit from formal financial institutions among men. Treated men became less likely to borrow from banks and credit unions and more likely to get complementary funding from non-traditional financial institutions. Conditional on access, the treatment also led to a recomposition of men's borrowing portfolios, substituting debt from traditional formal lenders with debt from cooperatives and NGOs. This substitution effect on the extensive and intensive margins (i.e., access and usage) suggests that, when given a chance, men prefer funding from institutions that rely on community-based models, do not require collateral, offer simple terms, and are geographically closer to their clients. On the contrary, women exhibit mixed results, partially supporting graduation as their likelihood to access productive formal loans from banks and credit unions increased. However, conditional on access, women's indebtedness levels with traditional lenders contracted, mainly due to a drop in debt related to consumption loans.

Since we only observe the equilibrium outcomes, we cannot disentangle between demand- or supply-driven effects. Lenders operating in the area may benefit from the information on repayment generated by the VSLA. However, these records are not formally shared with credit bureaus or other lenders, so we do not foresee banks and credit unions responding to the intervention by opening more branches or changing their credit risk assessment process. Repayment performance in the VSLA may be more accessible to local NGOs and cooperatives, which could actively recruit good clients who were previously unbanked. However, the results in Table 8 could also reflect that the intervention effectively tackled demand-side credit constraints related to risk aversion and collateral requirements, at least among men: when given the chance, treated men substituted the usage of funds from formal sources that tend to request collateral with the usage of funds from VSLAs and microfinance institutions with laxer collateral requirements such as NGOs and cooperatives.

6 Conclusions

Reaching the rural poor with appropriate savings and credit services has been a persistent challenge for formal financial institutions globally. Savings products offered by these institutions often yield very low, or even negative, effective returns. As a result, many rural residents turn to, and often prefer, informal financial mechanisms to meet their needs. These mechanisms include crop diversi-

fication, borrowing from informal lenders, friends, or neighbors, and saving cash at home. Access to formal credit is equally limited in remote rural areas. While formal lenders typically offer lower interest rates than informal options, their collateral requirements tend to deter risk-averse farmers. Microfinance institutions, although more flexible with collateral, offset their high operational and screening costs by charging higher interest rates.

This study sheds light on the role of VSLAs in enhancing financial inclusion and driving socioeconomic outcomes in rural Peru. While the immediate effects of the intervention on household income and expenditures are limited, our findings highlight the nuanced and gendered impacts that access to informal financial services can have on individual behavior, particularly in the domains of productive activities and access to formal credit. The treatment has led to improvements in housing quality and prompted significant adjustments in labor market participation, especially among women, who shifted time from household chores and business activities to more dependent work and likely increased their leisure or VSLA-related time. These shifts underscore the potential of VSLAs to empower women economically and improve their financial decision-making power within the household.

Moreover, the VSLA model, by fostering local savings and borrowing activities without relying on external capital, provided a mechanism for women in particular to graduate towards more formal financial institutions. This pattern was not mirrored among men, who instead reduced their reliance on formal banks in favor of more flexible but costlier credit from cooperatives and NGOs. Such differential impacts underline the importance of considering gender when designing and evaluating financial inclusion interventions, as the baseline access to financial services can greatly influence the outcome of these programs.

Our results also contribute to broader debates within the literature on financial inclusion and rural development. Consistent with previous studies, we find that while informal savings groups can support risk management and productive specialization, the effects on income and expenditure are not always immediate. Furthermore, the use of detailed administrative records on the savings groups' financial activities allowed us to capture a richer understanding of the internal dynamics of VSLAs. The integration of survey data with credit bureau records allowed us to study VSLA's external spillover effects on formal credit markets. This dual contribution enhances the robustness of our findings and paves the way for future research on informal financial institutions in rural areas where geographical barriers and gender disparities continue to hinder financial inclusion.

In conclusion, our study provides a comprehensive assessment of the impact of VSLAs on rural households, offering valuable insights into the potential of informal financial institutions to promote economic empowerment, particularly for women. As financial inclusion efforts continue to evolve, understanding the heterogeneous effects of these programs will be critical for designing more targeted and effective interventions in the rural developing world.

Our results also raise some key policy questions that go beyond the realm of this study. First,

are savings group interventions sustainable over time? The fact that their emergence was not spontaneous, despite the fact that they did not require external funding to be created, may be connected to the low bargaining power of females, the main beneficiaries, within their households and their villages. However, once females see their potential benefits, they may be interested to sustain the savings groups even without further support or guidance. The success to sustain the VSLA may depend on several factors such as the cohesion between group members; the group's ability to deal with rotation rates and work with ultra poor members [Burlando and Canidio, 2017]; the capacity of the group to accumulate capital [Le Polain et al., 2018] and mobilize funds; and the continued support of the sponsoring institution that promotes the group and endows its members with basic skills to self-manage them [Greaney et al., 2016].[19]

The second key policy issue relates to the implications of our findings for financial inclusion strategies in rural areas of developing countries [Diaz-Martin et al., 2020]. Our novel contribution on the aggregate spillover effects of VSLAs on access to funding from other financial institutions highlights the need to rethink financial inclusion strategies in rural settings. The provision of formal financial services in a high-risk environment may require new delivery models that do not rely on collateral requirements and that can potentially build on the methodologies offered by local microfinance lenders and savings groups.

[19]For instance, Beaman et al. [2014] shows that the positive effects of a savings group program on savings, housing quality, and food security in Mali only materialized when recruitment activities were organized and directly structured by an NGO, while the implementation of the model with soft support from the NGO did not yield much benefit. Moreover, even if information asymmetries are reduced, the group's rules to allocate credit are not usually guided by expected repayment, but rather reflect risk diversification and subjective criteria. Cassidy and Fafchamps [2020] focus instead on the tendency of the associations to have relatively low heterogeneity in terms of the productive activities of their members, which limits the possibility of intermediation between agricultural and non-agricultural households.

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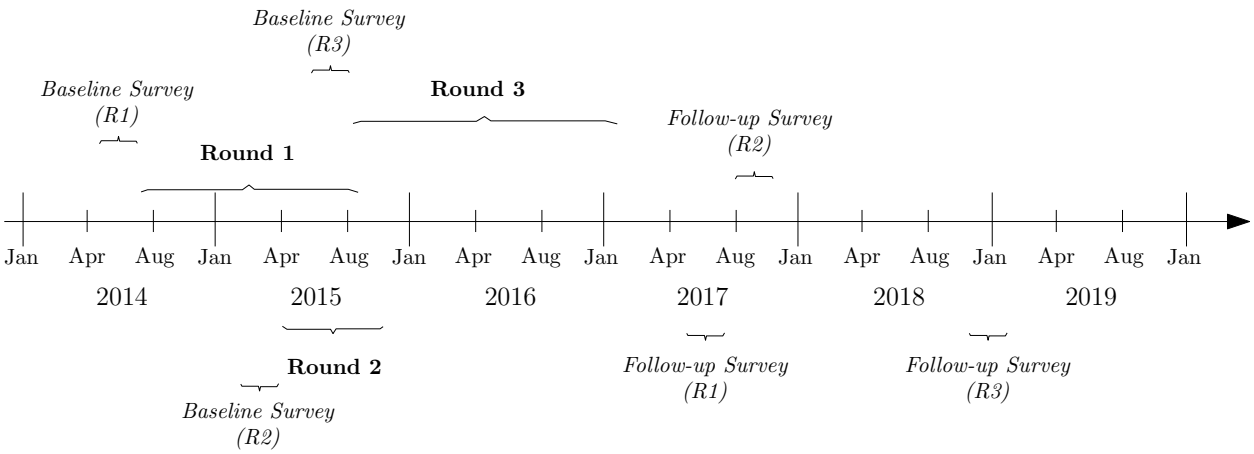
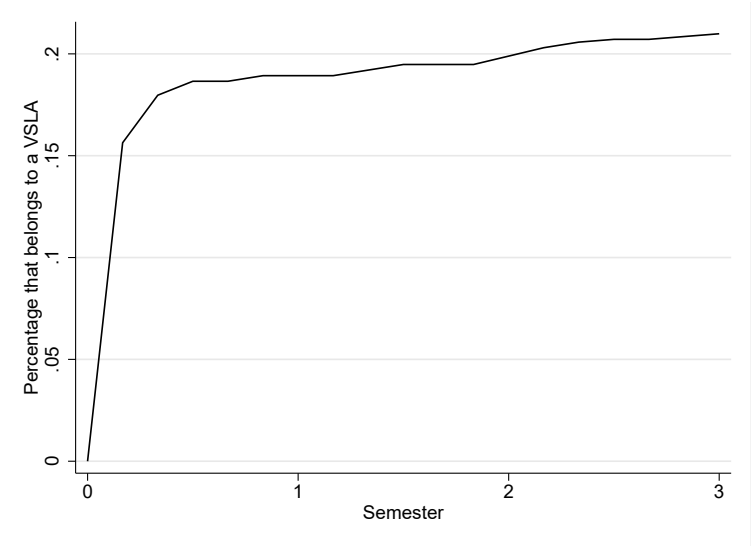
Figure 1: Study Timeline



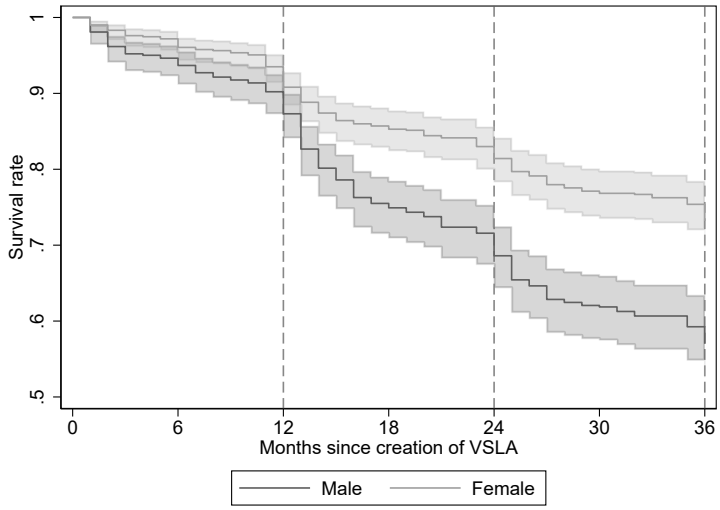
Note: Implementation activities in **bold** and data collection activities in *italics*.

Figure 2: VSLA Take-up at the Household Level



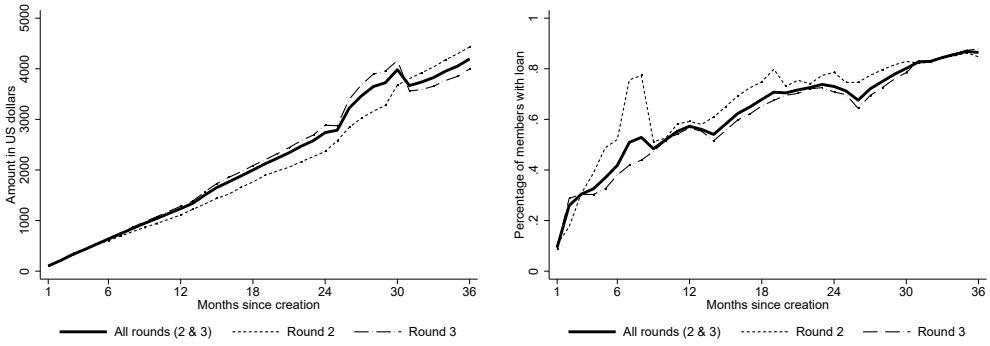
Source: VSLAs' administrative records, October 2014-October 2018 and baseline survey records.
Note: Accumulated percentage up to 18 months after the creation of the corresponding VSLA. Sample: Rounds 2 and 3.

Figure 3: Survival Rates by Sex of VSLA Member



Source: VSLAs' administrative records, October 2014-October 2018.
Note: Kaplan-Meier estimates adjusted for censoring in the sample of VSLA founders. Sample: Rounds 2 and 3.

Figure 4: Capital Accumulation and Mobilization of Funds in the VSLAs

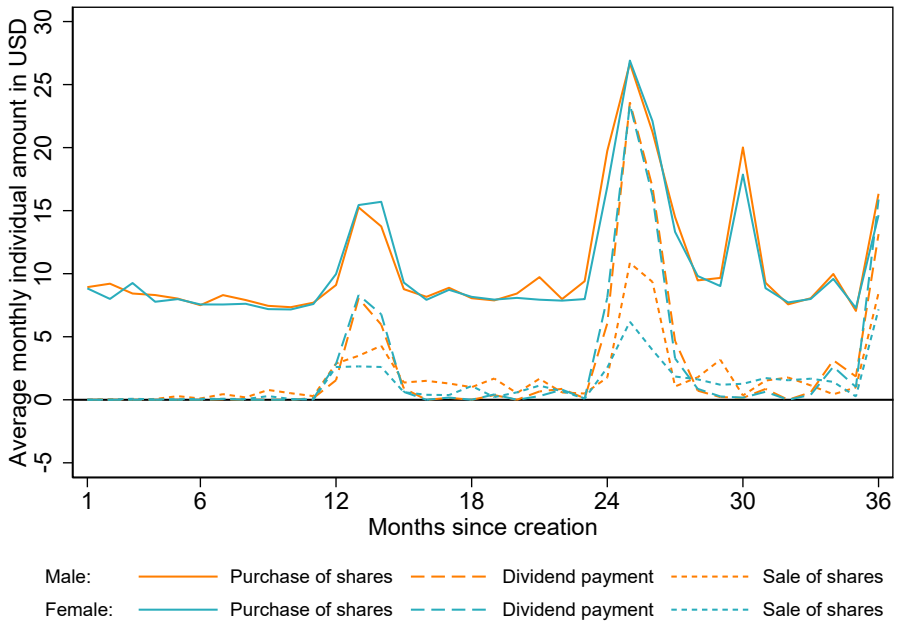


(a) Cumulative group capital (b) Percentage of members with loans

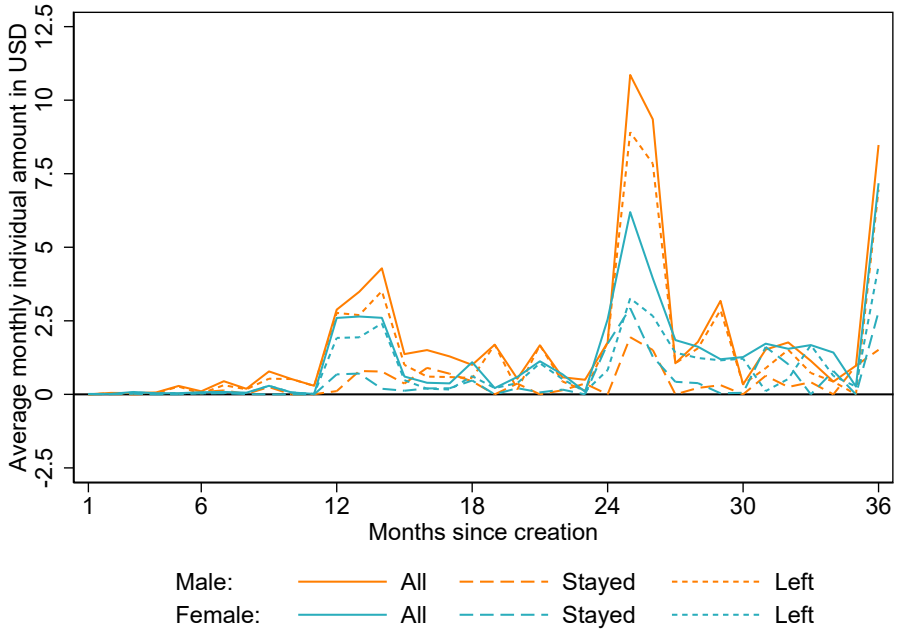
Source: VSLAs' administrative records, October 2014-October 2018.

Note: Amounts in panel (a) are expressed in dollars using a fixed exchange rate from August 2014. Months since creation of the corresponding VSLA in x-axis. Sample: Rounds 2 and 3.

Figure 5: Savings Dynamics in the VSLAs



(a) Withdrawals, Deposits, and Payment of Interests on Savings



(b) Withdrawals (or sales of shares)

Source: VSLAs' administrative records, October 2014-October 2018.

Note: Sales and purchases of stocks in panel (a) are equivalent to withdrawals and deposits of mandatory savings. Dividend payments of stocks shown in panel (a) are equivalent to the payment of interest on savings balances. Panel (b) depicts sales of shares by status in the VSLA: continuing or dropout members. Amounts expressed in dollars using a fixed exchange rate from August 2014. Months since creation of the corresponding VSLA in x-axis. Sample: Rounds 2 and 3.

Table 1: Determinants of affilliation to VSLAs

	Household		Respondent
	(1)	(2)	(3)
A. Household head/respondent-level characteristics			
Age	–0.002	–0.002	0.000
	(0.001)	(0.001)	(0.001)
Female	0.096*	0.094*	0.103**
	(0.051)	(0.050)	(0.042)
Married	0.057	0.055	–0.056
	(0.053)	(0.052)	(0.153)
Without formal instruction	–0.033	–0.033	–0.079**
	(0.046)	(0.046)	(0.033)
B. Household-level characteristics			
Most spoken language at home: Quechua	0.015	0.015	0.008
	(0.046)	(0.047)	(0.033)
Previous participation in village banks	0.049	0.057	0.046
	(0.060)	(0.058)	(0.057)
Previous access to formal financial sector	0.041	0.041	0.038
	(0.033)	(0.033)	(0.030)
Number of children	0.009	0.009	0.022**
	(0.011)	(0.011)	(0.009)
Ratio of household members to bedrooms	–0.012	–0.011	–0.006
	(0.011)	(0.011)	(0.010)
Wealth index	–0.004	–0.004	–0.000
	(0.010)	(0.010)	(0.006)
C. Respondent-level characteristics			
Entrepreneurship level	0.002	–	0.016
	(0.020)		(0.014)
Level of financial knowledge	0.003	–	0.015
	(0.014)		(0.018)
Savings attitudes: wants to save more than spouse	–0.000	–	–0.020
	(0.030)		(0.026)
Patience (consumption)	–0.010	–	–0.011
	(0.028)		(0.022)
Trust in people	0.022	–	0.018
	(0.018)		(0.014)
Trust in friends	–0.013	–	–0.020
	(0.019)		(0.016)
Trust in acquaintances	–0.007	–	0.005
	(0.023)		(0.016)
R2	0.086	0.083	0.084
Mean dependent variable	0.221	0.221	0.131
Observations	891	891	891

Note: First column shows the determinants of take-up at the household level; the second column, at the individual level (respondent). In the case of the second column, all variables that are labeled as referring to the household head, are respondent's characteristics. Sample is comprised only of households in the treatment group. Patience is a dummy variable that takes the value of 1 if the respondent would rather wait 30 days to receive 100 PEN (local currency) than receive a lesser amount today. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects. We also include a dummy variable that indicates whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Sample: Rounds 2 and 3.

Table 2: Retention and Rotation Rates

Years since creation	A. Retention			B. Rotation		
	Global	Female	Male	Global	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
1	0.89	0.91	0.88	2.61	3.43	1.78
	(0.015)	(0.016)	(0.019)	(0.365)	(0.669)	(0.359)
2	0.75	0.80	0.68	1.02	1.38	0.65
	(0.022)	(0.022)	(0.029)	(0.120)	(0.199)	(0.120)
3	0.64	0.70	0.55	0.84	1.03	0.58
	(0.023)	(0.023)	(0.031)	(0.100)	(0.151)	(0.123)

Source: VSLAs' administrative records, October 2014-October 2018.
Note: The retention rate reflects the percentage of founding members who have remained in the VSLA since its creation. Estimates for the retention rates were obtained by running a regression where each observation represents a founder at a point in time, the dependent variable is an indicator for whether they are still part of the VSLA, and the independent variables are dummies for each month (and their interaction with gender when required); errors were clustered at the VSLA level. The rotation rate reflects the ratio between the mean number of entrants and the mean number of dropouts for each year. These means were jointly estimated as part of a seemingly unrelated regression (SUR) model where each observation is a VSLA in a specific year (for each gender), the dependent variables are the number of entries or exits (for each gender) for each VSLA, and the independent variables are dummies for each year (and their interaction with gender); errors are assumed to be heteroskedastic and possibly correlated across equations. The delta method was then used to estimate the standard errors for the ratio of the two means. Sample: Rounds 2 and 3.

Table 3: VSLA Operations: Descriptive Statistics by Sex

	Global (1)	Male (2)	Female (3)	P-value (2)-(3)
A. Monthly interest Rates				
Active	3.36%	–	–	–
	(0.07%)			
Passive	2.56%	–	–	–
	(0.06%)			
B. Individual Tenure				
Average tenure in VSLA (months)	24.60	23.92	25.02	0.057
	(0.46)	(0.58)	(0.50)	
C. Individual Savings Balances				
Average savings balance (US Dollars)				
End of year 1	92.92	96.44	90.66	0.305
	(6.95)	(8.44)	(6.76)	
End of year 2	197.42	208.25	191.22	0.116
	(14.98)	(18.87)	(13.81)	
End of year 3	298.37	324.84	285.46	0.062
	(24.18)	(31.19)	(22.95)	
D. Individual Loans Portfolios				
Average loan size (US Dollars)				
Year 1	159.38	186.24	143.81	0.002
	(10.65)	(15.52)	(10.08)	
Year 2	305.16	331.09	290.81	0.033
	(22.95)	(27.30)	(22.96)	
Year 3	440.52	490.42	415.83	0.012
	(31.75)	(38.91)	(31.85)	
Average number of loans				
Year 1	1.43	1.30	1.52	0.011
	(0.06)	(0.06)	(0.08)	
Year 2	1.55	1.46	1.61	0.069
	(0.06)	(0.07)	(0.07)	
Year 3	1.51	1.40	1.57	0.048
	(0.08)	(0.09)	(0.09)	

Source: VSLAs' administrative records, October 2014-October 2018.

Note: Tenure in a VSLA was calculated as the number of months that an individual stays in the VSLA. Savings balances were estimated at the end of each 12-month period since the creation of the VSLA. The average loan size is the loan-level average disbursed amount during each 12-month cycle. The indebted percent of members corresponds to the proportion of members that took out at least one loan during each 12-month cycle. The active interest rates comes directly from VSLAs' administrative records. The monthly passive interest rate in a VSLA is the return on savings (stocks), which is comprised of the profits distributed through cash and stock capitalization. We obtained the returns by calculating the monthly internal rate of return (IRR) for each VSLA during each investment cycle. Active and passive interest rates were averaged across all VSLAs and investment cycles. Standard errors for estimates by sex and p-values were obtained from an OLS regression including a dummy variable for the sex of the individual. Standard errors clustered at the VSLA level in parentheses. Sample: Rounds 2 and 3.

Table 4: Effects on Poverty and Living Conditions

	Obs. (1)	Control Mean (2)	ITT Effect (3)
Monthly expenditure	1,434	155.186	6.635
		(4.295)	(6.500)
Food expenditure	1,434	98.237	6.974
		(3.292)	(4.754)
Health expenditure	1,434	10.058	0.481
		(0.922)	(1.368)
Other expenditure	1,434	46.891	–0.613
		(1.462)	(2.424)
Gross HH. Monthly Income	1,434	131.958	10.870
		(12.161)	(18.963)
Household assets index	1,434	–0.090	0.026
		(0.036)	(0.047)
Household experienced hunger in the past 12m	1,434	0.343	–0.032
		(0.018)	(0.033)
Housing quality index	1,434	–0.093	0.167***††
		(0.044)	(0.055)
Number of rooms in dwelling	1,433	3.580	–0.078
		(0.055)	(0.088)

Note: Food and health expenditures are monetary quantities answered explicitly in the survey; the variable other expenditures is derived from aggregating utilities, home repair, education and clothing expenditures. Variables that refer to monetary quantities and hectares are winsorized at the 99 percent level; additionally, they were converted from Nuevos Soles to 2014 US dollars. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 9 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table 5: Effects on Consumption Smoothing and Coping Strategies

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Probability of Facing Liquidity Problems			
At any point during the year	1,434	0.239	–0.008
		(0.010)	(0.020)
Harvest season (May-Jul)	1,434	0.130	0.016
		(0.012)	(0.022)
Planting season (Sep-Dec)	1,434	0.272	–0.030
		(0.013)	(0.026)
B. Coping Strategies			
Worked longer	1,191	0.528	0.037
		(0.020)	(0.040)
Temporarily migrated	1,191	0.434	0.007
		(0.020)	(0.039)
Used savings	1,191	0.434	–0.014
		(0.020)	(0.036)
Borrowed	1,191	0.333	0.040
		(0.020)	(0.033)
Sold assets/livestock	1,191	0.363	–0.028
		(0.019)	(0.033)
Sold assets	1,191	0.182	–0.048*
		(0.015)	(0.025)
Sold livestock	1,191	0.301	–0.016
		(0.019)	(0.033)

Note: The probability of facing liquidity problems corresponds to the number of months (within each subset) that the respondent reported when answering the question 'In which months do you believe that your household faces more money problems or difficulties to buy/get food?' (¿En qué meses crfees que tu hogar tiene mayores problemas de dinero o dificultad para comprar/conseguir alimentos?'); then umber of reported months was then divided by the maximum possible number of months in each subset. Regarding the main crops, the May-July period corresponds to the harvest/post-harvest season, while the September-December period corresponds to the planting/pre-planting season. Hectares winsorized at the 95% level. The sample in panel B includes households that reported having experienced a negative shock during the past 12 months. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 10 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table 6: Effects on Productive Activities

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Non-Agricultural Activities			
Owns a non-agricultural business	1,406	0.058	$-0.036^{***}_{\dagger\dagger\dagger}$
		(0.008)	(0.012)
Number of non-agricultural business	1,406	0.059	$-0.038^{***}_{\dagger\dagger\dagger}$
		(0.008)	(0.012)
B. Agricultural and Livestock Activities			
Number of harvested crops	1,434	1.635	–0.274**
		(0.068)	(0.139)
Low value	1,434	0.671	$-0.166^{**}_{\dagger}$
		(0.039)	(0.075)
Medium value	1,434	0.567	–0.050
		(0.026)	(0.053)
High value	1,434	0.403	–0.030
		(0.020)	(0.036)
Number of own ha. used for production	1,434	0.502	–0.037
		(0.024)	(0.050)
Number of animals	1,434	1.840	–0.318*
		(0.110)	(0.162)

Note: Crops are classified as low, medium or high value based on prices and performance (PEN/ha), according to the Agricultural Annual Compendium (MIDAGRI-Peru, 2017). Hectares winsorized at the 95% level. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 8 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table 7: Effects on Labor Supply (Past 7 Days)

		Global		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(5)-(7)
Has worked	3339	0.629	–0.002	0.749	–0.008	0.527	0.014	0.484
		(0.018)	(0.023)	(0.019)	(0.026)	(0.022)	(0.029)	
Agricultural and livestock	3339	0.558	–0.006	0.682	–0.016	0.453	0.014	0.358
		(0.021)	(0.025)	(0.024)	(0.029)	(0.025)	(0.030)	
Household business	3339	0.074	–0.009	0.041	0.004	0.102	–0.022	0.157
		(0.010)	(0.011)	(0.008)	(0.012)	(0.013)	(0.016)	
Dependent	3339	0.096	0.011	0.145	0.018	0.055	0.010	0.744
		(0.011)	(0.013)	(0.017)	(0.021)	(0.009)	(0.013)	
Has done domestic work	3339	0.658	–0.008	0.520	–0.016	0.777	–0.014	0.970
		(0.021)	(0.026)	(0.026)	(0.036)	(0.026)	(0.032)	
Weekly working hours	3339	25.510	–0.149	31.486	–0.047	20.395	0.365	0.826
		(1.058)	(1.330)	(1.143)	(1.646)	(1.297)	(1.594)	
Agricultural and livestock	3339	20.333	–0.555	25.525	–1.309	15.890	0.545	0.249
		(1.107)	(1.235)	(1.315)	(1.534)	(1.187)	(1.404)	
Household business	3339	2.163	–0.404	1.130	0.293	3.046	–1.025$^{*}_{\dagger}$	0.058
		(0.355)	(0.370)	(0.329)	(0.462)	(0.477)	(0.538)	
Dependent	3339	3.014	0.750	4.830	0.902	1.459	0.801*	0.910
		(0.386)	(0.490)	(0.663)	(0.843)	(0.276)	(0.462)	
Weekly hours of domestic work	3339	12.690	–1.040	4.736	–0.404	19.498	–2.247$^{*}_{\dagger}$	0.166
		(0.593)	(0.762)	(0.398)	(0.616)	(1.016)	(1.251)	

Note: Has worked is a dummy variable that indicates if the respondent carried out work in a in the past 7 days. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include regressions in two groups: 5 regressions for the work dummies and 5 regressions for hours worked; these calculations were conducted independently for columns (2), (4), and (6). Sample: Rounds 2 and 3, all household adults.

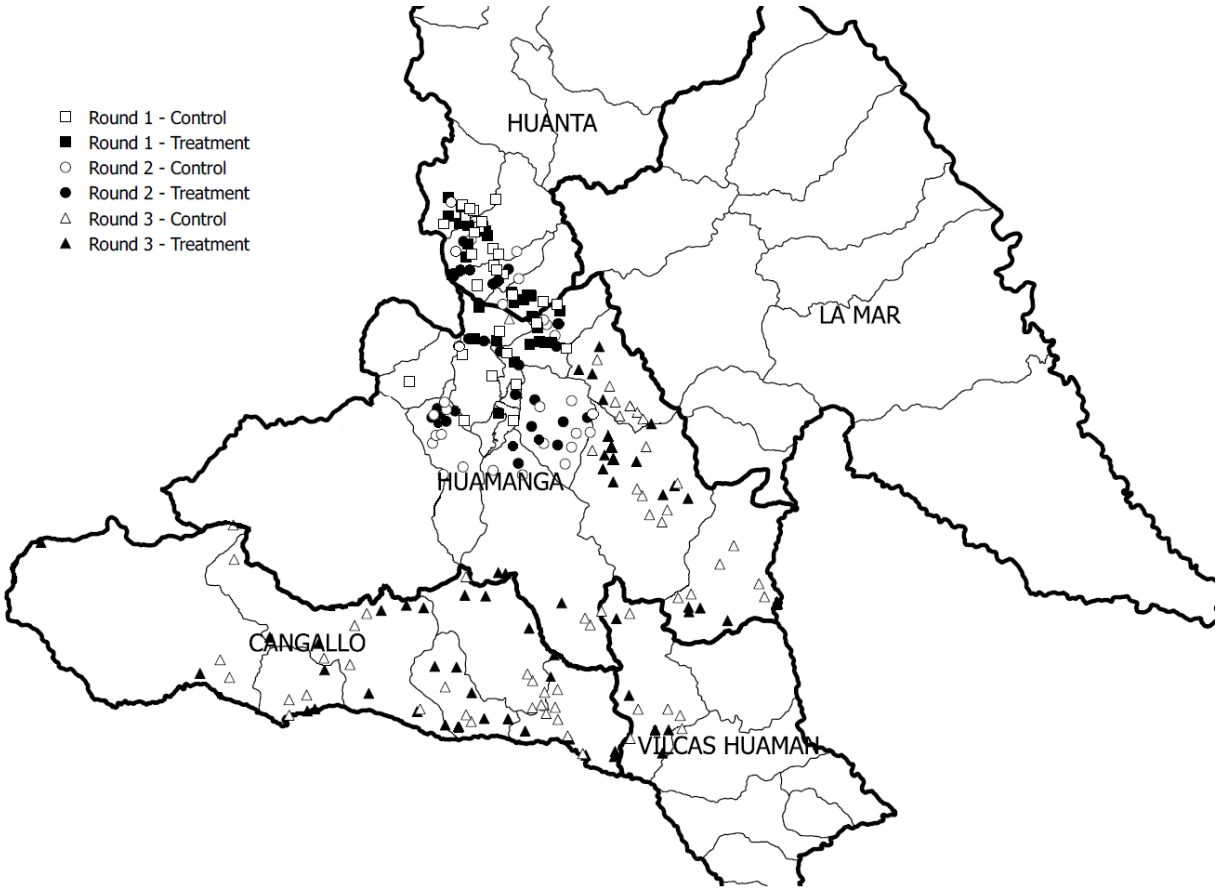
Table 8: Effects on Credit Access and Usage by Gender

		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(3)-(5)
A. Pr(Had a loan in the past 12m)	2,216	0.363	–0.047†	0.155	0.041	0.029
		(0.019)	(0.030)	(0.019)	(0.025)	
Banks and Credit Unions	2,216	0.317	–0.064**††	0.109	0.032	0.015
		(0.017)	(0.029)	(0.017)	(0.023)	
Productive loans	2,216	0.289	–0.054*†	0.091	0.041*†	0.015
		(0.017)	(0.029)	(0.017)	(0.021)	
Consumption loans	2,216	0.073	–0.024*†	0.028	–0.012	0.436
		(0.009)	(0.014)	(0.009)	(0.010)	
Cooperatives and NGOs	2,216	0.076	0.030*†	0.057	0.018	0.577
		(0.012)	(0.018)	(0.012)	(0.016)	
B. Outstanding debt (IHS)	451	8.097	–0.040	7.837	–0.371*	0.215
		(0.100)	(0.143)	(0.153)	(0.213)	
Banks and Credit Unions	451	6.939	–0.505	5.432	–0.389	0.872
		(0.276)	(0.394)	(0.422)	(0.608)	
Productive loans	451	6.117	–0.248	4.637	0.347	0.478
		(0.305)	(0.438)	(0.466)	(0.683)	
Consumption loans	451	1.191	–0.258	1.191	–1.059***† † †	0.064
		(0.200)	(0.286)	(0.305)	(0.335)	
Cooperatives and NGOs	451	1.554	0.823**†	2.750	0.182	0.382
		(0.280)	(0.406)	(0.427)	(0.624)	
C. Pr(Arrears in the past 12 months)	581	0.282	0.026	0.244	0.024	0.981
		(0.033)	(0.049)	(0.050)	(0.076)	
Banks and Credit Unions	467	0.241	0.013	0.155	0.069	0.576
		(0.033)	(0.054)	(0.056)	(0.089)	
Cooperatives and NGOs	177	0.512	–0.031	0.400	–0.090	0.722
		(0.078)	(0.107)	(0.091)	(0.136)	

Note: For the estimation of this table, we exclude loans in the SBS Pérdida debt qualification category (i.e., we exclude written off debts). Variables that refer to monetary quantities (outstanding debt) are winsorized at the 99 percent level; these money quantities are a snapshot of outstanding debt categories after two years of the intervention, and were converted from Nuevos Soles to 2014 US dollars and transformed using the inverse hyperbolic sine transformation; we only show results on outstanding debt for the sample who had outstanding debt two years after the intervention. In panel C, repayment behavior is proxied by a dummy variable that takes the value of 1 if any loan held by the household was in arrears at any point during the past 12 months. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, † † † 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations were ran separately for each panel and include, for panel A, 15 regressions with the variables shown as outcomes for each regression; 15 regressions for panel B; and 9 regressions for panel C. Data source: Equifax credit bureau. Sample: Rounds 2 and 3, all households that were interviewed at follow-up and where at least one member's ID was searched.

Appendix A

Figure A1: Villages Included in the Experiment



Note: The map represents the treated and control villages in the department of Ayacucho, including provinces Huanta, Huamanga, Cangallo and Vilcas Huaman. The lines with the largest width delimit province borders, while the lighter ones refer to district borders. The black filled shapes represent the treated villages, while the unfilled shapes represent the control villages. The squares represent the first round; circles are the second round, and triangles are the third round.

Table A1: Number of Individuals at Baseline and Follow-up

		Baseline			Follow-up			
		Treatment (1)	Control (2)	Total (3)	Treatment (4)	Control (5)	Total (6)	Attrition (7)
Round 1	Individuals	278	316	594	213	180	393	33.8%
	Villages	*31*	*31*	*62*	*31*	*30*	*61*	*1.6%*
Round 2	Individuals	281	260	541	235	216	451	16.6%
	Villages	*27*	*27*	*54*	*27*	*27*	*54*	*0.0%*
Round 3	Individuals	610	624	1234	494	489	983	20.3%
	Villages	*62*	*62*	*124*	*62*	*61*	*123*	*0.8%*
Total (All Rounds)	Individuals	1169	1200	2369	942	885	1827	22.9%
	Villages	*120*	*120*	*240*	*120*	*118*	*238*	*0.8%*
Total (Rounds 2 & 3)	Individuals	891	884	1775	729	705	1434	19.2%
	Villages	*89*	*89*	*178*	*89*	*88*	*177*	*0.5%*

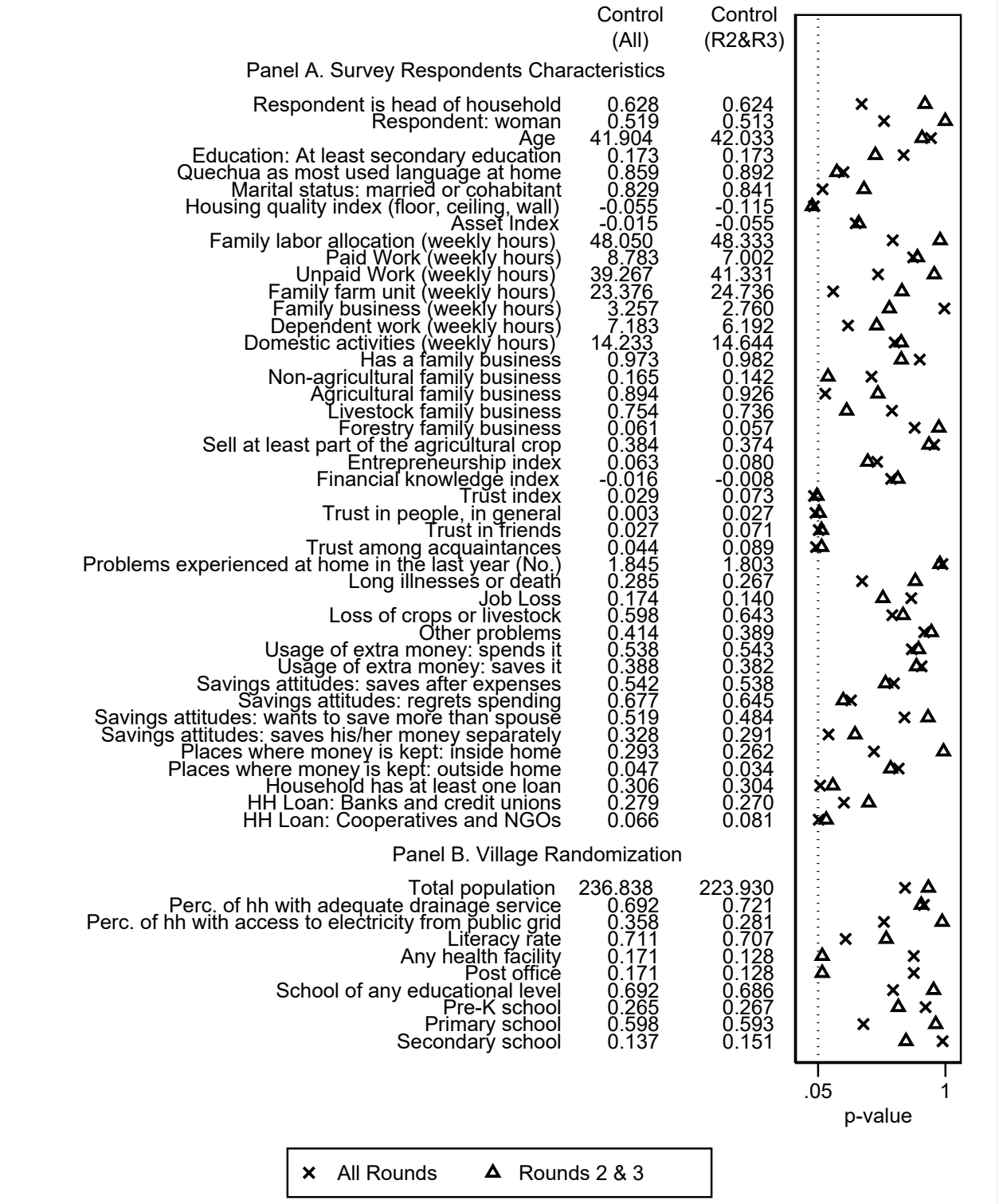
Note: The two villages not reported in the follow-up were lost due to access problems.

Table A2: Attrition Level by Treatment Status

	Full sample	Round 1	Rounds 2 & 3	Full sample	Round 1	Rounds 2 & 3
	Household			Respondent		
	(1)	(2)	(3)	(4)	(5)	(6)
A. Follow-Up Survey						
Treatment	–0.055**	–0.179***	–0.013	–0.032	–0.134**	0.002
	(0.023)	(0.052)	(0.024)	(0.023)	(0.053)	(0.025)
Mean in control	0.262	0.430	0.202	0.436	0.573	0.387
Observations	2369	594	1775	2369	594	1775
	Household			Respondent & Partner		
B. Credit Bureau Data						
Treatment	–0.015	–0.045	–0.005	–0.007	0.009	–0.012
	(0.015)	(0.034)	(0.017)	(0.019)	(0.036)	(0.022)
Mean in control	0.167	0.199	0.155	0.197	0.201	0.196
Observations	2368	594	1774	1963	482	1481

Note: All regressions include round-district fixed effects. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. The variables in columns (1) and (2) correspond to the socioeconomic characteristics of the head of household. We include age, gender, marital status, most spoken language at home, educational level, entrepreneurship level, level of financial knowledge, confidence level in people, friends and acquaintances, and participation in savings groups as controls. Columns (2) and (4) include only those surveyed in round 2 and 3. In the credit bureau data, attrition indicates that credit records were inaccessible due to missing or incorrect ID numbers. For columns (1) and (2) of this data source, attrition is characterized by situations where no member of the household provided a valid ID, while columns (3) and (4), are restricted to households where both the household head and their partner were present at baseline, and attrition is identified when either individual lacks a valid ID. Errors clustered at the community level. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values.

Figure A2: Balance: Baseline Respondents' Characteristics and Village Randomization



Note: Panel A: characteristics at baseline; all regressions include round-district fixed effects; errors clustered at the community level. Loan possession comes from administrative data, where the reference period is the 12 months leading the introduction of the first VSLA in each district-round. Sample includes all household adults for weekly hours worked. For Panel B, p-values were estimated through a simple OLS without fixed effects or clustered standard errors.

Table A3: Impact of VSLAs in Other Contexts

Item	**FV**	GO	BKT	KLLR	KSTU	BC	D
Country	**Perú**	Ghana, Malawi, Uganda, Mali, Kenia, Tanzania, Burundi	Mali	Northern Malawi	Ghana, Malawi, Uganda	Uganda	East India
Savings	**Y**	Y	Y	Y	Y	Y	N.A
Income	**N**	M	N	Y	Y	N.A.	Y
Expenditure	**N**	M	N	Y	N	N.A.	N.A.
Health/education expenditure	**Y**	M	N	N.A.	N.A.	N.A.	N.A.
Food security/consumption smoothing	**N**	M	Y	Y	N	N	Y
Food expenditure	**Y**	M	N	N.A.	N.A.	N	N.A.
Investments in dwelling quality	**Y**	N.A.	N.A.	Y	N.A.	Y	N.A.
Investments/participation in non-agricultural activities	**Y**	Y	N.A.	Y	Y	N	Y
Number of income-generating activities	**Y**	N.A.	N.A.	Y	N.A.	Y	N.A.
Time elapsed between baseline and endline (months)	**24**	24	24	24	26	24	N.A.

Note: BC: Burlando and Canidio [2017]; KLLR: Ksoll et al. [2016]; KSTU: Karlan et al. [2017]; GO: Gash and Odell [2013]; BKT: Beaman et al. [2014]; D: Demont [2022]. "Y" is "Yes, there is a positive impact"; "N" is "No, there is not a positive impact". "M" in GO stands for "Mixed results" since this study combines results from 7 RCTs in 7 countries.

Table A4: Effects on Size of Information Networks and Financial Literacy

	Obs. (1)	Control Mean (2)	ITT Effect (3)
Total number of people	1,434	1.688	–0.073
		(0.039)	(0.093)
By type of relationship			
Family	1,434	1.652	–0.081
		(0.039)	(0.091)
No Family	1,434	0.035	0.008
		(0.009)	(0.015)
By place of residence			
Village	1,434	1.350	–0.012
		(0.033)	(0.064)
No Village	1,434	0.338	–0.061
		(0.027)	(0.050)
Financial literacy index	1,434	–0.053	0.017
		(0.038)	(0.062)

Note: The financial literacy index is a composite z-score, calculated as the re-standardized mean of 3 standardized dummy variables. Each dummy indicates that the respondent correctly answered a question regarding compound interest, real interest rates, or risk diversification. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 6 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table A5: Effects on Credit Access and Usage by Gender (Baseline Sample)

		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(3)-(5)
A. Pr(Had a loan in the past 12m)	2,708	0.360	–0.035	0.171	0.012	0.202
		(0.017)	(0.028)	(0.017)	(0.025)	
Banks and Credit Unions	2,708	0.313	–0.044†	0.121	0.012	0.112
		(0.015)	(0.027)	(0.016)	(0.022)	
Productive loans	2,708	0.277	–0.028	0.102	0.017	0.215
		(0.015)	(0.027)	(0.015)	(0.020)	
Consumption loans	2,708	0.073	–0.016	0.031	–0.010	0.681
		(0.008)	(0.013)	(0.008)	(0.009)	
Cooperatives and NGOs	2,708	0.074	0.029*†	0.067	0.005	0.224
		(0.010)	(0.016)	(0.011)	(0.015)	
B. Outstanding debt (IHS)	556	8.106	0.013	7.888	–0.405**††	0.073
		(0.090)	(0.128)	(0.132)	(0.178)	
Banks and Credit Unions	556	6.993	–0.428	5.501	–0.532	0.870
		(0.245)	(0.349)	(0.363)	(0.538)	
Productive loans	556	6.031	0.007	4.893	–0.210	0.770
		(0.275)	(0.400)	(0.406)	(0.594)	
Consumption loans	556	1.295	–0.220	1.130	–0.752**††	0.207
		(0.193)	(0.283)	(0.286)	(0.309)	
Cooperatives and NGOs	556	1.479	0.707**†	2.807	0.111	0.366
		(0.251)	(0.352)	(0.370)	(0.556)	
C. Pr(Arrears in the past 12 months)	721	0.305	0.018	0.277	0.012	0.942
		(0.030)	(0.044)	(0.044)	(0.070)	
Banks and Credit Unions	583	0.251	0.013	0.177	0.061	0.616
		(0.030)	(0.048)	(0.049)	(0.080)	
Cooperatives and NGOs	219	0.580	–0.058	0.455	–0.148	0.525
		(0.070)	(0.099)	(0.075)	(0.115)	

Note: For the estimation of this table, we exclude loans in the SBS Pérdida debt qualification category (i.e., we exclude written off debts). Variables that refer to monetary quantities (outstanding debt) are winsorized at the 99 percent level; these money quantities are a snapshot of outstanding debt categories after two years of the intervention, and were converted from Nuevos Soles to 2014 US dollars and transformed using the inverse hyperbolic sine transformation; we only show results on outstanding debt for the sample who had outstanding debt two years after the intervention. In panel C, repayment behavior is proxied by a dummy variable that takes the value of 1 if any loan held by the household was in arrears at any point during the past 12 months. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations were ran separately for each panel. C. Data source: Equifax credit bureau. Sample: Rounds 2 and 3, all households that were interviewed at baseline and where at least one member's ID was searched.

Appendix B (online, not for publication)

Estimated effects with only stratifiers (round-district fixed effects) as controls

Table B1: Effects on Poverty and Living Conditions (Fixed-Effects Only)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
Monthly expenditure	1,434	155.186	6.387
		(4.295)	(6.723)
Food expenditure	1,434	98.237	7.261
		(3.292)	(4.900)
Health expenditure	1,434	10.058	0.177
		(0.922)	(1.332)
Other expenditure	1,434	46.891	–0.720
		(1.462)	(2.477)
Gross HH. Monthly Income	1,434	131.958	7.884
		(12.161)	(20.095)
Household assets index	1,434	–0.090	0.037
		(0.036)	(0.051)
Household experienced hunger in the past 12m	1,434	0.343	–0.024
		(0.018)	(0.033)
Housing quality index	1,434	–0.093	0.174***† † †
		(0.044)	(0.055)
Number of rooms in dwelling	1,433	3.580	–0.070
		(0.055)	(0.087)

Note: Food and health expenditures are monetary quantities answered explicitly in the survey; the variable other expenditures is derived from aggregating utilities, home repair, education and clothing expenditures. Variables that refer to monetary quantities and hectares are winsorized at the 99 percent level; additionally, they were converted from Nuevos Soles to 2014 US dollars. All regressions include round-district fixed effects and the value of the dependent variable at baseline. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, † † † 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 9 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table B2: Effects on Consumption Smoothing and Coping Strategies (Fixed-Effects Only)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Probability of Facing Liquidity Problems			
At any point during the year	1,434	0.239	–0.010
		(0.010)	(0.019)
Harvest season (May-Jul)	1,434	0.130	0.015
		(0.012)	(0.022)
Planting season (Sep-Dec)	1,434	0.272	–0.031
		(0.013)	(0.027)
B. Coping Strategies			
Worked longer	1,191	0.528	0.052
		(0.020)	(0.043)
Temporarily migrated	1,191	0.434	0.007
		(0.020)	(0.039)
Used savings	1,191	0.434	–0.005
		(0.020)	(0.038)
Borrowed	1,191	0.333	0.046
		(0.020)	(0.034)
Sold assets/livestock	1,191	0.363	–0.029
		(0.019)	(0.033)
Sold assets	1,191	0.182	–0.040
		(0.015)	(0.026)
Sold livestock	1,191	0.301	–0.017
		(0.019)	(0.032)

Note: The probability of facing liquidity problems corresponds to the number of months (within each subset) that the respondent reported when answering the question 'In which months do you believe that your household faces more money problems or difficulties to buy/get food?' (¿En qué meses crfees que tu hogar tiene mayores problemas de dinero o dificultad para comprar/conseguir alimentos?'); then umber of reported months was then divided by the maximum possible number of months in each subset. Regarding the main crops, the May-July period corresponds to the harvest/post-harvest season, while the September-December period corresponds to the planting/pre-planting season. Hectares winsorized at the 95% level. The sample in panel B includes households that reported having experienced a negative shock during the past 12 months. All regressions include round-district fixed effects and the value of the dependent variable at baseline. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 10 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table B3: Effects on Productive Activities (Fixed-Effects Only)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Non-Agricultural Activities			
Owns a non-agricultural business	1,406	0.058	–0.034***† † †
		(0.008)	(0.012)
Number of non-agricultural business	1,406	0.059	–0.036***† † †
		(0.008)	(0.012)
B. Agricultural and Livestock Activities			
Number of harvested crops	1,434	1.635	–0.284*†
		(0.068)	(0.144)
Low value	1,434	0.671	–0.176**††
		(0.039)	(0.076)
Medium value	1,434	0.567	–0.057
		(0.026)	(0.056)
High value	1,434	0.403	–0.028
		(0.020)	(0.037)
Number of own ha. used for production	1,434	0.502	–0.037
Number of animals		(0.024)	(0.051)
	1,434	1.840	–0.282*
		(0.110)	(0.169)

Note: Crops are classified as low, medium or high value based on prices and performance (PEN/ha), according to the Agricultural Annual Compendium (MIDAGRI-Peru, 2017). Hectares winsorized at the 95% level. All regressions include round-district fixed effects and the value of the dependent variable at baseline. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 11 regressions with the variables shown as outcomes for each regression. Sample: Rounds 2 and 3.

Table B4: Effects on Labor Supply (Past 7 Days, Fixed-Effects Only)

		Global		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(5)-(7)
Has worked	3339	0.629	0.003	0.749	–0.003	0.527	0.018	0.497
		(0.018)	(0.023)	(0.019)	(0.026)	(0.022)	(0.030)	
Agricultural and livestock	3339	0.558	–0.001	0.682	–0.012	0.453	0.019	0.351
		(0.021)	(0.026)	(0.024)	(0.029)	(0.025)	(0.031)	
Household business	3339	0.074	–0.008	0.041	0.006	0.102	–0.021	0.145
		(0.010)	(0.011)	(0.008)	(0.013)	(0.013)	(0.016)	
Dependent	3339	0.096	0.009	0.145	0.015	0.055	0.008	0.738
		(0.011)	(0.013)	(0.017)	(0.021)	(0.009)	(0.013)	
Has done domestic work	3339	0.658	–0.005	0.520	–0.015	0.777	–0.008	0.868
		(0.021)	(0.028)	(0.026)	(0.037)	(0.026)	(0.033)	
Weekly working hours	3339	25.510	–0.018	31.486	0.047	20.395	0.491	0.812
		(1.058)	(1.347)	(1.143)	(1.639)	(1.297)	(1.618)	
Agricultural and livestock	3339	20.333	–0.384	25.525	–1.200	15.890	0.734	0.231
		(1.107)	(1.272)	(1.315)	(1.548)	(1.187)	(1.447)	
Household business	3339	2.163	–0.254	1.130	0.458	3.046	–0.881$_{\dagger}$	0.054
		(0.355)	(0.396)	(0.329)	(0.480)	(0.477)	(0.558)	
Dependent	3339	3.014	0.559	4.830	0.707	1.459	0.597	0.901
		(0.386)	(0.497)	(0.663)	(0.854)	(0.276)	(0.459)	
Weekly hours of domestic work	3339	12.690	–0.827	4.736	–0.227	19.498	–1.961$_{\dagger}$	0.191
		(0.593)	(0.774)	(0.398)	(0.571)	(1.016)	(1.285)	

Note: Has worked is a dummy variable that indicates if the respondent carried out work in a in the past 7 days. All regressions include round-district fixed effects and the value of the dependent variable at baseline. We also include a dummy that indicates whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include regressions in two groups: 5 regressions for the work dummies and 5 regressions for hours worked; these calculations were conducted independently for columns (2), (4), and (6). Sample: Rounds 2 and 3, all household adults.

Table B5: Effects on Credit Access and Usage by Gender (Fixed-Effects Only)

		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(3)-(5)
A. Pr(Had a loan in the past 12m)	2,216	0.363	–0.038	0.155	0.045*†	0.040
		(0.019)	(0.032)	(0.019)	(0.027)	
Banks and Credit Unions	2,216	0.317	–0.054*†	0.109	0.037	0.021
		(0.017)	(0.031)	(0.017)	(0.024)	
Productive loans	2,216	0.289	–0.046†	0.091	0.045**††	0.021
		(0.017)	(0.030)	(0.017)	(0.022)	
Consumption loans	2,216	0.073	–0.022†	0.028	–0.011	0.466
		(0.009)	(0.014)	(0.009)	(0.010)	
Cooperatives and NGOs	2,216	0.076	0.033*†	0.057	0.020	0.547
		(0.012)	(0.018)	(0.012)	(0.016)	
B. Outstanding debt (IHS)	624	7.976	0.058	7.782	–0.202	0.261
		(0.094)	(0.128)	(0.134)	(0.184)	
Banks and Cooperatives	624	6.876	–0.240	5.648	–0.356	0.844
		(0.238)	(0.338)	(0.339)	(0.480)	
Productive loans	624	5.915	0.033	4.900	0.255	0.757
		(0.272)	(0.409)	(0.389)	(0.531)	
Consumption loans	624	1.358	–0.211	1.024	–0.656**††	0.302
		(0.192)	(0.282)	(0.275)	(0.303)	
Cooperatives and NGOs	624	1.415	0.678**†	2.679	0.158	0.392
		(0.243)	(0.341)	(0.347)	(0.493)	
C. Pr(Arrears in the past 12 months)	786	0.298	–0.014	0.291	0.007	0.767
		(0.029)	(0.042)	(0.043)	(0.061)	
Banks and Cooperatives	637	0.246	–0.025	0.176	0.022	0.545
		(0.029)	(0.044)	(0.046)	(0.066)	
Cooperatives and NGOs	239	0.538	–0.034	0.512	–0.110	0.577
		(0.070)	(0.091)	(0.077)	(0.101)	

Note: For the estimation of this table, we exclude loans in the SBS Pérdida debt qualification category (i.e., we exclude written off debts). Variables that refer to monetary quantities (outstanding debt) are winsorized at the 99 percent level; these money quantities are a snapshot of outstanding debt categories after two years of the intervention, and were converted from Nuevos Soles to 2014 US dollars and transformed using the inverse hyperbolic sine transformation; we only show results on outstanding debt for the sample who had outstanding debt two years after the intervention. In panel C, repayment behavior is proxied by a dummy variable that takes the value of 1 if any loan held by the household was in arrears at any point during the past 12 months. All regressions include round-district fixed effects and the value of the dependent variable at baseline. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations were ran separately for each panel and include, for panel A, 15 regressions with the variables shown as outcomes for each regression; 15 regressions for panel B; and 9 regressions for panel C. Data source: Equifax credit bureau. Sample: All rounds, all households that were interviewed at follow-up and where at least one member's ID was searched.

Appendix C (online, not for publication)

Estimated effects with full sample - all 3 rounds

Table C1: Effects on Poverty and Living Conditions (All Rounds)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
Monthly expenditure	1,827	170.957	–2.160
		(4.139)	(6.145)
Food expenditure	1,827	111.090	1.326
		(3.216)	(4.621)
Health expenditure	1,827	10.033	–0.017
		(0.783)	(1.142)
Other expenditure	1,827	49.834	–3.222
		(1.417)	(2.259)
Gross HH. Monthly Income	1,827	157.263	5.219
		(12.415)	(17.668)
Household assets index	1,827	–0.000	0.024
		(0.036)	(0.045)
Household experienced hunger in the past 12m	1,827	0.369	–0.036
		(0.016)	(0.028)
Housing quality index	1,827	–0.000	0.135**††
		(0.043)	(0.053)
Number of rooms in dwelling	1,826	3.637	–0.092
		(0.052)	(0.080)

Note: Food and health expenditures are monetary quantities answered explicitly in the survey; the variable other expenditures is derived from aggregating utilities, home repair, education and clothing expenditures. Variables that refer to monetary quantities and hectares are winsorized at the 99 percent level; additionally, they were converted from Nuevos Soles to 2014 US dollars. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 9 regressions with the variables shown as outcomes for each regression. Sample: Rounds 1, 2 and 3.

Table C2: Effects on Consumption Smoothing and Coping Strategies (All Rounds)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Portion of Months Facing Liquidity Problems			
At any point during the year	1,827	0.235	–0.004
		(0.009)	(0.017)
Harvest season (May-Jul)	1,827	0.133	0.016
		(0.011)	(0.019)
Planting season (Sep-Dec)	1,827	0.255	–0.016
		(0.011)	(0.022)
B. Coping Strategies			
Worked longer	1,534	0.558	0.027
		(0.018)	(0.034)
Temporarily migrated	1,534	0.484	–0.023
		(0.018)	(0.032)
Used savings	1,534	0.457	0.007
		(0.018)	(0.032)
Borrowed	1,534	0.352	0.014
		(0.018)	(0.030)
Sold assets/livestock	1,534	0.361	–0.014
		(0.017)	(0.029)
Sold assets	1,534	0.186	–0.036
		(0.014)	(0.023)
Sold livestock	1,534	0.298	–0.013
		(0.016)	(0.028)

Note: The probability of facing liquidity problems corresponds to the number of months (within each subset) that the respondent reported when answering the question 'In which months do you believe that your household faces more money problems or difficulties to buy/get food?' (¿En qué meses crfees que tu hogar tiene mayores problemas de dinero o dificultad para comprar/conseguir alimentos?'); then umber of reported months was then divided by the maximum possible number of months in each subset. Regarding the main crops, the May-July period corresponds to the harvest/post-harvest season, while the September-December period corresponds to the planting/pre-planting season. Hectares winsorized at the 95% level. The sample in panel B includes households that reported having experienced a negative shock during the past 12 months. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 10 regressions with the variables shown as outcomes for each regression. Sample: Rounds 1, 2 and 3.

Table C3: Effects on Productive Activities (All Rounds)

	Obs. (1)	Control Mean (2)	ITT Effect (3)
A. Non-Agricultural Activities			
Owns a non-agricultural business	1,794	0.063	–0.004
		(0.009)	(0.013)
Number of non-agricultural business	1,794	0.069	–0.008
		(0.010)	(0.014)
B. Agricultural Activities			
Number of harvested crops	1,827	1.599	–0.222*
		(0.060)	(0.117)
Low value	1,827	0.627	–0.130**
		(0.034)	(0.063)
Medium value	1,827	0.572	–0.044
		(0.023)	(0.045)
High value	1,827	0.372	–0.047
		(0.016)	(0.029)
Number of own ha. used for production	1,827	0.469	–0.015
		(0.022)	(0.043)
Number of animals	1,827	0.119	–0.020
		(0.007)	(0.014)

Note: Crops are classified as low, medium or high value based on prices and performance (PEN/ha), according to the Agricultural Annual Compendium (MIDAGRI-Peru, 2017). Hectares winsorized at the 95% level. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include 8 regressions with the variables shown as outcomes for each regression. Sample: Rounds 1, 2 and 3.

Table C4: Effects on Use of Time in the Past 7 Days (All Rounds)

		Global		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(5)-(7)
Has worked	4324	0.618	0.007	0.727	–0.003	0.527	0.023	0.369
		(0.016)	(0.020)	(0.018)	(0.023)	(0.019)	(0.026)	
Agricultural and livestock	4324	0.534	0.000	0.645	–0.009	0.441	0.017	0.361
		(0.019)	(0.021)	(0.022)	(0.025)	(0.022)	(0.026)	
Household business	4324	0.087	–0.005	0.061	–0.009	0.110	–0.005	0.813
		(0.010)	(0.010)	(0.011)	(0.012)	(0.012)	(0.014)	
Dependent	4324	0.108	0.015	0.154	0.022	0.069	0.012	0.639
		(0.010)	(0.012)	(0.015)	(0.019)	(0.009)	(0.013)	
Has done domestic work	4324	0.657	–0.004	0.526	–0.022	0.768	0.002	0.514
		(0.018)	(0.021)	(0.024)	(0.030)	(0.021)	(0.026)	
Weekly working hours	4324	24.947	0.634	30.739	0.181	20.086	1.464	0.453
		(0.899)	(1.139)	(1.002)	(1.426)	(1.077)	(1.405)	
Agricultural and livestock	4324	19.094	0.073	23.854	–0.516	15.099	0.941	0.288
		(0.962)	(1.041)	(1.157)	(1.293)	(1.007)	(1.195)	
Household business	4324	2.397	–0.209	1.602	–0.201	3.064	–0.269	0.922
		(0.310)	(0.324)	(0.360)	(0.427)	(0.397)	(0.504)	
Dependent	4324	3.456	0.682	5.283	0.809	1.923	0.708	0.907
		(0.359)	(0.461)	(0.611)	(0.779)	(0.282)	(0.471)	
Weekly hours of domestic work	4324	12.829	–1.126*	5.026	–0.700	19.378	–2.002*†	0.246
		(0.487)	(0.621)	(0.381)	(0.552)	(0.832)	(1.017)	

Note: Has worked is a dummy variable that indicates if the respondent carried out work in a in the past 7 days. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations jointly include regressions in two groups: 5 regressions for the work dummies and 5 regressions for hours worked; these calculations were conducted independently for columns (2), (4), and (6). Sample: Rounds 1, 2 and 3, all household adults.

Table C5: Effects on Credit Access and Usage by Gender (All Rounds)

		Male		Female		
	Obs.	Control Mean	ITT Effect	Control Mean	ITT Effect	P-value
	(1)	(2)	(3)	(4)	(5)	(3)-(5)
A. Pr(Had a loan in the past 12m)	2,791	0.370	–0.030	0.179	0.028	0.112
		(0.017)	(0.027)	(0.017)	(0.023)	
Banks and Credit Unions	2,791	0.318	–0.037	0.130	0.017	0.129
		(0.016)	(0.027)	(0.016)	(0.020)	
Productive loans	2,791	0.284	–0.028	0.110	0.024	0.146
		(0.015)	(0.026)	(0.015)	(0.019)	
Consumption loans	2,791	0.081	–0.020	0.028	–0.005	0.324
		(0.009)	(0.013)	(0.009)	(0.009)	
Cooperatives and NGOs	2,791	0.078	0.029*†	0.066	0.015	0.536
		(0.011)	(0.016)	(0.011)	(0.015)	
B. Outstanding debt (IHS)	624	7.976	0.018	7.782	–0.248	0.246
		(0.094)	(0.127)	(0.134)	(0.180)	
Banks and Cooperatives	624	6.876	–0.382	5.648	–0.537	0.793
		(0.238)	(0.321)	(0.339)	(0.480)	
Productive loans	624	5.915	–0.076	4.900	0.098	0.810
		(0.272)	(0.398)	(0.389)	(0.544)	
Consumption loans	624	1.358	–0.260	1.024	–0.712**††	0.302
		(0.192)	(0.279)	(0.275)	(0.310)	
Cooperatives and NGOs	624	1.415	0.729**††	2.679	0.191	0.382
		(0.243)	(0.331)	(0.347)	(0.507)	
C. Pr(Arrears in the past 12 months)	786	0.298	–0.017	0.291	0.002	0.792
		(0.029)	(0.041)	(0.043)	(0.061)	
Banks and Cooperatives	637	0.246	–0.030	0.176	0.020	0.520
		(0.029)	(0.045)	(0.046)	(0.068)	
Cooperatives and NGOs	239	0.538	–0.039	0.512	–0.102	0.650
		(0.070)	(0.095)	(0.077)	(0.105)	

Note: For the estimation of this table, we exclude loans in the SBS Pérdida debt qualification category (i.e., we exclude written off debts). Variables that refer to monetary quantities (outstanding debt) are winsorized at the 99 percent level; these money quantities are a snapshot of outstanding debt categories after two years of the intervention, and were converted from Nuevos Soles to 2014 US dollars and transformed using the inverse hyperbolic sine transformation; we only show results on outstanding debt for the sample who had outstanding debt two years after the intervention. In panel C, repayment behavior is proxied by a dummy variable that takes the value of 1 if any loan held by the household was in arrears at any point during the past 12 months. All regressions include village characteristics such as population size, literacy rate, households with drains (%), households with electrical energy (%), presence of a school with secondary-level education, presence of any school, and presence of a health center, as well as round-district fixed effects, the value of the dependent variable at baseline, and a dummy variable indicating whether the same person answered both the baseline and the follow-up survey. We also include a dummy that indicates whether whether data on village-level characteristics are missing; this lack of information is due to missing data in governmental official records. Clustered errors at the village level in parentheses. Stars denote significance levels (* 10%; ** 5%; *** 1%) based on unadjusted p-values. Daggers denote significance levels († 10%, †† 5%, ††† 1%) based on Romano Wolf p-values. Romano Wolf multiple hypothesis testing calculations were ran separately for each panel and include, for panel A, 15 regressions with the variables shown as outcomes for each regression; 15 regressions for panel B; and 9 regressions for panel C. Data source: Equifax credit bureau. Sample: All rounds, all households that were interviewed at follow-up and where at least one member's ID was searched.