



# Essay on financial inclusion: the case of informal savings groups

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# Preface

This dissertation focuses on the financial inclusion of individuals in low-income countries. Financial inclusion covers a large range of services and tools such as savings, affordable credit, facilitated payment systems, and insurance. While achieving global financial inclusion is not in itself defined as a Sustainable Development Goal (SDG) by the United Nations, it is recognized as a necessary mean to reach those goals such as no poverty, zero hunger, good health and gender equality. Financial tools are key for individuals to empower themselves and reduce dependency on development support. In a world where international aid flows are more and more uncertain, and where repeated crisis, weather financial, climatic, pandemic- or conflict-related, heightened this uncertainty, improving self-reliance and resilience for vulnerable communities is key. It is in this perspective that I worked on those topics during the last three years, aiming to understand what tools can be levered to improve access to financial services and more importantly how to design those tools to address the needs of their target populations and enhance their impacts.

The particular focus on savings groups spring from this idea that enhancing financial resilience and independence from donor's money is the best way to empower individuals and to give them the keys to improve their livelihoods. Just like Ashe and Jagger Neilan (2014) claim in their book on savings groups: "*As local communities take charge of the financial aspects of their lives, they gain the skills, confidence, and motivation to do more*" and further citing Marcia Oddell (a promoter of savings groups in Nepal): "*dependency is not empowering*" (Ashe and Jagger Neilan, 2014, p. 1). I strongly believe that savings groups, based primarily on mutual aid and reciprocity between members, are powerful in creating new resources for their members, both financial and immaterial such as solidarity, confidence, and empowerment. This dissertation aims at putting this belief to test, and at better understanding what actually works, what does not, and in which conditions.

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I am so happy for the chance to work with my colleagues from the CERSEM PhD team: Naome Otit, Linda Nakato, Rolando Manuel Gonzales Martinez, Roger Aganze, Benjamin Akatabanuse, Richard Sebaggala, Armande Mahabi Nabami, Daniël van Hemert, Emma Bossuyt and Eline Van der Auwera. Special thanks to Armande for being a great co-author, I am looking forward to working with you again in the future!

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To my friends back home: thank you for always being there for me no matter how much time I spend away, for encouraging me, and lifting me up when I need it the most. And especially all my love to Pauline, Jeanne, Naïla and Victoria for being the greatest friends and all-around shining stars. I am so lucky to have you in my life.

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Anaëlle Petre  
Kristiansand (NO) - Brussels (BE)  
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# List of Studies

## Published (Not included in this dissertation)

- Nabami, A. M., Petre, A., & Mersland, R. (2024). Impact of climate change training intervention in savings groups. *Journal of International Development*, e3896. <https://doi.org/10.1002/jid.3896>.

## In Progress (Included in this dissertation)

- Petre, A. (2024). Committing to save: A systematic review of behavioral interventions to foster savings in developing countries. In Review in *The European Journal of Development Research*
- Petre, A., D'Espallier, B. & Mersland, R. (2024). Savings groups as delivery platforms for development: Does financial intermediation benefit too? In Review in *Oxford Economic Papers*
- Petre, A., D'Espallier, B. & Mersland, R. (2024). Consumption smoothing in times of COVID-19: the role of informal group-based finance in Ugandan refugee settlements.

# List of Abbreviations

ASCA = Accumulating Savings and Credit Associations

ATT = Average Treatment effect on the Treated

DD = Difference-in-Difference

FE = Fixed Effects

FUR = Fund Utilization Rate

IGA = Income-Generating Activity

ITT = Intent-To-Treat

MFI = Microfinance Institutions

NGO = Non-Governmental Organization

*PICOS* Framework = Population - Intervention - Comparison - Outcomes - Study Design (as defined by Higgins et al. (2022))

PPP = Purchasing Power Parity

PT = Parallel Trends

RCT = Randomized Controlled Trial

ROS = Return on Savings

ROSCA = Rotating Accumulated Savings and Credit Associations

SAVIX = Savings Groups Information Exchange

s.d. = Standard Deviation

SDG = UN Sustainable Development Goals

SG = Savings Group

SHG = Self-Help Group

UN = the United Nations

UNHCR = the United Nations Office of the High Commissioner for Refugees

USA = United States of America

VSLA = Village Savings and Loans Associations

WASH = Water, Sanitation and Hygiene

WTP = Willingness To Pay

# Introduction

## 1. Financial Inclusion and savings groups

### 1.1 Financial inclusion on the savings-side

The World Bank defines financial inclusion as ownership of an account in a regulated institution such as a bank, microfinance institution, credit union or mobile money provider (Demirgüç-Kunt et al., 2022). Savings are recognized as an essential tool to improve the livelihoods of poor households: savings can be used as buffer stock against income shocks, insurance for unexpected expenses, capital to invest in business opportunities or to finance the purchase of durable goods (Demirgüç-Kunt et al., 2022).

In the last decade, ownership of a bank account has greatly expanded. In 2021, it is estimated that 71% of the global adult population has their own savings account. In large part, this is due to the rapid growth of the supply of mobile money services in recent years (Demirgüç-Kunt et al., 2022). Most of the remaining unbanked population lives in low-income countries and even more specifically in Sub-Saharan Africa. Women, ultra-poor households and individuals with disabilities are even more likely to remain unbanked, particularly in rural areas.

Rural areas are indeed difficult to serve due to their low population density and less infrastructures, increasing the costs of local bank branches (Allen, 2006; Allen and Panetta, 2010; Beaman, Karlan, and Thuysbaert, 2014). Even in urban areas, underserved populations struggle to access savings services. Providing savings services for accounts with small balances is challenging and leads to high transaction costs that are often transferred to customers (Matin, Hulme, and Rutherford, 2002). Even microfinance institutions, that made great strides to expanding access to financial tools, do not always find it profitable to offer savings services (Ashraf et al., 2003; Duflo and Banerjee, 2011).

In the absence of formal account ownership, people find alternatives to save: people hide cash in their home, consign it to their friends or neighbors, or invest it in buffer assets (Collins et al., 2009). A centuries-old tradition of saving in a group also exists, under a variety of names in each country, often referred to as the Rotating Accumulated Savings and Credit Associations (ROSCA) in the literature.

ROSCAs are based on a simple model: members meet weekly to deposit a fixed contribution into a common pot that is given in full to each member consecutively (Gugerty, 2007). The chosen method to allocate the pot at each meeting varies, sometimes based on a bidding system, an order decided in advance, or randomly drawn (Bouman, 1979; Besley, Coate, and Loury, 1994).

Based on the ROSCA model, the savings group (SG) methodology was launched in the 1990s in Niger at the initiative of CARE International (Ashe and Jagger Neilan, 2014). Contrary to self-initiated ROSCAs, savings groups are often facilitated by an NGO as part of a development program. The SG model is massively scaled-up, a standout compared to other development programs. Groups now exist on every continent and include millions of members. Savings groups are promoted as the flagship intervention in NGOs like the Aga Khan Foundation, CARE, Catholic Relief Services, Freedom from Hunger, Oxfam, Plan International, World Vision and many others. Building on the principle of the indigenous ROSCAs, savings groups connect 20 to 30 members of a community to meet weekly, pooling their savings together. Instead of allocating the pot at each meeting, SGs let the savings accumulate in the common fund and use it as capital available to meet the borrowing requests of members (Burlando, Canidio, and Selby, 2021). The savings groups model thus allows more flexibility than ROSCAs: members can choose the amount they save and when and how much they want to take out in loans (Burlando, Canidio, and Selby, 2021).

Usually, NGOs support the creation of new groups with information sessions in rural communities and training on the SG model. They help new groups manage their cashbooks to keep track of their loans and savings. Some NGOs also teach oral accounting methods to expand access to illiterate members (Ashe and Jagger Neilan, 2014). The NGO support usually lasts one “cycle” of activities, where savings are accumulated and lend out and by the end of which loans must be repaid with interest. At the beginning of the cycle, the group decides on the minimum saving contribution per meeting and the interest rate on loans. The minimum savings vary largely per group, depending on the saving propensity of its members. At times, the minimum can be small, as low as \$0.05 per week. Weekly deposits are kept in the group until the end of the cycle of activities; withdrawals are forbidden or allowed only with penalties.

At the end of this cycle, a “share-out” takes place: members recover their savings and the interest generated by loans are distributed amongst members. Members thus collect a return on savings, that typically ranges around 30%, an important incentive to save in areas where formal financial institutions sometimes struggle to offer a positive real interest rate on savings accounts (Allen, 2006). The share-out is often organized to match a period of the year where members expect high expenses:

in time for agricultural inputs before the new harvest season, at the beginning of the school year to cover the fees or around major religious celebrations (Allen and Panetta, 2010). After the share-out and the end of a cycle, members are free to leave the SG, new ones can join, and new rules and interest rates can be discussed and decided (Burlando, Canidio, and Selby, 2021).

## 1.2 Financial inclusion on the credit-side

Since the seventies, the expansion of microfinance institutions has been key to expand financial inclusion on the credit-side with the supply of non-collateralized loans to individuals previously largely underserved by the traditional banking system due to their low and volatile incomes. The assumption behind microfinance is that many entrepreneurs in low-income countries forego profitable investments due to a lack of capital. Accessing loans through microfinance institutions could thus help them to develop their income-generating activities and lift them out of poverty (Yunus, 2009). The evidence of the impacts of taking a microcredit on income and entrepreneurial activities is mixed and suggests heterogeneous effects depending on the context and types of borrowers. Banerjee, Karlan, and Zinman (2015), by reviewing six randomized controlled trials (RCT) of interventions promoting microcredits, find modest but positive effects. Despite some clear successes, it is thus not evident that microfinance is the panacea against poverty as it was presented in its outset (Bateman, 2018).

The most convincing impacts of microcredit are concentrated on business outcomes and for borrowers who had an existing entrepreneurial activity before the credit (Banerjee, Karlan, and Zinman, 2015; Banerjee, Duflo, et al., 2015). Yet, not all individuals in low-income countries are entrepreneurs in the making, ready to develop their business. Many households living on one or two dollars a day rely on small amounts borrowed from their network to cover daily expenses (Collins et al., 2009). Small consumption loans with short-term maturity, sometimes only a few days long, are key for those households with unpredictable revenue streams (Duflo and Banerjee, 2011). The microfinance sector is ill-equipped to offer such loan products as it is not its intended purpose. In contrast, savings groups are better fitted as a cash management tool, and can provide flexible credit conditions in terms of loan duration and repayment schedule. A typical SG loan has a duration of three months but can vary a lot. The monthly interest rates are chosen by the groups, but it usually ranges from 5% to 20% (Le Polain, Sterck, and Nyssens, 2018).

## 1.3 The specificities of Savings Groups

According to the Global Findex Database 2021, 419 million individuals save through savings groups, almost three times the number of microfinance borrowers worldwide

(Demirgüç-Kunt et al., 2022). Savings groups combine multiple advantages for their members as they provide a safe saving instrument (in a locked cashbox or a joint group account) accessible even to individuals with low savings capacity. The group setting imposes a certain saving discipline (Gugerty, 2007), and enforces responsible financial behaviors by being held accountable by other members (Breza and Chandrasekhar, 2019; Exley and Naecker, 2017; Besley, Coate, and Loury, 1993). The groups also provide access to small loans adapted to the needs of their members. As group members are part of the same community, they have a strategic advantage compared to formal institutions in screening and monitoring each other, reducing the risk of moral hazard (Arnott and Stiglitz, 1991).

Previous evidence has shown that group participation has significant benefits for its members. Annan et al. (2013) find, in their RCT in Burundi, that after one year in the group, members spend 23% more in consumption expenditures than at baseline. They also increased asset holdings more than non-member control households. Beaman, Karlan, and Thuysbaert (2014), studying membership in Mali, find improvements in food security, consumption smoothing and an increase in precautionary savings but no significant change in income or expenditure. Ksoll et al. (2016) follow new members of an RCT promoting savings groups in Malawi over two years. They find that, on average, members consume one more meal per week than control households. Member households also have larger overall savings and higher expenditures but experience no change in asset ownership.

Savings groups have also been praised to foster community empowerment (Ashe and Jagger Neilan, 2014). The groups do not require the infusion of external capital, all their activities are based on members' existing resources. The model fosters mutual aid and solidarity between members. The profits generated by interest on loans directly benefit members with no middlemen nor transaction costs (Rutherford, 1999). This promotes a sense of ownership and control that motivates members to participate and makes groups self-sustaining: even without the support of a NGO, groups have high long-term survival rates (Fleischer-Proaña, Gash, and Kuklewicz, 2011). Promoting new groups is relatively cheap for development organizations compared to other programs, estimated at \$1.5 per member (Ashe and Jagger Neilan, 2014). Groups also self-replicate without any NGO intervention, with previous members creating new groups (Greaney, Kaboski, and Van Leemput, 2016).

However, savings groups are not perfect, and the benefits of membership are heterogeneous. The main limitation lies with the small size of savings and credit. The capital available for loans depends entirely on the accumulated savings, and there is no certainty that supply of credit will be able to meet demand (Burlando, Canidio, and Selby, 2021). If all members require loans at the same time, it leads

to a credit shortage, and the decision on who “needs it the most” might not always be the result of a democratic process between members (Le Polain, Sterck, and Nyssens, 2018). In the same perspective, larger loans required for productive investments are not always obtainable, leaving the members credit-constrained (Allen and Panetta, 2010; Ashe and Jagger Neilan, 2014). On the other hand, if the demand for loans is low, the excess of savings may lead to large amounts of cash in the cashbox, a potential security threat. It is also a missed opportunity for a high return on savings as less interest is generated through the loans. This sometimes leads to pressures between members to take on more loans than desired to increase the return on savings and avoid leftover cash (Le Polain, Sterck, and Nyssens, 2018).

## 2. Methodology: impact evaluations in development economics

In recent years, the development economics literature has been largely based on impact evaluations. Impact evaluations are the various tools used to estimate the impacts of a specific intervention, and to clearly attribute the causality of these impacts to the intervention and not to other changes in the environment (Banerjee, 2020). Amongst the different methods of evaluation, randomized controlled trials (RCT) are often considered the “gold standard” (Ravallion, Martin, 2020). Based on the random allocation of individuals between a control and a treatment group, RCT are recognized for their high internal validity. However, RCT are also criticized regarding their costs (White, 2013), the ethical concerns they raise (Ravallion, Martin, 2020), their lack of interest for the social and cultural context in which they operate (Kabeer, 2020), and more generally their lack of external validity.

Other methods to estimate intervention impacts are also common in the literature, each with their merits and pitfalls. Three important alternatives are propensity score matching (Dehejia and Wahba, 2002), difference-in-difference approaches (Wooldridge, 2021; Marcus and Sant’Anna, 2021), or regression discontinuity designs (Imbens and Lemieux, 2008). These three techniques have the advantage that they can be applied to observational data, reducing the cost of data collection. I apply two of those techniques in this dissertation.

First, I apply propensity score matching on the data from SAVIX in Chapter 2. The SAVIX dataset contains observational data on 235,000 savings groups worldwide, recording their financial operations. In this chapter, I match savings groups that receive a development intervention (e.g. malaria prevention, women empowerment sessions, or entrepreneurial training) and groups that do not to estimate the impact of the development intervention on the group’s financial activities.

Second, in chapter 3, I adopt a difference-in-difference (DD) approach by com-

paring SG members and non-members during the COVID-19. With data collected by surveys in two refugee settlements in Uganda, I examine how participating in a savings group impact refugees during the COVID-19 crisis. As membership in savings groups is not random, there is a risk of selection bias if only refugees with specific characteristics, like higher income or entrepreneurial productivity, self-select into the groups. In order to reduce this bias, the DD computes the changes in outcomes for members and non-members and compares it over time, before and after the shock provoked by the COVID-19 measures. In addition to the DD analysis, I complement the results with qualitative insights from interviews with refugees and NGO workers.

The integration of qualitative and quantitative methods is desirable when trying to understand impacts in a specific context and tease out the different mechanisms and processes that brought about those impacts (Kabeer, 2020; Bamberger, Rao, and Woolcock, 2010; Migiro and Magangi, 2011). Complex phenomena are often difficult to express in measurable variables and quantifiable outcomes, and thus require understanding the varieties of realities that coexist, which a qualitative approach is better suited to capture. In this case, leading semi-structured interviews with refugees and NGO staff workers in March 2023 allowed me to gain a better understanding of the living conditions in Ugandan refugee settlements, how lockdown measures were implemented in those places and how savings groups operate in this highly specific context.

Mixed methods are particularly useful to phenomena that are not purely economic, such as savings groups. This dissertation focuses primarily on the financial performance of savings groups and the economic benefits they create for their members. Yet, savings groups are not just financial transactions between members, they are important social connections as suggested by the findings from the interviews. Members meet outside of meetings, they visit each other regularly, and help each other outside of the group's activities, particularly when one experiences hardship. Mutual aid is also formally included in the rules of certain groups that require their members to contribute to a so-called "welfare fund", similar to a joint insurance, that members can rely on for emergencies, the loss of a relative or a medical emergency. Capturing this social aspect of savings groups is limited through a purely quantitative approach. Qualitative and in-depth contextual analysis can thus be an advantage to understand this social dimension of the groups.

### 3. Summary of the studies

This dissertation consists of three chapters, each one exploring a different challenge related to financial inclusion in low-income countries, from barriers to save (chap-



ter 1), savings groups performance and development interventions (chapter 2) and adaptation to income shock through savings groups participation (chapter 3).

Chapter 1 addresses a puzzling common finding in savings promotion interventions that individuals owning a formal bank account rarely use it actively. In order to understand why access does not always lead to the adoption of savings services, I analyze 43 research papers studying the impact of savings promotion interventions, through a systematic literature review. I focus specifically on interventions including a commitment component: any type of device savers can rely on to ensure a certain level of saving discipline. This ranges from reminders to save, goal setting and planning, mechanism provoking guilt or remorse from deviating from their goal, withdrawal restrictions or the use of peer pressure.

I start by reviewing the literature on the reasons why individuals need such commitment mechanisms, mainly time-inconsistent bias, the lack of trust in formal banking institutions, temptation spending, procrastination, or capture of their savings by relatives. I then examine the impacts of different commitment devices on savings balances and various welfare outcomes (indebtedness, agricultural investment, consumption smoothing, bargaining power within the household). This methodical review of findings leads to four main conclusions: *(i)* social enforcement plays a key role in fostering saving discipline; *(ii)* a gender-specific approach to financial inclusion is key to understand the financial needs of households in low-income countries; *(iii)* there is a clear trade-off between flexibility and discipline in the design of efficient commitment mechanisms, and *(iv)* commitment default options directly built-in the design of savings services are the most impactful to increase take-up of savings accounts.

Chapter 2 focuses on savings groups and how they have become ideal platforms for the delivery of development interventions. In their research to maximize their impacts while minimizing their costs, many NGOs turn their attention to savings groups to use them as privileged beneficiaries of various development programs: malaria prevention, women empowerment session, business training, etc. Groups are indeed ideal platforms for those types of interventions as members meet weekly at known locations and are usually target populations, in most need of development interventions but difficult to reach. NGOs, by delivering activities and training directly in the SG, can benefit from both economics of scale, reaching all members at once, and economies of scope, by building on the saving and lending activities of the group. While previous evidence shows that those NGO-activities are beneficial at the individual level, we provide novel findings about their impact at the group level and how they affect savings and credits in the group.

To estimate the impact of delivering development interventions on the financial activities of savings groups, we use data from the SAVIX database. SAVIX contains

standardized financial data for over 235,000 savings groups worldwide, representing about 5 million individuals in 50 different countries. In the dataset, about 40% of savings groups receive NGO-led development interventions while the rest do not. We use propensity score matching to compare savings groups with interventions and savings group without.

We find that NGO-driven development interventions in the groups strengthen the SG capacity for financial intermediation by increasing the average savings and loan sizes per member. Piggybacking on savings groups for additional interventions aiming to improve the livelihoods of their members is thus beneficial for all stakeholders. In addition, we show that these positive impacts are more substantial when the intervention provided focuses on social activities rather than business training.

Finally, Chapter 3 focuses on how financial inclusion is key to facing uncertainty and income shocks for vulnerable households. We study this in a particular context: we use data from refugees in two settlements in Uganda from August 2019 to September 2020. During that period, the world was shaken by a global pandemic, with impacts reaching also our respondents that had to suddenly adapt to lockdown measures that strongly reduced their income opportunities. We document how this systemic shock affects refugees, most of them living with less than one dollar a day, with limited access to financial tools and engaging in various informal economic activities that were shut down.

In particular, we examine how participation in savings groups could have helped refugees mitigate the economic consequences of the COVID-19 measures by providing them with a saving instrument and access to credit. We compare savings groups members and non-members before and after the start of the lockdown measures with a difference-in-difference analysis. Our data contains detailed information on all financial operations of our respondents, including their income, expenditures, savings, loans, remittances, and savings group participation. The data was collected every two weeks from August 2019 to September 2020.

We find that, in the case of a systemic shock like COVID-19, savings groups were not adequate to support their members smooth their consumption after an important income reduction. Members of SG are spending 18% less than non-members on food items and essential households' expenses. They also borrow 16% smaller loans than non-members and withdraw a 17.5% smaller amount from their savings. Based on qualitative insights and descriptive analysis, we suggest that these negative impacts are due to the rigid rules of savings groups. Savings groups impose a withdrawal restriction for their members, meaning that members' savings are blocked in the group until the end of the cycle. Members, despite having higher levels of savings at baseline, thus could not take advantage of their savings to stabilize their expenditures. Relaxing the withdrawal interdiction could help savings groups

adapt better to large systemic shocks by allowing their members to use their savings in a pro-cyclical manner: members make more deposits when their income is high but dissave and withdraw their savings when their income falls below their median income.

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# Chapter 1

## Committing to save: A systematic review of behavioral interventions to foster savings in developing countries

*Anaëlle Petre*

This paper aims at investigating the behavioral aspects of savings through a systematic literature review of various interventions introducing savings commitment devices in developing countries. By examining and discussing previous evidence of the impact of commitment devices both on savings and on welfare outcomes, this paper aims at providing useful and evidence-based insights to develop and design saving services that are adapted to their target population and strategic in fighting poverty around the world. I use this review to identify success factors in terms of take-up of the commitment tool, capacity to increase savings and impacts on welfare outcomes of participants. The findings suggest that interventions including built-in or implicit commitment, notably through mechanisms signaling saving discipline to peers, and gender-specific approaches are the most successful in fostering savings.

*Keywords:* savings, commitment, behavioral finance, time-inconsistent preferences.

*JEL Codes:* D14, D15, G21, G4, G51

## 1.1 Introduction

In 2017, 43% of the adult population in developing countries reported accumulating savings and regularly putting money aside in the last 12 months (Demirgüç-Kunt, Klapper, Singer, Ansar, and Hess, 2018). Savings have many purposes for households: they can be used as buffer stock against income shocks, insurance against unexpected emergencies and capital to invest in business opportunities when they arise. Small amounts frequently put aside can be mobilized to pay for education and health expenditures and have the potential to produce long term benefits for savers. In the last decade, many interventions have thus tried to further foster household savings and expand financial inclusion, considered a key factor for global poverty alleviation (Demirgüç-Kunt, Klapper, Singer, and Ansar, 2022).

Yet, in many cases, practitioners and researchers are met with the puzzling finding that access to savings services is not a sufficient condition to effectively increase savings, i.e., access does not lead to adoption. Many studies promoting formal access to savings accounts experience low take-up rates (Ashraf, Karlan, and Yin, 2006; Brune, Giné, et al., 2016; John, 2020; Kast and Pomeranz, 2014). Many factors can explain this lack of take-up of savings products: lack of trust in formal banking institutions, difficulties in saving from an income that barely covers essential expenditures such as food and rent or security concerns, to cite a few. This literature review aims at assessing these different barriers and the interventions implemented in the last two decades to overcome those issues and foster household savings. More specifically, this paper reviews previous evidence to ask the question: can the low level of savings among poor people be overcome with commitment mechanisms?

Understanding how commitment instruments and incentives can foster savings and evaluating which interventions are most successful to do so can provide useful insights in designing services and interventions to reach the most vulnerable populations and further develop financial inclusion. This review focuses thus on the growing body of literature implementing and testing various kinds of commitment devices to increase savings. Simply defined, a commitment device is any arrangement that individuals use to reach a goal, limiting their future choices in order to pursue behaviors that they consider more optimal but difficult to reach due, for example, to temptation or lack of effective control over their resources (Bryan, Karlan, and Nelson, 2010).

I review interventions aiming to increase the savings of their participants by testing various commitment instruments ranging from “hard” commitments making saving completely illiquid for consumption (with withdrawal restrictions for example) to “soft” commitments relying on the psychological costs, guilt or remorse, of deviating from a goal. By reviewing savings interventions in the last two decades,

I was able to identify common issues but also successes, and I aim to offer some lessons that can be used in the future for the design of savings products and create a better understanding of the demands of individuals in the Global South regarding commitment devices. Different commitment instruments, from reminders, mental accounting, informal social enforcement to withdrawal restrictions are reviewed and compared in order to identify what makes for a “good” commitment that efficiently increases savings. Also, by combining findings from 43 studies in different countries and with various target participants, I can bring recommendations that are more robust than what can be developed in one single study in a specific population and context.

I focus on interventions in low-income countries as the banking industry in general and savings services in particular should be tailored to the needs of their customers and those will differ sharply between households surviving on a few dollars a day without safety nets compared to individuals in Western countries. In this perspective, this paper reviews 43 articles on interventions testing commitment devices for savings in low-income countries, covering studies in Africa, Asia and Latin America. The interest of this review is twofold: gain an understanding of what types of commitments are the most effective in fostering savings, and subsequently do those increased savings positively impact the welfare of savers. The studies included in this review investigate thus the impact of commitment devices on both financial outcomes, such as actual savings balances, and distal welfare outcomes in education, health, or agricultural productivity.

I find that all studies, no matter the type of commitment implemented, find a significant and positive impact on savings balances. Yet, the increase in savings is short-lived: the effects disappear over time for the few studies investigating long-term impacts (Ashraf, Karlan, and Yin, 2006; Breza and Chandrasekhar, 2019). Regarding other outcomes, I find suggestive evidence that increased savings balances translate in a reduction of short-term debts (Kast and Pomeranz, 2014; Steinert et al., 2022), better agricultural output (Brune, Giné, et al., 2016), more financial autonomy for female beneficiaries (Ashraf, Karlan, and Yin, 2006; Steinert et al., 2022), and consumption smoothing and a better ability to face shocks (Kast and Pomeranz, 2014; Breza and Chandrasekhar, 2019; Dupas and Robinson, 2013).

In addition, based on those findings, I discuss two policy-implications and features of commitment devices that is key for designing savings products that are adapted to the needs of savers in developing countries. First, I document the importance of social enforcement in financial behaviors and particularly to achieve savings goals, as highlighted by the continued success of ROSCA and other informal savings groups. Second, I argue that a gender-differentiated approach should be systematically adopted when designing savings products based on evidence that women and

men face different barriers to access financial services, and have different products demands.

I believe that this literature review builds on previous research by presenting novel findings in three ways. First, compared to the other most recent paper on this topic, the working paper by Flechtner (2023), both papers review the literature on under-saving. Yet, Flechtner focuses on the causes of under-saving: based on previous evidence, she tries to establish the robustness of the causal link between behavioral biases (mainly present-biased preferences) and under-saving. In contrast, this review does not aim at isolating the causes of under-saving or whether commitment devices are only useful to address behavioral causes of under-saving. Indeed, we briefly review what could cause the lack of household savings in our theoretical framework, but the main goal of this study is to review the solutions and interventions to promote savings. I review interventions introducing commitment devices in various contexts to understand what is efficiently increasing savings and in which conditions, proposing conclusions and policy recommendations that differ greatly from the ones offered by Flechtner (2023).

Second, compared to previous literature, this review could be compared to the working paper by Ashraf, Gons, et al. (2003) that presents a review of existing savings products. In their paper, the authors define the different types of commitment devices dividing commitment between “deposit-side features” that encourages discipline and reduce the risk of spending the money on other expenses rather than saving it, and “withdrawal-side features” that reduce the access to previously saved amounts. The authors then report on a few existing commitment products. I build on Ashraf, Gons, et al. (2003) first by reviewing much more recent commitment interventions and second by not reporting what exists but by comparing different features and building lessons of what type of commitment is more efficient in which context.

The paper is organized as follows; I present the methodology used to select the reviewed studies and then give a description of the sample in terms of publication information and explain the two consecutive coding used for the analysis of the sample. Section 1.5 reviews the evidence on the importance of the interventions promoting savings in developing countries. Section 1.6 reviews the different rationale on why commitment could be effective tools to increase savings and why they are needed. I review the different findings of my analysis of the studies sample in the four following sections: first I look at the determinants of the take-up rates of commitment products, second I review the evidence on whether commitment significantly increase savings, third I show the evidence of substantial substitution effects between saving and borrowing and finally I present how commitment devices impact other outcomes than saving, such as well-being, household bargaining power or

consumption smoothing. In section 1.11, I then offer some policy recommendations based on the review of the evidence. Finally, I explore some avenues for future research in Section 1.12 and make some concluding remarks in section 1.13.

## 1.2 Methodology

This review focuses on interventions introducing a savings commitment and investigating its impact on savings behaviors. Referring to the *PICOS* framework as defined by Higgins et al. (2022), the topic of this literature review can be framed in the following way. The *Population* concerned is limited to developing countries and in particular to populations with previously low or no access to financial services. The *Intervention* is any program introducing a new commitment device or studying an existing one, whether it is coupled with a formal financial service or not (in the case of informal savings groups for example). The *Comparison* groups vary across study, often interventions test different treatments arms where different commitment devices are compared. Otherwise, the control group is composed of individuals with similar access to financial services but without the possibility to take up a commitment service. The *Outcomes* of interest are diverse: papers investigating the direct impact of commitment on savings balances are included, as well as papers looking at secondary welfare outcomes such as consumption smoothing, investment in entrepreneurial activities, health or education. The *Study Design* used in the studies included in this review are in majority randomized controlled trials (RCT) where receiving the opportunity to take on a commitment device is considered a treatment and this treatment is randomly allocated amongst a target population. In addition to RCT, a few papers based on rigorous quasi-experimental designs and lab-in-the-field experiments are included in this review. I consider a quasi-experimental design “rigorous” based on the following criteria: the use of an appropriate control group, a clear justification of why the risks of selection bias and endogeneity issues are limited, and the publication of the study in a high-quality peer-reviewed journal.

Based on this, the keywords for the article’s selection were simply “saving commitment” (also declined in plural forms). The articles research was done on the Web of Science database in April 2021 and produced 416 articles. The research criteria were refined to include only the fields of economics, social sciences, management, business and development studies. From this first selection, the sample of articles was further reduced by screening titles and abstracts. Selection was based on these exclusion-inclusion criteria: all articles studying macroeconomic trends in private and public savings were excluded as this review focuses on the behavioral and mi-

croeconomic aspects of savings; only articles focusing on “developing” countries were selected (in terms of geographic areas this includes studies located in Africa, Asia and Latin America); articles relating both to formal savings services, such as banks and microfinance institutions (MFI), and informal saving settings, such as ROSCA and deposit collectors, were included.

This led to choosing 41 articles for full-text reading. In addition, in order to capture grey literature and other papers not captured by the keywords, a snowballing<sup>1</sup> citations research was performed. Indeed, as indicated by Popay et al. (2006), snowballing is particularly relevant for social sciences where keywords tend to fail to capture the full relevant literature. For each of the articles selected for full-text reading, the references were also reviewed by back-referencing<sup>2</sup> and citation-tracing to find additional articles relevant for this review. In addition, an in-depth search on Google Scholar was performed to avoid missing any important study. This led to the selection of 47 additional papers, resulting in a total of 88 articles chosen for full-text reading. Amongst those, 45 were discarded for not investigating the impact of a saving commitment device in a developing country. Figure 1.2 summarizes the screening and selection process according to the PRISMA statement (Page et al., 2021).

The remaining sample of 43 papers included in this review was split between empirical, relying on survey or administrative data to quantitatively estimate impacts, and theoretical contributions. The reference list at the end of this paper contains those 43 papers and additional references used in the theoretical section of this paper or for methodological guidance. Amongst the 43 papers, the 26 empirical ones are presented in a summary table with their findings in Table 1.3.

It should be noted that this selection is limited by publication bias and that the studies captured in this review reflect only interventions where significant impacts are found. It could be the case that studies showing no impact at all of commitment devices on savings or even negative impacts experience more difficulties to be published and thus could not be included in this review. Yet, a few working papers (circulated by the National Bureau of Economic Research or university research groups) are considered too for this review and are included in the sample search, as suggested by Waddington et al. (2012) to reduce the risk of publication bias.

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<sup>1</sup>We use snowballing following the definition by Waddington et al. (2012), p.363: “*Snowballing involves reviewing and pursuing references in identified papers, including primary studies and existing reviews, and using these sources to build up (that is, snowball) a larger body of evidence.*” In other words, for all studies identified through the Web of Science search, we review all the papers citing each identified study to find relevant ones for our review.

<sup>2</sup>We use back-referencing following the definition given by Waddington et al. (2012), p.363: “*(...) reviewing references of included studies*”. This means that for every study included in our review, we scope the reference list for additional papers that could be relevant for the review.



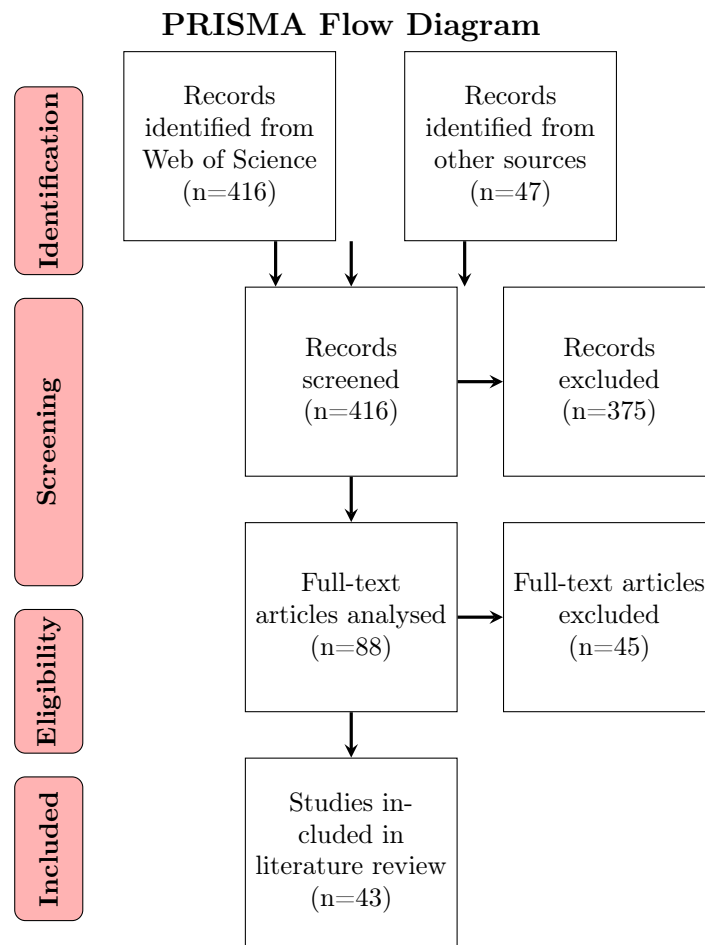


Figure 1.1: PRISMA diagram on the selection process of the studies included in the review (adapted from Higgins et al. (2022)).

In addition to topic relevance, the articles selected are reviewed based on quality and reliability of the findings. Table 1.2 presents in which journals the articles selected for the review were published.

Table 1.1: List of journals of the studies included in the review

Sources	Nbr of Articles	Impact Factor (2019)	ABS Ranking
Journal of Development Economics	5	2.649	3
American Economic Journal - Applied Economics	3	5.034	3
American Economic Review	3	5.558	4
Management Science	3	3.921	4
Quarterly Journal of Economics	3	11.375	4
Econometrica	2	3.992	4
Economic Development and Cultural Change	2	1.816	3
Oxford Development Studies	2	1.66	2
AIDS And Behavior	1	3.147	
American Economic Journal - Microeconomics	1	1.325	3
American Journal of Agricultural Economics	1	3.028	3
Annual Review of Economics	1	3.591	3
Economic Journal	1	2.764	4
Journal of African Economies	1	1	2
Journal of Consumer Affairs	1	1.733	2
Journal of Development Effectiveness	1	1.674	
Journal of Development Studies	1	1.596	3
Journal of Eastern African Studies	1	1.026	
Journal of Economic Behavior & Organization	1	1.591	
Journal of Personality and Social Psychology	1	6.335	4
The Review of Economics and Statistics	1	4.345	4
Others	7		

### 1.3 Description of the sample

This section gives an overview of the characteristics of the selected papers. No pre-defined timeframe was imposed on the scope of this review and the publications range from 1997 to 2021. However, only two papers have been published before 2000 and 45% of them after 2015, reflecting the growing interest for savings and commitment devices in recent years. Table 1.3 describes the article selection in terms of citations and authorship.

The sample is divided into empirical papers (26), theoretical contributions (10), and others, including literature reviews and conference proceedings (7). Amongst the 26 empirical papers, the majority (19) investigates the impact of saving commitment interventions with randomized controlled trials, the 7 remaining rely on other econometric methods to assess the impact of commitment devices such as lab-in-the-field (2), regression analysis (4) and descriptive and qualitative data (1).

Table 1.2: Description of the studies in terms of citations and authorship

Description	Results
Timespan	1997-2020
Documents	43
Average citations per documents	48.77
Median citations per document	8.5
Average citations per year per doc	6.916
DOCUMENT TYPES	
Article	42
Book Chapter	1
AUTHORS	
Authors	82
Authors of single-authored documents	8
Authors of multi-authored documents	74
AUTHORS COLLABORATION	
Single-authored documents	11
Documents per Author	0.5

The studies cover projects in Sub-Saharan Africa (13 papers in Benin, Burkina Faso, Ethiopia, Kenya, Malawi, Uganda), Asia (9 papers in India, the Philippines and Pakistan) and South America (4 papers in Chile, Guatemala, Bolivia and Peru). The data was mostly collected through surveys, but some studies also include administrative data from their implementing partners (banks or microfinance institutions), one study in our sample also collects social network data for 3,000 individuals across 30 villages in India (Breza and Chandrasekhar, 2019).

A specificity of randomized controlled trials is that the methodology is rather reliable to identify a causal impact, however, the results are context-specific and hide unobservable social and cultural dimensions reducing the generalization of the results. This review thus includes a variety of empirical findings spread across continents to draw more general conclusions. Table 1.3 presents an overview of the empirical studies selected for this review with their key findings.

## 1.4 Sample Analysis

In order to analyze the selected articles, two consecutive readings of the papers are executed. The first reading is used to record basic information about each paper: the keywords (as and if defined by the authors), the type of article (empirical, theoretical contribution, literature review), the country in question, the type of data, the sample size, the method (randomized controlled trials, ethnographic study, case study), the independent, dependent and control variables, the underlying theory and the main

findings. Microsoft Excel is used to register these data.

This first reading allows me to identify recurring themes, the main underlying theoretical models, and main points of discussion. With those in mind, a second reading of the articles is performed to highlight the contributions to the discussion points and understand potential contradictory findings. Articles are categorized based on the types of outcomes they investigate, the type of commitment devices used in the intervention, which theoretical models they refer to, if they consider crowding-out, spillovers, and long-term effects.

## 1.5 Why is there a multiplication of saving promotion interventions in recent years?

Promoting savings became an important poverty alleviation tool and practitioners advocate for it as a lever for financial inclusion without the risk of default and indebtedness linked to microcredits. Savings are seen as a way to protect individuals against income volatility and shocks, and can be used at frequent intervals to smooth consumption (Deaton, 1989). In addition to their role as a buffer stock, savings are mobilized for investments in income-generating activities, education, housing, provision of a safety cushion for health emergencies, and thus hold the potential to lastingly improve livelihoods.

Despite the welfare-enhancing potential of savings, low-income households still face important barriers to saving. On the supply side, banks still largely underserve an important part of the population in developing countries. There are still about 1.4 billion adults that do not own a bank account, and the majority of them live in low-income countries, in particular India and Sub-Saharan Africa (Demirgüç-Kunt, Klapper, Singer, and Ansar, 2022). Offering savings services for accounts with very small amounts is challenging and represents high transaction costs for banks (Matin, Hulme, and Rutherford, 2002). In addition, banks rarely open branches in rural areas and this render deposits and withdrawals difficult if one has to travel long distances to access their account (Brune, Giné, et al., 2016; Steinert et al., 2022).

From the point of view of a financial institution, it is challenging to foster savings: the financial institution has no particular incentive nor appropriate tool to encourage their clients to continue their deposits. This is strikingly different from the credit side where the institution allocates large resources in debt recovery (Afzal et al., 2019). Yet, there is a potential profit opportunity for banking institutions to foster savings: savings are directly linked to repayment capacity. Linking saving and loans constitute an opportunity for MFI and banks to screen their clients and

reduce information asymmetry and moral hazard. Savings also constitute a chance to improve the financial sustainability of MFI that often have to rely on external capital and subsidies to finance their operations (Gingrich, 2004). Whether a bank provides savings products depends on its assessment of the market demand, and its prediction of the take-up rate of such products (Ashraf, Karlan, and Yin, 2006). In this perspective, a review of previous evidence to identify the product features with the highest take-up rate is key for developing the supply of formal savings mechanisms.

On the demand side, people save in numerous different ways: they keep cash at home, invest in illiquid asset, or participate in informal saving and lending groups (Dupas, Karlan, et al., 2018). Yet, there is evidence that the demand for formal savings services exists, and that informal mechanisms can be costly or inefficient (Ashraf, Karlan, and Yin, 2006; Dupas, Karlan, et al., 2018). In addition, many researchers provide evidence that households participating in their studies both express the fact that they would like to save more and prove that they have the financial means to do so (Atkinson et al., 2013; Duflo and Banerjee, 2011; Kast, Meier, and Pomeranz, 2018). Yet, even when they own an account, many study participants do not actively use it through deposits and withdrawals (Ashraf, Karlan, and Yin, 2006; Dupas, Karlan, et al., 2018; John, 2020; Kast and Pomeranz, 2014). Based on this observation, many tools that help individuals reach their savings goals have been tested, and are reviewed in this paper.

## 1.6 Why would including commitment features to savings products increase savings?

To promote savings in developing countries, many researchers test savings products that include a “commitment” component. Commitment devices help individuals bind themselves to a level of savings they deem optimal, and make deviations from this saving optimal costly to make sure they actually reach their goal. Practically, commitment instruments include a large range of features such as reminders to save, mental accounting and planning, deposit enforcement, or withdrawal restrictions. The goal is to enforce the savings discipline of their users (Bryan, Karlan, and Nelson, 2010).

The literature offers different reasons for why individuals “under-save”. The most common one relates to the fact that most individuals have time-inconsistent or present-biased preferences, and lack self-control to limit their current consumption. In the current review, amongst the 43 studies, 19 state that present-bias and lack of self-control are the main reason for individuals to take-up a commitment product.

The connection between time-inconsistent preferences and consumption-saving decisions was made by Laibson (1997). Due to their time bias, individuals tend to under-save compared to what they perceive would be the best course of action. Commitment instruments have thus the potential of binding future selves to a pre-defined level of savings, for example by limiting withdrawals or encouraging deposits (Frederick, Loewenstein, and O’Donoghue, 2002).

Time-inconsistent preferences are common around the world but there is some evidence that poverty exacerbates self-control issues. For example, Bernheim, Ray, and Yeltekin (2015) develop a model where below a minimal level of assets, self-discipline is strenuous and people systematically under-save, making investment in their future unattainable and keeping them in a “poverty trap”. Similarly, Banerjee and Mullainathan (2010) theoretically predicts that myopic behaviors are exacerbated by poverty that makes more stringent the impact of temptation spending on overall consumption. They develop a model where lack of self-control has aggravated consequences for lower levels of income and thus provide evidence of “*a behavioral poverty trap*” (Banerjee and Mullainathan, 2010, p. 5).

Likewise, limited institutional capacity in certain developing countries makes it impossible to rely on automated ways of saving, for example through a direct deduction of a pension contribution from salaried income. As earnings are unstable or seasonable, and usually received in cash, more budget control is needed to handle such a high level of income liquidity and unpredictability (Steinert et al., 2022). In this perspective, commitment devices are even more salient, they can help individuals reach a certain level of discipline, and financial planning, and increase their long-term utilities by being able to transform small amounts of money in a lump-sum available for emergencies, investment, or consumption of more expensive durable goods.

Yet, alternative explanations to the lack of savings also exist in the literature. In addition to time preferences and self-control issues, savings can be made difficult due to the consequences of inter-personal disagreements. In this case, commitment devices could help protect savings from appropriation. Potential savings captures could arise within the household when decisions must be taken about budget and resources allocation. S. Anderson and Baland (2002) develop a model of household bargaining where the spouses do not have the same preferences for savings and current consumption. In their study in Kenya, they find that women typically join ROSCA to protect their savings from capture from their husband and to render them illiquid for consumption. Similarly, Dupas and Robinson (2013), in their experiment to promote savings services for microentrepreneurs in Kenya, find that women are willing to pay for commitment services to make their savings illiquid in order to prevent their spouse from using the money for other purposes.

More generally, researchers have identified a “social tax” where some individuals feel a social obligation to lend amounts to their social network and offer financial help to their kinship. This pushes individuals to forgo savings under the pressure to financially support their relatives (Platteau and Abraham, 1987). In this perspective, securing their savings with a commitment device that restricts withdrawals for example, reduces the pressure to accept the demands of relatives. Steinert et al. (2022) find evidence of this in their intervention in India offering portable commitment devices: the commitment makes savings illiquid, protecting it from demands from friends and family.

Finally, saving commitments can also play a role as signaling mechanisms. Exley and Naecker (2017), in their lab experiment with Stanford students, show that take-up for commitment is much higher when the choice is made publicly rather than privately. Openly choosing a high level of commitment is used by the students to signal financial responsibility to their peers. Similarly, Breza and Chandrasekhar (2019), in their social network experiment in India, find that when people are monitored by someone central in their social network, they increase their savings as they know that words will be spread about their financial behaviors. Fearing reputational effects, individuals use savings as a way to signal their trustworthiness. These studies link commitment devices to signaling theory but also relate to the extensive literature on peer pressure in financial behaviors. For example, regarding ROSCA, Besley, Coate, and Loury (1993) show the importance of social connections and sanctions between members for informal enforcement within the group. Gugerty (2007) also emphasizes that many features of ROSCA operations are based on the demand for commitment and discipline enforced by other group members as people “*can’t save alone*”. Rather they rely on other members to pressure them to follow group’s guidelines for saving and borrowing.

## 1.7 Do people want to commit?

All interventions reviewed in this paper offer commitment features to their study participants in the hope that it will help them increase their savings. Before reviewing the evidence on whether savings balances are actually increased or not, it is interesting to look at how many study participants are interested in the commitment product and end up actively using it. Most studies present figures about the take-up rates of their interventions testing a commitment. I review these take-up rates by differencing two categories: “soft” and “hard” commitments.

Soft commitments are used to pledge to a certain level of savings but generate only psychological consequences in case of failure of respecting the terms of the com-

mitment (Karlan, Ratan, and Zinman, 2014). Concretely, soft commitment can take the form of reminders to save but also of earmarking of expenses. The latter, also called mental accounting, relies on the fact that in many cases money is not seen as fungible and assigning money towards a specific goal helps people achieve this goal (Thaler, 1985). Amongst our studies, 20 interventions test soft commitments such as reminders (Afzal et al., 2019; Ashraf, Karlan, and Yin, 2006; Atkinson et al., 2013; Cassidy and Fafchamps, 2020; Karlan, McConnell, et al., 2016); earmarking and mental accounting (Ashraf, Karlan, and Yin, 2006; Atkinson et al., 2013; Dupas and Robinson, 2013; Karlan, Ratan, and Zinman, 2014); goal-setting and planning (Ashraf, Karlan, and Yin, 2010; Avdeenko, Bohne, and Frölich, 2019; Breza and Chandrasekhar, 2019); or peer-pressure and social enforcement (Breza and Chandrasekhar, 2019; Cassidy and Fafchamps, 2020; Dupas and Robinson, 2013; Kast and Pomeranz, 2014). Please see Table 1.3 for an exhaustive list of the different types of commitment.

In contrast, hard commitments make deviations costly: default to comply provoke financial penalties. In our sample of studies, interventions include fixed deposit schedule with penalty fees for missing an installment (Afzal et al., 2019; Ashraf, Karlan, and Yin, 2006; John, 2020), withdrawal-restrictions either about the amount that can be withdrawn or a date until which savings are “blocked” (Ashraf, Karlan, and Yin, 2010; Brune, Giné, et al., 2016; Casaburi and Macchiavello, 2019; Dupas and Robinson, 2013; John, 2020; Karlan, Ratan, and Zinman, 2014; Karlan and Zinman, 2018; Le Cotty et al., 2019). An underlying assumption in the literature is that hard commitments are more efficient in creating savings by providing stronger incentives. However, by making savings illiquid they reduce the possibility to use savings as buffer stock in face of a shock (Atkinson et al., 2013). People are then more reluctant to choose a product with a hard commitment.

Regarding take-up, there is mixed evidence on whether soft or hard commitment foster a higher take-up rate of savings products. Even more so, it is difficult to analyze whether the type of commitment not only prompts participants to accept the product but also to actively use it. From the studies included in this review, ten studies offer only soft commitments with take-up rates for accepting the service ranging from 19.4% (Brune, Giné, et al., 2016) to 53% (Kast and Pomeranz, 2014) and with a reported rate of actively using the account and making more than one deposit of 37% (Atkinson et al., 2013) and 39% (Kast and Pomeranz, 2014). In comparison, five studies combine soft and hard commitments. For example, when comparing the two types of commitment in her study in the Philippines, John (2020) finds that only 27% of the participants demanded the soft commitment (with planning and goal setting of savings) while 42% preferred the hard commitment with withdrawal restrictions and penalties for missing fixed instalments, hinting to a preference for



stronger discipline. In contrast, the only study offering solely a hard commitment device has the lowest take-up rate of 16% (Le Cotty et al., 2019).

The choice between hard and soft commitment can be summarized in a trade-off between flexibility and discipline common in the design of financial services (Labie, Laureti, and Szafarz, 2017). On the one hand, savings services should enforce enough discipline to promote optimal savings behaviors reducing time-inconsistent bias, for example through hard commitment effectively restricting withdrawals. On the other hand, savings services should offer enough flexibility to savers to access their money whenever they need to, particularly in the case of precautionary savings. Market failures such as incomplete information regarding the saving capacity and time preferences of the savers makes it difficult to design savings products that balance these contradictory features of discipline and flexibility (Labie, Laureti, and Szafarz, 2017).

Those varying take-up rates question what are the reasons for participants to use a commitment instrument or not when offered one. A first explanation could be the lack of trust in financial institutions, insufficient financial literacy, or self-confidence to interact with the bank (Avdeenko, Bohne, and Frölich, 2019). But even amongst participants that do open an account or accept a commitment device, many never use it (Ashraf, Karlan, and Yin, 2006; John, 2020; Kast and Pomeranz, 2014). This is surprising as baseline surveys indicate that participants want to save, so it seems that features of the offered services create a gap between intention and action.

Some authors try to identify the determinants of the take-up of saving commitments. Ashraf, Karlan, and Yin (2006), Brune, Chyn, and Kerwin (2021) and Dupas, Karlan, et al. (2018) find that transaction costs are relevant for actively using a savings account, whether measured as a distance to the banks or fees related to take-up of such products. In addition, Bonan et al. (2019), Le Cotty et al. (2019) and Ashraf, Karlan, and Yin (2006) highlight the importance of time-inconsistent preferences for predicting take-up of commitment services. Another explanation for the low take-up of commitment features in savings products is what is defined as “sophistication”: individuals are relatively more or less aware of their time-inconsistent preferences and their need for commitment (Frederick, Loewenstein, and O’Donoghue, 2002)). Naïve individuals will trust their future self to make the right decisions and will not demand a commitment device. Even though their past behaviors consistently deviated from their goal, they are overly optimistic they will do better in the future.

On the opposite side of the spectrum, sophisticated individuals know that they have time-inconsistent preferences, and they know that they are likely to deviate from their objectives. They ask for a commitment device as they anticipate that their future preferences will change but they are willing to commit to their current ones. John (2020) shows that being more naïve can lead to choosing an inappropriate

commitment product. Testing the level of sophistication of the participants in her study in the Philippines, she demonstrates that partially sophisticated individuals tend to choose commitment with too weak incentives that lead them to default. Being able to identify the “right” commitment contract that will enforce optimal behaviors is challenging. Individuals, depending on how self-aware they are of their time-inconsistent preferences will fail to do so, leading to a disutility from the cost of a failed commitment device. In contrast, John (2020) finds that more sophisticated individuals are less likely to demand commitment technologies, but when they do, they choose incentives that are strong enough so that the commitment is efficient to increase savings. Bai et al. (2021) find similar results, showing that some people are sophisticated enough to demand commitment, yet that many fails to estimate the correct level of incentives they need for it to be effective.

And if it is complicated for individuals to choose the right level of commitment for their preferences, it is even more difficult for financial institutions to estimate the preferences of their clients. Financial institutions cannot observe the level of sophistication of their clients, and very few empirical studies investigate the distribution of naïve and sophisticated individuals within a population (Bai et al., 2021).

Yet, sophistication is not the only explanation for why individuals are not willing to opt for commitment technology. Afzal et al. (2019) provide evidence that explicit commitment features provoke avoidance behaviors. In their study in Pakistan, they find that when commitment features are implicit and built in the repayment structure of the contract, demand is high, and the product is effective to raise savings. On the other hand, when commitment is offered explicitly as an additional item, demand is low. As many of the studies reviewed here include explicit and optional commitment technologies, this may explain the low take-up rates of commitment devices, despite their effectiveness in increasing savings. In contrast, the success of informal savings mechanisms such as ROSCA draws from the fact that they include implicit commitment: their operations remind and prompt their members to save without explicitly limiting their choices (Bonan et al., 2019). On the supply-side this suggests that financial institutions can nudge their clients to increase their savings by implicitly formulating contracts that include reminders, earmarking or rewards for savings, a practice qualified of “shrouded paternalism” (Afzal et al., 2019; Bai et al., 2021).

## 1.8 Does using a commitment increase savings?

Once commitment is adopted, we can further question whether the impact on savings, or other welfare outcomes is significant. But it is interesting to start by pointing

out that the majority of studies measure their impact by estimating the Intent-To-Treat (ITT) coefficient. This measures the impact of an intervention on all those assigned to the treatment group without differentiating if the treatment was actually received or not (i.e., if the account/commitment was used or not). As all studies in this sample find a positive impact of commitment devices on savings despite varying take-up rates of the treatment, the ITT can be interpreted as a lower bound of the potential impacts of commitment devices on savings and is promising for the reliability of the positive findings. In fact, all the studies investigating the impact of commitment on savings find positive significant effects, at least in the short run, ranging from 6% (Karlan, McConnell, et al., 2016) to 81% (Steinert et al., 2022) increase in savings balances for the treatment group.

Yet, two important empirical questions arise from these findings: whether this surge in formal savings is crowding out other types of saving tools and whether this positive impact is a lasting or a short-lived effect of the intervention. Regarding crowding-out, John (2020) finds that there is no substitution between savings at the bank and in other forms by comparing levels of savings kept at home and in other formal and informal institutions between the baseline and the endline surveys. Ashraf, Karlan, and Yin (2006) find a similar result, and so do Kast, Meier, and Pomeranz (2018). There is thus some suggestive evidence that there is no important substitution between means of savings but that aggregate savings do intensify.

With regards to long term effects, most studies are performed under a relatively short timeframe, making it difficult to evaluate whether the increase is sustained over time. The existing evidence indicates that the increase in savings following the use of a commitment is rather short-lived. For example, Ashraf, Karlan, and Yin (2006) find that the initial increase of 81% in savings after 12 months, is reduced to 33% after 32 months and is no longer significant. Breza and Chandrasekhar (2019) also address these long-term concerns with a survey 15-month post-intervention looking at the ability to cope with shocks resulting from increased savings. They find positive effects with treated households experiencing less unmitigated shocks. Yet, more empirical evidence is needed to investigate long-term impact of savings commitment and the persistence of the increase in savings, as suggested by Karlan, Ratan, and Zinman (2014).

## 1.9 Saving and borrowing: are they interchangeable?

An important recurring topic in many studies is the substitution between borrowing and saving. Indeed, borrowing and saving follow the same principle of putting aside

small frequent amounts in exchange for one lump-sum. The difference is in the timing of this lump-sum, received upfront in the case of a loan, and in the long term for savings (Matin, Hulme, and Rutherford, 2002).

More specifically, it can be argued that when there are important saving constraints, credit can be used as a form of hard saving commitment to finance lumpy expenditures: the regularity and frequency of fixed instalments contribute to financial discipline and is strongly enforced by the microfinance institution (Afzal et al., 2019). As overborrowing is often raised as a concern in the microfinance industry, offering a safe saving device promoting discipline through commitment mechanisms could offset the risk of over-indebtedness.

Kast and Pomeranz (2014) find that relaxing saving constraints by offering commitment mimicking the ROSCA process reduce the short-term debts of participants by 20%. This highlights the role of savings as precautionary resources to face shocks and income volatility, and that in the absence of reliable saving mechanism, people facing such shocks are forced to borrow. Similarly, Steinert et al. (2022) observe a 30% decrease in total outstanding debts after the introduction of a saving product with a commitment feature. Also, on the link between saving and borrowing, Atkinson et al. (2013) develops a theoretical framework where time-inconsistent borrowers save and borrow at the same time while transitioning from debt to saving-financed investments, and find some empirical evidence to support their predictions.

## 1.10 Commitments beyond savings

In addition to savings balances, many studies investigate the impact of commitment instruments on other welfare outcomes. For example, Brune, Giné, et al. (2016) offer saving accounts specific to crop revenues to farmers in Malawi with commitments that restrict withdrawals. They find that agricultural investment and output significantly increase but also household consumption, highlighting that committing to savings is also a way to foster investment, agricultural productivity and household welfare.

Regarding consumption smoothing, Kast and Pomeranz (2014) document a reduction in consumption cutbacks following shocks, and Breza and Chandrasekhar (2019) find an improvement in consumption smoothing following the introduction of a saving commitment. In addition, Kast and Pomeranz (2014) provide evidence that their intervention offering different types of soft commitments improved self-reported well-being and reduced financial anxiety.

Other welfare outcomes analyzed in this sample of articles include education and health. Karlan, Ratan, and Zinman (2014) provide evidence that a soft commitment

to save for school expenditures in Uganda improved ownership of school supplies but also test scores.

Dupas and Robinson (2013) test the impact of both soft and hard commitments on health-related outcomes. They also include a “social” commitment by linking the saving account to deposits made publicly during ROSCA group meetings. They found no significant impact on investment in preventive health. However, the combination of earmarking money for health emergencies and the social commitment due to the group setting positively increased the ability of households to cope with health emergencies.

With respect to household welfare, a few studies report a gender-differentiated impact of saving commitments. Ashraf, Karlan, and Yin (2006) find that access to formal savings account increase married women bargaining power in decision-making in the Philippines, and that it materialized through higher expenditures in female-oriented durable goods. Steinert et al. (2022) document a 17% increase in self-reported autonomy from partner for women in India due to the use of a commitment device making their savings illiquid.

As pointed out by Vonderlack and Schreiner (2002), men and women do not encounter the same constraints regarding financial inclusion. As an illustration, Dupas and Robinson (2013) find that when offering access to formal savings to both men and women microentrepreneurs, only women actively use the account and increase their savings, suggesting a gender difference in demand for formal savings services. Moreover, as suggested by S. Anderson and Baland (2002) consumption and savings preferences are gender specific and thus demand for saving services and commitments is too. For example, Ashraf, Karlan, and Yin (2006), in the Philippines, find that being a married woman was a strong determinant of taking up a saving commitment service. This means that banks, when designing their services, not only influence the levels of savings of their clients through offering commitments, but also the selection, and more specifically the gender, of clients that will take up such products.

## 1.11 What can we learn to design future savings products?

Based on the evidence presented in the previous section, I identify four main recommendations for future interventions promoting savings and creating new savings products with commitment features. First, many studies find that social enforcement plays a key role in fostering saving discipline. Many studies in this review test a commitment based on peer pressure and on enforcing saving discipline by

making savings observable by peers (Breza and Chandrasekhar, 2019; Cassidy and Fafchamps, 2020; Dagnelie and Lemay-Boucher, 2012; Dupas and Robinson, 2013; Gugerty, 2007; Kast and Pomeranz, 2014; Kast, Meier, and Pomeranz, 2018).

Notably in ROSCA and similar informal savings groups, the group-setting plays a key role in fostering savings. The fixed schedule of meetings and low and frequent contributions help members reduce their self-control problems and commit to savings better than they would have been able to do so on their own (Gugerty, 2007). Additionally, groups are usually formed between neighbors or relatively close-knit communities (Besley, Coate, and Loury, 1994). In engaging in group saving and borrowing, no financial collateral is needed, but members are bound by a so-called social collateral. Failure to comply with the group's rules, for example by not contributing savings, can have important social consequences. Participating in group savings is thus a way to increase accountability and enforcing saving discipline by relying on the implicit penalty of being frowned upon by peers if one deviates from its saving goals. This is further supported by Breza and Chandrasekhar (2019) that show the importance of being viewed as financially responsible and trustworthy by the other members of one's community.

The role of peer pressure and social collateral is largely documented for credit services, notably through group-lending in microfinance institutions (Labie, Laureti, and Szafarz, 2017). However, very little saving services rely on social collateral and reputational effects to foster account utilization. Of course, relying on social collateral is challenging for a formal institution and can have important pervasive effects if individuals are threatened with social ostracism in case of deviation. Yet, research and interventions in how to integrate this social aspect to foster formal savings could be beneficial to improve the design of savings products.

Second, the importance of a gender-specific approach to financial inclusion is fundamental. Evidence that saving constraints are not the same for women and men has been highlighted in the review of the findings (S. Anderson and Baland, 2002; Ashraf, Karlan, and Yin, 2006; Dupas and Robinson, 2013; Steinert et al., 2022). Women and men face different barriers to access financial services and thus will have different products demands. The microfinance industry often professes its goals of targeting women. However, little is done practically in product design to specifically address gender concerns and differentiated needs and demands (Vonderlack and Schreiner, 2002). For example, the amounting evidence presented above that women use saving commitments as a way to gain financial independence from their spouse, and that there is a link between access to saving services and women empowerment and bargaining power is rarely taken into account in the designing of savings products. More empirical studies on how demands and utilization of financial tools differ between genders could thus fill a gap in understanding how the

targeted unbanked population will respond to financial services.

Third, findings suggest that hard commitment tools are more effective in increasing savings but result in lower take-up rates of the commitment instrument compared to soft ones. In other words, it results in higher savings for a smaller portion of individuals. In contrast, soft commitment leads to higher take-up rates, but individuals tend to not actively use it after signing up for the product. There is thus a clear trade-off here between flexibility and discipline in designing savings services including a commitment feature. From a supply-side perspective, choosing whether to offer soft or hard commitment is thus dependent on the strategy and becomes more of a question than a recommendation: is the goal to retain a few but regular savers or opening the access to an account to as many people as possible without certainty about their use?

Finally, another interesting aspect of the design of saving services relates to the way the commitment component is introduced to savers. As presented by the findings, the preferred commitment types are the implicit ones: contracts that automatically include regular reminders and nudges or observation from peers such as in ROSCA, in contrast to optional features that savers have to select themselves. The practice of setting a default option that is believed optimal from the provider perspective, can be qualified of “*shrouded paternalism*” (Afzal et al., 2019; Bai et al., 2021). Yet, it relates to a large literature of the role of default options in influencing behaviors (see for example Beshears et al. (2009)) for the role of default options in saving for pension schemes in the USA).

## 1.12 Going forward with savings promotion research

Regarding avenues for future research, I identify a few that need further investigation by the literature. All commitment devices reviewed here focus on penalties, either psychological, social or financial, in case of deviations from optimal savings behaviors. Instead, another avenue to foster savings would be to develop prize-linked savings accounts where individuals are “rewarded” for increasing their savings. One example of such incentive to save is explored in Schaner (2018) where she studies the impact of offering high interest on savings accounts. In other cases, credit availability is linked to the saved amounts. Other incentives to save are also promoted in matched savings programs, already tested for low-income families in Western contexts (Fry et al., 2008; Klawitter, C. L. Anderson, and Gugerty, 2013). In these schemes, households receive access to a secure savings account including commitment mechanisms (such as withdrawal restrictions and goal setting). Additionally, households are incentivized to save by the matching of their accumulated funds to

encourage assets accumulation. This has also been explored in the context of developing countries by Gertler et al. (2018) in their study in Mexico. Their findings suggest that even temporary incentives to open and actively use savings accounts have long-term positive impacts on savings balances.

Similarly, most studies reviewed here focus on the demand side of the market. The literature could benefit from testing the impact of introducing savings and commitment services for the supply-side. Investigating how banks and microfinance institutions could benefit from offering such services and what is the impact on their profitability and financial sustainability is key to further advance financial inclusion worldwide.

Finally, I have already discussed the potential substitution between borrowing and savings and thus suggest that the field could benefit from more research on the interaction of different financial services, including credit, savings and insurance. For example, as more and more insurance products are being developed, this will reduce the need for precautionary savings. Interventions combining insurance, credit and savings services are needed to provide a deeper understanding of the different aspects of expanding financial inclusion and the interactions between the different financial services.

## 1.13 Conclusion

This literature review investigates the impact of saving commitment devices on increasing savings and different welfare outcomes, by analyzing 43 articles ranging from 1997 to 2021. The goal of this review is to analyze previous evidence in order to understand the current research landscape, identify avenues for future research as well as recommendations for the design of savings services.

First, by reviewing the theoretical literature I identify the multiple barriers to savings. Low saving amounts can be explained by time-inconsistent preferences, limited attention and procrastination but also by lack of household bargaining power and the so-called “social tax”. Studies often mention all the above reasons for the limited savings of their participants prior to their intervention. Which aspect is the most prevalent is difficult to disentangle as all play a part and be complementary to each other.

Second, the empirical studies included in this sample provide strong evidence that commitment devices are efficient in significantly increasing savings. Furthermore, such interventions produce positive and significant impacts on welfare outcomes such as agricultural productivity, education, health, and household welfare. Further cost-effectiveness analysis of this impact compared to other types of interventions



could complement the literature and help design more effective tools for poverty alleviation.

Finally, I highlight four key factors to take into account for designing new savings products: the role of social enforcement to reach savings goals, the importance of adopting a gender-differentiated approach, the difficult balance to strike between flexibility and discipline, and the fact that built-in, implicit commitment is preferred by savers.

## 1.14 Summary of the empirical studies selected for review (Table 1.3)

Legend to Table 1.3: Summary of the empirical studies selected for review

Different types of commitments:

- A = Reminders
- B= Earmarking and mental accounting
- C= Goal-setting and planning
- D= Peer pressure/Social enforcement
- E= Fixed deposits with penalty fees for missing an instalment
- F= Withdrawal restriction: amount-based
- G= Withdrawal restriction: date-based
- WTP= The willingness to pay for commitment is estimated

Table 1.3: Summary of the empirical studies selected for review

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Afzal et al.(2019)	Pakistan	Yes	3,206 female MFI clients	Offer various savings and credit contracts with different interests and commitment levels	A, E	High heterogeneity between types of contracts	N/A	N/A	Find higher demand for implicit rather explicit commitment devices in savings contract
Ashraf, Karlan, Yin (2006 a).	The Philippines	Yes	346 bank clients	Paid monthly cash collection services	A, E	27.7% accepted the deposit service, 14.5% actively used it	Savings balances held at the bank	Yes (+) 25% increase over 15-month period	Determinants of take-up: distance to the bank (+), being married (+) Decrease in borrowing

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Ashraf, Karlan, Yin (2006 b).	The Philippines	Yes	1,777 bank clients	Savings account with incorporated commitment devices	B, F, G	28.4% opened savings account 14% had made more than one deposit after 12 months	Savings balances held at the bank	Yes (+) 47% increase after 6 months, 82% after 12 months	Determinants of take-up of commitment: being female (+), education (+), income (+), hyperbolic preferences (+)
Ashraf, Karlan, Yin (2006 c).	The Philippines	Yes	4,000 bank clients	Savings account with incorporated commitment devices	F, G	Same as Ashraf, Karlan, Yin (2006 a): Follow-up study	Savings balances held at the bank	Effect no longer significant after 2,5 years	Increased in self-reported hh bargaining power for women Increased purchase of female-oriented durable goods

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Ashraf, Karlan, Yin (2010).	The Philippines	Yes	3,125 bank clients	Estimate the impact of saving commitments on female empowerment	C, F, G	28% took up the account, 9.3% regularly used the account	Savings held at bank	Yes (+)	Increased female participation in hh decision-making Higher expenses in female-oriented durable goods
Atkinson et al. (2013).	Guatemala	Yes	1,375 Micro-finance clients	Offer commitment devices to account holders with full flexibility and no enforcement	A, B, C	Test different treatment arms with different take-up rates	Account opening, number of deposits, net accumulated savings	(+) more likely to make one deposit (+) conditional on opening an account, savings are 3.5 higher than in control group	Higher loan repayment

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Avdeenkoa, Bohne & Frölich (2019).	Ethiopia	Yes	900 farmers	Moneyboxes distribution randomly combined with behavioral nudges	C	N/A	Savings held in cash	Yes (+), increase of 36%	
Bonan et al. (2019).	Benin	No	788 individuals	Observe determinants of participation in informal groups	WTP	N/A	N/A	N/A	Correlation between participation in collective savings club and being a married woman (+), time-inconsistent preferences (+)

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Breza and Chandrasekhar (2019).	India	Yes	3,000 individuals (60 villages)	Randomly allocate savers to "personal monitor" of their savings behavior	C, D	N/A	Savings balances held at the bank	Yes (+), 36% increase persistent 15 months after intervention	Centrality and proximity of the monitor further improves savings Increase in labor supply Decrease in unnecessary expenses Find positive spillovers effects on non-monitored individuals Improved risk-coping mechanisms

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Brune et al. (2016).	Malawi	Yes	3,150 cash-crop (to-bacco) farmers (also recipients of agricultural loans)	Compare impact of savings account facilitation with and without commitment	G	19.4% across treatment arms	Account opening, number of deposits, net accumulated savings	Yes (+) US\$12.85 increase in savings, persistent one year after intervention	Higher agricultural input expenditures in that season Higher output in the subsequent harvest Higher per capita consumption in the household

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Casaburi and Macchiavello (2019).	Kenya	No	600 dairy farmers	Investigate WTP for commitment in the form of monthly deferred payments	WTP	86% choose monthly deferred payment over daily ones	N/A	N/A	Strong demand for deferred payments even when monthly price is less advantageous than daily price. Indicate positive willingness to pay for commitment
Cassidy and Fafchamps (2020).	Malawi	No	150 VSLA groups (3,300 individuals)	Estimate probability of members assorting in one group based on occupations and time preferences	A, D, E, G	N/A	N/A	N/A	Negative sorting: VSLA attracts present-biased savers demanding commitment and time-consistent borrowers



Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Dagnelie and Lemay-Boucher (2012).	Benin	No	497 hh (2,083 individuals)	Investigate reasons to participate in RoSCA	A, D, E, G	N/A	RoSCA contributions	N/A	Quadratic impact of income on participation Participation related to lower non-necessary expenditures and higher share of savings over total income
Dupas and Robinson (2013 a).	Kenya	Yes	250 business owners	Facilitation of formal savings account with negative real interest rate	Other	87% opened the account, 41% made at least 2 transactions	Savings held in bank account	Yes (+) for women only	Increased business investments for women No effect on labor supply (nbr of hours worked)

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Dupas and Robinson (2013 b).	Kenya	Yes	771 individuals (143 RoSCA)	Comparison of 4 savings commitment tools	B, D	66% to 97%	Deposits in safe box	Yes (+) only for RoSCA commitment, not for earmarking alone	No impact on preventive health investments. Increased ability to cope with health emergencies
							Deposits in "health" account in RoSCA		

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Gugerty (2007).	Kenya	No	70 ROSCAs, 1,066 participants	Investigate determinants of RoSCA participation	A, D, E	N/A	N/A	N/A	RoSCA participants are likely to be female, less likely to have formal sector income Find evidence that patterns are consistent with self-control issues rather than household bargaining model

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
John (2019).	Philippines	Yes	615 individuals	Participants choose themselves the level of penalty for missing deposit	C, E	27% for penalty commitment, 42% for non-binding withdrawal restrictions	Savings held at bank	Yes (+), U.S. \$10.20 increase with penalty-commitment, U.S. \$3.50 for withdrawal-restriction commitment	Majority of participants tend to choose "unappropriate" level of commitment and have to pay the penalty

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Karlan and Linden (2014).	Uganda	Yes	136 primary schools (4,716 students)	Incentive to save for educational expenses, compare hard versus soft commitment	B, G	N/A	Cash deposited in a money-box	Yes (+), less restrictive commitment more efficient than restrictive one	Significantly more money deposited in soft commitment When combined with parental involvement work-shop, increased investment in school supplies and higher test scores No effect on student participation (enrollment or attendance)

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Karlan, McConnell, Mulainathan, Zinman (2010).	Philippines, Bolivia, Peru	Yes	14, 167 account owners	Comparison of 3 reminder schemes to enforce pre-defined saving goals	A, C	N/A	Likelihood of reaching savings goal	Yes (+)	N/A
Karlan, Zinman (2018).	Philippines	Yes	10,000 individuals	Door-to-door solicitations to open a commitment savings account	C, F, G	23%	Savings held at bank		Determinants of demand to savings: price sensitivity, marketing effects

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Kast, Meier, Pomeranz (2018).	Chile	Yes	2,687 micro-finance clients	Testing peer-pressure and public monitoring of savings goals increase goals attainment	A, C, D N/A	53% opened the account, 39% actively used it	Number of deposits Savings held at bank	Yes (+), U.S. \$52 higher in deposits	Reduction of financial anxiety Savings do not respond to increase in interest rate
Kast, Pomeranz (2014).	Chile	Yes	3,500 micro-finance clients	Facilitation of account opening testing different commitment devices	A, C, D	53% opened the account, 39% actively used it	Number of deposits Savings held at bank	Yes (+), U.S. \$135 in deposits	Reduction in outstanding short-term debt Increased consumption smoothing Reduction of financial anxiety

Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Le Cotty et al. (2019)	Burkina Faso	No	653 farmers	Offer of inventory credit system where crops are saved until lean season	F, G	16%	Portion of grain stocked in inventory	N/A	Time-inconsistent preference increase probability to engage in inventory system.
Schaner (2018).	Kenya	Yes		Test different interest rate incentives for savings	Other	N/A	Account opening Savings held at bank	Yes (+)	Higher interest rates increase overall hh income and probability of entrepreneurial business gains



Paper	Country	RCT?	Sample	Interventions	Type of commitments	Take-up rates	Type of savings	Stat.sig. treatment effect on savings?	Other outcomes
Steinert et al. (2020).	India	Yes	1,525 individuals	Compare receiving a regular cashbox and a portable secure saving instrument		N/A	Cash kept in lockbox and portable device	Yes (+), 81% increase in total savings	Increased women empowerment outcomes Reduction in participants level of debt Reduction in transfers in cash to other household members

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## Chapter 2

# Savings groups as delivery platforms for development: Does financial intermediation benefit too?

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Development interventions often have unintended and undocumented consequences on their beneficiaries. We investigate these consequences in the specific case of interventions delivered into informal financial groups. We use propensity score matching on a large dataset of group-level financial outcomes to estimate the impact of these interventions (such as business training, empowerment, and health programs) on the group’s core purpose: offering access to saving and borrowing to their members. We find that development interventions increase savings per member and average loan sizes. Yet, those plus-activities reduce profit-generation. We show that this adverse impact is stronger when the interventions are related to business training compared to health or community-building programs. Our results document the unexpected consequences of development interventions provided to savings groups. We show that there are some synergies between group operations and development interventions since it fosters financial intermediation in the groups by encouraging saving and borrowing.

*Keywords:* savings groups, financial inclusion, development interventions, financial intermediation, microfinance

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*JEL Codes:* D14; G23; G51; L31; O12; O19



## 2.1 Introduction

Faced with the challenge of reaching vulnerable populations in remote areas, NGOs have been more and more reliant on pre-existing community-based entities to use them as delivery platforms for their interventions. One key example is the case of savings groups, informal financial groups based on mutual aid where members save and borrow from each other (Bouman, 1979), which have become common beneficiaries of development programs. NGOs, instead of targeting individuals, use the structure of already established groups to take advantage of economies of scale and scope.

And this opens access to a large community of potential beneficiaries since the World Bank estimates that there are 419 millions individuals participating in savings groups around the world (Demirgüç-Kunt et al., 2022). Groups play a key role in assuring access to basic financial services for all, including those living at the bottom of the pyramid (Van Rooyen, Stewart, and De Wet, 2012). We focus on a specific type of savings groups that are particularly targeted by NGOs for additional development interventions: the Village Savings and Loans Associations (VSLA) model. In these groups, members contribute their savings at each weekly meeting and those savings are accumulated to become loanable funds to meet members' credit demands (Burlando, Canidio, and Selby, 2021). Participation in savings groups, following the VSLA model, is estimated to include more than 20 million people worldwide.<sup>2</sup>

The primary focus of savings groups is to assure basic financial inclusion for the most vulnerable populations in rural areas (Lønborg and Rasmussen, 2014). We examine how this goal, i.e., access to saving and borrowing services within the group, is impacted by external development interventions piggybacking on the group's financial activities. NGOs providing these interventions often have a stated objective of “do no harm” (Birdsall, 2007); thus, gaining a full understanding of how they impact their beneficiaries is key.

We aim to document potential interventions unintended consequences on community-based initiatives, which have been proven to be mixed in the past (Peredo and Chrisman, 2006). The development interventions studied in this paper include a wide range of NGO-provided activities, such as women's empowerment sessions, business training, agricultural coaching, financial literacy, and health promotion campaigns, that are often referred to as “plus-activities” (Rippey and Fowler, 2011). By providing these various training sessions directly to the groups, funding agencies and local governments aim to increase their impact while keeping their costs down (Nichols, 2021).

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<sup>2</sup>See their website: [VSLA.net](http://VSLA.net)

Indeed, savings groups are ideal platforms for development interventions due to the economies of scale and outreach to target populations that the group setting offers (Díaz-Martin et al., 2023; Gugerty, Biscaye, and Leigh Anderson, 2019; Nichols, 2021). Groups meet weekly at known locations and target populations that are in most need of development interventions but are usually difficult to reach (Dunford, 2001). Compared to offering plus-activities in microfinance, savings groups offered the additional advantages of being more targeted at ultra-poor (Burlando and Canidio, 2017) and putting more emphasis on savings and group cohesion which can lead to joint group investment more easily than in microcredit groups.

Previous evidence suggests the positive impact of these interventions at the individual level (Gugerty, Biscaye, and Leigh Anderson, 2019; Ksøll et al., 2016). We complement those findings by providing evidence of how the interventions impact the functioning of the beneficiary groups. We find that plus-activities, in addition to the individual welfare gains documented in previous studies, also foster financial intermediation within the groups by increasing average savings and borrowing per member which are both key determinants of the group’s long-term survival (Gonzales Martínez, 2020).

We estimate this causal impact of plus-activities on savings groups’ financial activities by applying propensity score matching between treatment groups that receive plus-activities and control groups that do not. We use data from the Savings Groups Information Exchange (SAVIX) dataset containing more than 235,000 groups.<sup>3</sup> To measure the impact of plus-activities at the group level, we select outcome variables that are key for the savings groups’ operational model: savings contributions per member, average loan size, fund utilization rate<sup>4</sup>, return on savings, and rate of attendance in weekly group meetings.

We also provide additional analysis by splitting the plus-activities into two categories: business-oriented (including business, entrepreneurial, and agricultural training) and welfare-enhancing (including health promotion, women’s empowerment, community services, etc.). In particular, we look at whether the impact of development interventions on savings groups’ financial services changes based on the type of plus-activities provided to the group.

We find that the provision of plus-activities to savings groups does indeed have an impact on savings groups’ financial services. The savings contribution per member increases by 10% over a cycle (typically one year) following a development intervention. Average loan sizes increase too, by \$1.3 or 4% compared to control groups.

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<sup>3</sup>For more information on the SAVIX initiative: [SAVIX.org](https://www.savix.org)

<sup>4</sup>The fund utilization rate is the rate at which savings are transformed into loans to members, calculated as the ratio of the cumulative value of loans and the accumulated savings over the cycle.

This is in line with the idea that new knowledge acquired during the development interventions creates new borrowing needs among members but also encourages financial planning and investment.

Moreover, we find that the fund utilization rate, i.e., the percentage of total savings intermediated into loans, is not significantly impacted by the intervention, suggesting that the increase in loan sizes is balanced by the increase in savings and does not lead to loan scarcity. The return on savings, the measure of the profit-generation in the group, decreases by 3 percentage points following the provision of plus-activities to savings groups. However, this negative impact does not deter members from increasing their savings, suggesting that profit-generation is not the main driver of group participation for members (Le Polain, Sterck, and Nyssens, 2018; Peredo and Chrisman, 2006).

When looking at which kinds of interventions are provided to the groups, we find that the most common ones relate to business-oriented training such as entrepreneurial skills, business and financial literacy. We show that those types of plus-activities have an adverse impact on savings per member. By contrast, plus-activities related to welfare programs (women’s empowerment, health promotion, climate change adaptation) significantly foster savings within the group.

We contribute to previous literature by providing new evidence of the impact of externally provided development interventions on community-based initiatives such as savings groups. On the one hand, there is existing evidence on the positive impact of group participation for the members (Beaman, Karlan, and Thuysbaert, 2014; Ksøll et al., 2016). On the other hand, previous studies have also shown that development interventions result in positive welfare improvements at the individual level (Gugerty, Biscaye, and Leigh Anderson, 2019; Ksøll et al., 2016). We want to make sure thus that the welfare improvements from interventions at the individual level do not come at the costs of stable financial intermediation within the group and a reduction of group collective activities that could threaten group’s long-term survival and consequently reduce group participation.

We show that plus-activities, often part of large donor-driven development interventions, do have a small but significant impact on beneficiary savings groups, namely, by increasing average savings and borrowing per member. These positive findings suggest that piggybacking on savings groups for additional interventions is not detrimental for the groups but rather strengthens financial intermediation between members. Given the previous evidence that such interventions are also beneficial at the individual-level (Gugerty, Biscaye, and Leigh Anderson, 2019), the provision of development interventions in savings groups has great potential to maximize impacts while minimizing costs of delivery. We also contribute to the debate in microfinance about integrating non-financial services into lending operations (Flynn

and Sumberg, 2018; Lensink et al., 2018) in the savings groups setting.

The paper is organized as follows. In Section 2.2, we present the savings group model and describe its advantages in terms of achieving financial inclusion for bottom-of-the-pyramid populations often neglected by formal institutions. We also discuss the potential gains and losses of providing development interventions to those groups. In Section 2.3, we present the SAVIX dataset and our model with our outcome variables used as proxies to measure group-level financial activities. In Section 2.4, we present our empirical strategy, namely, propensity score matching, to estimate the impact of plus-activities on savings groups' financial operations. We present and discuss our results in Section 2.5. In Section 2.5, we also perform additional analyses, namely, whether the type of plus-activities, welfare-enhancing or business-oriented, plays a role in influencing savings groups' financial performance. We perform some robustness tests of our empirical strategy in Section 2.6 and Section 2.7 concludes.

## 2.2 Why are savings groups ideal platforms for development interventions?

Understanding what works and collecting evidence on the impacts of development interventions is essential for designing and implementing programs that promote actual change (Van Rooyen, Stewart, and De Wet, 2012). In the case of development interventions piggybacking on savings groups, one important piece of evidence about their impact is missing: how do such interventions impact the financial activities of savings groups? We aim to fill this gap by documenting how using savings groups as delivery platforms for development efforts has consequences on financial intermediation within the group. We focus on savings groups following the VSLA (Village Savings and Loan Association) model. Inspired by existing informal financial groups, such as ROSCAs, savings groups were first developed in the nineties by CARE International in Niger. Participation in savings groups has grown exponentially over the past three decades and is estimated to have been at least 100 million in 2013 (Greaney, Kaboski, and Van Leemput, 2016). Savings groups promote access to basic financial services, i.e., saving and borrowing, to populations in rural areas still largely underserved by the traditional banking system (Lønborg and Rasmussen, 2014).

Savings groups are organized around weekly group meetings where members' savings are pooled into a common fund. Savings contributions are accumulated over time and form available loanable funds for members to meet their borrowing needs (Cassidy and Fafchamps, 2020). The model offers flexibility as members can choose

the amounts that they are willing to save and borrow in the group, allowing members to better respond to their income volatility and cash needs (Beaman, Karlan, and Thuysbaert, 2014; Karlan, Savonitto, et al., 2017).

Savings are incentivized as members earn a return on their savings, generated as profit through the interest collected on loans. The group setting with weekly meetings also works as saving and reimbursement reminders and peer pressure reduces the risk of moral hazard (Gugerty, 2007). Loans in savings groups have a typical loan duration of one to three months, with a monthly interest rate varying between 5% and 20% as decided by the group (Le Polain, Sterck, and Nyssens, 2018).

The groups' financial activities follow a cycle, typically one year in length, during which time savings are accumulated and loans can be borrowed but must be repaid before the end of the cycle. At the end of the cycle, the accumulated funds from savings, repaid loans, and interest payments are then shared out among the group's members proportionally to their savings contributions (Burlando and Canidio, 2017). Due to the interest payments, members earn an effective return on their savings and the system mimics a standard banking model, where deposits are converted into interest-bearing debt, leading to profit-generation in the institution.

Thus, for a group to be financially sustainable and generate profits to its members, two main conditions must be satisfied: members must save enough to prevent loan shortages and members must borrow enough in order for their savings to be actively converted into interest-bearing loans that will yield members a return on their savings (Burlando, Canidio, and Selby, 2021). In addition to their financial activities, savings groups have become regular beneficiaries of development interventions, for reasons unrelated to their main saving and borrowing activities (Díaz-Martin et al., 2023). From a program supplier perspective, there are many benefits associated with the provision of plus-services, or development interventions, to savings groups. Both economies of scale and scope can be achieved by targeting savings groups as recipients of such services (Gugerty, Biscaye, and Leigh Anderson, 2019). As members meet at a regular time in a fixed place, development practitioners are able to reach all members at once, reducing beneficiaries' recruitment and enrolment costs (Orr et al., 2019). This is even more relevant in rural and remote areas where savings groups are present and where development agencies find program implementation to be particularly challenging (Dunford, 2001).

Furthermore, savings groups' financial activities are likely to be complementary to other development interventions such as business or agricultural training (Rippey and Fowler, 2011). By learning how to manage their finances within the group and accessing safe saving instruments and affordable loans, members are more likely to be able to integrate the skills learned during these training sessions into their daily lives and to support the cost of their potentially resulting investment needs (Allen

and Panetta, 2010).

Regarding the welfare impacts of plus-activities, their impacts are positive for the beneficiaries when measured at the individual and household levels. For example, Bali Swain and Varghese (2014) find that business training provided to financial self-help groups in India effectively increases household assets, both productive (land and livestock), physical, and financial. Gugerty, Biscaye, and Leigh Anderson (2019) review 46 impact evaluations of various development interventions in savings groups. They find notably that health promotion interventions are efficient in improving maternal health practices and that agricultural training fosters adoption of new technologies and builds capacity for negotiating prices. Similarly, Díaz-Martin et al. (2023) reviews studies about the impact of development interventions provided to various types of women's groups, including savings groups, on women's empowerment. They find that the impact of such interventions can be heightened by using the groups as platforms for better outreach as well as by harnessing the social dynamic of the groups to foster connections between members.

Yet, despite the call for more research on how group dynamics influence the impact of development interventions on savings groups, there is so far no academic evidence exploring how savings groups are affected by receiving training and how it affects their financial dynamics (Gugerty, Biscaye, and Leigh Anderson, 2019).

In formal microfinance institutions, whether non-financial services should be provided to borrowers is also debated (Flynn and Sumberg, 2018; Lensink et al., 2018). The initial assumption when microcredit was introduced in the seventies and eighties was that access to affordable credit is sufficient for a household to engage in profitable business investments and generate income, and thus to rise out of poverty (Biosca, Lenton, and Mosley, 2014). However, today most observers agree that credit access alone is insufficient for long-term poverty alleviation. They advocate for the importance of addressing the multidimensional aspects of poverty (Khandker, 2005). Yet, there is a debate on whether it is the role of microfinance institutions to do so or not and how it affects their financial performance and long-term sustainability (Lensink et al., 2018).

Previous literature investigates the integration of non-financial services into microfinance institutions regarding individual repayment rates and business practices (Karlan and Valdivia, 2011) as well as the financial sustainability and efficiency of microfinance institutions offering such services Lensink et al. (2018). However, this issue has not yet been addressed in informal financial groups such as savings groups despite the fact that practitioners are calling for more academic research on the topic (Orr et al., 2019).

Financial intermediation within savings groups could be impacted in different ways by the provision of plus-activities to savings groups. On the one hand, practi-

tioners have concerns that these activities produce negative unintended consequences on the groups' financial operations. Allen and Panetta (2010) warn against overloading savings groups with plus-activities that increase the required management capacity and reduce the time available for saving and borrowing activities. Similarly, Orr et al. (2019) and Rippey and Fowler (2011) raise concerns that the provision of additional plus-activities to savings groups diverts the focus away from the financial needs of their members and potentially threatens the groups' sustainability. In a qualitative study about health promotion interventions in informal financial groups in India, Nichols (2021) finds that the training added to the regular group meetings is time-intensive and discourages participation of the most time-constrained members.

Potential unwanted consequences arising from the provision of plus-activities to savings groups could take the form of tensions between members and non-members, appropriation of group funds for non-borrowing purposes, and distraction from the group's financial transactions. Anecdotal evidence of unwanted consequences of plus-activities has been documented. For example, in a project in Central America, Catholic Relief Services provided training to savings groups along with regular hand-outs of free goods and services. This resulted in friction between the group members and the NGO staff due to the conflict between the self-help values of savings groups and the NGO's hand-outs (Rippey and Fowler, 2011).

On the other hand, training related to business practices, financial literacy, or health promotion has been found to encourage saving and borrowing in other contexts. Regarding financial education, training provided to savings groups in India resulted in an increase in members' savings and a more prudent approach to financial decision-making (Bhutoria and Vignoles, 2018). Research about business training, the main type of development intervention provided to the savings groups in our dataset, present positive evidence about increases in business investments and the probability of launching a successful business enterprise (McKenzie and Woodruff, 2014). Regarding health promotion, Dupas and Robinson (2013) show that earmarking deposits for health emergencies increase aggregate savings especially when savings are promoted in a group setting similar to savings groups. Overall, we can thus expect that at least some development interventions will increase saving and borrowing transactions among group members who want to implement the new knowledge acquired during the training.

## 2.3 Data Description

In order to isolate the impact of the provision of plus-activities to savings groups, we rely on the Savings Groups Information Exchange (SAVIX) dataset containing data on savings groups for monitoring and group comparison purposes. It is the most comprehensive dataset on savings groups as it reports standardized data on the financial operations and characteristics of over 235,000 savings groups worldwide, representing about 5 million individuals between 2010 and 2017. The data was originally structured as an unbalanced panel, yet the majority of groups are observed only once due to reporting difficulties. We therefore treated it as a repeated cross-section for the purposes of our analysis. In our dataset, 96,295 groups (39.44%) receive one or more plus-activities, while 147,868 groups (60.56%) do not. By “plus-activities” we mean any type of development intervention provided to savings groups that are not directly related to their saving and borrowing transactions. This definition of plus-activities thus excludes the training related to accounting and group guidelines for saving and borrowing that some savings groups offer to their members at the beginning of the cycle.

As seen in Table 2.3, the most common plus-activities are training related to financial literacy and business improvement activities (16%), followed by income-generating and entrepreneurial activities (6.7%) and health promotion activities (2.2%). The health promotion activities include malaria prevention, HIV/AIDS awareness and prevention, sexual and reproductive health training, nutrition information training, and Water, Sanitation and Hygiene (WASH) campaigns. Other types of plus-activities include community services, such as common purchase of livestock, construction of public latrines, conflict management and resolution training, awareness campaigns related to children’s well-being and education, and agricultural training.

Regarding our outcome variables, we aim to capture the “operational model” of savings groups by estimating how their financial activities and outcomes are impacted by the introduction of plus-activities. Following Brune et al. (2016) and Greaney, Kaboski, and Van Leemput (2016), we thus select five outcome variables that measure the different aspects of savings groups’ financial activities. Monetary variables (savings amount per member and average loan size) are reported in US dollars, converted from local currencies in February 2019.

In Table 2.3, we present descriptive statistics of our five outcome variables. Our first outcome variable is savings amount per member. The savings group model is



Table 2.1: Plus-Activities Description

Plus-activity type	Freq.	Percent	Cum.
Without plus-activities	147,868	60.56	60.56
Income-generation	16,381	6.71	67.27
Business/financial literacy Edu- cation	40,393	16.54	83.81
Climate change	2,587	1.06	84.87
Employment skills	4,280	1.75	86.63
Health	5,488	2.25	88.87
Other	22,103	9.05	97.93
Women's empowerment	5,063	2.07	100
Total	244,163	100	

Table 2.2: Descriptive statistics - Savings groups' financial activities

Outcome variables	Treatment			Control			Difference	
	N	Mean	s.d.	N	Mean	s.d.	Diff.	t-stat.
Savings per member (\$)	96,295	19.378	21.103	147868	23.516	23.407	4.137	45.332
Avg. loan size (\$)	78,311	25.686	23.006	103740	35.17	27.389	9.484	80.182
Fund utilization rate (FUR) (%)	78,408	87.1	0.339	103878	83.9	0.339	-3.2	-19.972
Return on savings (ROS) (%)	94,317	34.3	0.337	144311	31.6	0.323	-2.6	-18.937
Meeting attendance (%)	96,295	92.1	0.096	147868	91.6	0.108	-0.5	-11.359

*Notes:* Univariate mean comparison of outcome variables between groups that receive plus-activities (treatment) and groups that do not (control). N denotes the number of observations and s.d. the standard deviation. All t-tests are significant at the 99% confidence level.

entirely based on the contributions of its members: without these savings contributions, the group cashbox remains empty, and no loans can be lent out (Ksøll et al., 2016). Our second outcome variable is the average loan size, i.e., the mean amount borrowed by a member. On average, group members save \$22 over the course of one cycle (typically one year in length) and borrow \$31 from the group.

The fund utilization rate (FUR) measuring the rate at which savings are transformed into interest-bearing loans is around 85% in our sample, meaning that each dollar saved yields 85 cents in loans. The FUR is the ratio between the cumulative value of loans and the accumulated savings over the cycle. If savings are left unused in the group cashbox, no interest will be paid and there will be no share-out at the end of the cycle.

Return on savings (ROS) is a proxy for profit-generation in the group. Savings groups offer a positive rate of return on savings to their members due to the interest charged on loans. Practically, the rate of return on savings measures the percentage of return per dollar saved within the group and “rewards” members for their savings

contributions, it is the sum of the outstanding loans, the interest payments minus the accumulated savings, divided by the accumulated savings (Burlando, Canidio, and Selby, 2021).

Table 2.3: Descriptive statistics - Continuous covariates

Continuous covariates	Treatment			Control			Difference	
	N	Mean	s.d.	N	Mean	s.d.	Diff	t-stat.
Members at group formation	45,703	21.197	6.162	96068	20.697	6.773	-0.5	-13.812
Women participation (%)	96,295	88.6	0.206	147868	76.8	0.243	-11.8	-130
Group duration (months)	96,295	18.473	16.035	147861	12.398	12.111	-6.075	-100
Number of completed cycles	96,295	1.505	0.819	147868	1.218	0.519	-0.287	-96.768

*Notes:* Univariate mean comparison of covariates between groups that receive plus-activities (treatment) and groups that do not (control). N denotes the number of observations and s.d. the standard deviation. All t-tests are significant at the 99% confidence level.

ROS is an important incentive to promote savings contributions by group members as even the formal financial sector often struggles to offer savings accounts with positive real interest rates (Allen, 2006). The average ROS in our sample is about 32%. This ROS is shared out at the end of the cycle and often savings groups organize so that they share it out at a time when important expenses are due (school fees or agricultural investments) or when revenue is particularly low, typically during the lean season (Allen and Panetta, 2010). The ROS is thus key not only for the financial sustainability of savings groups but also for the financial planning of those members that rely on it (Gonzales Martínez, 2020).

Finally, we estimate the impact of plus-activities on the group meeting attendance rate. Savings groups are based on the voluntary participation of their members and the introduction of plus-activities could either foster active participation of group members or discourage it if the training becomes too time-intensive and reduce the attendance of time-constrained members. Overall, our sample displays high rates of attendance, with 92% of members participating in the weekly group meetings, illustrating high commitment to group participation.

## 2.4 Empirical strategy

To identify the causal impact of plus-activities on savings groups' financial operations, we compare the financial activities of savings groups receiving those development interventions, i.e., treatment groups, to savings groups that do not, i.e., control groups. We base our analysis on propensity score matching to pair treatment to control groups. As treatment is not randomly allocated, savings groups

could differ in outcomes even in the absence of such development interventions due to selection bias and confounding factors that affect both the probability of receiving the intervention and the outcome variables, leading to biased impact estimations (Caliendo and Kopeinig, 2008; Dehejia and Wahba, 2002). To remedy for this, we compute, through a logistic regression, the probability of savings groups receiving the intervention depending on observable covariates and then subsequently match groups with similar propensities (Rosenbaum and Rubin, 1983).

Propensity score matching is based on two assumptions: unconfoundedness and overlap (Caliendo and Kopeinig, 2008). The first assumption, unconfoundedness, or the conditional independence assumption, postulates that when variables affecting both treatment assignment and outcomes are observed and controlled for, the outcomes are independent of the treatment assignment (Caliendo and Kopeinig, 2008). The second assumption, overlap, or the common support assumption, postulates that groups with the same characteristics have a positive probability of receiving the intervention (Caliendo and Kopeinig, 2008). These two assumptions ensure that, conditional on the propensity score, there is a balance in the distributions of observed covariates between the treatment and control groups (Dehejia and Wahba, 2002) and thus that we can identify the causal impact of the intervention on the savings group's financial performance.

Whether the first assumption, conditional independence, holds, and whether propensity score matching is appropriate, are often-debated questions in the impact evaluation literature (Abadie and Imbens, 2011). It is helpful here to understand how the assignment process of plus-activities works and whether there is a risk of selection bias due to unobserved group characteristics. Based on practitioners' testimonials (Allen and Panetta, 2010) and our own experience on the ground<sup>5</sup>, it appears that the decision to provide plus-activities to groups is mostly driven by external suppliers of development interventions such as international NGOs. Generally, NGOs do not hand-picked groups based on their performance but rather choose a priority program (such as health or business promotion) or a priority geographic area and provide similar interventions to groups based on those priorities.

This means that treatment, i.e., receiving a plus-activity, is not assigned at the behest of the groups, which would suggest self-selection and the risk that unobservable factors, such as members' motivation or management capacity, influence both treatment allocation and financial performance. Instead, the fact that external NGOs take the decision whether or not to provide the intervention supports

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<sup>5</sup>One of our co-authors has nearly thirty years of experience working with savings groups and microfinance institutions in various contexts in Africa and Latin America. In addition, we were able to connect with Hugh Allen, the CEO of VSL Associates, a firm that is working to further expand the savings group model.

that the conditional independence assumption holds: the NGO is likely to select groups based on program policy and practical considerations (proximity to their headquarters, facility of access) or development intervention priorities (reaching the most rural areas, promoting women’s empowerment, advocating for climate change adaptation) rather than based on savings groups’ unobservable characteristics. This implies that very similar savings groups can be found both in treatment and control groups due to external factors decided by the purveying NGO.

In addition, Heckman, Ichimura, and Todd (1997) recommend that, for the matching to plausibly estimate a causal impact, the survey instrument should be the same for control and treatment groups. More particularly, outcome variables should be measured in the same way in both the treatment and control groups. This is the case in our data since the SAVIX dataset systematically collects standardized data on all types of savings groups, regardless of whether they receive a plus-activity or not.

We thus estimate the probability of a group receiving treatment, i.e., a plus-activity, using a logistic regression that includes our matching variables, which are group characteristics that predict the likelihood of a group receiving a development intervention. Here, we include variables that are unaffected by treatment but that impact both our outcome variables and the selection into the treatment group (Nannicini, 2007). We check whether the second assumption, that of a common support area, holds. We find a large common support area as the overlap in density functions of the propensity scores in the treatment and control groups, as can be observed in 2.8.

Based on the computed propensity scores, we estimate the average treatment effect on the treated (ATT) savings groups. The estimated ATT is the difference in outcomes between matched control and treatment groups weighted by the distribution of propensity scores.

There are different algorithms to match groups based on their propensity scores. As suggested by (Caliendo and Kopeinig, 2008), we test two different matching algorithms to assess the stability of our results with regard to our methodological choices. For each outcome variable, we compute two different ATTs: the first estimated with kernel matching and the second with 3 nearest neighbors matching with replacement. We present the nearest-neighbors estimation results in Table 2.5.1. The results of the kernel matching algorithms are presented in Appendix 2.8. For all outcomes, the estimated ATTs from the two matching algorithms are similar, with the same directions and comparable magnitudes. To evaluate the robustness of our matching, we also present the balance in covariates post matching to show that the standardized differences between our treatment and control groups have been minimized (Austin, 2009). The robustness results are reported in the Appendix 2.8.

## 2.5 Empirical Findings

### 2.5.1 Propensity score estimation

To appropriately estimate our treatment effect, we match savings groups by their propensity scores, computed based on various pre-treatment characteristics. We construct the propensity score based on a logistic regression of variables predicting the probability of receiving treatment. We include several covariates, measured at group formation before the training is received and before the financial activities of the group start. Group characteristics that predict the probability of treatment are the following: the number of members at group formation, the percentage of women members, the duration (in months) of the group, how many cycles the group has completed when observed, the process behind group formation (whether spontaneous or facilitated by a trained field officer), and whether the group is monitored by an NGO or not. In addition, we control the group's country, the NGO providing the plus-activity, and in which year the group is observed. The results are reported in Table 2.5.1.

Table 2.4: Probability of a savings group receiving a plus-activity

Probability of receiving a plus-activity	Coefficient	Std. err.	z	P>z	[95% conf. interval]	
Members at formation	0.003	0	572.46	0	0.003	0.003
Women members (%)	0.029	0	208.5	0	0.029	0.029
Group duration (months)	0.003	0	1110.89	0	0.003	0.003
No. of completed cycles						
1	(omitted)					
2	0.067	0	716.39	0	0.067	0.067
3	0.141	0	766.79	0	0.14	0.141
4	0.208	0	637.99	0	0.207	0.208
5	0.258	0.001	434.35	0	0.257	0.259
6	0.291	0.001	273.33	0	0.289	0.293
7	0.321	0.011	28.52	0	0.299	0.343
GROUP FORMATION						
Employed agent	0.05	0	617.86	0	0.05	0.05
Spontaneous/unknown	0.103	0	758.08	0	0.103	0.104
Independent agent	(omitted)					
GROUP STATUS						
Supervised	-0.156	0.001	-125.33	0	-0.158	-0.153
Self-managed	(omitted)					
NGO	23 different NGOs					
Country	51 different countries					
Year	from 2010 to 2017					
Constant	0.092	0	279.55	0	0.091	0.092
N.	141,766					

We find that all our covariates are significant in predicting the probability of a group receiving a plus-activity. Larger groups with more women members are more

likely to receive plus-activities. This demonstrates the female focus in development efforts and particularly in development interventions involving savings groups (Díaz-Martin et al., 2023; Gash and Odell, 2013; Kumar et al., 2021). We find that more experienced groups that have been active longer and completed more cycles have a higher probability of receiving a plus-activity, in line with the recommendation of Carmichael (2018) to focus development efforts on more mature groups, already experienced in managing their financial activities.

Our dataset includes savings groups in 51 different countries. Appendix 2.8 reports the distribution of treatment and control savings groups by country. Since savings groups are matched within a country, some countries are dropped from the matching if they include only treatment or only control savings groups. The dataset includes 23 different NGOs providing plus-activities, the largest ones being Plan International, Oxfam, and CARE International. A complete list of the NGOs can be found in Appendix 2.8.

The mean propensity score for treatment savings groups is 0.379, and 0.295 for control savings groups. The common support area contains 141,766 observations with a score included in the interval [0.066; 0.898]. The strong overlap of propensity scores between control and treatment savings groups graphically shown in the Appendix 2.8.

To show the quality of our matching approach, Table 2.5.1 presents the balance of our covariates between treatment and control groups after the matching. The last column contains the standardized differences between the covariates' sample means for matched control and treatment savings groups. The standardized differences for continuous variables are computed as follows:

$$\frac{|\mu_t - \mu_c|}{\sqrt{\frac{s_t^2 + s_c^2}{2}}}$$

where  $\mu_t$  and  $\mu_c$  are the sample means for treatment and control savings groups, respectively, while  $s_t^2$  and  $s_c^2$  are their sample standard deviations (Austin, 2009). It can be observed that after matching these standardized differences tend to zero, showing that matched treatment and control savings groups are well balanced on the continuous matching covariates (Caliendo and Kopeinig, 2008). The discrete matching covariates are not presented here, but as groups were matched within the variables categories (e.g., within countries and within NGOs), the differences between the matched savings groups are close to zero too.

## 2.5.2 ATT Estimation

Table 2.5.2 presents our ATT estimates, computed by matching treated savings groups to 3 nearest neighbors control savings groups with replacement and a caliper

Table 2.5: Balance of covariates before and after matching

Covariates	Raw			Matched (ATT)		
	Treatment	Control	Std. diff.	Treatment	Control	Std. diff.
Members at group formation	21.197	20.697	0.077	21.253	21.82	-0.088
Women members (%)	0.811	0.77	0.166	0.834	0.839	-0.02
Group duration (months)	17.795	13.313	0.289	20.301	19.783	0.033
No. of completed cycles	1.382	1.182	0.313	1.468	1.468	0

of 0.05. Similar ATT estimates computed based on kernel matching are presented in Appendix 2.8. The results of the two matching algorithms are very similar, reinforcing the robustness of our results to methodological choices (Caliendo and Kopeinig, 2008).

Table 2.6: Estimated average treatment effect on the treated (ATT) for savings groups receiving a plus-activity

Outcome variables	ATT	Std. err.	z	P> z	[95% conf. inter.]	No. of obs.		
						T	C	
Savings per member (\$)***	2.322	0.515	4.51	0	1.312	3.332	45698	96068
Avg. loan size (\$)*	1.346	0.738	1.82	0.068	-0.1	2.793	34294	60459
Fund utilization rate (FUR)	-0.924	0.008	-1.13	0.258	-2.522	0.675	34354	60526
Return on savings (ROS)***	-2.911	0.007	-4.01	0	-4.335	-1.487	43916	93773
Meeting Attendance*	-0.446	0.002	-1.88	0.06	-0.911	0.018	45698	96068

*Notes:* Estimated average treatment effect on the treated (ATT) savings groups receiving a plus-activity (matching algorithm: 3 nearest neighbors with replacement and a caliper of 0.05). \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

First, we find that plus-activities provided to savings groups increase savings contributions per member by about \$2.3, which is significant at the 99% level. This corresponds to a 10% increase in savings per member over a cycle since baseline average savings per cycle are \$22. This finding is contradictory to the concern that plus-activities distract members from their financial activities, at least on the saving side. This increase in savings can be attributed to the new knowledge acquired during the training that often boils down to better planning for the future (whether related to health, agriculture, or business) and thus encourages savings (Bhutoria and Vignoles, 2018). It could also suggest that receiving a plus-activity increases the value of participating in the group for members that are thus ready to contribute more actively through their savings.

Second, regarding the average loan size, receiving plus-activities increases the average borrowed amounts by \$1.3, corresponding to an increase of 4%, which is

significant only at the 90% level. This impact is small but can still be economically significant when most members live close to the poverty line (Lønborg and Rasmussen, 2014). The increase in loan size suggests that new plus-activities create larger borrowing needs from members seeking to implement the new knowledge they acquired during the training (e.g., investment in income-generating activities or agricultural fertilizer) as suggested by (Allen and Panetta, 2010).

Third, we look at the fund utilization rate (FUR) within the groups. We find that plus-activities have no significant impact on the rate at which savings are converted into loans. This is in line with our previous findings since the fund utilization rate is the percentage of savings actively converted into loans. We find that average savings per member and average loan size both increase in relatively similar proportions, keeping the fund utilization rate constant. Regarding the profit-generation in the group, as measured by the return on savings (ROS), the introduction of plus-activities produces a negative significant impact of almost 3 percentage points. However, this negative impact is small compared to a baseline ROS of 32%. Combined with the positive increase in savings, our findings show that a reduction in profit-generation does not discourage members from actively saving in the group.

Lastly, we find a negative, weakly significant impact of development interventions on meeting attendance rates. Participation in meetings decreases by 0.4 percentage points after treatment. Since participation in our sample is on average 92%, it follows that even with this reduction participation in treatment groups remains high. Receiving a plus-activity in their group does not deter members from participating in meetings. The small impact could derive from the fact that additional training provided on top of the regular meetings can be time-consuming. Previous testimonies about health promotion training provided to self-help groups in India suggest that some members are too time-constrained by domestic or labor tasks to participate in both the group's meetings and the additional training (Nichols, 2021). This also is the case for at least a few members in our sample. Therefore, we recommend that NGOs should be careful to limit the length of their interventions in order to avoid putting too much pressure on members to attend lengthy group meetings.

### 2.5.3 Types of plus-activities

As we have a wide variety of plus-activities in our dataset, a relevant question is whether the impacts we find are dependent on the type of plus-activity provided to the group. To test for this possibility, we provide an additional analysis where we divide the plus-activities into two categories. On the one hand, we aggregate all plus-activities that relate directly to increasing revenues, such as business, finan-



cial, entrepreneurial, and agricultural training sessions, into a “business-oriented” activities category. On the other hand, we aggregate all plus-activities that do not directly relate to increasing revenues, such as health promotion, women’s empowerment, community services, and climate change adaptation training sessions, into a “welfare-enhancing” activities category. This categorization of plus-activities is based on previous literature such as Biosca, Lenton, and Mosley (2014) and Lensink et al. (2018) that divide non-financial activities provided to microfinance groups into “business development services” and “social services.”

Table 2.5.3 presents the findings on distinguishing between the types of plus-activities provided to the savings group, again estimated by propensity score matching. The first column is the estimated ATT of providing business-oriented activities to savings groups (after we exclude from the sample all groups receiving welfare-enhancing activities). The second column shows the estimated ATT of providing welfare-enhancing activities to savings groups (after we exclude from the sample all groups receiving business-oriented activities). In both columns, the control savings groups are the ones that do not receive any type of activity at all.

Table 2.7: ATT estimates comparing the impacts of business-oriented (1) and welfare-enhancing (2) plus-activities on savings groups’ financial operations

Outcome variables	(1)	(2)
Savings per member (\$)	-0.595	4.173***
	-0.768	-0.651
Avg. loan size (\$)	1.427*	3.308***
	-0.813	-1.043
Fund utilization rate (FUR) (%)	-0.013	0.042***
	-0.01	-0.015
Return on savings (ROS) (%)	-0.036***	0.030***
	-0.009	-0.01
Meeting attendance (%)	0	0.003
	-0.003	-0.004
Number of treatment groups	61,054	27,591

*Notes:* ATT estimates comparing the impacts of business-oriented and welfare-enhancing plus-activities on savings groups’ financial operations. Control groups: savings groups that did not receive any type of plus-activities. Savings groups are matched based on 3 nearest neighbors with replacement and a caliper of 0.05. \*\*\* p<0.01; \*\* p<0.05; \* p<0.1.

We do find important differences depending on whether the savings groups receive business-oriented or welfare-enhancing plus-activities. For example, regarding savings per member, the two types of plus-activities have opposite effects: business-oriented activities have no significant impact on savings, while welfare-enhancing

activities increase savings per member by \$4.1. We hypothesize that there is a substitution effect where, after the savings group receives business training, the disposable income usually allocated to savings within the group is instead allocated to business activities. By contrast, plus-activities related to health, empowerment, or climate change adaptation emphasize the importance of long-term planning and precautionary savings, further fostering savings within the group.

Regarding average loan size, both types of activities create larger borrowing needs as both ATTs are statistically significant and positive, raising the average loan size by \$1.4 for business-oriented activities and by \$3.3 for welfare-enhancing activities. The latter’s larger impact on loans is also linked to a positive and significant (yet small) increase in FUR for groups receiving welfare-enhancing activities. Financial intermediation in savings groups thus benefits from the provision of plus-activities but mainly if those are related to improving livelihoods rather than promoting business activities.

The small negative impact on ROS found in the previous section is driven mostly by business-oriented activities. We find no significant impact of either type of plus-activities on meeting attendance rate.

## 2.6 Limitations and robustness checks

A potential concern when estimating a causal impact based on propensity score matching is the failure of the conditional independence (or “unconfoundedness”) assumption, which states that all the factors impacting both our outcomes and the probability of a saving group receiving treatment are observed (Caliendo and Kopeinig, 2008). Based on the information we have about the process of the selection of savings groups receiving intervention or not, it is unlikely that the conditional independence assumption does not hold.

Indeed, savings groups receive plus-interventions based on external considerations, such as the providing NGO’s policy concerns and priorities, which are unlikely to affect the group’s financial operations other than by the provision of the plus-activities. Yet, we cannot fully rule out that some unobserved group characteristics play a role in the NGO’s decision to provide plus-activities and affect saving and borrowing transactions in the group, resulting in a confounding factor that would bias our results. In other words, we cannot exclude the possibility that some unobserved variables influence both the treatment assignment (i.e., receipt of a plus-activity) and our outcome variables, resulting in an inappropriate use of our control groups as counterfactuals (Caliendo and Kopeinig, 2008).

To test the robustness of our ATT estimates to violations of the conditional

independence assumption, we test three different scenarios by simulating potential unobserved confounders. This sensitivity analysis is developed by Ichino, Mealli, and Nannicini (2008) and Nannicini (2007). The analysis is based on the assumption that our initial set of covariates is not sufficient to verify the conditional independence assumption but that it will hold if we include an additional unobserved variable to our set of covariates.

By modeling different distributions of this unobserved variable, we can test the sensitivity of our ATT estimates to different scenarios of how confounding factors might impact our analysis. Specifically, we can check whether there is a plausible scenario where the inclusion of an unobserved variable drives our ATT estimates to zero (Ichino, Mealli, and Nannicini, 2008; Nannicini, 2007).

We test three different scenarios of unobserved group characteristics that could influence both the probability of savings groups receiving treatment and our outcomes. First, we test the groups' vulnerability (i.e., whether the groups serve populations in the poorest and most remote areas). Second, we test the groups' motivation (i.e., whether the groups are proactive in developing their financial activities).

More details about our different tests of the sensitivity of our ATT estimates to unobserved confounders can be found in Appendix 2.8, along with the results of our analysis. We do find strong support that the conditional independence assumption holds in our data, suggesting that our ATT estimates are relatively robust to unobserved factors and correctly estimated based on the observed covariates available in our dataset.

## 2.7 Conclusion

In this paper, we explore potential unintended consequences of development interventions by looking at the consequences of providing additional interventions to savings groups. We estimate the impact of these plus-activities on savings groups' financial operations, i.e., their saving and borrowing transactions, by matching treatment groups that receive the interventions and control groups that do not, based on their propensity scores.

We find that the provision of plus-activities to the groups has a significant positive impact on savings per member, increasing them by \$2.3, which corresponds to a 10% increase. As the savings group model is based on the voluntary savings of group members, increased savings contributions are thus indicative that plus-activities reinforce the savings groups' goal of promoting long-term financial sustainability.

We find that plus-activities also increase the average size of loans within savings group by \$1.3. It is likely that training encouraging new investments in business ac-

tivities or health promotion fosters borrowing within the groups (Allen and Panetta, 2010; Dupas and Robinson, 2013). Yet, we find suggestive evidence that the demand for larger loans does not lead to loan scarcity in the group as the fund utilization rate does not significantly change following the introduction of the plus-activity. This suggests that saving and borrowing transactions increase somewhat proportionally so that there are enough available funds in the group to accommodate increased borrowing demands.

On the other hand, we find that plus-activities have a small negative impact on profit-generation within the groups, reducing the return on savings by 3 percentage points. The return on savings is an important feature of the savings groups model compared to other types of informal financial self-help groups such as ROSCAs where participants do not earn interest on their contributions. The return on savings is meant to encourage members to save within the group. Yet, we find that even with a lower return on savings, treatment groups have higher savings per member. This suggests that the return on savings is not the only driver of savings within the group.

We also provide evidence that our findings hide heterogeneous impacts based on the type of plus-activities provided to the group. Business-oriented activities, which incentivize members to engage in new income-generating activities or employment, have no significant impact on savings per member and only weakly increase average loan sizes by \$1.4 over the course of a business cycle. By contrast, welfare-enhancing activities, which do not directly relate to increasing revenues but increase personal well-being, have a significant impact on both saving and borrowing transactions, increasing them by 4 and 3.3, respectively. We thus find that both types of activities create new borrowing needs, probably to implement the new knowledge acquired during training (Allen and Panetta, 2010).

Yet, welfare-enhancing interventions are more effective in fostering financial intermediation within savings groups, probably by encouraging long-term planning and precautionary savings (Dupas and Robinson, 2013). This also reflects the importance of the non-financial aspects of savings groups. Savings groups are meant to be financial institutions, yet previous evidence suggests the importance of the non-financial interactions within the group: building social capital, exchanging experiences, and engaging in new types of non-market interactions (Besley, 1995). Gaining new knowledge together as a group probably boosts these non-financial aspects of savings groups. Members are then more inclined to actively participate in the group's financial activities by actively saving and borrowing.

Our study is the first that looks at the impact of providing plus-activities to savings groups on the groups' financial performance and activities. We present novel findings that show that piggybacking on the groups structure to provide welfare-improving interventions do not come at the cost of threatening the long-term survival

of groups due to loan scarcity of or lack of active borrowing in the group. We adopt a broad approach by including all types of plus-interventions, while differentiating between business-oriented and welfare-enhancing activities. A lot more can be done to understand the impact of such interventions, such as by testing specific programs in different contexts and complementing our findings with experimental evidence in order to develop meaningful development interventions with documented impacts on their beneficiary groups at the collective level.

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## 2.8 Appendix 1

We present in table 2.11 the results of our sensitivity analysis to unobserved confounders. We assess the robustness of our ATT estimates to two different violations of the conditional independence assumption, key for the validity of propensity score matching. We look at two different ways an unobserved variable could strongly influence both assignment to treatment and our outcome variables, biasing our results. First, we simulate a confounder that follows the distribution of the observed variable “Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)”. The hypothesis is that NGOs choose the most vulnerable SGs to receive “plus”-activities. As we do not observe the group’s vulnerability (for example with members income or a measure of public goods availability), we proxy for it with a measure of poverty. The second column shows an estimated ATT where this vulnerability proxy is included as a matching covariate. The results are very similar to our baseline ATT, suggesting the robustness of our analysis to this type of unobserved confounder. Similarly, modelling an unobserved confounder that simulates group motivation does not fundamentally change our baseline ATT estimates. We thus find support that the conditional independence assumption is verified in our data and that we do not have a strong selection problem where an unobserved factor would explain the impact of “plus”-activities we find. Rather, it seems that our baseline ATT are robust to the inclusion of such potential factor.

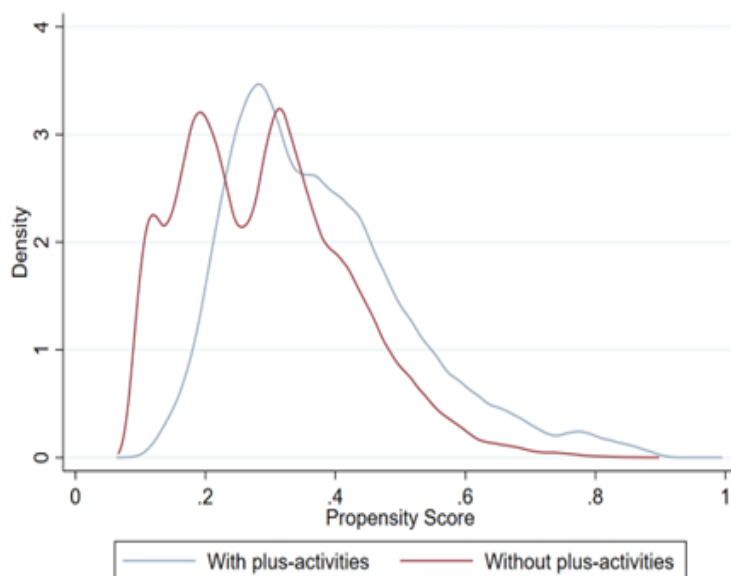


Figure 2.1: Common support area, overlap in the density functions of the propensity scores of treatment and control groups

Table 2.8: Savings groups per country

COUNTRY	Without plus-activities	With plus-activities	Total
Afghanistan	4,088	1,435	5,523
Angola	25	0	25
Benin	1,241	6,539	7,780
Burkina Faso	6,568	11,836	18,404
Burundi	5,197	1,240	6,437
Cambodia	4,777	89	4,866
Cameroon	1,947	0	1,947
Colombia	6,569	11	6,580
Costa Rica	2	0	2
Egypt	4,549	0	4,549
Ethiopia	5,176	1,652	6,828
Ghana	7,809	5,025	12,834
Guatemala	10	0	10
Guinea	25	3,058	3,083
Guinea Bissau	344	562	906
India	3,587	230	3,817
Ivory Coast	226	5,646	5,872
Kenya	9,610	318	9,928
Lesotho	40	0	40
Madagascar	1,712	66	1,778
Malawi	1,713	3,373	5,086
Mali	6,299	32,744	39,043
Mongolia	145	121	266
Mozambique	6,735	964	7,699
Myanmar	544	0	544
Namibia	154	2	156
Nicaragua	156	0	156
Niger	1,282	4,543	5,825
Nigeria	148	323	471
Pakistan	1,065	0	1,065
Peru	108	114	222
Philippines	2,550	69	2,619
Republic of the Congo	255	1	256
Russia	0	161	161
Rwanda	3,667	1,236	4,903
Senegal	9,471	1,179	10,650
Sierra Leone	1,912	2,693	4,605
Somalia	1	0	1
South Africa	949	489	1,438
South Sudan	70	1	71
Sri Lanka	0	28	28
Sudan	84	23	107
Swaziland	283	0	283
Tajikistan	1,787	3	1,790
Togo	167	5,592	5,759
Uganda	21,361	1,973	23,334
Tanzania	18,430	1,040	19,470
Vietnam	0	259	259
Zambia	3,480	1,520	5,000
Zimbabwe	1,543	137	1,680
Total	147,861	96,295	244,156

Table 2.9: Savings groups per NGO

NGO	Without plus-activities	With plus-activities	Total
Aga Khan Foundation	20,649	1,803	22,452
CARE International	25,272	12,378	37,650
Catholic Relief Services	28,048	298	28,346
ChildFund	172	1,399	1,571
Feed the Children	137	0	137
FHI360	0	8	8
Freedom from Hunger	127	1,752	1,879
Global Communities	707	12	719
IED	6,515	11	6,526
Mercy Corps	386	0	386
No Facilitating Agency	11,727	2,620	14,347
Norwegian Association	793	0	793
Oxfam	6,127	33,063	39,190
PATH	0	63	63
PCI	156	0	156
Plan International	30,657	39,569	70,226
SaveAct	930	489	1,419
We Effect	220	282	502
Welthungerhilfe	139	1	140
World Education	110	0	110
World Relief	559	0	559
World Relief Canada	1,344	4	1,348
World Vision	13,086	2,543	15,629
Total	147,861	96,295	244,156

Table 2.10: ATT estimation: Kernel matching

Outcome variables	ATT	AI robust std. err.	z	P> z	[95% conf. inter.]	No. of obs.	
						T	C
Savings per member (\$)***	2.221	0.556	4	0	1.132 3.311	45698	96068
Avg. loan size (\$)	1.295	0.806	1.61	0.108	-0.284 2.874	34294	60459
Fund utilization rate (FUR) (%)	-0.2	0.009	-0.22	0.829	-0.021 0.016	34354	60526
Return on savings (ROS) (%)***	-2.9	0.008	-3.72	0	-0.044 -0.014	43916	93773
Meeting attendance (%)	-0.4	0.003	-1.49	0.137	-0.009 0.001	45698	96068

Table 2.11: Sensitivity Analysis to unobserved confounders

Outcome variables	Baseline ATT	Vulnerability-simulation	Motivation-simulation
Savings per member (\$)	2.322	1.757	1.908
	-0.515	-0.275	-0.243
Avg. loan size (\$)	1.346	-1.851	-2.021
	-0.738	-0.351	-0.339
Fund utilization rate (FUR) (%)	-0.924	-4.9	-2.7
	-0.008	-0.004	-0.003
Return on savings (ROS) (%)	-2.911	-4.5	-4.7
	-0.007	-0.004	-0.004
Meeting Attendance (%)	-0.446	0.008	0.006
	-0.002	-0.001	-0.001

## Chapter 3

# Consumption smoothing in times of COVID-19: the role of informal group-based finance in Ugandan refugee settlements

*Anaëlle Petre*<sup>1</sup>

Refugee flows have been on the rise around the world in recent years. Efficient policies fostering their financial independence and resilience are key to help them integrate in their host communities. We test one such policy, the implementation of savings groups, informal financial cooperatives, in two refugee settlements in Uganda. We estimate the impact of participation in savings groups on consumption smoothing during the COVID-19 pandemic, using a difference-in-difference design. We find that groups could not help their members face the shock, as members have lower expenditures, smaller credit amounts, and withdrawals in the six months following the crisis. We offer two recommendations to adapt the savings groups model so that members can better rely on the group to protect themselves during systemic shocks: the relaxing of the rule forbidding withdrawals, and the supply of joint liability loans from NGOs and financial institutions to the groups to avoid loan scarcity.

*Keywords:* consumption smoothing, informal finance, savings groups, insurance, aggregate shock, refugees.

*JEL Codes:* D14, G51, I31, O12

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## 3.1 Introduction

Since 2012, the number of individuals forced to flee their countries due to persecution, conflict, or human rights violations has been continuously increasing (UNHCR, 2033). Among these displaced populations, 83% are hosted in low- and middle-income countries (UNHCR, 2033), often residing in refugee settlements with limited access to infrastructure and economic opportunities. With the heightened risk of displacement due to natural disasters linked to climate change, the global refugee population is likely to keep growing. In this context, it is crucial to develop policies and humanitarian aid tailored to the specific needs of refugees. We contribute by exploring ways to help refugees stabilize their consumption in response to significant systemic income shocks, such as the one caused by the COVID-19 pandemic.

In Uganda, strong lockdown measures were imposed in March 2020 following the outbreak of the pandemic. The closure of all non-food markets and restrictions on in-country travels led to an important loss of income for many Ugandan households (Mahmud and Riley, 2021). Due to their weaker economic status and their reliance on the informal sector as a source of revenues, refugees are particularly vulnerable to the economic consequences of the pandemic (Abay et al., 2023; Di Maio et al., 2022). In this context, precautionary savings and access to credit are potential tools to mitigate the impact of the shock on consumption (Alderman and Paxson, 1994).

As access to formal banking services is limited in refugee settlements, informal and group-based financial institutions are often the only available option for savings and credit. We focus on one such institution called savings groups (SGs), informal cooperatives consisting of 15 to 30 members that meet weekly to pool their savings into a common fund, which becomes available for borrowing by members (Burlando, Canidio, and Selby, 2021; Van Hemert, D’Espallier, and Mersland, 2024). We compare members and non-members of savings groups to understand whether SGs are efficient in protecting their members against a large, unanticipated, systemic shock.

Our data was collected through financial diaries every two weeks, recording the expenditures, income, remittances, loans and savings, of our respondents from August 2019 to September 2020. We adopt a difference-in-difference analysis comparing SGs members and non-members before and after the imposition of the lockdown measures. We focus on the impact of SG participation on expenditures, deposits, withdrawals and credit amounts. We first consider the immediate impact of the pandemic from the end of March to the end of May, when the lockdown measures were strictly enforced. We then differentiate with the impact in the following months, when restrictions eased up, but the economic consequences still have lingering effects on our respondents.

We find that participation in savings groups did not have much of an impact

during the first months of the lockdown restrictions, significant differences between SG members and non-members in terms of expenditures, withdrawals and credit only appear around June 2020. Surprisingly, our results show that participating in savings groups reduced the ability of refugees to smooth their consumption. SG members have on average 18% less expenditure on food and essential house items. They withdraw 17.5% less from their savings, despite having higher initial savings levels at baseline. Contrary to previous evidence, savings groups did experience credit shortage following the COVID-19 crisis as members took on loans 16% smaller than non-members.

We identify that the potential reason for those negative findings lies with the SG strong rule restricting withdrawals during its cycle of activities (typically one year long). Members are thus unable to use the amounts previously saved in the groups to smooth their consumption and this becomes more stringent as months pass and their other sources of savings dry up. We suggest relaxing the withdrawals restrictions in case of systemic shock so that members can better insure themselves. Regarding loan scarcity, we recommend that NGOs and formal financial institutions intervene to provide joint liability loans, in particular during periods of generalized loss of income, as previously suggested by Burlando, Canidio, and Selby (2021).

We contribute to the literature in two major ways. First, our detailed bi-weekly data collected from August 2019 provides a unique opportunity to understand the conditions and consequences of the pandemic in one of the most vulnerable socio-economic contexts in the world. Research regarding the COVID-19 pandemic has, so far, largely focused on its impacts on Western countries, due to the difficulties of collecting quality data during the lockdown periods in low-income countries. Some studies in low-income countries manage to collect important data through phone surveys, but they are limited by not having pre-crisis data and relying on respondents retrospectively recalling their pre-crisis consumption levels (Bundervoet, Dávalos, and Garcia, 2022; Egger et al., 2021; Josephson, Kilic, and Michler, 2021).

Second, we are able to complement our findings with insights from a qualitative analysis. In March 2023, we interviewed refugees, savings groups participants and NGO workers in the Nakivale settlement. The semi-structure interviews focus on how the groups are formed and operate, the living conditions in the settlement under the lockdown measures, and the kind of support provided by NGOs. A major advantage of adopting a mixed methods approach is to gain a more in-depth understanding of the context at hand (Migiro and Magangi, 2011). On one hand, our quantitative analysis clearly establishes the causal link between SG participation and consumption smoothing during the pandemic. On the other hand, we present a contextual analysis and detailed account of the specificities of our respondents through our qualitative investigation.

This paper is structured in the following way: in Section 3.2, we give some context regarding the COVID-19 in Uganda and particularly in the refugee settlements. We then explain how participation in savings groups can help alleviate the negative shock due to the pandemic from a theoretical standpoint and previous evidence in section 3.3. In Section 3.4, we present our different data sources: the financial diaries, the one-off special surveys and the qualitative interviews. Section 3.5 clarifies our empirical strategy to identify the impact of participating in a saving group during a systemic income shock. We explain our findings in section 3.6 and support them with two robustness checks. Section 3.7 concludes.

## 3.2 The COVID-19 crisis in the Ugandan context

The first COVID-19 case in Uganda was reported on the 22nd of March 2020 (Sarki, Ezeh, and Stranges, 2020). To curb the risk of contagion, the Ugandan government implemented some of the strictest lockdown measures in the world and enforced these across the country even in most rural and remote areas through significant police presence (Hale et al., 2023; Sarki, Ezeh, and Stranges, 2020; Katana et al., 2021). The measures include a nationwide curfew, a ban on public transport, an interdiction of public gatherings and religious events (including large marketplaces, weddings and funerals), the closure of non-essential businesses and non-food markets and strict restrictions on in-country travels (Aguta et al., 2020). Most of these restrictions eased progressively from the end of May 2020 onwards, except for schools and universities which were closed most of the time from March 2020 to January 2022.

As of June 2022, 167 511 COVID-19 cases and 3,621 deaths have been confirmed in Uganda (UNHCR, 2022). On the economic side, the lockdown situation resulted in spikes in food prices, most notably for staple goods such as cereals, maize, rice and wheat, and a stunted economic growth (UN, 2020). An estimated 1.9 million Ugandans are at risk of falling into poverty due to the economic consequences of the pandemic (UN, 2020). In their survey administered in May 2020, Mahmud and Riley (2021) show that rural Ugandan households are severely impacted by the COVID-19 lockdown. They find that households had to reduce their food expenditures by 40%, and 20% more households reported that they had to skip meals. These negative impacts are even more substantial for populations that were already the most vulnerable before the pandemic, such as women, youth, informal workers (Bundervoet, Dávalos, and Garcia, 2022), and displaced households (Di Maio et al., 2022).

The lockdown restrictions were also enforced in the refugee settlements we study. The closure of all non-food markets meant a significant loss of income for many of our



respondents, who rely on small trade and various informal income sources (casual labor, shopkeeper, hawker, repair businesses, tailoring, etc.). During a survey in late April 2020, our enumerators asked respondents about their perceptions of the crisis and its impact on their daily life. When asked how the lockdown restrictions affected their income, 44% reported that their income was reduced by a lot, while 34% reported that their income stream stopped completely. For example, during an interview, the owner of a shop selling utilities and kitchen equipment that had to close, admitted that to survive during the lockdown restrictions, their only option was to illegally sell through their house window, at the risk of being caught and fined for COVID-19 rules violation. Almost 60% of our respondents considered that their food consumption was reduced “by a lot” following the restrictions and reported that their main worry due to the situation was hunger and poverty, while their perception of risking to contract the COVID-19 virus was relatively low.

The lack of opportunities for income-generation and social interactions created a strong sense of isolation amongst our respondents as illustrated by this quote from an interview with an adult man living alone: *“I could not find any job, so I had no revenue. I did not work at all for 6 months. All the marketplaces were closed. I could not leave my home. I live alone. I felt very isolated. I could not leave the house, I had nothing to do”*. As all gatherings were strictly forbidden, many groups had to suspend their meetings. Yet, many found ways to continue group activities, for example by messaging through social media, or proceeding with their saving and loan operations through one-on-one meetings with the group chairman. Some groups also allowed their members to stop the weekly saving contributions to the common fund given their lack of income.

### 3.3 How can informal savings groups help consumption smoothing?

There is a large literature on how households in low-income countries respond to all types of shocks.<sup>2</sup> In the aftermath of a shock, whether due to lack of rainfall for harvest, natural disasters, conflicts or health emergencies, households adopt multiple strategies to smooth their consumption. They withdraw previously accumulated savings, borrow money, sell buffer assets such as livestock or durable goods, rely on

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<sup>2</sup>For example, see previous findings related to agricultural shocks (Jensen, 2000; Jayachandran, 2006; Dercon and Christiaensen, 2011; L. D. Nguyen, Raabe, and Grote, 2015); conflict-related shocks (Ibáñez and Moya, 2010; Alderman, Hoddinott, and Kinsey, 2006); natural disaster (Carter et al., 2007; Arouri, C. Nguyen, and Youssef, 2015); health shocks (De Weerd and Dercon, 2006; Islam and Maitra, 2012; Robinson and Yeh, 2011; Asfaw and Braun, 2004; Genoni, 2012); and other various transitory income shocks (Beegle, Dehejia, and Gatti, 2006; Combes and Ebeke, 2011; Yilma et al., 2014).

their social network for help through remittances, reduce their expenditures, increase their labor supply or mix multiple strategies at once. Yet, in the specific case of the pandemic multiple of those strategies are unattainable: as the shock is systemic, transfers within the kinship networks are likely to be cut back, the strict lockdown restrictions in Uganda resulted in a lack of work opportunities and households might be reluctant to sell productive assets to avoid reducing their long-term productivity (Fafchamps, Udry, and Czukas, 1998) or just not have the opportunity to sell due to the closure of non-food markets. In addition, due to the aggregate nature of the COVID-19 economic tightening, if all households resort to the same strategies at the same time by trying to increase their labor supply or sell their assets, there is a risk that the market will be saturated, and wages and prices will collapse.

As a result, one of the remaining viable options for facing the economic consequences of the pandemic strategically relies on households access to financial tools, i.e., safe saving instruments and affordable credit. Previous evidence indeed shows the importance of financial services to mitigate the impact of uninsured shocks. For example, Gertler, Levine, and Moretti (2009) show that geographical proximity to a microfinance institution and ownership of a savings account help Filipino families stabilize their consumption in face of large and unexpected health shocks. Likewise, Islam and Maitra (2012) demonstrate that, in Bangladesh, access to microcredit help individuals alleviate the consequences of a health emergency by reducing the need to sell productive assets, a risk-coping strategy with potential long-term costs on productivity and income. Somville and Vandewalle (2019) further provide evidence that households with access to formal savings accounts are better able to smooth their consumption against income shocks. They observe pro-cyclical savings: households make more deposits when income is high but dissave and withdraw their savings when their income falls below their median income.

Yet, formal financial services are not always be accessible to shelter poor households from shocks. Following an unexpected shock, microfinance institutions are likely to reduce their loans supply or refuse new clients for non-collateralized consumptions loans (Gertler, Levine, and Moretti, 2009; C. Berg and Emran, 2020). In this perspective informal savings and lending clubs, such as savings groups and ROSCA, have a potential advantage in extending access to risk-mitigating strategies.

Informal savings groups vary in their exact methodology but are typically based on the pooling of their members' savings and the availability of those funds to meet their members' borrowing needs (Van Hemert, D'Espallier, and Mersland, 2024). According to the Global Findex Database 2021, 419 million individuals save through those informal groups, almost three times the number of microfinance borrowers worldwide (Demirgüç-Kunt et al., 2022). Organized around weekly group meetings,

these informal organizations encourage saving discipline and expand access to lump-sum needed for investments or consumption purposes (Gugerty, 2007).

These informal savings groups are founded on reciprocity and mutual aid between members. Without formal enforcement, financial transactions are ensured by mutual trust between members and a so-called social collateral (Gugerty, 2007; Karlan et al., 2009). These groups promote financial intermediation in villages and rural areas by matching borrowers and savers (Cassidy and Fafchamps, 2020). Members are encouraged to keep their savings within the group because it provides them with a relatively safe saving instrument and most importantly a commitment to enforce saving and avoid the capture of their savings by others (Anderson and Baland, 2002; Cassidy and Fafchamps, 2020). The pooled funds are then available to meet members credit demands, allowing them to access lump-sums that would have been difficult to accumulate or acquire on their own (Besley and Levenson, 1996).

We see these informal groups as intermediaries between informal kinship support and formal banking institutions. Indeed these “middle-rung” organizations, as qualified by Czura and Klonner (2023) and Maitra, Miller, and Sedai (2023), combine the advantages of social enforcement while being more reliable and less cash-constraint than the help available through one’s network. The groups allow households to insure their consumption against income shocks by providing a tool to move resources across time and between states of nature.

Alongside access to financial intermediation, informal savings groups can also mitigate the impact of a negative shock due to their social aspects. One key feature of those groups is to build on pre-existing social connections to facilitate transactions between individuals in the absence of legal enforcement of contracts (Karlan et al., 2009; Benda, 2013). Yet, by participating in the group and meeting other members regularly, it is likely that these social connections will be further reinforced. The social aspect of the group is often cited as one of the main reasons to become a member (Musinguzi, 2016). The meetings become an opportunity for sharing experiences and knowledge. Group participation has the potential to foster collective action and solidarity between members (Desai and Joshi, 2014). Membership in such informal savings groups should thus be understood as a “*bundled intervention, including microfinance, but also solidarity networks, collective action platforms, and female empowerment*” (Demont, 2022, p. 105893). This aspect can be particularly relevant in the context of refugee settlements. Creating new social connections is especially important for displaced households that have left their relatives and support system in their home countries.

Group participation can thus help members reduce the impact of the loss of income due to the lockdown restrictions on their expenditures in three ways: the use of their savings (previously accumulated savings that can be withdrawn after the

shock), access to loans within the group and the mutual aid and solidarity between members fostered by the group setting.

However, a common assumption is that these mechanisms are only useful for idiosyncratic shocks, and not for large, systemic shocks where all group members are affected (Jensen, 2000; Besley, 1995). We test this assumption by looking at a large, unanticipated aggregate shock, the COVID-19 crisis. We evaluate whether this shock had heterogeneous impacts on group members, with some members better off than others, leaving enough scope for financial intermediation between savers and borrowers, even during the pandemic (Czura and Klønner, 2023).

Previous evidence study this question at the group-level. Demont (2022) show that, contrary to local moneylenders and microfinance institutions, self-help groups in India do not experience a credit supply shortage after a negative rainfall shock. Czura and Klønner (2023) demonstrate that ROSCAs are efficient in channeling funds from better-insured employees to less-insured entrepreneurs following the 2004 Indian Ocean tsunami. We thus aim to complete those evidence by inspecting whether at the individual level, the group is able to help its members to stabilize their expenditures. Our novelty is to compare members with non-members and testing how savings and credits patterns differ between the two.

## 3.4 Data

### 3.4.1 Data sources

We combine three different sources of data for our analysis: financial diaries, special one-off surveys, and qualitative interviews. The financial diaries and special one-off surveys were collected in two Ugandan refugee settlements (Kiryandongo and Nakivale)<sup>3</sup> by L-IFT, a social enterprise focused on collecting evidence on the financial lives of low-income households. Developed by D. Collins et al. (2009), financial diaries are a tool particularly relevant to access detailed data on the financial lives of households living close to the poverty line. Financial diaries help to adopt a more comprehensive approach by reporting on all types of financial tools and better understanding daily cash flows and combinations of loans, savings and insurance (Janssens et al., 2021).

The methodology offers cashbooks to participants that are asked to record all of their daily transactions. Every two weeks a trained enumerator comes to visit

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<sup>3</sup>Kiryandongo is located north of Kampala and hosts about 60 000 refugees, principally from South Sudan but also from other neighboring countries such as the Democratic Republic of Congo, Burundi, Rwanda and Sudan (UNHCR, 2018) Nakivale is situated near the Tanzanian border, it was established in 1958 and has continuously welcomed new arrivals of refugees since then, its current population is estimated at about 145 613 refugees, mostly from the Democratic Republic of Congo and Burundi (UNHCR, 2022).

them to review their cashbooks and record their transactions of the last two weeks (meaning that our data are collected bi-weekly). We use 26 of these repeated surveys spanning from August 2019 to September 2020, including 223 refugee respondents from two different refugee settlements. The information collected with the diaries includes the respondents revenues, expenses, savings, loans, remittances, savings groups participation and assets.

In addition to the financial diaries, we use data from one-off surveys focusing on one specific topic, different every time, for example women empowerment, energy use, refugee status, COVID-19 impacts. We use the insights gained through the topic-specific surveys to present figures and descriptive statistics that complement our main results from the difference-in-difference analysis based on the financial diaries data.

Finally, we complement our findings with qualitative data collected through semi-structured interviews with refugees, NGOs workers and L-IFT staff. The interviews took place in March 2023 in Nakivale (after the lockdown restrictions were lifted) and were performed either in English or in French, or Kiswahili with the help of a translator. Everything was then translated and transcribed in English. We use several quotes from those interviews to help illustrate our findings and understand how savings groups operate in the refugee settlements.

Despite COVID-19 related restrictions, data collection of the financial diaries persisted in-person during the different lockdown periods enforced in Uganda, ensuring no discontinuity in our data. This was due to the fact that L-IFT enumerators are themselves refugees and reside in the refugee settlements, limiting the risk of contamination from settlement outsiders. In addition, all precautions were taken to follow sanitary measures by wearing masks during the one-on-one interviews and respecting social distancing.

One important challenge related to understanding the impacts of the pandemic in low-income countries is caused by the lack of data. Most of the studies related to the impacts of the pandemic in low-income countries are based on post-lockdown measures phone surveys (Bundervoet, Dávalos, and Garcia, 2022; Egger et al., 2021; Josephson, Kilic, and Michler, 2021). Their estimates are based on asking respondents to retrospectively compare their current situation to the one before the crisis which is at risk of recall bias. In our case, we can take full advantage of not having to rely on the memories of respondents since the data collection started well before COVID-19.

During summer 2019, respondents were randomly drawn from the two settlements for a baseline interview asking them basic background information (country of origin, time since arrival, household composition, education, age). Out of the 600 respondents selected for a baseline interview, 223 participants agreed to continue for

the bi-weekly repeated interviews. We investigate potential self-selection in our final sample by comparing our repeated interview participants to baseline respondents on main characteristics and find no significant difference (Appendix 3.8).

Table 3.4.1 presents the main demographic characteristics of our respondents, along with participation in savings groups. Our sample is equally distributed between the two settlements and respondents from each settlement are relatively similar in terms of demographics and time of arrival in Uganda. Our sample is split into equal parts of female and male respondents. The majority originates from South-Sudan (49%) and are married (70%) with children. Regarding savings group participation, 63 respondents are members of a savings group during the time of our study, corresponding to 28% of our sample.

Table 3.1: Comparison of SG members and non-members

	SG Members	Non-members	Total
<b>Settlement</b>			
Kiryandongo	18	92	110
Nakivale	45	68	113
<b>Type of accommodation</b>			
Own	53	130	183
Rented	10	28	38
<b>Gender</b>			
Women	30	79	109
Men	33	81	114
<b>Age</b>			
Min	18	18	18
Max	67	80	80
Avg	37.12	34.3	35
<b>Country of origin</b>			
Burundi	32	32	64
DR Congo	13	35	48
South-Sudan	18	93	111
<b>Arrival</b>			
Less than 4 years	32	112	144
More than 4 years	28	41	79
<b>Married</b>	49	108	157
<b>Avg HH size</b>	6.36	6.55	6.5
<b>Nbr of children</b>	3.66	3.25	3.37
<b>Total</b>	63	160	223

### 3.4.2 Outcome variables

We estimate the impact of being a group member during the COVID-19 crisis mainly on expenditures in order to understand if being part of a savings groups help refugees stabilize their spending on food and other essential items (hygiene products, education, health, energy costs). It is important to note that expenditures measure the value of what was bought during the last two weeks, not what was consumed. There could be important differences between the two as most of our respondents report some type of agricultural activity for home consumption. Unfortunately, we do not have data for this consumption and thus our measure of expenditures cannot fully capture whether respondents were able to maintain their level of food consumption.

Based on the assumption that savings group participation can help members smooth their consumption through access to a safe saving instrument and credit, we also look at deposits, withdrawals, and amounts borrowed as dependent variables.

Table 3.4.2 presents an overview of the financial situation of our respondents before the COVID-19 crisis. It can be noted that there are significant differences between informal savings groups members and non-members. Notably, members have significantly higher total income. This is a common finding related to informal financial groups within poor communities, where the relatively less poor tend to join (Burlando and Canidio, 2017). This could be due to the fact that SGs impose a mandatory minimum savings deposit at each weekly meeting. The poorest individuals within one community could see this as an insurmountable obstacle to group participation. We also observe a difference in loan amounts and number of loans as savings groups members borrow on average more times and in larger amounts. This is not surprising because in a context in which most individuals have difficulties accessing credit, group members can take advantage of one more credit source and they do. The last difference before the pandemic is in net assets: non-members hold more assets than savings group members. We do not find any evidence of different levels of expenses, savings nor withdrawals before the COVID-19 shock.

It is important to note that baseline differences in levels of our outcome variables are unlikely to impact our difference-in-difference analysis. Indeed, our impact estimates are computing the changes in outcomes for members over time compared to the changes in outcomes for non-members over time. Difference between members could thus only be a threat to our identification strategies if there are important divergences between members and non-members in trends or growth rate of our outcome variables and not in levels at baseline. We control this with our robustness check that tests the parallel trends assumption in section 3.6. As long as the assumption of parallel trends holds, we can consider that our difference-in-difference estimates are credibly assessing how being a saving group member can reduce the

impact of the COVID-19 on different financial outcomes (Roth, 2022).

Table 3.2: Univariate mean comparison (*t-test*) between group members and non-members on financial variables at baseline

Performance indicators (US\$)	Full sample (avg)	Non-members	SG members	Difference
Income***	15.67	12.62 [10.59; 14.65]	21.8 [18.91; 25.51]	-9.18 (2.15)
Expenditures	20.17	18.94 [14.72; 23.15]	22.64 [17.63; 27.66]	-3.7 (53.34)
Deposits (amounts saved)	13.75	10.29 [8.33; 12.25]	20.72 [3.72; 37.72]	-10.43 (8.72)
Withdrawals (amounts withdrawn)	4.89	4.23 [1.90; 6.55]	6.22 [3.81; 8.63]	-1.99 (1.71)
Loans amounts**	3.9	2.31 [1.71; 2.91]	7.11 [2.24; 11.95]	-4.79 (2.49)
Number of loans***	3.11	2.59 [ 2.44; 2.75]	4.16 [3.94; 4.38]	-1.57 (0.14)
Net support (received-given)	17.19	17.11 [14.69; 19.53]	17.36 [14.61; 20.12]	-0.26 (1.87)
Net asset (bought-sold)**	0.11	0.15 [0.04; 0.27]	0.03 [-0.00; 0.07]	0.12 (0.06)

\*\*\* $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ . Parenthesis indicate standard errors and square brackets indicate confidence intervals.

### 3.4.3 Financial situation of our respondents

In terms of financial services, 28% of our sample are members of a saving group. We define membership as having attended at least 5 group meetings before the implementation of the COVID-19 lockdown restrictions. During the baseline interview, participants were asked about their experience with life and health insurance. None of them had either a health nor a life insurance and only a few (about 10%) had ever tried to get either (but were refused by the insurance company). This highlights the non-existent formal insurance coverage in our sample and thus the potential large impacts of uninsured shocks on consumption when health is affected.

In January 2020, in one of the one-off surveys, respondents were asked the following question: “*How would you pay for a sudden large health cost, such as a broken leg or severe sudden illness?*”. The majority (36.6%) reported that they would use



their savings and 28% replied that they would need to take out a loan. Only 7% of the respondents declared being able to cover the cost with their regular income. This highlights how savings and loans are used interchangeably for insuring against unexpected shocks, as suggested by (Matin, Hulme, and Rutherford, 2002). Consequently, access to a safe saving instrument and favorable borrowing conditions can reduce household vulnerability to uninsured shocks.

Regarding loans, during the full time period from August 2019 to September 2020, \$17 324.63 has been borrowed amongst our 223 respondents, out of which \$4 153.473 comes savings groups (about 24%) and the rest stems from a multitude of sources: relatives, neighbors, friends, microfinance institutions, moneylenders, SACCOs, banks or local stores. On average, each respondent took out 3.1 loans over the time period for a total median amount of \$23.24. In terms of savings, the aggregate savings reach \$64 707.99, including \$4 377.761 into savings groups (6.8%). The total median amount saved per respondent over the period is \$66.27, almost three times the total median amount borrowed.

These figures show the importance of borrowing and saving activities, particularly for refugee households that live on average with less than one dollar a day, as suggested by D. Collins et al. (2009). At an aggregate level, saved amounts combined from all sources are three times bigger than the amounts borrowed. This could reflect either a preference for savings, constraints on obtaining credit or a lack of profitable investment opportunities. In the context of refugee populations, it is plausible that accumulating precautionary savings is essential to safeguard against shocks and potential return to home country or relocation. In addition, credit is difficult to obtain in the settlements as financial institutions and moneylenders consider refugees as high-risk borrowers that could disappear back to their country without repaying their loans. We do not have information about investment opportunities, yet 123 of our respondents have developed their own income-generating activity that could potentially require credit for investments.

Regarding saving and borrowing within savings groups, these descriptive statistics hint that while it is the groups are a major source of credit (24% of the amounts borrowed come from a saving group), it is not the main saving instrument of our respondents.

### 3.5 Empirical strategy

To identify the impact of participating in a saving group on the ability to mitigate shocks, we exploit the natural experiment setting created by the COVID-19 crisis. Indeed, the income shock it created was exogenous, unanticipated, large and systemic. It thus allows us to study how the savings groups were used as an insurance

mechanism. We use a difference-in-difference identification strategy to capture if being a group member can mitigate the impact of the COVID-19 shock on expenditures and other indicators of resilience. We implement a two-way fixed effects model that controls for both time-specific and individual-specific effects (Wooldridge, 2021). Our model is defined by Equation eq:eq1:

$$Y_{it} = \beta_0 + \beta_1(Shock_t \cdot SG_i) + \delta_t + \gamma_i + \epsilon_{it} \quad (3.1)$$

The dependent variable  $Y_{it}$  is one of our various outcomes (see section 3.4 for a detailed description). Our outcomes are measured in logarithms to facilitate the interpretation of our coefficients as percentage change of our outcomes.  $Shock_t$  is defined as a binary variable equal to 1 for all observations collected after the shock occurred, that is after the introduction of COVID-19 lockdown restrictions on the 30th of March 2020.  $SG_i$  is a time-invariant binary variable measuring participation of the respondent in a saving group. A respondent is considered part of a savings group if they attended at least 5 group meetings in the pre-crisis period.  $Shock_t \cdot SG_i$  is an interaction term that will be equal to one only for respondents that are group members and observed after the shock,  $\beta_1$  is thus our coefficient of interest in order to understand if group participation has a mitigating effect on the consequences of the crisis. We control for time fixed effects ( $\delta_t$ ) and individual fixed effects ( $\gamma_i$ ), following the two-way fixed effects regression to estimate difference-in-difference defined by Wooldridge (2021).  $\epsilon_{it}$  are our residuals, clustered at the individual level to account for serial correlation due to the panel structure of our data (Wooldridge, 2021). The main advantage of the difference-in-difference strategy is that, if the assumptions of non-anticipation effect and parallel trends are respected, the impact we estimate is robust to any confounding variable. We test these two assumptions in Table ?? to evaluate the robustness of our estimates.

## 3.6 Results

### 3.6.1 Homogeneous impact from April 2020 to September 2020

We present the outcomes for our two-way fixed effects difference-in-difference model in Table 3.6.1. These represent the average impact of participating in a group after the end of March 2020 up until September 2020. Overall, we find small but significant impacts of being a member of a savings group during the months following the introduction of lockdown measures. As all our outcome variables are measured in natural logarithms, one unit increase in our independent variable (i.e., switching

from  $Shock_t \cdot SG_i = 0$  to  $Shock_t \cdot SG_i = 1$ ) leads to a  $\beta_1 \cdot 100$  percentage change in our outcome variable.

Table 3.3: Impact of being a SG member during the COVID-19 lockdown measures

VARIABLES	(1) Expenditures	(2) Deposits	(3) Withdrawals	(4) Loans amount
$SG * Post$	-0.181* (0.0962)	-0.0483 (0.121)	-0.175*** (0.0667)	-0.159** (0.0641)
Constant	1.785*** (0.0229)	1.101*** (0.0267)	0.259*** (0.0141)	0.406*** (0.0137)
Time FE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
Observations	4,201	4,201	4,201	4,201
R-squared	0.019	0.000	0.007	0.008
Number of ID	227	227	227	227

Robust standard errors in parentheses. \*\*\* $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

First, we find a small significant effect on expenditures, as members spend 18.1% less than non-members, indicating that participation in groups could have adverse effects on consumption smoothing. This is due to a rule common to most groups that savings accumulated in the group can only be withdrawn at the end of the group cycle of activities, typically one year long. This rule is used to make sure there are enough funds within the group to lend to members but also to be able to use deposits as loan collateral. It does mean that members are not able to use their accumulated savings within the groups to maintain their level of expenditures when their income fluctuates. This constitutes a trade-off between discipline and flexibility: the rule enforces discipline by preventing all members to withdraw their savings at once following an aggregate shock and leading to the group dissolution, yet it severely limits the flexibility of the members to use their savings when they need it the most. This impossibility to withdraw savings from the groups is also exemplified by the fact that we find that members have 17.5% less withdrawals than non-members, despite having higher levels of savings at baseline.

Regarding credit, we find that the amounts borrowed by group members are almost 16% smaller than for non-members. During interviews with group members in March 2023, multiple said that their groups suspended the mandatory contributions during the first weeks after the introduction of the COVID-19 lockdown measures. In consequence, the loanable fund available to members was reduced,

maybe provoking loan shortage in certain groups, explaining our results. An alternative explanation could be that groups are perfect examples of “learning by doing” in terms of financial literacy, and there is evidence that higher financial knowledge is linked to better debt management (G. Berg and Zia, 2017). It could be the case thus that members, more financial savvy, are less inclined to take on new credits during a crisis when they are not sure they will have the means to reimburse their loans. Or that groups are simply less likely to approve loans during the pandemic.

### **3.6.2 Heterogeneous impacts from April 2020 to September 2020**

As a complementary analysis, we estimate the impact of savings group participation during the COVID-19 crisis for each different period post-crisis separately. Indeed, the estimates shown in Table 3.6.1 could hide heterogeneity across time as the lockdown measures are lifted. Table 3.6.2 presents the estimates per two-weeks period. The uneven-numbered columns focus on the short-term impact until the end of May 2020 when COVID-19 restrictions started to ease. The even-numbered columns show the estimated impact for each two weeks period until the end of September 2020, six months after the introduction of the lockdown measures. We find that the negative impact on expenditures from Table 3.6.1 is mainly driven by later periods, we find no difference in expenditures between members and non-members before mid-June 2020. The lack of flexibility to withdraw savings from the groups thus constrains members only several months after their initial income shock . Regarding the impact on withdrawals and amounts borrowed, the estimation per period show again that the results presented in Table 3.6.1 is driven by negative impacts in later periods (from June to September 2020) while we find no significant difference between members and non-members before the end of May 2020.

Table 3.4: ATT estimates per period post-COVID-19

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expenditures	Expenditures	Deposits	Deposits	Withdrawals	Withdrawals	Loans total amount	Loans total amount
$SG * Post_0$	-0.230 (0.177)	-0.231 (0.178)	-0.187 (0.185)	-0.188 (0.186)	-0.126 (0.116)	-0.126 (0.116)	-0.166 (0.133)	-0.166 (0.133)
$SG * Post_1$	-0.0190 (0.220)	-0.0201 (0.220)	-0.130 (0.183)	-0.131 (0.183)	0.0624 (0.149)	0.0624 (0.150)	-0.250 (0.162)	-0.250 (0.162)
$SG * Post_2$	-0.289 (0.184)	-0.289 (0.184)	0.0983 (0.209)	0.102 (0.208)	-0.134 (0.116)	-0.135 (0.116)	-0.0554 (0.167)	-0.0553 (0.167)
$SG * Post_3$	0.267 (0.208)	0.267 (0.208)	0.00289 (0.193)	0.00765 (0.193)	-0.347*** (0.127)	-0.345*** (0.127)	0.0534 (0.165)	0.0507 (0.165)
$SG * Post_4$	-0.318 (0.202)	-0.317 (0.202)	-0.123 (0.212)	-0.127 (0.212)	-0.147 (0.167)	-0.146 (0.167)	-0.322** (0.127)	-0.325** (0.127)
$SG * Post_5$		0.256 (0.179)		-0.157 (0.192)		-0.0542 (0.132)		-0.343*** (0.103)
$SG * Post_6$		-0.451** (0.186)		0.0114 (0.170)		-0.169 (0.128)		-0.0744 (0.148)
$SG * Post_7$		-0.320* (0.186)		-0.157 (0.217)		-0.0974 (0.140)		-0.0453 (0.182)
$SG * Post_8$		-0.321* (0.188)		-0.0458 (0.216)		-0.246* (0.148)		-0.350** (0.165)
$SG * Post_9$		-0.353* (0.198)		-0.182 (0.210)		-0.329** (0.130)		-0.125 (0.158)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expenditures	Expenditures	Deposits	Deposits	Withdrawals	Withdrawals	Loans total amount	Loans total amount
<i>SG * Post<sub>10</sub></i>		-0.0341 (0.194)		0.126 (0.199)		-0.214* (0.115)		0.152 (0.163)
<i>SG * Post<sub>11</sub></i>		-0.305* (0.178)		0.130 (0.200)		-0.274*** (0.0967)		-0.267** (0.125)
<i>SG * Post<sub>12</sub></i>		-0.193 (0.200)		-0.0151 (0.196)		-0.188* (0.107)		-0.259** (0.128)
Constant	2.632*** (0.0911)	2.628*** (0.0938)	1.305*** (0.0900)	1.317*** (0.0947)	0.539*** (0.0852)	0.544*** (0.0872)	0.776*** (0.0756)	0.776*** (0.0793)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,996	4,201	2,996	4,201	2,996	4,201	2,996	4,201
R-squared	0.079	0.069	0.011	0.012	0.026	0.027	0.032	0.034
Number of ID	227	227	227	227	227	227	227	227

Robust standard errors in parentheses.

\*\*\*p<0.01; \*\*p<0.05; \* p<0.1.

### 3.6.3 Robustness checks

To evaluate our difference-in-difference identification, we perform two robustness checks to assess whether the two key assumptions of our strategy hold: no anticipation effects and parallel trends. We first test for anticipation effects: intuitively it is unlikely that the COVID-19 crisis could have been anticipated. Even as news of increasing infections started to emerge in January and February 2020, neither individuals nor government could have predicted the magnitude of the pandemic, the necessary measures they will have to undertake to slow it down and the social and economic consequences of the crisis. Table 3.6.3 presents the result of the Granger test checking for anticipation effects and shows that there are none.

Our second robustness check aims to verify the parallel trend assumption, needed for our estimates to be unbiased. The parallel trends assumption posits that there can be potential selection bias into treatment but that this selection bias is constant over time and is the same for pre and post-shock periods. In our case, it is likely that self-selection into informal savings groups exist. For example, Cassidy and Fafchamps (2020) find that the saving discipline enforced in the groups particularly attract present-biased savers. Present-biased preferences will potentially affect not only group participation but all other financial activities of our participants. Yet, this is not an issue if this selection effect based on time preferences is constant over time. We test for this following the approach by Marcus and Sant’Anna (2021) and Sun and Abraham (2021). Our test supports the validity of the parallel trends assumption, as shown in the second column (“PT test”) of Table 3.6.3.

Table 3.5: Robustness checks for anticipation effects and the parallel trends assumption

	Granger test	PT test
Expenses	F(12, 226) = 1.43 Prob > F = 0.1552	F(1, 226) = 0.40 Prob > F = 0.5280
Deposits	F(12, 226) = 0.98 Prob > F = 0.4671	F(1, 226) = 0.02 Prob > F = 0.8795
Withdrawals	F(12, 226) = 2.34 Prob > F = 0.0077	F(1, 226) = 4.55 Prob > F = 0.0341
Loans	F(12, 226) = 1.12 Prob > F = 0.3471	F(1, 226) = 1.01 Prob > F = 0.3169

In addition to the statistical testing of parallel trends, intuitively we would argue that the parallel trends assumption holds in our data. Savings groups members and

non-members are living in very similar circumstances, in the two same settlements, they experience similar economic, and contextual conditions and each group includes different profiles of individuals (in terms of occupation, household status, gender, country of origin, etc.). They are all subject to the same seasonality and income volatility constraints. As such we would not expect no difference in expenditures, loans and savings trends between members and non-members.

### 3.7 Discussion and conclusion

Uganda is the largest refugee-hosting country in Africa, with approximately 1.5 million individuals fleeing conflict-stricken areas from neighboring countries (UNHCR, 2021). With active conflicts in the Republic Democratic of Congo, Sudan, and South-Sudan, the flow of refugees searching shelter in Uganda is likely to intensify. In this context, it is essential to find solutions to improve the livelihoods in refugee settlements to complement the existing support from the Ugandan government and the UNHCR. We study one initiative in this regard, with participation in savings groups, informal financial cooperatives based on mutual aid.

In regular times, savings groups participation is known to foster asset ownership and spending on food items (Annan et al., 2013), larger overall savings and improvements in consumption smoothing (Beaman, Karlan, and Thuysbaert, 2014), and increases in credit and agricultural investments (Ksøll et al., 2016). In addition, compared to other NGO-led interventions, the creation and training of new savings groups is relatively cheap, estimated at only \$1.50 per member by Ashe and Jagger Neilan (2014). Implementation of savings groups within refugee populations could thus be a powerful tool to improve their livelihoods.

Savings groups are present in different refugee settlements in Uganda, either facilitated by NGOs or emerging spontaneously. In the absence of access to formal banking services, savings groups can play an important role in helping their members with a safe saving instrument and credit opportunities. We study the impact of participating in savings groups, during the months under lockdown measures in two refugee settlements in Uganda. We identify this impact by a difference-in-difference analysis comparing members and non-members of savings groups before and after the shock created by the pandemic.

In our sample of 223 refugees in two settlements in Uganda, surveyed every two weeks between August 2019 and September 2020, we find that savings group did not help their members protect themselves against the negative income shock provoked by the COVID-19 lockdown measures. Between the beginning of April 2020 to September 2020, we find that group members spend 18.1% less than non-members. While we find no difference in the levels saved during the pandemic, members with-



draw from their accumulated savings 17.5% less than non-members, despite having larger initial savings amounts at baseline in August 2019. We explain this by the fact that savings within the groups are “blocked” and cannot be withdrawn before the end of the cycle, so members are actually less able than non-members to use their accumulated savings to mitigate the impact of the shock.

On the credit side, members borrowed 16% smaller loans less than their counterparts. We offer two potential alternatives to explain this result: either there is credit shortage within the groups, making members credit-constrained; or members, by participating in savings group, have acquired higher financial literacy and in consequence are more reluctant to increase their level of debts during a crisis compared to non-members.

Thus, we find that group membership could not help their members efficiently mitigate the financial impact of such a large and systemic shock as the COVID-19 pandemic. While this may be a disappointing finding, easy solutions regarding how savings groups operate could improve groups’ capacity to protect members during systematic shocks. First, on the savings side, the strong restriction on withdrawals could be relaxed in case of important income shocks. Second, on the credit side, NGOs and formal banking institutions could help groups limit their loan scarcity by providing joint liability loans to groups when they most need it, as previously suggested by (Burlando, Canidio, and Selby, 2021).

In addition, one impact of savings groups that we could not investigate through our quantitative analysis but that is predominant in interviews with group participants is the importance of the social connections created with other members. A common source of unhappiness amongst our refugee respondents is the feeling of loneliness and isolation due to displacement and the lockdown measures largely amplified this feeling. Many of our interviewees declare that being part of a group helps them feel better integrated in their new communities. Multiple said that their main reason in joining a savings group was to build a new network and help each other in building a better life. When their meetings had to be cancelled during the pandemic, several groups continued to communicate regularly through messaging. Measuring the social cohesion created by the SG setting and how it helps refugee populations improve their mental health and their integration in their host country is an interesting avenue for future research.

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## 3.8 Appendix 2

Table 3.6: Comparison of respondents of baseline and repeated bi-weekly surveys

	Repeat	Baseline
<b>Member of SG (%)</b>	28.25%	32.55%
<b>Female Respondents (%)</b>	51.12%	53.37%
<b>IGA<sup>4</sup> (%)</b>	55.16%	37.83%
<b>Settlement</b>		
Kiryandongo (%)	49.33%	74.78%
Nakivale	50.67%	25.22%
<b>Type of accommodation (%)</b>		
Own	82.96%	87.39%
Rented	11.14%	12.61%
<b>Country of origin (%)</b>		
Burundi	28.70%	13.20%
DR Congo	21.52%	12.02%
South-Sudan	49.78%	74.78%
<b>Arrival in Uganda (%)</b>		
Less than 4 years	36.77%	33.72%
More than 4 years	50.22%	66.28%
<b>Age (avg)</b>	35.1	33.5
<b>Married (%)</b>	70.40%	68.33%
<b>Nbr of children (avg)</b>	3.36	3.25
Total nbr of respondents	223	341