Essays on the performance of savings groups

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Introduction

1. Understanding savings groups

Savings groups (SGs) are self-managed, community-based financial institutions where self-selected members pool money into a common pool and borrow from the pool at an interest (Le Polain, Sterck, & Nyssens, 2018; Burlando & Canidio, 2017). Referred to as the "small wonder" by the Economist (The Economist, 2011), the modern savings groups model has its roots in the 1990s. An initiative that started in Niger by the Cooperative for Assistance and Relief Everywhere (CARE) was driven by the need to achieve socioeconomic empowerment of women (Grant & Allen, 2002). Through the Mata Masu Dubara (Women on the Move) program, women were organized into groups through which they consolidated their own funds from which they would then take loans at an interest. This initiative gave birth to the Village Savings and Loan Association (VSLA), one of the most widely implemented savings group models in existence today (Brunie et al., 2017). Based on the VSLA model, several international development organizations have built their own models such as the Savings and Internal Lending Communities model by Catholic Relief Services, the Saving for Change program by Oxfam in collaboration with Freedom from Hunger and the Stromme Foundation, the Women Organizing Resources Together (WORTH) program by Pact, the Agha Khan model, the Savings for Transformation by World Vision program, and more.

SGs are mobilized by development organizations referred to as facilitating agencies and these agencies find SGs appealing because they offer a sustainable way to assure a basic model for financial inclusion (Le Polain et al., 2018) and a platform for delivery of other development programs (e.g., gender training, business training, health education, etc.) to hard-to-reach rural populations particularly in Africa (Sinclair & Singh, 2015). The growing popularity of SGs is reflected in current estimates that show that there are over 14 million members in facilitated SGs[1] controlling assets between 430 million and 1.2 billion US dollars (SEEP Network, 2016).

[1]This number pertains to SGs supported by facilitating agencies. However, the estimate is much higher if self-replication is taken into account. When facilitating agencies form SGs in a particular community, there

The SG methodology is based on centuries' old traditional financial systems, often referred to as Rotating Savings and Credit Associations (ROSCAs) and Accumulating Savings and Credit Associations (ASCAs) (Beaman, Karlan, & Thuysbaert, 2014). In ROSCAs, people routinely gather in groups where funds are collected in a common pool and handed over to one person in turn until all the group members have had their turn, after which the group is disbanded or a new cycle starts (Gugerty, 2007; Van den Brink & Chavas, 1997). In ASCAs, funds are collected in a common pool at regular meetings just like in the ROSCAs. However, rather than give all the collected funds to each person in turn, the funds are allowed to accumulate, and group members can take loans from the common pool at an interest (Bouman, 1995). At the end of a cycle, the accumulated funds are then shared out among the group members. Savings groups especially build on the ASCA model since SG members make contributions to a common fund from which they can take a loan at an interest. However, unlike ASCAs that emerge spontaneously based on local initiatives, savings groups are facilitated by an external agency, usually an international non-government organization (NGO) such as Oxfam, CARE International, World Vision, etc. (Ledgerwood, Earne, & Nelson, 2013). These organizations mobilize community members into groups and train the members in a predefined SG methodology for saving and borrowing that is aimed at assuring transparency and sustainability. Hence, the facilitating agencies (the NGOs) aim to introduce procedures that will enhance the operation of the SGs.

Once training in the SG methodology is completed, members organize themselves into groups typically composed of 20–30 members and elect their leaders (Burlando & Canidio, 2017). At this point, the facilitating agency takes on a monitoring role until the group is deemed mature enough to continue operations on its own without the support of the agency. SGs operate in cycles and a typical cycle lasts one year. Before the start of a cycle, groups formulate a constitution that lays down agreed upon guidelines pertaining to the day-to-day functioning of the group. Such guidelines include the maximum number of members allowed in the group, the minimum amount that one can save, which is often referred to as a "share," the interest rate to be charged on loans, the frequency of meetings and

is a multiplier effect that sees more groups formed without the support of the agency (Karlan et al., 2017). In Uganda, for example, Mine et al. (2013) find that for every SG that is formed by a facilitating agency, there are 1.99 SGs that form spontaneously.

related fines for missing the scheduled meetings, and the group leadership structure and related procedures for electing leaders.

When a cycle begins, members invest savings into the group by purchasing shares. Usually, there is a maximum limit to how many shares a member can purchase at every meeting. This is to ensure that members of a group are sufficiently homogeneous. The group funds are kept in a lockbox that normally has three different locks, and the keys are kept by different group members for safety purposes. The lockbox is opened only during the group meetings in the presence of group members. When funds accumulate, members take loans at an interest. Loan requests are subject to approval by other group members and, usually, a member can take a loan that is up to 3 times their savings amount. All saving and borrowing activities take place during the scheduled group meetings.

For bookkeeping purposes, every member has a passbook in which their saving and borrowing transactions are recorded. On the group level, a general ledger is kept recording the total amount in the cash box. This is updated by the treasurer at every group meeting. In addition to the group loan fund, some groups keep a welfare fund that is used in case of emergencies like death of a family member, natural calamity, etc. Hence, the welfare fund acts as an informal insurance mechanism. At the end of the cycle, all the cash in the loan fund, i.e., member savings and interest earned on loans, is shared out among the group members in proportion to each member's savings amount. This acts as an audit and, at this point, groups can make changes to the group's guidelines and composition before a new cycle starts.

Owing to its flexibility, its ability to reach largely excluded populations, and the minimum costs required for its implementation, the savings group model has undergone many developments and innovations. Some of these developments that are touched on in this thesis include linking SGs to formal financial institutions, using SGs to deliver other development initiatives, and engaging men in SGs. Because SGs are intended to be autonomous, some of these developments, like linking SGs to formal financial institutions, may influence the group's financial operations. Moreover, using SGs to deliver other development initiatives raises questions as to whether this would not divert the groups from their core saving and borrowing activities (Mersland & Eggen, 2007). Finally, the inclusion of male

members may have an effect on the way men and women interact in groups. Drawing on these innovations, this thesis aims to shed light on the performance of savings groups. Specifically, we delve into the following research questions: How do linkages with formal financial institutions influence the performance of savings groups? How does financial education delivered through savings groups influence the performance of these groups? What impact does male membership have on savings groups' profit-generating capacity? Before elaborating on these questions in Section 4, I first discuss performance measures for SGs in Section 2. Then, I describe the dataset used in this dissertation and the issues that arise when attempting to make causal inferences from observational data in Section 3.

2. Core SG performance measures

Savings groups are usually designed in such a way that they do not require external capital and are entirely dependent on savings from the group members (Jeffrey, 2009). Consequently, *savings per member* is our first performance measure for this financial model. Savings are the main input of the SG methodology and they make it possible to collect a lump sum that can be made available as loans to interested members. Savings per member is calculated as the value of members' savings divided by the number of members in the group. This measure can be scaled by the gross national income (GNI) per capita for comparability across countries with different macroeconomic environments.

How do members then benefit from investing their savings into the group? Mainly, member savings are made available as loans to interested group members at interest. It is optimal that a larger percentage of the savings are converted into loans as funds left in the lockbox do not earn returns for the members. Consequently, *fund utilization rate* is our second performance measure. It captures the rate and efficiency with which members' savings are converted into loans and is calculated as the value of loans outstanding divided by the value of members' savings.

Our third measurement, *return on savings*, captures the group's profitability and the wealth created for group members. It is calculated as the profits generated at a point in time divided by the average value of members' savings at the same point in time and measures how the group uses members' savings to generate profit for the group members. At the end of each cycle, the available funds (the members'

savings plus earned interest) are shared out among the group members in proportion to each member's savings.

3. Causal inference with observational data

To investigate the different research questions, we use data from the Savings Group Information Exchange (SAVIX).[2] The SAVIX is an online platform that contains standardized data on over 200,000 savings groups globally. It is the first platform to provide data on different metrics related to a vast number of savings groups. The metrics cover group gender composition, country of origin, location (i.e., rural versus urban), different variables like savings, value and number of loans outstanding etc. It was developed by VSL Associates[3] in collaboration with three facilitating agencies including CARE, Oxfam, and Catholic Relief Services and funding from the Bill & Melinda Gates Foundation. Data is collected by field officers who work on behalf of the facilitating agencies and it is uploaded to an online Management Information System on a quarterly basis.

The SAVIX database contains observational data, i.e., the data is generated in an uncontrolled setting (Cameron & Trivedi, 2005). A major source of bias arising from such data is the non-random assignment of units to the treatment or control group. Random assignment aims to create two groups that are comparable along both observed and unobserved characteristics before an intervention is implemented (White & Raitzer, 2017). This makes causal claims possible as assignment to the treatment or control group is independent of the characteristics prior to the intervention. In the absence of randomization as is usually the case with observational data, endogeneity concerns, especially of selection bias, are commonplace (Rosenbaum, 2005).

"Selection bias arises when the treatment variable is correlated with the error in the outcome equation" (Cameron & Trivedi, 2005, p. 868). In such a situation, assignment to either the treatment or control group is based on certain existing characteristics and, hence, there are systematic differences between the two groups prior to the intervention (White, 2013). With selection bias, estimating the effects

[2] http://thesavix.org/

[3] https://www.vsla.net/

of an intervention on outcomes of interest may be problematic as the results may reflect the characteristics before the intervention rather than as an effect of the intervention itself. In Chapter 1, for example, savings groups are assessed along certain group-specific characteristics based on the linkage-readiness assessment tool developed by CARE International. This means that even before linkage, there are already systematic differences between savings groups that are linked to formal financial institutions and those that are not. Hence, a general regression approach based on pooled observational data will give biased estimates for the influence of linkages on outcomes of interest unless adjustments are made for the selection bias.

Randomized controlled trials (RCTs) are designed to minimize such biases. However, these are not always feasible due to cost and time constraints (White, 2013). Additionally, RCTs face external validity limitations as the results may not be generalizable to the general population (Williams, 2020). Another problem observed in many RCTs is that groups that are elected for treatment are often not interested in being treated and this may result in low participation (White, 2013); i.e., one can end up with "treated" groups that are not treated at all but only selected for being treated. In addition to RCTs, several statistical methodologies for mitigating selection bias under various assumptions have been proposed, e.g., matching, difference-in-differences (DID), regression discontinuity design, instrumental variables, etc. In this thesis, we apply matching and DID, depending on the available data.

Matching is one of the most widely applied methods for dealing with selection bias. Matching estimators aim to select treated groups (those that receive an intervention) and control groups (those that do not receive an intervention) that are similar along observable characteristics (Dehejia & Wahba, 2002) except for the fact that one received treatment and the other did not. Whatever effect is found from comparing a matched sample can then be attributed to the treatment. Matching is usually feasible when there is a large control sample (Rosenbaum, 2002). Matching estimators can be based on covariates as in *mahalanobis* distance matching or based on the probability of receiving treatment as in *propensity score* matching (Imbens, 2004). In Chapter 1, using the linkage-readiness assessment tool, we employ matching estimators to make the savings groups that are linked to a formal financial institution comparable to those that are not linked. Similarly, in

Chapter 2, we match groups that receive financial education with those that do not receive it along several covariates.

Another proposed solution for mitigating selection bias is the difference-in-differences methodology. This is applicable when one has data on the treated and control groups both before and after the intervention (Listl, Jürges, & Watt, 2016). Under the parallel-trend assumption, one can determine the effect of an intervention by comparing how the outcome changes in the treated and control groups before and after the intervention (Bertrand, Duflo, & Mullainathan, 2004). The DID methodology takes into consideration time-invariant unobservable variables (Zhou at al., 2016). Following data pre-processing with matching estimators, we apply difference-in-differences methods in Chapters 1 and 3, where we have data on the treated and control groups before and after the intervention.

4. Overview of chapters

This thesis consists of three chapters that each address a different factor that influences the performance of SGs. Chapter 1 looks at SGs' financial linkages with formal financial institutions. Chapter 2 looks at financial education delivered through savings groups. Chapter 3 looks at SGs' gender composition.

Chapter 1 investigates the effect of financial linkages on the performance of savings groups. Financial linkages occur when informal savings groups either open a joint savings account at a formal financial institution or participate in a joint credit facility arrangement with a formal financial institution. The central reason for financial linkages between savings groups and formal financial institutions is to balance group liquidity shortages and excesses. Additionally, financial linkage is attractive as it is viewed as a conduit for formal financial inclusion. Applying a difference-in-differences methodology to a matched sample of data on 3,234 savings groups from 31 countries, we investigate the differential effect of a savings and credit linkage. This is complemented with a qualitative investigation from SGs in Uganda that provides more insight into the observed results obtained from the quantitative investigation. Overall, there is a positive effect of savings linkage on savings per member and return on savings. We argue that this is due to the safekeeping function that an account with a formal financial institution provides. There is, however, a reduction in the fund utilization rate following a savings

linkage, probably because the cash is no longer readily at hand in the lockbox but is now deposited in a bank that may be geographically located at a distance from the group and may also require procedures to withdraw it. By contrast, there is a negative effect of the credit linkage on savings per member and return on savings. This may be because infusion of external capital discourages internal savings mobilization. The results suggest that financial linkage should be demand-driven, i.e., based on the need of the SG, and savings group facilitators should weigh the costs against the benefits before prescribing financial linkages for SGs.

Chapter 2 takes a critical look at the effectiveness of financial education delivered through the informal savings groups. There is widespread recognition that traditional classroom-based financial education has fallen short of stimulating substantial changes in adult financial behavior (e.g., Carpena, Cole, Shapiro, & Zia, 2019). We show that savings groups provide an innovative delivery channel for financial education especially at the bottom of the pyramid. Based on a matched sample of data on 2,364 savings groups from 9 African countries, our random effects regression results show the benefits of financial education both at the individual and at the group level. At the individual level, members increase their savings as evidenced by the increase in savings per member. At the group level, there is an increase in profitability and the rate at which members' savings are converted into loans. This is evidenced by the increased fund utilization rate and return on savings for groups that receive financial education. We partly attribute this to the fact that savings groups offer members an immediate opportunity and framework for putting into practice the new financial knowledge acquired. The findings show that knowledge alone may not be enough to change individual financial behavior and should be complemented with practical hands-on experience as is possible in SGs.

Chapter 3 delves into the composition of the group in terms of gender and how this influences the group's profit-generating capacity. I start from the premise that, like many development efforts, the savings group was initially promoted as a gender-focused financial initiative with a particular emphasis on women. The first facilitated savings group, the Village Savings and Loan Association, was at its inception exclusively composed of women. Yet, recent trends suggest that male participation and advocacy to engage men as group members are increasing. I investigate the effect of male membership on the profit-generating capacity of

savings groups and further probe the moderating effect of gender equality in the countries where the groups are located. Based on a sample of 81,853 savings groups from 30 countries, random effects regression results suggest that male membership negatively impacts the profit-generating capacity of savings groups. Moreover, gender inequality in a country strengthens the observed relationship. These findings highlight the need to thoroughly appraise gender-based interventions aimed at the SGs in order to avoid harming some aspects of their core operational model. Further, they also show that contextual factors should be accounted for before rolling out interventions.

References

Beaman, L., Karlan, D., & Thuysbaert, B. (2014). Saving for a (not so) rainy day: A randomized evaluation of savings groups in Mali. National Bureau of Economic Research Working Paper 20600.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, 119(1), 249–275.

Bouman, F. J. (1995). Rotating and accumulating savings and credit associations: A development perspective. *World Development*, 23(3), 371–384.

Brunie, A., Rutherford, D., Keyes, E. B., & Field, S. (2017). Economic benefits of savings groups in rural Mozambique. *International Journal of Social Economics*, 44(12), 1998–2001.

Burlando, A., & Canidio, A. (2017). Does group inclusion hurt financial inclusion? Evidence from ultra-poor members of Ugandan savings groups. *Journal of Development Economics*, 128, 24–48.

Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and Applications*. Cambridge University Press.

Carpena, F., Cole, S., Shapiro, J., & Zia, B. (2019). The ABCs of financial education: Experimental evidence on attitudes, behavior, and cognitive biases. *Management Science,* 65(1), 346–369.

Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, 84(1), 151–161.

Grant, W. J., & Allen, H.C. (2002). CARE's Mata Masu Dubara (Women on the Move) program in Niger: Successful financial intermediation in the rural Sahel. *Journal of Microfinance/ESR review*, 4(2), article 10.

Gugerty, M. K. (2007). You can't save alone: Commitment in rotating savings and credit associations in Kenya. *Economic Development and Cultural Change*, 55(2), 251–282.

Imbens, G. W. (2004). Nonparametric estimation of average treatment effects under exogeneity: A review. *Review of Economics and statistics*, 86(1), 4–29.

Jeffrey, A. (2009). The savings led revolution: Mass-scale, group-managed microfinance for the rural poor. Available at https://www.findevgateway.org/sites/default/files/publications/files/mfg-en-paper-the-savings-led-revolution-mass-scale-group-managed-microfinance-for-the-rural-poor-sep-2009.pdf

Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. *Proceedings of the National Academy of Sciences*, 114(12), 3079–3084.

Le Polain, M., Sterck, O., & Nyssens, M. (2018). Interest rates in savings groups: Thrift or threat? *World Development*, 101, 162–172.

Ledgerwood, J., Earne, J., & Nelson, C. (eds.). (2013). *The New Microfinance Handbook: A Financial Market System Perspective*. The World Bank.

Listl, S., Jürges, H., & Watt, R. G. (2016). Causal inference from observational data. *Community Dentistry and Oral Epidemiology*, 44(5), 409–415.

Mersland, R., & Eggen, Ø. (2007). You cannot save alone: Financial and social mobilization in savings and credit groups. *Available at SSRN 1032247*.

Mine, S., Stokes, S., Lowe, M., & Zoubek, S. (2013). "Post-project replication of savings groups in Uganda. Datu Research. Available at https://mangotree.org/files/galleries/1223_UgandaReport_FINAL_3.pdf

Rosenbaum, P. R. (2002). Overt bias in observational studies. In *Observational Studies* (pp. 71–104). Springer.

Rosenbaum, P. R. (2005). Observational study. In *Encyclopedia of Statistics in Behavioral Science*. Wiley Online Library.

SEEP Network. (2016). *Delivering Formal Financial Services to Savings Groups: A Handbook for Financial Service Providers*. Available at https://mangotree.org/files/galleries/1752_SEEP_Delivering-Formal-Financial-Services-to-SGs_A-Handbook-for-FSPs-FINAL-20170407.pdf

Sinclair, R., & Singh, N. (2015). *Savings Groups and their Role in Child Wellbeing: A Primer for Donors*. Available at https://www.marketlinks.org/sites/default/files/resource/files/STRIVE_Savings_Group_Technical_Report_final.pdf

The Economist. (2011). Small wonder: A new model of microfinance for the very poor is spreading. https://www.economist.com/finance-and-economics/2011/12/10/small-wonder

Van den Brink, R., & Chavas, J. P. (1997). The microeconomics of an indigenous African institution: The rotating savings and credit association. *Economic Development and Cultural Change*, 45(4), 745–772.

Williams, M. J. (2020). Beyond "context matters": Context and external validity in impact evaluation. *World Development*, 127, 104833.

White, H. (2013). An introduction to the use of randomised control trials to evaluate development interventions. *Journal of Development Effectiveness*, *5*(1), 30–49.

White, H., & Raitzer, D. A. (2017). *Impact Evaluation of Development Interventions: A Practical Guide*. Asian Development Bank.

Zhou, H., Taber, C., Arcona, S., & Li, Y. (2016). Difference-in-differences method in comparative effectiveness research: Utility with unbalanced groups. *Applied Health Economics and Health Policy*, 14(4), 419–429.

Chapter 1:
Should informal financial groups at the bottom of the pyramid be linked to banks? A comparative analysis of linked and unlinked groups*

Abstract

We investigate the influence that linkages with formal financial institutions have on the performance of savings groups. Applying a difference-in-differences methodology to a matched sample of data on 3,234 savings groups from 31 countries, we contribute to the literature by investigating the differential effect resulting from a credit linkage and a savings linkage. Overall, results indicate that a savings linkage is beneficial to the groups as it enhances group performance in terms of increased savings per member and return on savings. There is, however, a reduction in the fund utilization rate following a savings linkage. By contrast, a credit linkage largely has a negative effect on the performance of the groups as observed in a reduction in the savings per member and return on savings following the credit linkage. The findings offer guidance for international development organizations, policy makers, and banks currently recommending bank linkage to savings groups.

Keywords: Financial Linkages; Savings Groups; Financial Inclusion; Difference-in-Differences

JEL classification: G21; O1; O16; O17

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1. Introduction

In many developing economies, informal financial institutions continue to serve as a vital source of financial services at the bottom of the pyramid. One such informal arrangement is savings groups (SGs). SGs are member-owned institutions that are comprised of 15–25 self-selected members who pool money in a common fund and borrow from the fund at an interest rate (Allen & Panetta, 2010). Informal savings groups are increasingly gaining attention as conduits for financial inclusion, especially among the excluded poor and rural communities, hence buttressing efforts of major global organizations like the World Bank. Given their potential, governments are increasing their commitment to savings groups as pathways to financial inclusion (Jarden & Rahamatali, 2018). Additionally, a host of international development organizations like Plan International, CARE International, and the Agha Khan Foundation are promoting SGs as a potential solution to multidimensional poverty. Often SGs not only offer their members access to basic savings and credit services, but also serve as platforms for development organizations to provide other important development services like literacy training and training in income-generating activities.

Despite their relevance and popularity, SGs are usually limited in their capacity to fulfill the financial needs of their clientele, for several reasons. First, SGs experience seasonal fluctuations in the amount of money available in the loan fund. This is because SGs operate on a cycle system that usually lasts a year and group activities are planned around this cycle system. As a result, at the beginning of the savings cycle, deposits are few and small, and there is insufficient money in the loan fund to service the loan needs of the members (Burlando & Canidio, 2017). On the other hand, at the end of the savings cycle, there is a surplus of money in the loan fund as loans are repaid, and the excess funds in the pot of money available for lending pose a security risk for the group. Second, SGs may be unable to progressively cover bigger loans. As the SG matures, there may be a demand for larger and more long-term loans by the members. Third, SGs are normally composed of people who are engaged in similar economic activities that can be affected by systemic shocks, e.g., droughts, such that if there is a shock, it will compromise the very existence of the group, as almost all the members will be unable to conduct their regular savings and borrowings (Cassidy & Fafchamps, 2020).

Given the above limitations of the SG methodology, there has been a continued policy push to link savings groups to formal financial institutions (Cassidy & Fafchamps, 2020; Burlando & Canidio, 2017; BFA, 2014). Organizations involved in the promotion of SGs are continuously innovating ways of linking savings groups to the formal financial system. The central reason for financial linkages between SGs and formal financial institutions is to balance SG liquidity shortages and excesses as well as boost the pot of money available for lending (Ledgerwood, Earne, & Nelson, 2013). During periods when SGs face shortages, additional funds can be made available through seeking extra credit from formal financial institutions (Ledgerwood & Jethani, 2013). On the other hand, during periods when SGs face security risks, excess funds can be deposited in formal financial institutions for safekeeping (Bouman, 1977; Chipeta & Mkandawire, 1992; Ledgerwood & Jethani, 2013).

In this paper, we investigate the effect that linkages with a formal financial institution have on the performance of savings groups. Several scholars support such linkages between formal and informal financial institutions in the view that they have the potential to increase the supply of financial services in rural areas (Ghate, 1992; Pagura & Kirsten, 2006; Piprek, 2007) by leveraging the strengths of both sectors. Informal financial institutions such as SGs may seek to link with their formal counterparts to get access to a wider resource base and expertise while the formal financial institutions may increase their loan portfolio and at the same time tap into the information that the savings groups possess on their members that might help the banks to better understand the demands of the clientele (Pagura & Kirsten, 2006; Aryeetey, 2008).

There are, however, several cautionary arguments against financial linkages. Based on theoretical reasoning, there are arguments that such linkages will disturb the dynamics of savings groups (Dercon, De Weerdt, Bold & Pankhurst, 2006; Aliber, 2002) as they have to meet some formal requirements of the formal financial institutions. Furthermore, there are concerns that these financial linkages risk weakening the social systems that bind members together (Bouman, 1977). Moreover, some scholars argue that an infusion of external capital into savings groups poses the risk of diverting the group from their savings mobilization objective (Mersland & Eggen, 2007).

Understanding the impact that financial linkages have on the savings groups is of paramount interest to several actors. After all, SGs represent a major segment of the financial system in developing economies, with over 20–30 million members (Seel, 2018).[4] Further, as of 2016, SGs had between $430 and $1.2 billion in total assets (SEEP Network, 2016). Further still, governments in developing countries are increasingly advocating policies for linking SGs to formal financial institutions in order to increase financial inclusion.[5] Consequently, there has been a call for scholarly research among practitioners on the impact of these linkages on SGs (Nelson & Gash, 2016). Yet, except for a few case studies investigating the linkage efforts of particular development agencies (e.g., Maes, 2007; Bakliwal & Umoh, 2011), comprehensive empirical studies investigating the implications of financial linkage on savings groups' performance are yet to be undertaken. Such is the research objective of the present study.

Using a matched sample of data on 3,234 SGs from 31 countries, this paper is the first to carry out a rigorous empirical investigation of the relationship between financial linkage and a selection of complementary savings groups' performance dimensions. Our empirical analysis is based on a sample extracted from the Savings Group Information Exchange (SAVIX), a global dataset that collects standardized data on over 250,000 SGs. We find that linkage through savings significantly enhances the performance of groups, as evidenced by the increase in savings per member and the return on savings. This suggests that members gain confidence in the safety that an account with a formal financial institution provides. This is, however, achieved at a cost, as the fund utilization rate, i.e., the share of the available funds that is lent out to the members, decreases for savings groups that are linked through savings, probably due to the fact that the group's funds are now "locked up" in a savings account in a formal financial institution. Available funds at the group level seem therefore to be lent out to members at a higher interest rate, enhancing members' return on savings. Thus, members that

[4] These figures pertain to savings groups that are supported by development actors (often referred to as facilitating agencies), such as CARE International, World Vision, etc. There are several savings groups that were spontaneously formed without the support of a facilitating agency. These groups are believed to have many more members, but exact estimates are not available (The Mastercard Foundation, 2014).

[5] See, for example, the national financial inclusion strategies for Uganda (https://www.bou.or.ug/bou/bouwebsite/bouwebsitecontent/publications/special_pubs/2017/National-Financial-Inclusion-Strategy.pdf) and Rwanda (https://info.undp.org/docs/pdc/Documents/RWA/Concept%20Note%20R-FIP_FINAL_LPAC.pdf).

are net savers benefit most from the savings linkage while members that are net borrowers benefit less.[6]

On the other hand, credit linkage significantly reduces the savings per member and the return on savings, which suggests that the infusion of external capital into the group is detrimental to the performance of these groups and thus curtails the wealth creation of individual members. We complement the empirical study with a qualitative field study to better understand the statistical results obtained.

This study makes several contributions. First, we employ a large cross-country panel dataset, arguably the largest dataset on community-managed financial services available for a comparative study. The majority of studies on savings groups are based on RCTs or impact evaluations of a particular SG program operating in a particular area. In contrast to previous studies that have mainly focused on a single program, we employ a large dataset covering many SG projects worldwide that are supported by different facilitating agencies. Thus, our dataset allows us to contribute to a broader understanding of the SG model rather than the limited specialties of a single SG program. It also allows us to generalize our findings to a global population of these informal-sector initiatives. Further, we exploit a quasi-experimental design. Specifically, we employ a matched sample difference-in-differences specification. Linkage to a formal financial institution is not random. It is mainly recommended based on the performance of a group against a scorecard, usually the linkage readiness assessment tool developed by CARE International (CARE International, 2014). As a result, it is likely that well-performing groups are linked to a formal financial institution. By matching linked groups to comparable unlinked groups, we aim to address the non-random nature of linkage. This, coupled with the difference-in-differences specification, is arguably a robust way to investigate our research question.

The study also contributes to the growing literature on SGs. Previous studies have investigated the effects of participation in SGs on group members' welfare (Beaman, Karlan, & Thuysbaert, 2014; Ksoll, Lilleør, Lønborg, & Rasmussen, 2016; Karlan, Savonitto, Thuysbaert, & Udry, 2017). Scholars have also delved into how processes internal to the SG like group composition (Burlando &

[6] See Taylor (1971) for a detailed discussion of the net savers-net borrowers dilemma in cooperative banking models.

Canidio, 2017) and group formation (Greaney, Kaboski, & Van Leemput, 2016) affect the performance of SGs. While these studies have guided our understanding of SGs, our study accounts for external influences, specifically financial linkages, on SG performance. We capture SG performance using three different dimensions: savings per member, fund utilization rate, and return on savings. These dimensions portray the different ways through which SG members generate wealth for the group. Savings per member is an indicator for savings capacity while fund utilization and return on savings capture the efficiency with which groups use members' savings to generate profits for the group. In a further analysis, we dig deeper into understanding how the interest rate on group loans varies with linkage. The interest rate is the transmission mechanism through which financial wealth is created when savings are turned into credit.

The study also contributes to the literature on financial inclusion. Financial inclusion is currently high on the agenda of major global bodies. For example, the World Bank has heavily invested in efforts to increase formal financial inclusion, especially of low-income populations, through various projects like the Universal Financial Access 2020 (World Bank Group, 2018). Informal financial mechanisms such as savings groups provide reliable ways through which marginalized populations can be included in the formal financial system, especially in developing countries. By exploring how linkage with formal financial institutions influences the performance of these groups, this study can guide policy on how groups can be sustainably linked to formal financial institutions.

The paper is organized as follows. Section 2 provides some background on savings groups, the concept of financial linkage, and the relevant literature. Section 3 presents the data and summary statistics for the variables of interest. Section 4 describes the empirical strategy applied in the paper and Section 5 presents the results and Section 6 concludes.

2. Relevant Literature

2.1 Background on savings groups

"A savings group is a community-based financial institution that collects savings from its members into a common pool, lends those funds back to its members, and typically operates over a limited period of time (the cycle)" (Burlando & Canidio,

2017, p. 7). They are improvements upon the Rotating Savings and Credit Associations (ROSCAs) and Accumulating Savings and Credit Associations (ASCAs) (Beaman et al., 2014) that have been in existence for a long time (Bouman, 1995; Tavanti, 2013).

The basic savings group model (the Village Savings and Loan Association) was founded in Niger by CARE International in the 1990s (Allen & Panetta, 2010). It was based on the foundation of the local *tontine,* an informal organization where members made regular contributions to a fund that was then given in full to one person at a time (Karlan et al., 2017). Other notable international development agencies have also developed variations of this model based on similar foundations. These include the Saving and Internal Lending Community (SILC) by Catholic Relief Services, Saving for Change (SfC) by Oxfam/Freedom From Hunger, PACT's WORTH model, the Plan International and Aga Khan Foundation models. These development agencies are often referred to as facilitating agencies. They are normally involved in training communities on the savings groups' methodology, assisting in group formation and supervision of the groups, especially during the initial cycle of the group (Allen & Panetta, 2010).

The different SG variations share some common principles. SGs are typically composed of 15–25 self-selected members. On formation, a constitution is formulated that stipulates the rules governing the group's operations. It includes rules on group leadership, i.e., what leadership positions exist, how leaders are elected, what services will be offered by the SG to its members (savings, credit, social fund), plus the terms for such services such as the savings cycle, the savings amount, savings withdrawal, and loan guidelines. It also includes rules on the day-to-day operation of the SG such as meeting schedules, meeting attendance policies, and potential fines for those who violate the rules. For further discussion of the savings groups concept see Allen and Panetta (2010).

In the scheduled meetings, which typically take place weekly, members contribute savings to the group fund and can take loans from the group fund at an interest rate predefined by the group (Burlando, Canidio, & Selby, 2016). Groups also normally choose to keep a social fund that is accessed by members in case of an emergency like a death or health crisis (Karlan et al., 2017). Hence the social fund reduces the credit risk in savings groups.

With regard to the safety of funds and accountability for group transactions, all collected funds are kept in a cashbox with multiple locks, usually 3, whose keys are kept by different individual members as agreed upon by the group members, and which is opened only during group meetings (Ledgerwood et al., 2013). SG transactions are transparent, with each individual maintaining a passbook detailing their savings transactions. Additionally, the group normally maintains a central ledger detailing the group's transactions and being regularly updated about the transactions that take place in the group meetings (Burlando & Canidio, 2017). The loan fund is shared out among the group members at the end of the cycle, typically annually, at which point changes may take place in the composition and rules of the group before a new cycle is initiated (Beaman et al., 2014).

2.2 Linkage of savings groups with formal financial institutions

Pagura and Kristen (2006, p. 2) define financial linkages as "any mutually beneficial partnership between a formal and a less formal institution that results in the expansion of rural financial services." They further classify linkages into two types, namely, facilitating and direct financial linkages. In facilitating linkages, the formal financial institutions hire the less-formal institutions to work on their behalf. By contrast, in direct linkages formal financial institutions "help less-formal institutions diversify their sources of funding, expand their loanable funds and/or balance liquidity shortages and excesses" (Pagura & Kristen, 2006, p. 6). In this paper, the focus is on direct linkages.

Linkage with a formal financial institution can be initiated by the SGs itself or through a facilitating agency like CARE, Plan International, the Agha Khan Foundation, and so on. SGs sometimes form linkages with semi-formal institutions like Savings & Credit Cooperatives (SACCOs). For example, CARE Rwanda encourages linkages between SGs and the Umurenge SACCO (Rippey, 2017). In other instances, SGs are linked to formal financial institutions (e.g., Barclays Bank) through the Banking on Change initiative where the bank cooperates with a facilitating agency (CARE and Plan International) to expand financial inclusion in various developing countries like Egypt, Uganda, Tanzania, Peru, and more (Barclays, 2016).

Most studies that investigate the influence of financial linkage on SGs focus on impact evaluations of particular facilitating agency projects and provide mixed

evidence on the same. Allen (2007) and Rippey (2008) evaluate the impact of linkage on the Mata Masu Dubara (Women on the Move) project in Niger. The Mata Masu Dubara project, initiated by CARE International in 1991, was the first modern and innovative savings group program and in 2004 some of the groups received external loans from microfinance institutions and credit unions (Rippey, 2017). Findings from the two independently conducted studies reveal a risk of over-indebtedness as the groups were receiving multiple loans. Additionally, the studies find a drop in the membership of the linked groups while the unlinked groups continued to grow. The authors attributed this to stress within the linked groups due to the handling of the external loans (Rippey, 2008).

Maes (2007) documents a case study on the CARE CLASSE-Intambwe (Community Learning and Action for Savings Stimulation and Enhancement & Business) model in Rwanda. Under this model, SGs form federations (*intergroupments*) through which they can access external credit from credit unions (*Banques Populaires*). Findings from the study include an increased savings rate over time. However, it is not clear whether this is due to linkages or due to the 25 percent deposit required by the credit unions in order to acquire a loan. Moreover, because the internal savings are sometimes used as collateral, the study finds that the rate at which members' savings are converted into loans is low.

Studying savings and credit cooperative societies in Tanzania, Ndiege, Qin, Kazungu, and Moshi (2014) find that as informal institutions receive more external funds, their sustainability, as measured by the operating self-sufficiency, decreases. This is because as more external funds become available, the internal savings mobilization behavior of the group decreases and the debt burden of the institution increases, leading to adverse effects on portfolio quality and hence poor performance (Ndiege et al., 2014; Ndiege, Haule, & Kazungu, 2013). Owing to the fact that there are external funds in the group, members feel less of a sense of group ownership, less solidarity, and have less responsibility for external funds, sometimes referred to as "cold money" (Murray & Rosenberg, 2006). This is further supported by Ishengoma (2015) who finds that microfinance cooperatives (MFCs) that do not have access to loans from formal financial institutions seem to mobilize more savings and deposits than those with access to formal financial institutions.

While research on credit linkage often reveals negative results on SG performance, researchers often find a positive effect of savings linkage on SG performance. Evaluating the CARE Link Up project in Tanzania and Kenya where a number of SGs are linked to formal financial institutions, it was observed that groups that opened accounts with formal financial institutions had a higher return on savings (CARE International, 2017; Eckhoff et al., 2019). Additionally, these groups experienced an increase in savings compared to the unlinked groups (Vandergaag, Kwilasa, & Krause, 2017). This was attributed to the increase in trust among group members that came with knowing that their savings were stored in a safe place (Eckhoff et al., 2019).

2.3 Why financial linkage may influence savings groups' performance

Linkage to a formal financial institution most likely has an effect on the performance of savings groups. Formal financial institutions usually have to follow a strict set of procedures in order to meet requirements from the central regulatory authorities or other stakeholders. Such procedures include "Know Your Customer" requirements that involve rigorous background checks before carrying out transactions with customers. When savings groups establish relationships with formal financial institutions, they have to adhere to some of these procedures as laid out. Given their informal nature, these groups may sometimes not have the administrative capacity to meet the standards required by formal financial institutions (Balkenhol & Gueye, 1994; Aryeetey, 2003). Additionally, financial linkage may entail extra operational costs for savings group members as they have to make regular trips to the formal financial institution to deposit and withdraw money. Given the differences in their operational models and legal structures, financial linkage thus affects savings groups' performance.

It should, however, be argued that a savings linkage does not necessarily have the same effect on an SG's performance as a credit linkage. In a savings linkage, the group has a joint savings account with a formal financial institution. Groups usually distribute loans and deposit any excess cash into these accounts. This provides groups with a safe place to keep their excess cash. A savings linkage may thus increase group members' trust in the security of their savings, which encourages them to save more and ultimately increases the amount of funds available in the group's loan fund. At the same time, however, it may sow mistrust and dissatisfaction among group members as they no longer have immediate

access to their cash as it is “locked up” in an account at a formal financial institution. Moreover, it may now be more inconvenient to withdraw money, which may be reflected in lower lending levels in the group.

By contrast, in a credit linkage the group receives a joint loan from a formal financial institution. The infusion of external credit into the group means that the group holds joint liability for the loan, which may bring about tensions if some group members default on their individual loans taken out of the group loan fund. Additionally, members who are more financially literate may take advantage of the other group members and appropriate bigger loans to themselves. All this may bring about conflicts among group members, such as those experienced among solidarity groups in traditional microfinance schemes (Ghatak & Guinnane, 1999), which may ultimately affect group performance. A credit linkage may also make groups more reliant on external funds, thus discouraging internal savings mobilization. Moreover, as Bennett, Goldberg, and Hunte (1996) argue, linkage through credit creates a situation of dependency rather than a sense of group ownership, which may in turn affect loan repayment.

Moreover, financial linkage may exacerbate the conflict between net savers and net borrowers usually faced by financial institutions with a cooperative model (Branch and Baker, 2000; Taylor, 1971). Net savers are interested in earning high returns from their savings and hence are in support of high interest rates on loans. By contrast, net borrowers are in support of favorable interest rates. Since financial linkage may have an impact on the internal interest rate charged on group loans, it may lead to conflicts between the net savers and the net borrowers in the group.

Finally, since an SG is a transparent member-based system, the conditions it negotiates with the bank are directly observable to all members. For example, bank representatives usually visit the groups to explain to them the bank products (Burlando, Goldberg, & Etcheverry, 2020). This transparency is likely to affect the internal borrowing conditions, i.e., the interest rate charged on internal group loans. If, for example, groups are linked for credit and negotiate an annual interest rate for the loan from a formal financial institution, it will be very difficult for them to then set an overly high interest rate on loans to group members. Instead, there will be pressure to reduce the interest rate on internal group loans, which may ultimately lead to a reduction in the return on savings.

3. Data and Descriptive Statistics

3.1 Data

Data for this study was obtained from the Savings Group Information Exchange (SAVIX). The SAVIX is an online platform containing data on community-managed savings groups. It is based on a management information system developed by the Village Savings & Loan Associates, an organization whose objective is to provide deprived households with a safe place to save and borrow under flexible conditions (http://www.vsla.net/). Different facilitating agencies report data on a range of operational and financial metrics by uploading data to the management information system. The operational metrics include group composition (female versus male membership), group dynamics (dropout rate, meeting attendance rate), and performance metrics (net savings value, total assets, repayment performance, value of loans outstanding, etc.). The information reported to the SAVIX provides sufficient data to calculate several ratios like the fund utilization rate and the return on savings that are a relevant representation of the performance of SGs.

The major strength of the SAVIX lies in the richness of the data: it is the first platform of its kind to facilitate the collection of extensive quality data in this sector. Additionally, the data is not reported by the groups themselves but rather collected by independent field staff who upload data to the platform on a quarterly basis. Currently, the SAVIX covers over 276,000 savings groups located globally.[7] Many of the groups in the SAVIX are in Africa (over 88 percent) (Mersland et al., 2019).

The concept of financial linkage is still new to the sector and, as a result, few savings groups are linked with a formal financial institution. In constructing the dataset for this study, as an initial step, we considered only groups that were linked to a formal financial institution. Moreover, only groups having at least two quarters of data were included in this study. Hence, the initial sample of linked groups was matched with the pool of groups not linked to a formal financial institution to yield the final dataset used to investigate our research question. The matching procedure is detailed in Section 4.1. The final sample of data contains 3,234 savings groups

[7] http://www.thesavix.org/

located in 31 countries across Africa and Asia for the period from 2010 to 2017. Table 1 presents the country distribution of the groups included in the sample.

Table 1: Savings Groups in the Sample by Country

Country	Number of SGs	Country	Number of SGs
Ghana	1,130	Egypt	20
Rwanda	694	Burundi	14
Tanzania	310	Mozambique	12
Togo	300	Zambia	12
Tajikistan	102	Cameroon	10
India	100	Madagascar	10
Senegal	78	Nigeria	8
Ivory Coast	68	Philippines	8
South Africa	66	Benin	6
Uganda	58	Guinea	6
Myanmar	50	Afghanistan	4
Kenya	36	Ethiopia	4
Malawi	34	Nicaragua	2
Sierra Leone	34	Pakistan	2
Zimbabwe	32	Republic of the Congo	2
Burkina Faso	22	**Total**	**3,234**

Two independent dummy variables are explored in this study. Credit linkage takes the value of 1 if a group is linked through credit and 0 otherwise. Similarly, savings linkage takes the value of 1 if a group is linked through savings and 0 otherwise.

Following Ledgerwood et al. (2013), Greaney et al. (2016), and Burlando and Canidio (2017), we use three indicators – savings per member, fund utilization rate, and return on savings – as proxies for SG performance. The three performance indicators represent three core aspects of the SG operational model. We will now examine each in turn.

Savings per member represents the savings capacity of the group members. It is derived by dividing the value of total members' savings in the current cycle by the number of active members in the group.

The fund utilization rate represents the rate at which members' savings are converted into loans. The main way groups make profits on members' savings is by lending out this money to group members at interest. The fund utilization rate is used to measure how much money is lent out per dollar saved and is derived as a ratio of the value of loans outstanding to the value of savings. A higher fund utilization rate implies that the groups are actively converting members' savings into loans and hence leaving less money inactively stored in the group's cashbox.

Finally, the return on savings represents the profitability of the group. Members' savings are lent out at an interest rate predetermined by the group members at the beginning of the cycle. The return on savings is calculated as a ratio of total profit to the average savings and is a measure of returns per dollar saved.

Cognizant of the fact that the SGs in the sample are at different stages of maturity and size, SG-specific controls are drawn on to minimize the effects of such differences. Older groups with more experience (successive cycles) may deal with member relations, manage group operations, and perform better than younger groups. Larger groups with more assets may benefit from financial linkage more than smaller groups due to scale effects. Following Mersland, Nyarko, and Szafarz (2019) and D'Espallier, Guerin, and Mersland (2013), we proxy the size of a savings group by the natural logarithm of total assets of the group.

All ratios used in the study are winsorized at the 1 and 99 percent cutoff levels to minimize the influence of extreme values.

3.2 Descriptive statistics

In Table 2, we define and present descriptive statistics for the variables used in this study. It can be seen that around 4% of the SGs are linked through credit while around 46% are linked through savings.

Savings groups are grassroots organizations, as reflected in the following descriptive statistics on group savings and loans. The average savings per member is 34 USD. The average fund utilization rate is approximately 70 percent. Thus, a

high percentage of members' savings are given out to members who need loans: only 30 percent of the members' savings are left in the loan fund and not distributed as loans. On average, 51.56 percent of the members take out loans and the average loan size is 22.64 USD. Typically, loans are not used for business purposes but mainly to cover different consumption needs like school fees, uniforms, or food (Karlan et al., 2012). Moreover, the fact that only around half of the members take loans from the group suggests that up to half of the members are interested in the savings function of the group rather than in taking out loans. We also see that return on savings is on average 35 percent, which speaks to the nature of interest rates set in savings groups. Interest rates in savings groups are typically higher than those in formal financial institutions. Further, we see that the average savings group has a social fund of 36.99 USD. This fund is typically used by group members in case of an emergency.

The average SG has an asset size of 1078.14 USD and has been in existence for approximately 609 days (about a year and a half). Furthermore, the average dropout rate is low (1.2 percent) and the average attendance rate is high (91 percent). These two features represent member satisfaction with the group and member adherence to group rules such as that regarding meeting attendance.

Table 2: Variable Definitions and Summary Statistics

Variable	Definition	Obs.	Mean	Median	Std. Dev.	Min	Max
Financial Linkage							
Credit Linkage	1 if the group has joint liability, outstanding loan from a regulated financial institution	11,174	0.04	0	0.13	0	1
Savings Linkage	1 if the group has a joint savings product (such as a savings account or a term deposit) with a regulated financial institution	11,174	0.46	0	0.41	0	1
Savings groups' Performance							
Savings per member	Savings per member	11,174	33.67	21.84	35.05	0	150.44
Fund utilization rate	Value of loans outstanding/value of member savings	11,152	69.77	79.14	45.14	0	173.37
ROS	Return on savings	11,152	34.93	23.11	41.14	-14.29	222.99
SG characteristics							
Age	Age of group in days	11,174	608.66	420	557.96	2.00	2527
Size	Natural logarithm of total assets	11,169	6.31	6.53	1.39	-4.32	8.45
Total Assets	Total assets of group	11,174	1078.14	686.10	1143.83	0	4666.99
Dropout rate	Percentage of members exiting group for various reasons	11,174	1.20	0	4.87	0	33.33
Attendance rate	Percentage of members attending meetings	11,174	91.14	96.67	12.56	41.67	100
Members with loans outstanding	Percentage of members with outstanding loans	11,174	51.56	57.14	33.52	0	100
Average loan size	Value of loans outstanding/active members in the group	11,174	22.64	13.57	27.76	0	128.16
Value of loans outstanding	Value of loans outstanding	11,174	575.66	332.06	711.11	0	3073.24
Social fund	Cash kept in other funds for emergency purposes	11,174	36.99	20.44	45.47	0	191.53

4. Empirical Strategy

4.1 Matching

In investigating how financial linkages impact the different group-level outcomes, we are faced with the empirical problem of endogeneity. It could be the case that it is not linkage that is driving performance but rather performance that is driving linkage. This is because linkage is recommended based on SGs' score as determined by what is known as the "linkage readiness assessment tool." The tool, developed by CARE (CARE International, 2014), assesses groups along several criteria before they are considered eligible for linkage. The linkage readiness assessment tool is adopted by various facilitating agencies considering linking their supported groups to formal financial institutions. The tool functions as a scorecard that contains both quantitative and qualitative measures of groups' readiness for linkage. The decision to recommend linkage for a group depends on the final score that the group attains. Savings groups that perform well are likely to get linked, and so it is possible that performance drives linkage and not the other way around, resulting in reverse causality.

Using instrumental variables is a common way to tackle endogeneity concerns in research. However, it is hard to find an instrumental variable that is related to financial linkage but with arguably little relation to our group-level outcomes. Therefore, instead of an instrumental variable, we use a matching procedure[8] to build a counterfactual situation of how the performance measures would be for the linked groups had they not been linked. Based on several characteristics before the linkage, we build a matched sample of groups that are not linked to a formal financial institution. Specifically, for each linked group, we drop all observations recorded after the linkage happened. Then we average the pre-linkage observations for linked groups and all available observations for unlinked groups by averaging the time element of the data. This averaged data thus forms the sample on which matching is carried out. We define treatment as being linked or not. For simplicity, groups that are linked to a formal financial institution are referred to as "treated" groups while those that are not linked are referred to as "control" groups. The goal of this matching is to create a sample of matched control groups, taken from the large pool of groups not linked

[8] See Flammer (2015) and Frésard and Valta (2016) for a similar methodology

to a formal financial institution, that are as similar as possible to the treated groups prior to being linked (Stuart, 2010; King & Nielsen, 2019).

In constructing the control group sample, we use the following criteria. Out of the large pool of groups that are not linked to a formal financial institution, we consider only savings groups that are domiciled in the same country and have the same facilitating agency as the linked groups. We define facilitating agency as a nongovernmental organization (NGO) that offers support to the mobilization and training of savings groups (Allen & Panetta, 2010; Ledgerwood et al., 2013). Examples include organizations like CARE, Catholic Relief Services, World Vision, etc. Additionally, we consider only groups that are located (in terms of rural versus urban location) in the same area as those in the treated sample. Ensuring that the treated and matched control groups are exactly the same along the above characteristics minimizes the differences between them. Furthermore, we use nearest neighbor matching to choose from the remaining savings groups the control group with the lowest Mahalanobis distance from the treated group (Rubin, 1980; Stuart & Rubin, 2004). We select matched control groups according to the same characteristics as used by the linkage readiness assessment tool to assess whether the group is ready for linkage to a formal financial institution or not, namely, meeting attendance rate, fund utilization rate, maturity of groups (here proxied by age), savings volume, average loan per member, dropout rate, and percentage of members with loan outstanding. For groups that have more than one possible match, we keep only the first matched pair. The resulting data contains information on 3,234 savings groups (1,617 treated groups and 1,617 matched control groups) that form the basis for the empirical analysis in this study.

4.2 Reliability of the matching method

To check that our matched "control" and "treated" samples are as similar as possible, Table 3 presents the t-tests for the matching characteristics (in Panel A) and other group-level characteristics (Panel B). Overall, the matching satisfies the stated purpose of removing differences between the "treated" and "control" savings groups along the matching characteristics and several other savings groups' characteristics. In particular, the p-values for the mean comparison test range from 0.131 for return on savings to 0.975 for the fund utilization rate; hence, we cannot reject the null hypothesis of equal means. From these

tests, we can conclude that the matched “control” groups provide reliable counterfactuals for the “treated” savings groups.

Table 3: Univariate t-test results comparing the treated and matched groups

		Obs.	Mean	p-value (diff. in means)
Panel A. Matching characteristics				
Age	Linked groups	1617	517.48	0.805
	Matched controls	1617	521.91	
Dropout rate	Linked groups	1617	1.059	0.483
	Matched controls	1617	0.967	
Value of savings	Linked groups	1617	832.50	0.303
	Matched controls	1617	803.00	
Attendance rate	Linked groups	1617	91.633	0.313
	Matched controls	1617	92.000	
Fund utilization rate	Linked groups	1617	66.811	0.975
	Matched controls	1617	66.769	
Members with loans outstanding	Linked groups	1617	48.624	0.597
	Matched controls	1617	48.117	
Average loan size	Linked groups	1617	21.040	0.314
	Matched controls	1617	20.239	
		Obs.	**Mean**	**p-value (diff. in means)**
Panel B. Other characteristics				
Total Assets	Linked groups	1617	1043.1	0.281
	Matched controls	1617	1004.2	
Return on savings	Linked groups	1617	32.305	0.131
	Matched controls	1617	30.586	
Savings per member	Linked groups	1617	33.488	0.222
	Matched controls	1617	32.117	
Value of loans outstanding	Linked groups	1617	530.58	0.387
	Matched controls	1617	512.80	
Cash in other funds	Linked groups	1617	35.781	0.496
	Matched controls	1617	34.863	

4.3 Difference-in-differences estimation

To investigate the impact that financial linkages have on savings groups' performance, we estimate a difference-in-differences specification as follows:

$$y_{it} = \alpha_i + \alpha_f \times \alpha_t + \alpha_c \times \alpha_t + \delta X_{it} + \beta_1 FinancialLinkage_{it} + \varepsilon_{it}$$

where *i* is the savings group, *t* is the quarters, y is the group-level outcomes, α_i is savings group fixed effects, $\alpha_f \times \alpha_t$ is facilitating agency by time effects, $\alpha_c \times \alpha_t$ is country by time effects, X_{it} is a set of time-varying savings group-specific controls, and $FinancialLinkage$ is a savings and credit linkage. The latter variable is a dummy that equals one if a group is linked through savings or credit and zero otherwise. We let ε denote the error term. Our coefficients of interest, β_1 and β_2, discriminate the impact that different linkage types have on the savings groups' performance.

We control for any unobserved time-invariant differences across savings groups by including group fixed effects. We further include facilitating agency by time fixed effects to account for time-invariant differences in the facilitating agencies supporting the groups. Similarly, country by time fixed effects account for the time invariant heterogeneity in the different countries in which the groups are located. We estimate the equation with the error term clustered at the group level.

4.4 Qualitative field study

In addition to the analysis of the SAVIX database, we conducted a field study in Uganda to gain an in-depth understanding of how linkage to a formal financial institution influences the performance of savings groups. The insights obtained from the field study are used here as supplementary evidence supporting the results of the statistical analysis. Using convenience sampling, we held focus group discussions with eight groups from the districts of Iganga, Manafwa, and Kampala in Uganda. Five of the groups visited are part of the iSAVE[9] project aimed at assuring the inclusion of persons with disabilities in savings groups. iSAVE is supported by the Norwegian Association of the Disabled. Two other

[9] The iSAVE project is a typical example of how savings groups are being used to reach the largely marginalized populations in society. It aims to empower disabled populations by enhancing their self-sufficiency and social inclusion.

groups are supported by CARE Uganda and one by the Strømme Foundation. Additionally, interviews were conducted with the different field and program officers implementing the different projects.

5. Empirical Results

5.1 The effect of a savings linkage on savings groups' performance

Results for the effect of savings linkage are reported in the first row of Table 4. As observed in Column 1, a savings linkage has a positive and significant relation to the savings per member. This indicates that the savings per member increases significantly following a savings linkage with a formal financial institution. Specifically, the savings per member increases by 1.484 USD, corresponding to an increase by 4.4% given an average savings per member of 33.56 USD prior to linkage. This finding is similar to Maes (2007) and Vandergaag et al. (2017) who find an increase in the savings among linked groups in the CARE Link Up project. A savings account in a formal financial institution provides a safe place for groups to save their excess money. As some group members confirmed during our field visit, SGs sometimes open a savings account in a formal financial institution for security reasons. For example, one member noted that *"As savings accumulate, it poses a security risk and so we need an account for safety"* (iSAVE group member, February 6, 2019). This security increases trust among group members (Eckhoff et al., 2019), which in turn encourages them to save more.

In column 5 of Table 4, we observe a positive and significant relation between savings linkage and return on savings. The coefficient indicates that a savings linkage increases ROS by 12.132 percentage points, which corresponds to an increase of 38.3% given an average pre-linkage ROS of 31.69%. This finding concurs with Eckhoff et al. (2019) who find higher returns for groups that opened savings accounts in the CARE Link Up project. Le Polain et al. (2018) find that groups turn accumulated savings into credit specifically for security reasons: in order to maintain a minimal amount of money in the cashbox, group members are encouraged to take extra loans when there is a lot of cash left in the box at the end of the meeting. What this may mean is that the interest rate on such unsolicited loans is also reduced to encourage members to take extra loans. Given the safekeeping advantage that comes with a formal financial institution, groups would no longer have to

solicit members to take extra loans at reduced rates. Consequently, a higher interest rate could be set, resulting in a higher return on savings for groups linked through savings. Further analysis of the effect of savings linkage on ROS is presented in Section 5.3.

The findings further show that the positive effects of a savings linkage are however achieved at the cost of a significant reduction in the fund utilization rate. The coefficient of -6.095 (Column 3) signifies a reduction by 6.1 percentage points. Given a pre-linkage fund utilization rate of 65.89%, this corresponds to a reduction by 9.26%. Similar to the return on savings, it is likely that this finding is due to the fact that groups with a savings account don't need to pressure members to take extra loans in order to reduce the amount of money in the cashbox. Alternatively, formal financial institutions usually have their branches in peri-urban or urban areas, which is a disincentive for groups to make regular withdrawals as it is costly for savings groups to make frequent trips to urban centers for that purpose. This coincides with a similar concern expressed by several respondents during the field interviews. One respondent told us: *"The process of taking the money to the bank and then withdrawing it when you want to use it is expensive"* (field officer, Manafwa district, February 6, 2019). This situation is exacerbated by the poor rural infrastructure that makes travel even harder. In acknowledgment of this, another respondent shared: *"Some groups live high up in the mountains, which are sometimes affected by natural disasters"* (field officer, Manafwa district, February 6, 2019). All this goes to show the costs that members have to bear if they keep their extra savings in a formal financial institution. Moreover, on occasions where groups need to move large amounts of money to and from the bank, they face a risk of theft. Indeed, some members related that *"It is risky to move with such monies"* (CARE member, Iganga District, February 7, 2019). In addition, there are fees incurred per transaction in formal financial institutions that are oftentimes unknown to SG members. As one program manager put it, *"One thing that disgruntles members is when they start deducting their money in charges"* (CARE program manager, February 8, 2019). To reduce costs related to deposits and withdrawals, groups may limit the number of transactions made, which also leads to lower fund utilization rates.

Table 4: Financial Linkages and the Performance of SGs[10]

	Savings per member		Fund utilization rate		ROS	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Savings Linkage	1.484**		-6.095***		12.132***	
	(0.684)		(1.245)		(1.348)	
Credit Linkage		-10.011***		4.570		-31.440***
		(2.049)		(3.951)		(4.894)
Age	0.002	0.002	0.009***	0.006*	-0.010***	-0.006*
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Size	15.043***	15.108***	13.128***	13.013***	12.564***	12.892***
	(0.363)	(0.363)	(0.493)	(0.493)	(0.477)	(0.479)
Agency-time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,169	11,169	11,151	11,151	11,151	11,151
R-squared	0.475	0.476	0.150	0.147	0.154	0.150
Number of SGs	3,234	3,234	3,234	3,234	3,234	3,234

Table 4 shows the results for the relationship between financial linkage (credit and savings linkage) and SG performance (measured by the savings per member, fund utilization rate and return on savings). Refer to table 2 for the definition of the variables. Robust standard errors in parentheses. *, ** and *** represent significance at 10%, 5% and 1% respectively.

[10] Results are consistent even with the addition of within-cycle fixed effects to the model. The within-cycle fixed effects account for effects arising during the current cycle of a savings groups' operation.

5.2 The effect of a credit linkage on savings groups' performance

Results for the effect of credit linkage are reported in the second row of the Table 4. In Column 2, we observe that the credit linkage dummy is negatively and significantly related to savings per member. This indicates that savings groups that are linked through credit have significantly lower savings per member. The estimated coefficient of -10.011 (Column 2) is statistically significant at the 1% level. Given an average savings per member of 32.73 USD for credit-linked groups prior to linkage, this effect corresponds to a reduction of 30.59%. The reduction in savings per member stems from the fact that the infusion of external capital reduces the savings mobilization drive among the members as they become more reliant on the external capital. This result is similar to that of Ndiege et al. (2014) who observe that external funds lower the savings motive among Tanzanian savings and credit cooperative societies. Moreover, the infusion of external funds into the groups could affect the groups' sense of ownership because such money come from sources other than their own savings (Bennett et al., 1996). This may also lead some members to cut back on their savings amounts. After all, with credit linkage, the groups could have enough resources to carry on with their activities without necessarily boosting their savings.

The results further reveal that the credit linkage dummy is negatively and significantly related to return on savings. As can be seen in Column 6, credit-linked groups have a significantly lower return on savings and the estimated coefficient is 31.440. This signifies that the ROS of credit-linked groups is on average 31 percentage points lower than that of their savings-linked and unlinked counterparts. Given an average return on savings of 38.98 percent for credit-linked groups prior to linkage, this reduction is highly economically significant. One explanation for the observed reduction in the return on savings rests on the fact that groups have to pay interest on the borrowed funds from the bank. An alternative explanation is the fact that with access to external credit, funds are more available in the group and, as a result, groups have to the reduce interest rates in order to encourage members to take loans. Moreover, group members are aware of the interest rate negotiated for the external credit from the formal financial institution and hence, from a moral perspective, some groups may consider it wrong to lend to members at a much higher interest rate.

In Columns 4 of Table 4, we find, surprisingly, that credit linkage is insignificant suggesting that credit linkage has no effect on the fund utilization rate (the rate at which savings are converted into loans). The main reason put forward in prescribing credit linkage for groups is that the internal members' savings are inadequate to meet the credit needs of the members. If this argument were valid, then we would expect group members to demand more credit when the group has access to external credit. Yet, our results show that credit linkage has no significant effect on fund utilization rate. Together with the reduction in savings per member observed above, this suggests that the external credit substitutes for the reduced internal savings and hence the utilization rate remains the same.

Examining the control variables, it is interesting to note that lower ROS is associated with older groups. This shows that as groups mature, members gain in social capital and mutual knowledge, and hence can give loans to each other at lower interest rates. It could also signify that group members are now familiar with the methodology and no longer accept the interest rate recommended in the facilitating agency guidelines but adjust it to fit their capabilities. We also see that higher performance is associated with SGs that have larger assets.

Overall, the results show that savings linkage is mostly beneficial for group performance. We observe an increase in savings per member and return on savings but with a side concern of a reduced fund utilization rate as money is locked away in the bank. The security of a savings account in a formal financial institution motivates group members to save more. Moreover, the group can now set higher interest rates on loans, resulting in an increase in return on savings. The increase in interest rates, however, benefits net savers at the expense of net borrowers who now must pay a higher interest rate to access loans from the group fund.

By contrast, credit linkage has, in general, a negative effect on the performance of savings groups. Even if funds are available to group members at a cheaper rate, the internal savings mobilization behavior of the group decreases. This increases members' dependency on external credit and may end up locking them in a vicious cycle. The quantitative results support the qualitative concerns raised during the field visits. For example, one field officer cautioned that *"If you link them via credit, it will break them"* (Strømme Foundation field officer, February 8, 2019). This is because when groups have access to external loans from

formal financial institutions, they sometimes overborrow and then default on these loans. It should be noted, however, that there is some benefit arising from a credit linkage. The observed insignificant effect on the fund utilization rate shows that extra credit from the bank is lent to the group members in the same proportion as before the linkage, which means that the extra resources to the group trickle down to the members. It further shows that there seem to be a real demand for the extra credit, and that it is not forced on the groups.

5.3 Additional analysis

To further understand the effect of financial linkage on return on savings observed in Table 4, we conduct the additional analysis described below. Financial linkage can have an impact on ROS through two potential channels: a direct and an indirect channel. The effect may be direct through revenue earned from the interest on saved funds for savings-linked groups and through extra costs incurred to acquire a loan for credit-linked groups. The effect may also be indirect through higher interest rates charged on a group loan for savings-linked groups and lower interest rates charged on a group loan for credit-linked groups. However, it should be noted that the direct revenue earned from the interest on savings and the direct cost incurred from interest on loans are an order of magnitude lower than the indirect effect. This is because the interest on savings in formal accounts are mostly calculated on an annual rather than weekly basis while the credit offered to the savings groups is often subsidized. We accordingly focus on the indirect effect.

We utilize univariate mean and median comparison tests to test whether there are significant differences between the means and medians of the interest rate before and after linkage. Specifically, we apply paired samples t-tests and chi-square statistics for the mean and median tests, respectively. We conduct the tests only for savings-linked groups. Due to data limitations, we are not able to conduct this additional analysis for the credit-linked groups.

The interest rate proxy is calculated by dividing the change in profits across cycles by the value of loans outstanding (all numbers are expressed on an annual basis). The variable is winsorized at the top and bottom 5% of the distribution to mitigate the impact of extreme values.

We follow a step-by-step approach to check for consistency of the observed results. We start by investigating data that has been aggregated over time for each group. Put differently, we take the average interest rate for each group before and after the linkage. Groups with missing average values in any period (before or after linkage) are not included in the univariate analysis. This generates a final sample of 164 groups. Results shown in Table 5 indicate that the interest rate for savings-linked groups increases significantly after linkage. The median interest rate increases from 27% to 48%.

For the second approach, we limit the data to the period surrounding the linkage. We consider one period before linkage and the linkage period in order to see if there is a change in interest rates due to linkage. To be included in the sample, groups need to have no missing data on the interest rate in the periods surrounding the linkage. The final analysis is performed on 64 savings-linked groups. The results presented in Table 5 indicate that the interest rate for savings-linked groups increases significantly after linkage, with the median interest rate increasing from 24% to 54%.

Table 5: Interest Rate Before and After Financial Linkage

	Mean values			Median values		
	Before Linkage	After Linkage	Sig. (t-test)	Before Linkage	After Linkage	Sig. (χ^2)
Average interest rate before and after linkage	0.5011	0.7989	-3.3239***	0.2673	0.4830	15.760***
One period before linkage and at linkage	0.3486	0.9595	-4.4331***	0.2412	0.5412	18.848***

*, **, and *** represent significance at 10%, 5% and 1% levels, respectively.

Overall, the results suggest that a savings linkage induces an increase in the interest rate on group loans.

6. Conclusion

Recent developments encourage financial linkage between savings groups and formal financial institutions. Savings groups provide excluded communities with an opportunity to save and borrow money and acquire basic financial management skills. These community-level informal savings groups thus present a platform through which many excluded populations can be brought into the formal financial sector. The Global Findex

Report notes that about 25% of savers in developing economies reported using an informal mechanism as their only form of saving (Demirguc-Kunt et al., 2018). Hence, linking such informal mechanisms to formal financial institutions contributes to the overall financial inclusion agenda that is currently being pursued by major economic actors. With access to a group account, group members are able to create financial histories upon which they can build and open individual personal accounts. However, as financial linkage contributes to formal financial inclusion, it is also important to understand how this linkage influences the performance of SGs and hence affects the operational model of these SGs.

To the best of our knowledge, no study has endeavored to conduct a rigorous econometric investigation of the effects of financial linkage. This paper is the first to conduct a rigorous empirical investigation clearly differentiating the effects of a savings linkage from those of a credit linkage. Further, the study responds to various recent practitioner calls for a rigorous empirical study into the influence of financial linkage on savings groups (Gash, 2017; Nelson & Gash, 2016; Seel, 2018). The study seeks to understand how the different linkage types (in terms of credit versus savings linkage) relate to savings groups' performance. Using a unique large matched sample dataset of 3,234 savings groups from 31 different countries, we empirically study the above relations. Specifically, we use a difference-in-differences specification together with a field study in order to explore the phenomenon.

In general, the results indicate that linking savings groups with savings accounts in formal financial institutions has significant effects on the performance of the groups. We find that savings per member is increased, utilization rate is decreased, and return on savings goes up. We argue that this is attributed to the safety function that a savings account in a formal financial institution provides. However, the significant increase in group wealth as a result of a savings linkage is mainly enjoyed by group members who are net savers as their savings now fetch higher interest rates when converted into loans for other group members. The net borrowers in this instance now have to pay higher interest on borrowed funds.

As for credit linkage, we generally observe a negative effect on group outcomes. We find that it reduces savings per member possibly due to the fact that internal mobilization of funds is reduced as external capital is injected into the groups. It further reduces the return

on savings potentially as a result of the reduction in interest rates resulting from more money being available to the group through credit.

These findings are robust in a multivariate setting even when group-specific controls are included in the estimated model. In light of this, a number of policy recommendations emerge. Savings group promoters should ensure that financial linkage is demand-driven. SGs that consider linking with formal financial institutions should carefully assess their peculiar situation and needs and choose the kind of linkage that meets those needs. They must be aware of the pros and cons of both types of linkage and the associated possible tradeoffs. For example, linkage through savings encourages savings but at the same time it reduces the rate at which these savings are converted into loans, i.e., the fund utilization rate, and thus does not benefit the net borrowers.

Additionally, based on the objective they intend to achieve, development organizations should exercise caution when prescribing financial linkage for savings groups. The finding that savings linkage reduces the fund utilization rate while increasing the return on savings may imply that groups use the interest rate as a discriminatory mechanism such that with the increased safety of funds, groups have the alternative to set a higher interest rate, which means that members who cannot afford this are barred from taking out loans. This would run counter to financial inclusion efforts.

Furthermore, based on the detrimental effects observed arising from credit linkage, we would recommend that savings groups' promoters recommend credit linkage only after doing a thorough analysis of the benefits that would accrue from it. Linkages should not be prescribed just to meet the promoters' own goals but should be aimed at benefiting the groups and their members.

Policy makers often recommend integration between the formal and informal sectors. The argument put out is that such integration or linkage promotes effectiveness and efficiency in the informal sector. Yet, according to our findings, the outcome of such integration is not as straightforward as is often assumed but rather nuanced. Thus, while linkage can produce some positive outcomes, it can at the same time distort dynamics and certain core fundamentals of the informal sector. Thus, policy makers should be aware of the possible

tradeoffs associated with formal-informal sector linkage. Our study informs policy recommendations in this regard.

This research can be expanded on in several ways. Whereas the present study provides evidence on linkage between savings groups and formal financial institutions, we are unable to ascertain the type of formal financial institutions that directly influence such linkage. Do savings groups reap more benefits when they are linked to, say, Savings and Credit Cooperatives (SACCOs) than when they are linked to mainstream commercial banks? Future studies can explore the linkage between savings groups and specific types of formal financial institutions such as commercial banks, credit unions, and microfinance institutions. Such an inquiry can provide specific insights into the types of formal financial institutions exhibiting greater impact on savings groups' behavior, which can assist stakeholders in identifying partners for sustainably promoting savings groups in emerging economies. Moreover, the benefits that savings groups obtain from having a linkage with a formal financial institution may depend on specific savings groups' characteristics like asset size. Future research could investigate the SG-specific characteristics that ensure that groups reap full benefits from their relationships with formal financial institutions. This will offer better policy guidance.

Finally, from this study we do not know the mechanisms through which financial linkage impacts social capital among group members. Social capital is a main building block for the success of informal financial mechanisms (Oraro & Wyss, 2018) and understanding how this is affected by financial linkage is important for promoters of savings groups. Future studies could aim at exploring the ways through which having a relationship with a formal financial institution influences the social mechanisms among savings groups members.

References

Aliber, M. (2002). Informal finance in the informal economy: Promoting decent work among the working poor. ILO Working Paper. International Labour Organization.

Allen, H. (2007). MMD in Niger: Evolution, perspectives, and the future. VSL Associates.

Allen, H., & Panetta, D. (2010). Savings groups: What are they? SEEP Network.

Aryeetey, E. (2003). Recent developments in African financial markets: Agenda for further research. *Journal of African Economies*, 12(2), 111–152.

Aryeetey, E. (2008). From informal finance to formal finance in Sub-Saharan Africa: Lessons from linkage efforts. AERC/IMF African Finance for the 21st Century. Unpublished Manuscript.

Bakliwal, S., & Umoh, M. (2011). A Sustainable Access to Financial Services for Investment (SAFI) project (Financial Linkages: Theme number 1). Retrieved from http://savings-revolution.com/doclib/

Balkenhol, B., & Gueye, E. H. O. (1994). Tontines and the banking system: Is there a case for building linkages? *Small Enterprise Development*, 5(1), 47–55.

Barclays (2016). Banking on Change. Retrieved from https://www.careinternational.org.uk/sites/default/files/Banking%20on%20Change%20Partnership.pdf

Beaman, L., Karlan, D., & Thuysbaert, B. (2014). Saving for a (not so) rainy day: A randomized evaluation of savings groups in Mali. NBER Working Paper 20600. National Bureau of Economic Research.

Bennett, L., Goldberg, M., & Hunte, P. (1996). Ownership and sustainability: Lessons on group-based financial services from South Asia. *Journal of International Development*, 8(2), 271–288.

BFA (2014). Focus note 1: Outcompeting the lockbox: Linking savings groups to the formal financial sector. Retrieved from https://docs.gatesfoundation.org/documents/Focus%20Note%201%20Outcompeting%20the%20Lockbox%20-%20Linking%20Savings%20Groups%20to%20the%20Formal%20Financial%20Sector.pdf

Bouman, F. J. (1977). Indigenous savings and credit societies in the Third World: A message. *Savings and Development*, 1(4), 181–219.

Branch B., & Baker C. 2000. Overcoming credit union governance problems. In Westley G., Branch, B. (eds.), *Safe Money: Building Effective Credit Union in Latin America* (pp. 203–226). Inter-American Development Bank: Washington, DC.

Burlando, A., & Canidio, A. (2017). Does group inclusion hurt financial inclusion? Evidence from ultra-poor members of Ugandan savings groups. *Journal of Development Economics*, 128, 24-48.

Burlando, A., Canidio, A., & Selby, R. (2016). The economics of savings groups. Available at SSRN: https://doi.org/10.2139/ssrn.2785033

Burlando, A., Goldberg, J., & Etcheverry, L. (2020). Banking the group: Impact of credit and linkages among Ugandan savings groups. Retrieved from https://mangotree.org/Resource/Banking-the-Group-Impact-of-Credit-and-Linkages-among-Ugandan-Savings-Groups

CARE International. (2014). A roadmap to responsible linkage. Retrieved from https://www.mangotree.org/files/galleries/1591_roadmap-to-responsible-linkage.pdf

CARE International (2017). CARE Link Up Final Report Evaluation of Key Learning Questions. Retrieved from http://www.careevaluations.org/Evaluations/LinkUp%20Final%20Report%20March%202017%20VF.pdf

Cassidy, R., & Fafchamps, M. (2020). Banker my neighbour: Matching and financial intermediation in savings groups. *Journal of Development Economics*, 145, 102460.

Chipeta, C., & Mkandawire, M. (1992). Links between the informal and formal/semi-formal financial sectors in Malawi. AERC Research Paper 14. African Economic Research Consortium.

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. The World Bank.

Dercon, S., De Weerdt, J., Bold, T., & Pankhurst, A. (2006). Group-based funeral insurance in Ethiopia and Tanzania. *World Development*, 34(4), 685–703.

D'Espallier, B., Guerin, I., & Mersland, R. (2013). Focus on women in microfinance institutions. *The Journal of Development Studies*, 49(5), 589–608.

Eckhoff, S., Kibombo, G. M., Natukunda, M. M., Pennotti, C., & Vandergaag, K. (2019). What works to increase financial inclusion and women's financial autonomy? Intentional designs showing promise. *Development in Practice*, 29(8), 974–987.

Flammer, C. (2015). Does product market competition foster corporate social responsibility? Evidence from trade liberalization. *Strategic Management Journal*, 36(10), 1469–1485.

Frésard, L., & Valta, P. (2016). How does corporate investment respond to increased entry threat? *Review of Corporate Finance Studies*, 5(1), 1–35.

Gash, M. (2017). Understanding the impact of savings groups. The SEEP Network.

Ghatak, M., & Guinnane, T. W. (1999). The economics of lending with joint liability: Theory and practice. *Journal of Development Economics*, 60(1), 195–228.

Ghate, P. B. (1992). Interaction between the formal and informal financial sectors: The Asian experience. *World Development*, 20(6), 859–872.

Greaney, B. P., Kaboski, J. P., & Van Leemput, E. (2016). Can self-help groups really be "self-help"? *The Review of Economic Studies*, 83(4), 1614–1644.

Ishengoma, E. K. (2015). Linkage banking and outreach: A case of microfinance cooperatives in Tanzania. *Business Management Review*, 16(1), 140–160.

Jarden, F., & Rahamatali, A. (2018). State of practice: Savings groups and the role of government in Sub-Saharan Africa. Retrieved from https://mangotree.org/files/galleries/SEEP_Savings-Groups-and-the-Role-of-Government-in-SSA.pdf

Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. *Proceedings of the National Academy of Sciences of the United States of America*, 114(12), 3079–3084.

Karlan, D., Thuysbaert, B., Udry, C., Cupito, E., Naimpally, E., Salgado, E., & Savonitto, B. (2012). Impact assessment of savings groups: Findings from randomized evaluations of CARE village savings and loans associations in Ghana, Malawi and Uganda. IPA Final Report. Innovations for Poverty Action.

King, G., & Nielsen, R. (2019). Why propensity scores should not be used for matching. *Political Analysis*, 27(4), 435–454.

Ksoll, C., Lilleør, H. B., Lønborg, J. H., & Rasmussen, O. D. (2016). Impact of Village Savings and Loan Associations: Evidence from a cluster randomized trial. *Journal of Development Economics*, 120, 70–85.

Le Polain, M., Sterck, O., & Nyssens, M. (2018). Interest rates in savings groups: Thrift or threat? *World Development*, 101, 162–172.

Ledgerwood, J., & Jethani, A. (2013). Savings groups and financial inclusion. In *Savings Groups at the Frontier* (pp. 134–146). Practical Action Publishing.

Ledgerwood, J., Earne, J., & Nelson, C. (eds.). (2013). *The new microfinance handbook: A financial market system perspective*. The World Bank.

Maes, J. (2007). Linkages between CARE's VSLAs with financial institutions in Rwanda. Retrieved from https://mangotree.org/files/galleries/691_CARE_Rwanda_SLA_Linkage_to_Credit_Case_study_-_August0712.pdf

Mersland, R., & Eggen, Ø. (2007). You cannot save alone: Financial and social mobilization in savings and credit groups. Available at SSRN: https://ssrn.com/abstract=1032247

Mersland, R., D'Espallier, B., Gonzales, R., & Nakato, L. (2019). What are savings groups? A description of savings groups based on information in the SAVIX database. Retrieved from https://www.researchgate.net/publication/333238735_Global_Indicators_of_Savings_Groups

Mersland, R., Nyarko, S. A., & Szafarz, A. (2019). Do social enterprises walk the talk? Assessing microfinance performances with mission statements. *Journal of Business Venturing Insights*, 11, e00117.

Murray, J., & Rosenberg, R. (2006). Community-managed loan funds: Which ones work? *Small Enterprise Development*, 17(3), 13–27.

Ndiege, B. O., Haule, T. B., & Kazungu, I. (2013). Relationship between sources of funds and outreach in savings and credits cooperatives societies: Tanzanian case. *European Journal of Business and Management*, 5(9), 188–196.

Ndiege, B. O., Qin, X., Kazungu, I., & Moshi, J. (2014). The impacts of financial linkage on sustainability of less-formal financial institutions: Experience of savings and credit

co-operative societies in Tanzania. *Journal of Co-Operative Organization and Management*, 2(2), 65–71.

Nelson, C., & Gash, M. (2016). A practitioner-led research agenda for savings groups. Retrieved from https://seepnetwork.org/files/galleries/1717_SavingsGroupResearchAgenda.pdf

Oraro, T., & Wyss, K. (2018). How does membership in local savings groups influence the determinants of national health insurance demand? A cross-sectional study in Kisumu, Kenya. *International Journal for Equity in Health*, 17(1), 170.

Pagura, M., & Kirsten, M. (2006). Formal-informal financial linkages: Lessons from developing countries. *Small Enterprise Development*, 17(1), 16–29.

Piprek, G. (2007). Linking with savings and credit cooperatives to expand financial access in rural areas: A case study of CRDB Bank in Tanzania. Retrieved from http://www.ruralfinance.org/fileadmin/templates/rflc/documents/1188984200805_CRDB_Ta

nzania.pdf

Rippey, P. (2008). Key findings and recommendations from the study on the impact of exterior loans on the MMD groups and networks and measures to minimize risks. CARE Niger.

Rippey, P. (2017). Evidence, hope and hype: A review of the literature concerning commercial relationships between savings groups and financial service providers. Retrieved from http ://www.mangotree.org/files/galleries/SEEP_Literature-Review_Relationships-between-SGs-FSPs_20170608_FINAL.pdf

Rubin, D. B. (1980). Bias reduction using Mahalanobis-metric matching. *Biometrics*, 36(2), 293–298.

Seel, G. (2018). Where Next After VSLA? A World Renew Research Paper Exploring the Value of Linking Savings Groups with Financial Services Providers. Retrieved from https://www.mangotree.org/files/galleries/WhereNextAfterVSLA-ReportforWorld_Renew-FINAL24July18.pdf

SEEP Network. (2016). Delivering formal financial services to savings groups: A handbook for financial service providers. Retrieved from https://mangotree.org/files/galleries/1752_SEEP_Delivering-Formal-Financial-Services-to-SGs_A-Handbook-for-FSPs-FINAL-20170407.pdf

Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science*, 25(1), 1–21.

Stuart, E. A., & Rubin, D. B. (2004). Matching methods for causal inference: Designing observational studies. Harvard University Department of Statistics mimeo.

Tavanti, M. (2013). Before microfinance: The social value of microsavings in Vincentian poverty reduction. *Journal of Business Ethics*, 112(4), 697–706.

Taylor, R. A. (1971). The credit union as a cooperative institution. *Review of Social Economy*, 29(2), 207–217.

The MasterCard Foundation. (2014). Practices & possibilities in savings groups. Retrieved from https://villageenterprise.org/wp-content/uploads/2015/11/1.1-Fostering-Financial-Inclusion-Mastercard-Study.pdf

Vandergaag, K., Kwilasa, M., & Krause, H. (2017). Advancing women's economic empowerment through formal financial services for savings groups: An evaluation of the LINK Up Programme. Retrieved from http://www.careevaluations.org/wp-content/uploads/FINAL-LINK-Up_Group-and-Member-Impacts-Analysis.pdf

World Bank Group. (2018). UFA2020 Overview: Universal Financial Access by 2020. Retrieved from

https://www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financial-access-by-2020

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Chapter 2:
Financial education at the Bottom of the Pyramid: Is there an effect on the performance of informal grassroots financial associations?*

Abstract

Financial education has become a global policy recommendation for reducing negative economic behavior resulting from financial illiteracy. We investigate the effect of financial education tailored to benefit individual participants and delivered through informal grassroots financial associations. While research on the effects of financial education normally focuses on possible individual benefits, we focus on possible effects at both the individual and group levels. Using a large, matched sample of data on 2,364 savings groups from 9 African countries, results obtained from random effects regression analysis show that on an individual level, the savings per member increase. At the group level, the fund utilization rate and return on savings increase, suggesting that the groups become more active in leveraging the members' savings in order to generate welfare for the members. The study highlights that exploiting teachable moments, coupled with peer learning that takes place in the savings group context, offers a good alternative channel for delivery of financial education.

KEYWORDS: Financial education, Bottom of the pyramid, Savings groups, Grassroots financial associations, Performance

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1. Introduction

In this paper, we investigate from a new angle the effect of financial education on people at the bottom of the pyramid (BOP). Using a unique setting and delivery channel, i.e., informal savings groups, we build on previous studies that recognize that traditional classroom-based financial education does not yield substantial changes in adult financial behavior (Carpena, Cole, Shapiro, & Zia, 2019; Fernandes, Lynch, & Netemeyer, 2014; Collins, 2013). Our unique setting allows us not only to assess the effect of non-classroom-based financial education, but also to evaluate financial education outcomes at both the individual and group levels.

Financial literacy is very low in most low-income countries (Xu & Zia, 2012). For example, according to Standards & Poor's financial literacy survey, the percentage of people in Africa who are financially literate is generally below 50% (Klapper, Lusardi, & Van Oudheusden, 2015). Such low levels of financial literacy have significant implications on how people make financial decisions, which ultimately affects economic outcomes. To mitigate the negative consequences of low levels of financial literacy, vast effort has been devoted to the design of financial education interventions aimed at the BOP populations. An example is the global financial education program created by Microfinance Opportunities and Freedom from Hunger with support from the Citi Foundation. Additionally, several governments like Uganda and Rwanda have, in their national financial education strategies, specific priorities aimed at low-income earners, especially rural dwellers who are excluded from the formal financial sector (Bank of Uganda, 2013).

There is a vast literature on the effect of financial education on financial behavior in both the developed world (Bernheim & Garrett, 2003; Lusardi, 2008) and the developing world (Cole, Sampson, & Zia, 2011). However, scholars are still struggling to clearly identify the positive effects of financial education on individuals who have undergone financial education (Fernandes et al., 2014). Some scholars attribute this lack of positive results to the ineffectiveness of the traditional classroom-based channel. For example, Carpena et al. (2019) find that stand-alone classroom-based financial education has no effect on the financial behavior of urban poor households in Ahmedabad, India. Similarly, in his investigation of the effects of mandatory financial education offered to very low-income families in the US, Collins (2013) finds no significant effect on saving behavior. Moreover,

Fernandes et al. (2014) conclude from their meta-analysis that traditional classroom-based financial education has no effect on financial behavior. Given the weight of this evidence, there is a call for more innovative ways of designing and delivering financial education (The World Bank, 2017).

Recently, there has been a growing literature that seeks to understand alternative delivery channels for financial education and their effectiveness. One stream of literature studies mass media channels like televised series and how they can be used to deliver financial education to a large population (e.g., Berg & Zia, 2017; Spader, Ratcliffe, Montoya, & Skillern, 2009). Another stream of literature focuses on the timing of the delivery of financial education and how this influences behavioral change in the recipients of the financial education (e.g., Doi, McKenzie, & Zia, 2014). Notably, Bhutoria and Vignoles (2018) investigate financial education interventions delivered to women in Indian self-help groups and find positive effects on personal saving and budgeting behavior. However, in addition to narrowly focusing on a single individual-level outcome, namely, personal savings, these authors investigated an intervention in a controlled setting over a one-day period. Thus, although their study provides initial evidence on financial education offered through informal savings associations, it does so for a brief one-day period and does not provide evidence on the effects of a long-term intervention.

In this study, we investigate the effectiveness of financial education delivered through informal grassroots financial groups - savings groups (SGs). Savings groups are member-owned institutions that are comprised of 15–30 self-selected members who pool money in a common fund and borrow from the fund at an interest (Le Polain, Sterck, & Nyssens, 2018). In Sub-Saharan Africa, these community-based financial institutions are in practice the most common financial system available, particularly in rural areas (Ledgerwood, Earne, & Nelson, 2013). This informal banking model has been around for centuries and commonly more than 50% of adult villagers participate in a savings group (Bouman, 1995). Savings groups provide people with a safe place to save and borrow money. Although the vast majority of savings groups spring up spontaneously without any form of facilitation from non-governmental organizations (NGOs), Le Polain et al. (2018) report that facilitated savings groups in Africa have more than nine million members. In addition to offering members a basic informal banking system, savings groups have sufficient flexibility to adapt to different macroeconomic conditions.

Savings groups meet regularly, often weekly. These meetings offer "teachable moments" as group members can immediately put into practice what is delivered through the intervention (Kaiser & Menkhoff, 2017; Doi et al., 2014). Offering financial education in a traditional classroom-based format may not yield the desired results as participants cannot immediately apply their knowledge. By contrast, in a savings group context, in which financial education complements the core group activities of saving and borrowing, group members can immediately use the acquired knowledge in their regular group transactions. Additionally, the peer component in the savings group's methodology offers group members an environment in which they can learn from each other and reinforce the acquired knowledge through peer monitoring (Cassidy & Fafchamps, 2020; Sarkar & Singh, 2006). In this paper, we exploit the uniqueness of savings groups to address the question of whether financial education affects the financial behavior of the group members.

To answer this question, we use matched sample data from the Savings Group Information Exchange (SAVIX). The data covers 2,364 savings groups from 9 African countries for the period 2010 to 2017. We use coarsened exact matching to obtain the matched sample of data for SGs with and without financial education, which is then analyzed using random effects generalized least squares regression techniques. We draw on three complementary measures to assess financial education outcomes at the individual level as well as at the group level. The individual-level measure, namely, savings per member, captures the savings capacity of the group members. These savings are an input that is converted into loans to group members at an interest. The group-level measures are the fund utilization rate and return on savings. The fund utilization rate, i.e., the share of available funds that are lent out to the members, captures the efficiency with which member savings are converted into loans while the return on savings measures group profitability, i.e., the wealth created for group members from the available savings.

Comparing savings groups with and without financial education allows us to demonstrate that financial education improves financial behavior at both the individual and group levels. Specifically, financial education is consistently associated with higher savings per member, a higher fund utilization rate, and a higher return on savings, and the effect is substantial in economic terms. Thus, the findings suggest that, indeed, savings groups provide a viable channel through which financial education can be offered. At the individual level, we see

the benefits of financial education as savings per member increase in SGs with financial education. At the group level, we see groups becoming more active and efficient in terms of increased lending/borrowing activity, as captured by the fund utilization rate. Further, as more savings are lent out at interest, more welfare is created for group members, as captured by the increased return on savings. Thus, savings groups that receive financial education are able to leverage the members' savings to yield benefits that are enjoyed at both the individual and group levels.

The paper contributes to the literature in several ways. First, we contribute to the growing literature that seeks to understand how the manner and the timing of the delivery of financial education can impact its effectiveness. We investigate financial education delivered in an informal savings group setting, with a peer monitoring component, that provides members with an immediate opportunity to implement the acquired knowledge. Second, we broaden the scope of the literature on the effects of financial education on economic behavior by showing how financial education tailored to the individual yields benefits that trickle up to the group level. Third, the paper contributes to the study of integrated development programs, specifically the integration of microfinance and other development initiatives (Lensink, Mersland, Vu, & Zamore, 2018), by looking at the complementarity between financial education and savings groups.

The rest of the paper is organized as follows. Section 2 provides a brief history of savings groups and reviews the relevant literature. Section 3 describes the data and the empirical strategy adopted in the paper. Section 4 presents the empirical results and Section 5 concludes.

2. Relevant literature

2.1 Background on savings groups

The bottom of the pyramid (BOP) comprises the largest but poorest segment of the world's population. It is characterized by people who subsist on less than 2.50 USD per day (Prahalad, 2005), often living in urban slums or hard to reach rural areas and having low levels of education. The BOP is further characterized by a large informal sector. Several interventions have been designed to bring financial education to people at the BOP. These

include initiatives by national governments, non-governmental organizations, donor agencies, and formal financial institutions. For example, the Global Financial Education Program, an initiative launched by two not-for-profit organizations (Microfinance Opportunities and Freedom from Hunger), provides financial education to BOP populations, and Aflatoun, an international NGO, provides school-based financial education to BOP youths (Supanantaroek, Lensink, & Hansen, 2017; Berry, Karlan, & Pradhan, 2018). Some interventions have been devised to deliver financial education through radio and television programs. For example, Scandal, a popular soap opera on debt management, was aired on television in South Africa (Berg & Zia, 2017), and Contracorriente (against the flow) a television series aimed at spreading information on money management and saving, was sponsored by Banco ADOPEM in the Dominican Repubic (Garcia, Grifoni, Lopez, & Mejía, 2013). In addition, banking regulators are increasingly demanding that banks financially educate their clients. For example, banks in Ecuador are obligated by law to provide financial education to their clients and other interested parties (Superintendencia de Bancos Ecuador, 2019).

At the forefront of financial education at the BOP are community-embedded organizations such as savings groups (SGs). Savings groups are member-owned institutions that are comprised of 15–30 self-selected members who pool money in a common fund and borrow from the fund at an interest (Le Polain et al., 2018). The basic savings group model is built upon the indigenous Rotating Savings and Credit Associations (ROSCAs) and, more specifically, the Accumulated Savings and Credit Associations (ASCAs) that have been in existence for centuries (Odell, 2011; Cameron & Ananga, 2015; Beaman, Karlan & Thuysbaert, 2014). Unlike ROSCAs and ASCAs, savings groups are usually supported by a non-governmental organization, referred to as a facilitating agency, that mobilizes, trains, and monitors members in the initial phase of a new group. The first facilitated savings groups were formed in Niger by CARE International in the 1990s. Since then, several facilitating agencies have designed various savings group models based on CARE's Village Savings and Loan Association (VSLA) model. Today major international development organizations like Catholic Relief Services, Oxfam, Freedom from Hunger, Plan International, World Vision, and the Agha Khan Foundation all consider the establishment of different types of savings groups to be a core objective in their strategy to reach out to rural populations, particularly in Africa.

Members of SGs contribute savings to a common pool from which they can take out loans to meet their various needs. Funds are kept in a metal cash box normally secured with three locks (Burlando & Canidio, 2017). The keys to the cash box are kept by three different people for safety purposes (Cassidy & Fafchamps, 2020). The cash box is opened only during group meetings, so that all transactions take place with full transparency. Together with the regular savings and loan fund, some groups maintain a smaller welfare fund for emergency use. Savings groups operate according to a cycle system where at the end of each cycle, all contents of the cashbox are distributed to the members. Upon completing a cycle nearly all groups initiate a new cycle.

2.2 Financial education and financial behavior

According to the OECD, financial education is "the process by which financial consumers/investors improve their understanding of financial products, concepts, and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (OECD, 2005). Put simply, "financial education refers to the set of skills and knowledge that allow individuals to plan and manage their money" (Catholic Relief Services, 2013, p. ix).

Financial education thus aims at equipping group members with the knowledge and skills required to make informed financial decisions especially with respect to household and business expenses. It covers a broad range of topics including setting savings goals, making borrowing decisions, budgeting, making investment decisions, understanding, and managing risk, and planning for retiremement (iSAVE, 2014; Genesis Analytics, 2013). In a savings group context, financial education is typically delivered in training modules that are held during regular group meetings and usually scheduled in such a way that they coincide with the activities that take place at a given time during the group cycle (Catholic Relief Services, 2013). The initial module generally focuses on conveying a general understanding of income and expenses, setting financial goals, and budgeting. Modules that take place at the beginning of the cycle, when the group is building up its common fund, may discuss savings-related topics, whereas modules that take place when savings

have accumulated and the group has started giving out loans to group members, may discuss loan-related topics.

It is important to highlight the difference between savings groups that receive financial education and those that do not. Savings groups that do not receive financial education do not address the above-noted topics and teach their members only the core group activities of saving and borrowing. Specifically, savings groups that do not receive financial education teach basic financial literacy, such as numeracy skills, that is meant to assist members in saving and borrowing from the common fund. By contrast, savings groups that receive financial education aim to foster good saving and borrowing habits, impart a knowledge of saving and borrowing options, teach budgeting and goal-setting skills, and more. The "theory of change" in financial education research assumes a causal chain such that financial education increases financial literacy, which in turn improves financial behavior (Alsemgeest, 2015; Sayinzoga, Bulte, & Lensink, 2016).

How might financial education in a savings group context influence financial behavior? First, savings groups are mutual associations that are highly driven by peer pressure (Breza & Chandrasekhar, 2019). In such a setting, members who are learning to make financial plans in the financial education modules may be motivated by the example of other group members to follow through on their plans (Kast, Meier, & Pomeranz, 2018). Moreover, given the presence of peer monitoring among group members especially during group meetings, members have an opportunity to regularly remind each other about their financial education, thereby motivating and strengthening each other to make better financial decisions.

Second, savings groups are usually comprised of people who have prior knowledge about each other, belong to similar social settings, and share common social norms. When group members internalize the way decisions are made at the group level, they may be led to behave the same way when making decisions at the individual level (Ambuehl, Bernheim, Ersoy, & Harris, 2018). Hence, the behavior of the individual conforms to the behavior of society at large (Dolan et al., 2012). In particular, one's personal financial behavior aligns with normative social behavior. Additionally, given the high levels of illiteracy among populations that belong to savings groups, it may be hard for members of these populations to process financial education when it is delivered individually. A savings group setting,

however, provide a conducive environment for social learning to take place. In particular, group members may be motivated to change their financial behavior when they observe other group members who have done so (Bursztyn, Ederer, Ferman, & Yuchtman, 2014; Battaglini, Bénabou, & Tirole, 2005).

Third, savings groups provide "teachable moments"; that is to say, they provide members with "the possibility to apply their knowledge in a concrete case of interest to them" (Kaiser & Menkhoff, 2017). When savings groups receive financial education, members have the opportunity to immediately put into practice the acquired knowledge during their regular group activities of saving and borrowing (Miller, Reichelstein, Salas, & Zia, 2015). Moreover, the financial education training modules are often scheduled in such a way that they coincide with the group activity that is taking place during that time in the cycle. For example, when the group is starting to build up the common fund at the beginning of the cycle, modules on making savings plans, comparing savings services, and developing savings habits are offered at such a time. This provides knowledge at the very time when it can be utilized to make financial decisions. Thus, savings groups provide the framework in which people can effectively practice the acquired knowledge. In sum, compared to offering financial education at the individual level, savings groups provide greater stimulus and opportunity for people to actuate the knowledge acquired, as discussed above.

There is a vast body of literature on the impact that financial education in the developed world has on economic outcomes like savings rates and borrowing rates. However, the evidence is still mixed (Bernheim & Garrett, 2003; Lusardi, 2008; Lusardi & Mitchell, 2007; Collins & O'Rourke, 2010). Some scholars find that financial education positively influences consumer behavior, e.g., in terms of higher savings rates, lower expenditures, improved budgeting, and improved retirement planning. However, other scholars find no impact of financial education on financial behavior (Servon & Kaestner, 2008).

The evidence pertaining to the developing world is also inconclusive. For example, Field, Jayachandran, & Pande (2010) find that among women employed in the informal sector in India, financial education has no effect on savings rates, but increases borrowing rates. Eissa, Habyarimana, & Jack (2013) find that financial education delivered through cartoons on different media outlets in Kenya yielded no significant impacts on savings rates. However, Steinert et al. (2018) find that a combined financial literacy and psychosocial

parenting intervention in South Africa improved financial behavior in terms of higher saving and lower borrowing rates. They attribute these improvements to improved self-efficacy and increased levels of moral support as the program is embedded in a wider society intervention. Other studies have focused on financial education aimed at children and young adults. For example, Jamison, Karlan, & Zinman (2014) find that a youth-focused financial literacy program in Uganda had positive benefits in terms of saving rates but no effect on borrowing rates. Supanantaroek et al. (2017) focused on primary school children and found some evidence of increased saving rates.

Despite the fact that savings groups now form an integral part of the delivery of financial education to a large number of people, little is known about the effectiveness of these inteventions. There are two studies worth mentioning in this regard. Bhutoria & Vignoles (2018) examine the effectiveness of a financial education program among 78 self-help groups with 1,281 female members in India. Through a randomized control trial, 41 of these groups were exposed to a "rule of thumb" one-day financial education intervention. The results show positive effects in terms of personal savings, financial knowledge, and budgeting. Allen & Guevara (2019) evaluate the effectiveness of financial education delivered by Catholic Relief Services through their savings and internal lending communities in Latin America. Using responses from member self-evaluations to rate financial knowledge and behavior before and after the intervention, the authors find that financial education improved members' financial knowledge and behavior.

Although the two above-noted studies investigate the effectiveness of financial education in the context of savings groups, our study of the same differs from them in that it covers a large number of groups mobilized by many different facilitating agencies and operating in several countries. Moreover, it goes beyond looking at only savings. We look at three dimensions that represent a holistic picture of the performance of savings groups, namely, savings per member, fund utilization rate, and return on savings. By looking beyond member savings to fund utilization rate and return on savings, we go beyond evaluating the effectiveness of financial education at the individual level and show how through training aimed at the individuals, the member savings are leveraged to achieve benefits at the group level.

3. Method

3.1 Data

We have access to data from the Savings Group Information Exchange (SAVIX).[11] The SAVIX contains global data on over 214,000 savings groups. The data is uploaded to the database on a quarterly basis by field officers who make regular monitoring visits to the savings groups. Indeed, one of the strengths of the SAVIX is that the data is not reported by the group itself but by a more advanced independent authority. The SAVIX collects the data on metrics such as group composition, group dynamics, and group performance. However, given the informal nature of savings groups, it is often difficult to acquire comprehensive data on them. As a result, the SAVIX is subject to certain limitations; for example, it often does not cover groups that form spontaneously or that are not supported by any facilitating agency. Be that as it may, the SAVIX is currently the most representative database for reporting on savings groups.

The sample for this study covers 2,364 savings groups from 9 African countries for the period 2010 to 2017. In constructing this sample, we first considered only savings groups that received financial education. We realized that the savings groups that received financial education were primarily located in Africa, and therefore we limited the sample to African countries. We then considered savings groups that did not receive financial education, and for comparability reasons we limited the sample to those that had the same facilitating agencies as the savings groups that received financial education.

In addition to the SG-specific data from the SAVIX, we obtain country-level data from multiple sources. Data on population density for the different countries in our sample is obtained from the World Development Indicators developed by the World Bank, data on inflation is obtained from the World Economic Outlook database maintained by the International Monetary Fund, and the Economic Freedom Index is obtained from the Heritage Foundation.

[11] http://thesavix.org/

3.2 Variable definitions

As our dependent variables, we measure financial behavioral outcomes using three complementary dimensions of SG performance, namely, savings per member per week, fund utilization rate, and return on savings (ROS) (Allen & Panetta, 2010; Ledgerwood et al., 2013; Lowicki-Zucca, Walugembe, Ogaba, & Langol, 2014; Burlando, Canidio, & Selby, 2016; Burlando & Canidio, 2017). Given the operational model of savings groups, these three variables cover the core elements of savings groups operations. Savings per member represents the savings capacity of the group members. Fund utilization rate and ROS cover the profit-generating capacity of the group. The fund utilization rate measures how actively savings are converted into loans. It is not optimal for a savings group to leave funds dormant in the group's cash box as such funds do not earn interest and instead pose a security threat. Hence, a high fund utilization rate is good for the group. The ROS measures group profitability and captures the wealth created for group members. The savings are lent out at interest, earning returns for the group members. This profit is usually shared among group members at the end of the cycle.

Our independent variable, financial education, is measured using a dummy variable that takes a value of 1 if the savings group received financial education beyond basic education in the core group activities of saving and borrowing and 0 otherwise. It should be noted that facilitating agencies customize their financial education curricula and therefore the financial education modules offered may vary by facilitating agency. Due to data limitations, the dummy variable does not capture differences in financial education between facilitating agencies. Exploring such differences would be a fruitful avenue for future research.

We include a number of SG-specific control variables, namely, age, group size, welfare fund, asset size, other development initiatives, rural location, and facilitating agency. Older groups are more likely to have higher performance owing to the learning effect that takes place during the lifetime of the group. Larger groups may have lower performance as they are harder to manage and prone to internal conflicts and free-rider problems (Cuevas & Schrieder, 1991; Sharma & Zeller, 1997). In addition to the group's main cash fund, some groups keep a welfare fund that acts as an informal insurance mechanism that is normally used by group members when faced with an emergency. Keeping a welfare fund can have an effect on the performance of the group (Gonzales Martinez, 2019).

We also control for the asset size of the group as groups with higher assets are more likely to achieve higher performance. SGs normally integrate other development initiatives besides financial education, commonly referred to as "add-ons." For example, together with financial education, a savings group may receive health education and women's empowerment instruction. Hence, to estimate the true effect of financial education, we include a dummy variable that takes a value of 1 if the group has integrated other development initiatives and 0 otherwise. The rural location dummy accounts for differences that may occur between SGs located in the rural areas and those located in urban areas. SGs located in urban areas may have access to more resources and hence achieve higher performance. SGs are also usually supported by different Non-Governmental Organizations commonly referred to as facilitating agencies. These agencies are charged with the responsibility of educating communities in the groups' core activities of saving and borrowing and also assisting in group formation. Due to the different operational models and priorities of these agencies, we argue that different agencies can influence the performance of the groups in different ways. We account for this by controlling for the facilitating agency in our regressions.

Finally, we include three macroeconomic variables that account for the differences in the macroeconomic conditions faced by the SGs in our sample. These include population density, economic freedom index, and inflation. Meeting attendance is crucial for the operation of a savings group as all transactions take place during the regular meetings. Especially in areas where the population is sparsely populated, it may be time-consuming and costly for members to convene regularly and poor attendance may affect group activities and ultimately performance (Gonzales Martinez, 2019; Christensen, 1993). The inflation rate in a country may have an impact on the way members conduct saving and borrowing activities (Loayza, Schmidt-Hebbel & Servén, (2000). Economic freedom index measures the degree of economic liberalization in the countries in which the SGs are located and may have an effect on citizens' participation in economic activities, both formal and informal. A list of all the variables and their definitions is provided in Table 1.

3.3 Estimation strategy

In our empirical analysis, we note that there may be endogeneity concerns as SGs do not randomly incorporate financial education. Rather, the decision to incorporate financial

education largely depends on the facilitating agency. We further note that there may be selection bias concerns as some savings groups requested financial education from the facilitating agency. Consequently, there may be systematic differences in the groups that have financial education and those that do not. The results obtained from analyzing such a sample of SGs may reflect these systematic differences rather than the effect of financial education. To mitigate this possibility, we use matching methods as a data pre-processing strategy to acquire a sample of SGs that are as similar as possible along various matching covariates. Matching can be applied when one has a treatment, a group of treated units, and a group of untreated units, where the latter serve as control units (Caliendo & Kopeinig, 2008). In this study, the treatment is financial education. The savings groups that received financial education serve as the treated units and those that did not receive financial education serve as the control units. The goal of the matching is to derive from the control pool a group of savings groups that did not receive financial education that are as similar as possible to those that received financial education along several observable characteristics.

We use coarsened exact matching (CEM) as our matching algorithm. CEM starts by coarsening the data so that groups with similar characteristics are grouped together. The exact matching algorithm is then applied to the coarsened data to obtain the matched data and unmatched units are discarded (Iacus, King, & Porro, 2011, 2012). We choose matching covariates based on theoretical reasoning and information on the operation and institutional setting of SGs (Caliendo & Kopeining, 2008). We include as covariates mainly time-invariant variables that either influence the decision to offer financial education or our performance measures (Stuart, 2010). The matching covariates are the share of women in the group, the age of the group, the rural dummy, indicator variables for the facilitating agencies that support the SGs, and other development initiatives. The matching is carried out on data that has been averaged at the group level. After the matching, the data is decompressed back to the panel structure. To check the quality of our matching solution, we employ the multivariate L1 distance statistic (Iacus et al., 2012). The L1 distance before matching is 0.93 and after matching is 0.38, which shows that the matching considerably increases the balance between the treated and untreated SGs. The final matched sample of data contains data on 1,182 SGs with financial education and a similar number of SGs without financial education. We then conduct random effects regressions on the matched

sample of data. We regress the performance measures on the financial education dummy and control for several SG-specific and contextual factors. We include cycle dummies and time dummies in the different regressions to account for cycle and time fixed effects, respectively.

3.4 Descriptive statistics

Table 1 presents the summary statistics of the variables used in the study. We see that SGs with financial education constitute 64% of the sample data. With regard to the performance measures, we see that in the average group, members save about 2.27 USD per week with a maximum value of 21.3 USD. The small values of the savings per member indicate that savings groups really serve the bottom of the pyramid market. The fund utilization rate of the average group is 73.6%, which indicates that more than half of the savings are converted into loans for the group members that need credit. The average group has a return on savings of 51.7%. The return on savings represents the profits earned on member savings and a value of 51.7% shows that savings are lent out at high interest rate levels. In fact, annualized interest rates on loans in SGs are commonly above 50% (Le Polain et al., 2018; Rasmussen, 2012).

Furthermore, as we see from the SG characteristics, the average SG has an asset size of 1,443 USD, has been in operation for 401 days (approximately 13 months), has 22 active members, and is composed of 91% women. About 80% of savings groups keep a welfare fund that can be used by group members when faced with an emergency and 12% of the groups are located in rural areas. In terms of group facilitation, a majority of the SGs in our sample are supported by Plan International (68%), followed by SaveAct (27%). The remaining 5% comprise SGs supported by CARE and SGs with no facilitating agency. We also note that in addition to financial education, 69% of the groups also offer other add-on services. Finally, the macroeconomic indicators show that the average country has a population density of 5 people per square kilometer, an economic freedom index score of 95%, and an inflation rate of 60%.

Table 2 presents a correlation matrix for the independent variables in our study. A visual inspection of the correlation coefficients reveals that multi-collinearity is not a concern. All the correlation values are reasonably low, with the highest correlation coefficient being

0.552 between inflation and economic freedom. This is also below the threshold 0.9 suggested by Kennedy (2008).

Table 1: Variable Definitions and Summary Statistics

Variable	Definition	Obs.	Mean	Std. Dev.	Min.	Max.
Independent variable						
Financial Education	1 if the group received financial education	4,785	0.636	0.481	0	1
Financial Performance						
Savings per member	Savings per member per week in US$	4,785	2.269	3.118	0.093	21.346
Savings per member to GNI per capita	Savings per member per week relative to GNI per capita adjusted for PPP (in dollars per 1,000 dollars GNI per capita)	4,785	1.422	1.492	0.007	6.064
Fund utilization rate	Value of loans outstanding/value of member savings	4,785	0.736	0.506	0	1.669
ROS	Return on savings	4,785	0.517	0.527	-0.920	3.017
SG Characteristics						
Age	The age of the group in days	4,785	401.361	302.304	17	1974
Asset size	The total assets of the group	4,785	1442.749	1467.555	17.334	6521.443
Ln(Asset size)	The natural logarithm of total assets	4,785	6.733	1.174	2.853	8.783
Group size	Number of active members in the group	4,785	22.281	5.625	7	47
Womenperc	Percentage of women in the group	4,785	91.078	13.725	0	100
Welfare fund	1 if the group keeps an emergency fund	4,785	0.799	0.401	0	1
Other “add-ons”	1 if the group integrates other development initiatives	4,785	0.685	0.464	0	1
Rural location	1 if the group is located in a rural area	4,785	0.120	0.325	0	1
Facilitating Agency						
CARE	1 if the group is supported by CARE	4,785	0.037	0.189	0	1
No facilitating agency	1 if the group has no facilitating agency	4,785	0.017	0.129	0	1
Plan International	1 if the group is supported by Plan International	4,785	0.680	0.466	0	1
SaveAct	1 if the group is supported by SaveAct	4,785	0.266	0.442	0	1
Macro indicator						
Population density	People per square km of land area	4,785	5.018	5.819	-1.083	19.241
Economic freedom	The heritage index of the country in which the SG is located	4,785	95.232	70.554	20.079	460.846
Inflation	Annual inflation rate	4,785	60.374	2.755	48.300	64.800

Table 2: Correlation matrix

	No.	1	2	3	4	5	6	7	8	9	10
Financial Education	1	1.000									
Age	2	-0.021	1.000								
Asset size	3	-0.067	0.312	1.000							
Group size	4	0.149	0.123	0.219	1.000						
Other "add-ons	5	0.330	0.052	-0.263	0.277	1.000					
Welfare fund	6	0.356	-0.027	-0.145	0.175	0.528	1.000				
Rural location	7	-0.096	-0.003	-0.168	-0.024	0.003	0.075	1.000			
Population density	8	-0.052	0.066	-0.100	0.267	0.338	0.283	0.414	1.000		
Economic freedom	9	0.083	0.152	0.241	-0.010	-0.332	-0.196	-0.106	0.234	1.000	
Inflation	10	0.213	0.024	0.004	-0.031	-0.098	0.001	0.140	0.017	0.552	1.000

4. Results and discussion

Table 3 presents our random effects regression results for the effect of financial education on the performance of SGs measured in terms of savings per member, fund utilization rate, and return on savings. The model statistics, i.e., the Wald $\chi 2$, are statistically significant for all our models and the R-squared values show that our independent variables explain between 34% and 37% of the change in the performance measures.

Table 3: Financial education and performance of SGs.

Variables	(1) Savings per member	(2) Fund utilization rate	(3) ROS
Financial Education	0.602***	0.198***	0.085***
	(0.200)	(0.024)	(0.027)
Age	-0.004***	-0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Asset size	0.287***	0.025***	0.253***
	(0.057)	(0.008)	(0.008)
Group size	-0.029***	0.010***	-0.013***
	(0.011)	(0.002)	(0.002)
Other “add-ons	0.186	-0.306***	-0.072
	(0.587)	(0.083)	(0.079)
Welfare fund	0.014	0.029	0.019
	(0.157)	(0.025)	(0.025)
Rural location	1.553***	0.540***	0.176***
	(0.253)	(0.034)	(0.035)
Population density	-0.003**	-0.001***	-0.001***
	(0.001)	(0.000)	(0.000)
Economic freedom	0.163***	0.037***	0.007
	(0.041)	(0.006)	(0.007)
Inflation	-0.013	-0.023***	-0.024***
	(0.011)	(0.002)	(0.003)
Agency dummies	Yes	Yes	Yes
Cycle fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	4,785	4,785	4,785
R-squared	0.3685	0.3358	0.3441
Number of SGs	2,364	2,364	2,364

Table 3 shows the results for the relationship between financial education and SG performance (measured by the savings per member, fund utilization rate and return on savings). Refer to table 1 for the definition of the variables. Robust standard errors in parentheses. *, ** and *** represent significance at 10%, 5% and 1% respectively.

Looking at column 1, we see that financial education has a positive and statistically significant impact on savings per member. The finding is consistent when savings per member is scaled by GNI per capita. This finding is similar to several studies that find a positive impact of financial education on saving rates in developing country settings (Bhutoria & Vignoles, 2018; Jamison et al., 2014). The result shows that savings per member per week for groups that receive financial education is, on average, 0.6 USD cents higher. This corresponds to an increase in savings per member to 2.87 USD for SGs with financial education compared to an average of 2.27 USD in the entire sample. Additionally, since the average group is composed of 22 members, this shows that the economic effect of financial education is around 13 USD more savings on average. We argue that there are two potential mechanisms driving the observed results. First, savings groups offer "teachable moments." Savings groups provide members with an immediate opportunity to put into practice the knowledge they acquire. In particular, group members can translate the acquired knowledge into behavior using their increased savings amounts. Wagh (2017) notes that offering timely financial education, i.e., so that it coincides with the time at which people make financial decisions, may achieve results as people are less likely to forget the acquired knowledge. Second, through peer pressure, financial education offered through savings groups may influence members' behavior. When financial education is offered in the context of savings groups, there is peer monitoring that may motivate members to demonstrate their ability to utilize the knowledge received.

In column 2, performance is measured in terms of the fund utilization rate. The fund utilization rate represents the rate at which SGs convert savings into loans. A high fund utilization rate is good for SGs as this means that funds are efficiently being lent out and earning an interest that will be shared out to group members at the end of the cycle. We observe a positive and statistically significant relationship between financial education and fund utilization rate. SGs that with financial education have a significantly higher fund utilization rate compared to those with no financial education. Specifically, the estimated coefficient of 0.198 implies that the fund utilization rate for SGs that have financial education is, on average, 19.8 percentage points higher. On average, we have a fund utilization rate of 73.6% in the entire sample, which shows that the fund utilization rate for SGs with financial education increases to 93.4%, which means that the largest percentage (93.4%) of the members' savings are converted into loans. Hence, only 6.6% of the group

funds are left lying unproductive in the cash box in SGs with financial education compared to 26.4% in the entire sample. This suggests that SGs with financial education are more active in terms of converting members' savings into loans than their counterparts with no financial education. Moreover, an increase in the fund utilization rate reflects an increase in the borrowing rate. This is consistent with Sayinzoga et al. (2016) who find that financial education induced farmers to take out loans. The increase in borrowing could stem from the fact that financial education increases people's understanding of how to select investments and manage loans and hence their confidence in loan acquisition. This confidence can be seen to trickle up to the group level as the groups take on more risk by lending out higher shares of the common fund.

Furthermore, the results in column 3 show a positive and statistically significant relation between financial education and return on savings. This finding is consistent even when we use the annualized return on savings.[12] SGs with financial education have a return on savings that is on average 8.5 percentage points higher than SGs without financial education. Compared to the average return on savings of 51.7% in the entire sample, savings groups with financial education have a return on savings of 60.2%. The positive results on the fund utilization rate and the return on savings show that the benefits of financial education are enjoyed not only at the individual level, i.e., through the higher savings per member, but also at the group level, i.e., through the increased welfare created for the savings group. With financial education, the members' small individual savings are leveraged to generate higher benefits for the group as a whole. With a higher fund utilization

[12] The ROS and the annualized ROS both measure profitability but with the annualized ROS, one has to extrapolate the observed profits and savings measured at a point in time over the group cycle. The ROS we apply, however, captures the profits and savings at the same point in time, i.e., the ROS is calculated as profits generated at a point in time divided by the average savings at the same point in time. SGs operate in such a way that at the beginning of the cycle, the only activity that takes place is saving. When funds have accumulated, the borrowing activity starts. Moreover, also towards the end of the cycle, the borrowing activity stops. This shows that saving and borrowing activity varies over the cycle and annualization may introduce noise in the ROS measure. By annualizing ROS, you assume that the "percentage-point returns" earned on your savings so far, will continue to grow at the same rate throughout the cycle. Given the 'unproductive periods' we observe notably at the beginning and end of the cycle and given the profit-figures we univariately observe both across and within the cycle, we consider this 'linear-growth assumption' fairly unrealistic. We do not argue that one measure is better than the other and, in unreported results, we use the annualized ROS, and the results are consistent.

rate, members' savings are not left dormant in the group's cash box but are lent out and fetch a return that is later shared out to all group members at the end of the cycle. This shows how financial education aimed at individuals yields benefits that trickle up to the group level.

Looking at the control variables, some results are worth mentioning. We observe that the asset size and rural dummies have a significant impact on all three performance measures. Specifically, we see that asset size significantly enhances group performance. Also, the rural dummy has a positive effect on all three performance measures. This means that SGs located in rural areas have higher performance, which may be due to the fact that access to financial services is limited in such areas and hence rural populations take greater advantage of the available savings groups. The observed effects on the economic freedom index (positive effect) and inflation (negative effect) suggest that SGs thrive in countries with more favorable macroeconomic conditions.

5. Conclusion

There is widespread recognition that traditional classroom-based financial education is to a large extent ineffective. Moreover, most research efforts have focused on investigating effects of financial education at the individual level. Using a unique setting, we investigate financial education delivered through an innovative channel, savings groups. In so doing, we shed light on the unique characteristics of these groups that make them suitable to reach people at the bottom of the pyramid and spur successful changes in financial behavior. We also show that there is a trickle-up effect as training aimed at individuals yields benefits at the group level. We run random effects regressions on a comparable matched sample of data on 2,364 savings groups from 9 African countries.

Our findings reveal that savings groups with financial education have higher savings per member, a higher fund utilization rate, and a higher return on savings. Generally, the results provide evidence that financial education delivered through these informal grassroots financial associations indeed has an effect on the financial behavior of people at the bottom of the pyramid. We argue that the observed effects are due to the peer monitoring and social learning that take place in the savings group context. Additionally, exploiting teachable moments to provide financial education could potentially explain the effectiveness of financial

education when delivered through the savings groups. Savings groups provide the framework in which people can put into immediate use the acquired knowledge during their regular group activities of saving and borrowing. Moreover, we argue that with financial education, group members' ability to select investments and manage loans improves, their confidence in loan acquisition grows, and hence the fund utilization rate increases. Taken together, these findings show that financial education is effective not only at the individual level in terms of increased savings per member but also at the group level in terms of wealth generated for all group members.

Generally, the study contributes to the literature by showing that savings groups are a viable channel through which financial education can be offered. In particular, the study demonstrates the effectiveness of financial education in savings groups at the bottom of the pyramid. The study goes beyond looking at economic outcomes only at the individual level in terms of savings per member by considering economic outcomes also at the group level in terms of fund utilization rate and return on savings. The study has important implications for financial education projects that target members at the BOP. First, it highlights the fact that knowledge alone may not be sufficient for encouraging change in financial behavior among people at the BOP. However, education coupled with a practical element (savings groups in this case) provides members with the impetus to practice what they are being taught. Savings groups provide teachable moments and provide group members with a practical way to practice what they learn. Moreover, based on their foundation as mutual associations, savings groups that offer financial education act as commitment and enforcement mechanisms that stimulate positive behavior in members relative to other individual-based vehicles of financial education.

The results also show that when evaluating the effectiveness of financial education, context should be taken into consideration. When one looks at the results on increased borrowing, one may be led to conclude that financial education has not been successful since in a typical setting people are taught to increase savings but to be cautious about borrowing. However, in the savings group context, an increase in borrowing is ultimately good for the group as members' funds are not left dormant in the group's cash box but are lent out and fetch an interest that is shared out to all group members at the end of the cycle.

Further research could investigate the mechanisms through which financial education influences economic behavior. Is it the peer-monitoring mechanism inherent in the savings group model that is the major driver of modifying financial behavior or is it the practical element provided by the savings group's model? Understanding the mechanisms will shed more light on how to successfully design financial education for people at the bottom of the pyramid. Further research could also investigate what mode of delivery yields the best outcome, both in terms of who delivers the training and how the pedagogy is structured. Additionally, this study does not probe the differences in the financial education curricula and modules offered by the different facilitating agencies. Future research should explore such specificities as this will offer guidance on the type of curricula that yields the most optimal outcomes and guide other agencies that are in the process of designing their own curricula.

References

Allen, B. S., & Guevara, M. (2019). Effectiveness of CRS' financial education curriculum in savings and internal lending communities (SILC): Evidence from three Latin American countries. Catholic Relief Services.

Allen, H., & Panetta, D. (2010). Savings groups: What are they? The SEEP Network.

Alsemgeest, L. (2015). Arguments for and against financial literacy education: Where to go from here? *International Journal of Consumer Studies*, 39(2), 155–161.

Ambuehl, S., Bernheim, B. D., Ersoy, F., & Harris, D. (2018). Peer Advice on financial decisions: A case of the blind leading the blind? National Bureau of Economic Research Working Paper 25034.

Bank of Uganda. (2013). Strategy for financial literacy in Uganda. Retrieved from https://www.bou.or.ug/opencms/bou/bou-downloads/Financial_Inclusion/Strategy-for-Financial-Literacy-in-Uganda_August-2013.pdf

Battaglini, M., Bénabou, R., & Tirole, J. (2005). Self-control in peer groups. *Journal of Economic Theory*, 123(2), 105–134.

Beaman, L., Karlan, D., & Thuysbaert, B. (2014). Saving for a (not so) rainy day: A randomized evaluation of savings groups in Mali. National Bureau of Economic Research Working Paper 20600.

Berg, G., & Zia, B. (2017). Harnessing emotional connections to improve financial decisions: Evaluating the impact of financial education in mainstream media. *Journal of the European Economic Association*, 15(5), 1025–1055.

Bernheim, B. D., & Garrett, D. M. (2003). The effects of financial education in the workplace: Evidence from a survey of households. *Journal of Public Economics*, 87(7–8), 1487–1519.

Berry, J., Karlan, D., & Pradhan, M. (2018). The impact of financial education for youth in Ghana. *World Development*, 102, 71–89.

Bhutoria, A., & Vignoles, A. (2018). Do financial education interventions for women from poor households impact their financial behaviors? Experimental evidence from India. *Journal of Research on Educational Effectiveness*, 11(3), 409–432.

Bouman, F. J. (1995). Rotating and accumulating savings and credit associations: A development perspective. *World Development*, 23(3), 371–384.

Breza, E., & Chandrasekhar, A. G. (2019). Social networks, reputation, and commitment: Evidence from a savings monitors experiment. *Econometrica*, 87(1), 175–216.

Burlando, A., & Canidio, A. (2017). Does group inclusion hurt financial inclusion? Evidence from ultra-poor members of Ugandan savings groups. *Journal of Development Economics*, 128, 24–48.

Burlando, A., Canidio, A., & Selby, R. (2016). The economics of savings groups. Retrieved from https://pages.uoregon.edu/burlando/Current_Research_files/Economics_VSLA.pdf.

Bursztyn, L., Ederer, F., Ferman, B., & Yuchtman, N. (2014). Understanding mechanisms underlying peer effects: Evidence from a field experiment on financial decisions. *Econometrica*, 82(4), 1273–1301.

Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, 22(1), 31–72.

Cameron, S., & Ananga, E. D. (2015). Savings groups, livelihoods and education: Two case studies in Ghana. *Journal of International Development*, 27(7), 1027–1041.

Carpena, F., Cole, S., Shapiro, J., & Zia, B. (2019). The ABCs of financial education: Experimental evidence on attitudes, behavior, and cognitive biases. *Management Science*, 65(1), 346–369.

Cassidy, R., & Fafchamps, M. (2020). Banker my neighbour: Matching and financial intermediation in savings groups. *Journal of Development Economics*, 145, 102460.

Catholic Relief Services. (2013). Financial Education. Retrieved from https://www.crs.org/sites/default/files/tools-research/financial-education-booklet-1.pdf

Christensen, G. (1993). The limits to informal financial intermediation. *World Development*, 21(5), 721–731.

Cole, S., Sampson, T., & Zia, B. (2011). Prices or knowledge? What drives demand for financial services in emerging markets? *The Journal of Finance*, 66(6), 1933–1967.

Collins, J. M. (2013). The impacts of mandatory financial education: Evidence from a randomized field study. *Journal of Economic Behavior & Organization*, 95, 146–158.

Collins, J. M., & O'Rourke, C. M. (2010). Financial education and counseling: Still holding promise. *Journal of Consumer Affairs*, 44(3), 483–498.

Cuevas, C. E., & Schrieder, G. R. (1991). Determinants of informal financial group participation: Evidence from rural Cameroon.

Doi, Y., McKenzie, D., & Zia, B. (2014). Who you train matters: Identifying combined effects of financial education on migrant households. *Journal of Development Economics*, 109, 39–55.

Dolan, P., Hallsworth, M., Halpern, D., King, D., Metcalfe, R., & Vlaev, I. (2012). Influencing behaviour: The mindspace way. *Journal of Economic Psychology*, 33(1), 264–277.

Eissa, N., Habyarimana, J. P., & Jack, W. G. (2013). Impact of cartoons on the effectiveness of financial education: Evidence from a randomized experiment in Kenya. Financial Literacy & Education Russia Trust Fund.

Fernandes, D., Lynch Jr., J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861–1883.

Field, E., Jayachandran, S., & Pande, R. (2010). Do traditional institutions constrain female entrepreneurship? A field experiment on business training in India. *American Economic Review*, 100(2), 125–129.

Garcia, N., Grifoni, A., Lopez, J.C., & Mejía, D., (2013), Financial education in Latin America and the Caribbean: Rationale, overview and way forward. OECD Working Papers on Finance, Insurance and Private Pensions 33.

Genesis Analytics. (2013). Developing an effective financial education strategy for peri-urban and rural savings and credit groups. Retrieved from https://www.findevgateway.org/sites/default/files/publications/files/mfg-en-case-study-developing-an-effective-financial-education-strategy-for-peri-urban-and-rural-savings-and-credit-groups-jun-2013.pdf

Gonzales Martinez, R. (2019). Which social program supports sustainable grass-root finance? Machine-learning evidence. *International Journal of Sustainable Development & World Ecology*, 27(5), 1–7.

Iacus, S. M., King, G., & Porro, G. (2011). Multivariate matching methods that are monotonic imbalance bounding. *Journal of the American Statistical Association*, 106(493), 345–361.

Iacus, S. M., King, G., & Porro, G. (2012). Causal inference without balance checking: Coarsened exact matching. *Political Analysis*, 20(1), 1–24.

iSAVE. (2014). Financial literacy: Simplify money, magnify life. Retrieved from https://isave-inclusion.com/wp-content/uploads/2017/03/Financial-Literacy-Toolkit-Trainers-Guide.pdf

Jamison, J. C., Karlan, D., & Zinman, J. (2014). Financial education and access to savings accounts: Complements or substitutes? Evidence from Ugandan youth clubs. National Bureau of Economic Research Working Paper 20135.

Kaiser, T., & Menkhoff, L. (2017). Does financial education impact financial literacy and financial behavior, and if so, when? *The World Bank Economic Review*, 31(3), 611–630.

Kast, F., Meier, S., & Pomeranz, D. (2018). Saving more in groups: Field experimental evidence from Chile. *Journal of Development Economics*, 133, 275–294.

Kennedy, P. (2008). *A Guide to Econometrics* (6th ed.). Malden, MA: Blackwell Publishing.

Klapper, L., Lusardi, A., & Van Oudheusden, P. (2015). Financial literacy around the world. World Bank.

Le Polain, M., Sterck, O., & Nyssens, M. (2018). Interest rates in savings groups: Thrift or threat? *World Development*, 101, 162–172.

Lensink, R., Mersland, R., Vu, N. T. H., & Zamore, S. (2018). Do microfinance institutions benefit from integrating financial and nonfinancial services? *Applied Economics*, 50(21), 2386–2401.

Ledgerwood, J., Earne, J., & Nelson, C. (Eds.). (2013). *The New Microfinance Handbook: A Financial Market System Perspective*. The World Bank.

Loayza, N., Schmidt-Hebbel, K., & Servén, L. (2000). Saving in developing countries: An overview. *The World Bank Economic Review*, 14(3), 393–414.

Lowicki-Zucca, M., Walugembe, P., Ogaba, I., & Langol, S. (2014). Savings groups as a socioeconomic strategy to improve protection of moderately and critically vulnerable children in Uganda. *Children and Youth Services Review*, 47, 176–181.

Lusardi, A. (2008). Household saving behavior: The role of financial literacy, information, and financial education programs. National Bureau of Economic Research Working Paper 13824.

Lusardi, A., & Mitchell, O. S. (2007). Financial literacy and retirement planning: New evidence from the Rand American Life Panel. Michigan Retirement Research Center Research Paper 157.

Miller, M., Reichelstein, J., Salas, C., & Zia, B. (2015). Can you help someone become financially capable? A meta-analysis of the literature. *The World Bank Research Observer*, 30(2), 220–246.

Odell, M. (2011). Micro-finance in Africa: State-of-the-Sector Report 2011. Closing the gap. Retrieved from https://www.care.org/sites/default/files/documents/MF-2011-CARE-Access-Africa-Closing-the-Gap.pdf

Organization for Economic Co-Operation and Development (2005), Improving financial literacy: Analysis of issues and policies. OECD.

Prahalad, C. K. (2005). *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*. Wharton School Publishing.

Rasmussen, O. D. (2012). Interest rates in community-managed microfinance: How the poorest Africans earn sixty percent return on their savings. Institut for Virksomhedsledelse og Økonomi, Syddansk Universitet.

Sarkar, A. N., & Singh, J. (2006). Savings-led micro-finance to bank the unbankables: Sharing of global experience. *Global Business Review*, 7(2), 271–295.

Sayinzoga, A., Bulte, E. H., & Lensink, R. (2016). Financial literacy and financial behaviour: Experimental evidence from rural Rwanda. *The Economic Journal*, 126(594), 1571–1599.

Servon, L. J., & Kaestner, R. (2008). Consumer financial literacy and the impact of online banking on the financial behavior of lower-income bank customers. *Journal of Consumer Affairs*, 42(2), 271–305.

Sharma, M., & Zeller, M. (1997). Repayment performance in group-based credit programs in Bangladesh: An empirical analysis. *World Development*, 25(10), 1731–1742.

Spader, J., Ratcliffe, J., Montoya, J., & Skillern, P. (2009). The bold and the bankable: How the Nuestro Barrio telenovela reaches Latino immigrants with financial education. *Journal of Consumer Affairs*, 43(1), 56–79.

Steinert, J. I., Cluver, L. D., Meinck, F., Doubt, J., & Vollmer, S. (2018). Household economic strengthening through financial and psychosocial programming: Evidence from a field experiment in South Africa. *Journal of Development Economics*, 134, 443–466.

Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science: a review journal of the Institute of Mathematical Statistics*, 25(1), 1–21.

Supanantaroek, S., Lensink, R., & Hansen, N. (2017). The impact of social and financial education on savings attitudes and behavior among primary school children in Uganda. *Evaluation Review*, 41(6), 511–541.

Superintendencia de Bancos Ecuador. (2019). *Manual de education financiera*. Retrieved from https://issuu.com/superbancosec/docs/manual_educacion_financiero_uasb

The World Bank. (2017). Understanding financial education: What works, what doesn't, and what's next? Retrieved from http://pubdocs.worldbank.org/en/651581495591040439/understanding-financial-education.pdf

Wagh, P. (2017). Beyond the classroom: Evidence on new directions in financial education. Innovations for Poverty Action.

Xu, L., & Zia, B. (2012). Financial literacy around the world: An overview of the evidence with practical suggestions for the way forward. The World Bank.

Chapter 3:
Including men in a female financial model: an analysis of informal grassroots financial associations*

Abstract

There is an increasing push among development actors to engage men in gender-focused development efforts. This is also observed in initiatives organizing economically poor individuals into groups where members save and borrow among each other. While such savings groups were originally tailored for women, we now observe an upsurge of male members. Yet, little is known about how male engagement affects certain core elements of the savings groups model. This study investigates the influence of male membership on the group's profit generating capacity. Further, the study aims to understand if this relationship is moderated by the level of gender equality in the country that the group is located. Drawing on random effects regression analysis on a sample of data pertaining to 81,853 savings groups from 30 countries, the results show that the group's profit generating capacity reduces as the percentage of male members increases. Moreover, the results further show that gender equality of the country in which the group is located moderates the observed relationship.

KEYWORDS: Savings groups; male members; profit generating capacity; gender; group performance

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1. Introduction

For decades, women have been the focus of several development interventions since they were largely marginalized and victimized in the society. In areas such as reproductive health, gender equality, gender-based violence, intimate partner violence and even mainstream microfinance, emphasis was put on women. Increasingly, however, we are observing a shift towards engaging men in such interventions (See for example Subašić et al., 2018 for gender equality; Casey, Carlson, Two Bulls & Yager, 2018 for gender-based violence; Ruane-McAteer et al., 2019 for sexual and reproductive health; Flood, 2011 for men's violence against women). There are increasing global efforts in this regard from major development actors. The United Nations for example through campaigns like the "HeForShe"[13] campaign recognizes the role men and boys have to play to foster gender equality. The move towards male engagement in these different efforts stems from the realization that it may be difficult to achieve gender equality change from development efforts if the focus is entirely on women and men are excluded. Since marginalization of women is deeply rooted in discriminative gender norms inherent in several societies and men are normally the custodians of such norms, it is important that their role is recognized if a change is to happen.

In this paper, I consider a large and growing development model - savings groups which is currently facing a similar trend of increased male focus. I investigate the influence of increasing male engagement on key aspects of the savings group's operational model. Savings groups (SGs) are grassroots, community managed financial institutions where members save collectively and borrow from pooled savings at an interest (Le Polain, Sterck, & Nyssens, 2018). Such institutions are flexible and robust to different environments (Mutebi et al., 2017; Ojong, 2014) which makes them very popular among development actors like CARE International, Catholic Relief Services, Oxfam, World Vision etc. as a mode to reach largely excluded populations. Estimates show that there are over 14 million members in facilitated savings groups globally (SEEP Network, 2016). At inception, the model had a particular emphasis on women. For example, the first structured savings groups model, the Village Savings and Loan Associations, pioneered by CARE international in Niger in the 1990s started by reaching out to only women. Through the Mata Masu Dubara (meaning women on the move)

[13] See https://www.heforshe.org/en

groups, the goal was to drive the socio-economic empowerment of women (Grant & Allen, 2002). Although women still make up around 80 percent of savings groups' membership (Wheaton, 2019), available data shows that male membership is increasing overtime. In the data sample used for this study, for example, the share of male members increased from about 9 percent in 2010 to over 27 percent in 2017. However, very little is known about the influence that this increasing male engagement has on the SG core operational model.

I shed light on the influence that male engagement has on savings groups. Specifically, I investigate the following research question: what impact does male membership have on the savings group's profit generating capacity? In other words, I investigate whether the SG gender composition has an impact on the group profit generating capacity. The SG model requires efficient handling of savings and borrowing activities to create wealth for the group members and for sustainability of the groups. The group profit generating capacity is the best way to measure whether the group is operating efficiently. Moreover, sustainable groups which generate reasonable profits for group members are more likely to survive and continue operation into subsequent cycles which ensures continuity of the SG methodology but also strengthens financial inclusion efforts. Some scholars argue in favor of member homogeneity across certain elements within the group arguing that when people are similar, it is easier to enforce rules making transaction costs much lower in such groups (Cassidy & Fafchamps, 2020; Slover 1991). On the contrary, heterogeneity may bring people of dissimilar interests together (Nagarajan, Meyer & Graham, 1999) which can affect group functioning and performance in general. For example, men who are usually portrayed as more self-interested whereas women usually tend towards collective interests (D'Espallier, Guerin, & Mersland, 2013; Guérin, 2011; Johnson, 2004).

I use a novel data set covering 81,853 savings groups from 30 countries in the period 2010 to 2017. This data is obtained from the Savings Group Information Exchange (SAVIX), the first platform of its kind to have comprehensive data on these informal financial associations. SG profit generating capacity is measured using the return on savings which captures the wealth creation for the group and members' individual financial outcome from group participation. The results indicate that as the percentage of male members in the group increases, the profit generating capacity of the group reduces. In addition to the above analysis, I

investigate whether the relation between gender composition and group profit generating capacity is influenced by the level of gender equality in the country in which the group is located. Countries with low levels of gender equality are usually characterized by discriminatory gender norms that could curtail the ability of men and women to interact and collaborate in groups. For example, in certain societies, it is even prohibited for women to interact with men especially in public spaces (Lata, Walters & Roitman, 2020). Indeed, the results show that gender inequality in the countries that these groups are located worsens the negative relation between gender composition and SG's profit-generating capacity. In other words, group profit generating capacity suffers more as the percentage of men increases in countries with high inequality.

This study is conceptually rooted in a larger body of work that investigates increasing male engagement in development interventions that previously focused on women. Several scholars have investigated male engagement albeit the effect of this has been mostly investigated on an individual and household level. For example, Slegh, Barker, Kimonyo, Ndolimana, & Bannerman (2013) studies the effect that engagement of male partners of savings groups members has on household income, care work, decision making and power dynamics. Stern, Pascoe, Shand & Richmond (2015) explore how engagement of males in sexual and reproductive health changed their attitudes towards family planning use and involvement in domestic duties. I shift the unit of analysis from the individual to the group level. By doing so, the research contributes to a broader body of knowledge and guides policy on engaging men in savings groups without harming the core aspects of the group.

Additionally, the paper adds to the evidence base regarding savings group composition by investigating the gender composition question. Burlando & Canidio (2017) look at the socioeconomic status of the group members and how this influences the amount of savings collected and the loans disbursed. Cassidy & Fafchamps (2020) investigate how sorting of group members along certain characteristics like occupation may influence the financial intermediation capability of savings groups.

Further, I contribute to the literature by considering gender equality as a contextual variable that could influence the performance of SGs. Savings groups are usually located in countries that are characterized by discriminant gender norms. It is,

therefore, crucial to understand how this influences interaction of men and women in groups and ultimately influences several aspects of the SG methodology.

The rest of the paper is organized as follows: section 2 presents the relevant literature; section 3 describes the data and the empirical strategy used in the paper. In section 4, the results are presented and discussed, and section 5 concludes the paper.

2. Relevant literature

2.1 Background on savings groups

Savings groups are community-based financial institutions composed of 15-30 members that pool money in a common fund and borrow from the fund at an interest (Le Polain et al., 2018; Burlando & Canidio, 2017). They are typically informal associations that are built on a foundation of mutual co-operation and trust (Cassidy & Fafchamps, 2020). The basic savings group model, the Village Savings & Loan Associations (VSLA), was pioneered by CARE International in Niger in 1990. Since then, different international Non-Government Organizations (NGOs) like Catholic Relief Services, Agha Khan Foundation, Oxfam, Plan International, Freedom From Hunger, Stromme Foundation etc. have promoted variants of the VSLA model. The savings group methodology has gained popularity among NGOs owing to its capability to reach large populations in a cost-effective way (Le Polain et al., 2018; Karlan, Savonitto, Thuysbaert, & Udry, 2017). Additionally, several studies have identified various positive effects from savings group participation on individual and household welfare (Moret, Swann, & Lorenzetti, 2020; Ksoll, Lilleør, Lønborg & Rasmussen, 2016).

These savings groups are based on traditional financial group schemes like the Rotating Savings and Credit Associations (ROSCAs) and Accumulating Savings and Credit Associations (ASCAs), that have been existence for centuries (Beaman, Karlan, & Thuysbaert, 2014; Bouman, 1995). In ROSCAS, every member contributes a pre-determined amount to a common pot which is then given to one member of the group in turn until all members have had the opportunity to receive the pot (Ambec & Treich, 2007). While in ASCAs, rather than giving all the collected funds to one member in turn, the funds are allowed to accumulate and members can take out loans from the group fund (Jahns-Harms, 2018). Like the

ASCAs, SGs accumulate money in a common fund and group members can take loans from the fund at an interest. What differentiates SGs from ASCAs is that groups are mobilized and trained by an external agency sponsored by an international NGO like CARE or Aga Khan. Thus, SGs is a facilitated financial model that are provided with certain guidelines and procedures that are aimed at enhancing the group operations and management (Ledgerwood, Earne & Nelson, 2013).[14]

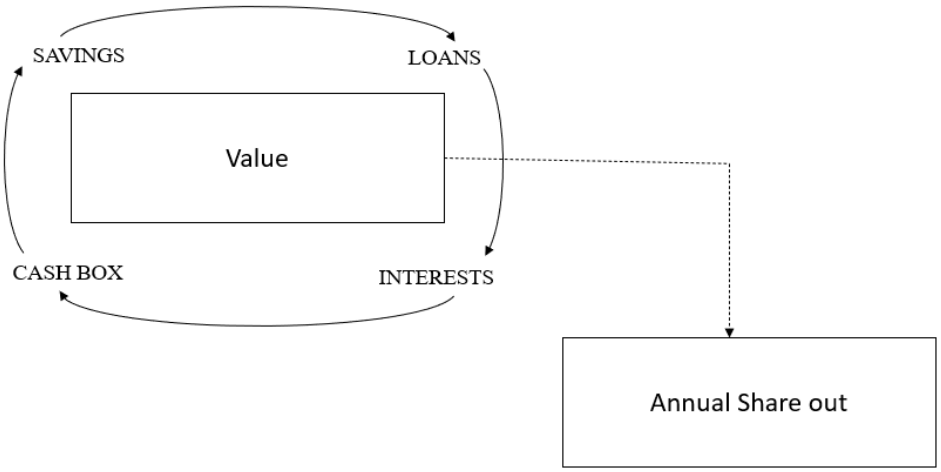
These guidelines include that the groups typically operate on a cycle system which usually lasts a year. Following training from the NGOs (referred to as facilitating agencies) on the concepts and functioning of savings groups, the groups begin their cycle by making a constitution that clearly lays out guidelines that will govern the group. These include guidelines on the number of members that the group will have, the leadership positions available and how leaders will be elected, meeting schedule and corresponding fines if a member misses a meeting, is late for a meeting or do not bring in a minimum amount of savings. This minimum amount of savings is often called 'a share' and members can bring to a meeting several shares up to a maximum agreed beforehand in the constitution of the group. Thus, if a share price is set to 20 cents and maximum shares are five a group member can bring to a meeting 20, 40, 60, 80 or 1 dollar. These low number examples are deliberately chosen as they reflect the reality in many groups. The SG model is a financial model reaching the very poor. For transparency purposes, savings group activities take place at scheduled meetings. Group funds are kept in a lock box that has three locks and the keys are held by three different people for security purposes.

Figure 1 below summarizes the savings group operational model. Savings and loans are the core group activities. Members make savings by purchasing shares during the scheduled group meetings. These savings are then made available to interested members who can take loans from the group funds at a pre-determined interest rate. Normally members can only borrow around three times their own savings. Thus, collecting savings and giving out loans represents the main mechanism through which SGs create value and generate profits for the group members. It is, therefore, important that more member savings are converted into

[14] When SGs have been mobilized in an area, it is frequently observed that the model starts spreading and more groups are initiated without external support from a facilitating agency (Karlan et al., 2017).

loans such that they can fetch a return for the members. Other channels of income include penalties for example for not attending or arriving late for group meetings. However, these are usually minimal. At the end of the cycle, typically annually, the contents of the cash box (the savings plus the accumulated interest) are shared out among the group members. By the share-out date all loans must be repaid. Hence, operating a SG effectively is not easy. In the beginning of a cycle, members must be motivated to bring in sufficient savings to make lending possible. When lending begins, the borrowers must be carefully selected in order to assure repayment. Fines and interests must be collected, and as the end of a cycle approaches all loans must be repaid. It is therefore common to observe that large shares of the savings remain in the cash box not only at the beginning and end of a cycle but throughout the cycle period. Taken together, a savings group is a complex business model to operate and the best proxy to measure whether a group is managed effectively and efficiently is the return on savings (ROS). This measurement summarizes a group's ability to intermediate savings and create wealth for the group members.

Figure 1: The operational model of savings groups



The first basic savings groups formed in Niger by CARE International under the Mata Masu Dubara (Women on the move) project focused on improving women's socioeconomic conditions. Hence, all initial savings groups were comprised of only female members. Currently, there are still some facilitating agencies that exclusively focus on women. For example: in Sudan, Oxfam's Saving for Change program targets only women (Stevens, 2018). Though, the savings groups are still

dominated by females, recent developments have witnessed increasing male participation. Savings group promoters are encouraging the engagement of men in order to mitigate against certain negative effects that may arise when men feel threatened by the increasing women empowerment. Such effects include increased intimate partner violence (Slegh et al., 2013; Gupta et al., 2013).

2.2 Relevant literature

Numerous scholars have investigated the group gender composition-performance relationship in different settings albeit with inconclusive results. Some findings indicate that more homogenous groups perform better than heterogenous groups (see Williams & O'Reilly III, 1998 for a review of work groups). Other studies find the contrary, with heterogenous groups outperforming their homogenous counterparts (see Orlitzky & Benjamin, 2003 on student groups). Others still find no effect of gender composition on the performance of groups (Ely, 2004 on work groups).

In conventional microfinance it is common to apply group lending methodologies. In such settings several scholars have investigated the effect of gender composition of credit groups. In a laboratory experiment setting of microfinance loan groups, Berge, Juniwaty & Sekei (2016) find that female groups are better than all male and mixed groups with regards to collaboration for problem solving. Further, they find that female groups are more risk taking. Studying loan repayment rates in credit groups, Anthony & Horne (2003) find a positive relation between the percentage of women and individual loan repayments. Similarly, while investigating delinquency rates among microfinance loan groups in Bangladesh, Sharma & Zeller (1997) show that delinquency rate decreases as the percentage of females in the groups increases. Still, investigating repayment rates, D'Espallier, Guérin & Mersland (2011) focus on the microfinance institutions and investigate the gender question in terms of the percentage of female clients served by an MFI. Their findings suggest that an increase in the percentage of female clients results in a decrease in portfolio risk, write-offs, and loan loss provisions. In Guatemala, Kevane & Wydick (2001) highlight that female credit groups have the lowest instances of fund misuse with mixed gender groups having the worst performance.

When it comes to gender composition and performance of savings groups Eboh (2000) takes a descriptive approach when analyzing the sustainability of savings

and credit associations in Nigeria. He shows that all-female savings and credit groups had higher average savings and loans per member compared to all-male groups. He further observes that absenteeism from meetings was lower for all-female savings groups compared to gender mixed groups. Slover (1991) however, finds that groups with membership dominated by females have less funds mobilized than those comprised of predominantly males. He attributes this to the differences in the nature of risk taking between men and women.

Why would male involvement as group members influence the savings group's profit generating capacity? One argument is that male involvement may increase conflicts and tensions in the group due to inherent difference in behavioral characteristics between men and women. There is a common perception that unlike women, men are less co-operative and less socially oriented (D'Espallier et al., 2013; Anthony & Horne, 2003). In other words, men are more individualistic (Johnson, 2004). Further, literature proposes that men tend to lean more towards disagreement and are more competitive while women lean more towards agreement and are more conciliatory (Anthony & Horne, 2003). In this paper, I argue that such differences may affect group interactions, communication among group members, conflict resolution and decision making and consequently affecting the group operations.

Additionally, men have alternative sources of credit and savings (D'Espallier et al., 2013). Due to this, they may join savings groups for other purposes and may not be interested in the group functions of savings and credit. For instance, women sometimes engage in informal financial associations like ROSCAS without the knowledge of their husbands and extended family because this is the only way they can have control over their money (Guérin, 2011). Men may hence join such groups in order to monitor the actions of their wives and get more information about their savings and credit activities. This may affect the way women conduct their group activities and ultimately have a negative effect on the overall group performance.

With the view that men are poor at loan repayment (Enimu, Eyo, & Ajah, 2017) and have lower savings rates (Ledgerwood, 1999), trust issues may arise in the groups when men join which may also lead to hesitations in issuing loans to men. Moreover, there is a perception that men compared to women are not as much

influenced by social pressure (Johnson, 2004) hence they may default on loan repayment without fear of any consequences.

However, based on some socio-economic characteristics of men especially in the areas in which savings groups are prevalent, male engagement may enhance group performance in several ways. Men are usually involved in activities that require large lumpsums of money and equally have responsibilities that require the same (Jonhson, 2004). This may translate into an increased demand for loans which is beneficial for a group as a larger share of the savings is lent out. Also, men are generally more educated and more literate than women (Guérin, 2011). This could bring advantages for the group as they could enhance the knowledge base in the group, devise more efficient ways of running the group and growing the group fund. After all, as mentioned, operating a SG is complex. Moreover, the argument that men are more risk seeking than women (Croson & Gneezy, 2009; Jianakoplos & Bernasek, 1998; Slover, 1991) may positively influence the group profit generating capacity. If this risk appetite is combined with an increase in interest rate to cover the additional risk brought on by men, it may lead to an increase in the group returns.

Does the relationship between gender and savings group profit generating capacity vary with the level of gender equality in the different countries where the groups are located? One can argue that, indeed, the effect may be different in countries where men and women have more equal rights and access to equal opportunities compared to countries where there is high inequality between men and women. Gender norms inherent in different societies influence the way men and women interact in different spheres and have a bearing on the kind of opportunities that are available to the different genders (Johnson, 2004). For example, in some societies the woman's responsibilities are relegated only to childbearing and taking care of the household (Kabeer, 2005). In such societies, women may not be allowed to freely participate in economic activities such as in financial associations like savings groups. Moreover, in several cases, even when women can participate in certain activities, they are limited from reaching their full potential owing to the discriminatory gender norms of such patriarchal cultures (Kinkingninhoun-Mêdagbé, Diagne, Simtowe, Agboh-Noameshie & Adégbola,2010). When the percentage of men in the group increases in such societies characterized by high

levels of gender inequality, it will likely have a worse effect than in societies where gender inequality is low.

3. Method

3.1 Variable definitions

Dependent variables

The dependent variable, return on savings (ROS), is used to proxy the profit generating capacity. Previous studies have used ROS to measure performance of SGs (Gonzales Martinez, 2020; Burlando, Canidio & Selby,2016; Burlando & Canidio, 2017). ROS captures the profitability of the group and the efficiency with which a group manages the complex SG business model to generate profit for its members. It measures the value created for the group members when their savings are lent out at an interest and it is obtained as the total profit over the average savings used to generate these profits. The main avenue through which savings groups generate profits is by lending out the collected savings to members who require loans (Gonzales Martinez, 2020). It is not profitable for a savings groups to have group savings dormant in the loan fund. The most optimal decision is to lend out the group savings so that they can earn an interest that is shared out along the member savings at the end of the cycle.

Independent variable

The independent variable, group gender composition is captured using two variables. One I call *male members*. This captures the percentage of male members in a group and is computed as the number of male members divided by the total number of members in the group. The second independent variable I call *mixed gender* which is a dummy variable that takes on the value of one if the group is composed of both male and female members, and zero if the group is composed of only female members. Whereas the dummy variable, *mixed gender*, covers the effect of the mere presence of male members in the group, the *male members* variable covers the difference in effects resulting from differing percentages of male members.

Moderating variable

I conjecture that the relation between gender composition and group profit generating capacity is influenced by the level of gender equality of the country where the group is located. I investigate this by introducing a moderation term for gender equality. To measure gender equality, I use the global Gender Gap Index (GGI) obtained from the World Economic Forum[15]. The GGI measures gender-based differences in relation to four dimensions i.e., economic participation, education attainment, health, and political empowerment. The index ranges from 0 to 1 with higher values meaning higher equality and vice versa. In this study, the index has been reverse-coded with higher values meaning higher inequality and vice versa for ease of interpretation.

Control variables

I include as control variables several SG-specific and contextual variables. The SG-specific variables include age of the group, total assets, group size, welfare fund, rural dummy, other development initiatives and facilitating agency. *Age* is likely to influence the profit generating capacity of the groups due to the learning effect that takes place overtime. With subsequent cycles, members may have a better understanding and appreciation of the savings group's methodology (Moret et al., 2020). I also control for *total assets* which represent the welfare of group members, i.e., their ability to bring in more savings to the group. *Group size* is also likely to influence the profit generating capacity as larger groups are likely to have higher loan fund utilization rates due to a higher number of projects qualifying for loans which should translate into to higher returns. However, a larger group size may also expose the group to risks associated with free riding and may affect the group operations negatively. Alongside the core loan fund, some SGs keep an emergency fund referred to as a *welfare fund* to cater for member emergencies. The welfare fund is likely to influence the group profit generating capacity (Gonzales Martinez, 2020). We include a dummy variable that takes the value of one if the group keeps a welfare fund and zero otherwise.

Additionally, I include a dummy variable that takes on the value of one if the group is located in the *rural* areas. The location of the group may influence the profit generating capacity of the group because groups in urban areas may have access to more resources. SGs are usually used as channels through which *other*

[15] https://www.weforum.org/reports?utf8=%E2%9C%93&query=gender+gap+report

development initiatives are delivered to low-income populations. These other development initiatives are usually referred to as "add-ons" or "plus activities". They include health education, financial education, training on income generating activities, etc. The presence of add-ons along core group activities is likely to influence the SG profit generation capacity as illustrated by Gonzales Martinez (2020). I include, as a control variable, a dummy variable that takes on the value of one if the group has integrated other development initiatives and zero otherwise. SGs are normally formed and supported by international Non-Governmental Organizations referred to as *facilitating agencies*. These facilitating agencies, like CARE, World Vision or Aga Khan, usually have different objectives and modes of operation which may influence the profit generating of the groups. I take this into account by including dummy variables for the different facilitating agencies in the sample.

Savings groups' profit generating capacity is influenced by macro-economic conditions of the countries in which they operate. To account for the different macro-economic conditions under which the savings groups in our sample operate, I include three contextual control variables. These are the population density, gross domestic product (GDP) per capita and the heritage index of economic freedom.

To minimize the effect of outliers, all the ratios are winsorized at the 1% and 99% levels. Table 2 presents all the variables and their definitions.

3.2 Data

I have access to a unique dataset on informal grassroot financial associations from the Savings Group Information Exchange (SAVIX)[16]. The SAVIX is an online platform that contains standardized data on a large number of savings groups globally. It was developed by the VSL Associates and funded by the Bill and Melinda Gates Foundation together with several facilitating agencies (CARE International, Catholic Relief Services, Oxfam International, and Plan International). Data is collected and uploaded to the SAVIX Management Information System (MIS) on a quarterly basis. The SAVIX captures several elements relating to the operations of the savings groups. It contains data on the group dynamics, composition and performance. The sample for this study consists

[16] http://thesavix.org/

of 81,853 savings groups from 30 countries. It is an unbalanced dataset that covers 32 quarters from 2010 to 2017. Table 1 shows the country distribution of the SGs in this sample.

Table 1: Savings groups in the sample by country

Country	Number of SGs	Country	Number of SGs
Mali	16,140	Niger	1,673
Uganda	12,158	Rwanda	1,501
Burkina Faso	6,155	Egypt	1,450
Ghana	5,113	Ethiopia	1,388
Ivory Coast	4,730	Mozambique	1,330
Kenya	4,723	Zimbabwe	1,076
Benin	3,763	South Africa	1,007
Tanzania	3,006	Nigeria	765
Togo	2,484	Cameroon	652
Senegal	2,410	Madagascar	410
Sierra Leone	1,961	Guinea Bissau	314
Zambia	1,960	Namibia	131
Burundi	1,959	Republic of the Congo	60
Guinea	1,838	Swaziland	18
Malawi	1,673	Lesotho	5
		Total	**81,853**

The SAVIX is the first and arguably the most comprehensive database there is on informal community managed grassroot associations. Unlike several studies on savings groups that are based on case studies of a few selected programs, the SAVIX contains global data that makes it possible to do rigorous studies on savings groups. The data to the SAVIX is collected and uploaded by field officers visiting the groups on a quarterly basis. The SAVIX mainly contains data for savings groups that are supported by a facilitating agency, thus it does not cover several other groups that are formed spontaneously without the support of a facilitating agency which is a weakness of the dataset. Nonetheless, the SAVIX is the most representative dataset on savings groups as it covers different complementary metrics and contains several groups from different countries.

To supplement data from the SAVIX and consider the macro-economic conditions of the countries where the SGs are located, I draw on several country indicators obtained from multiple sources. GGI data is obtained from the World Economic Forum global gender gap reports, population density is obtained from the world development indicators developed by the World Bank (https://data.worldbank.org/), Gross Domestic Product(GDP) is obtained from the world economic outlook database maintained by the International Monetary Fund (https://www.imf.org/en/data) and economic freedom index is obtained from heritage foundation (https://www.heritage.org/index/).

3.3 Estimation strategy

It should be noted that there could be some endogeneity concerns as the group profit generating capacity and the percentage of male members may be simultaneously determined. If SGs formed completely or almost completely by women are successful for example in terms of producing high returns for group members, this will attract men to participate in the next cycle of the SG. Hence, the number of men in a group may be influenced by the profit generating capacity of a group just as the number of men in a group may influence the profit generating capacity. I address this simultaneity bias concern by doing the analysis on only the data pertaining to the first cycle of group operations. In such a case, men are not basing their decision to join the group on the groups' previous cycle outcomes.

I employ random effects regression analysis to investigate whether the profit generating capacity is statistically related to the gender composition of the group. Specifically, I estimate the basic model below:

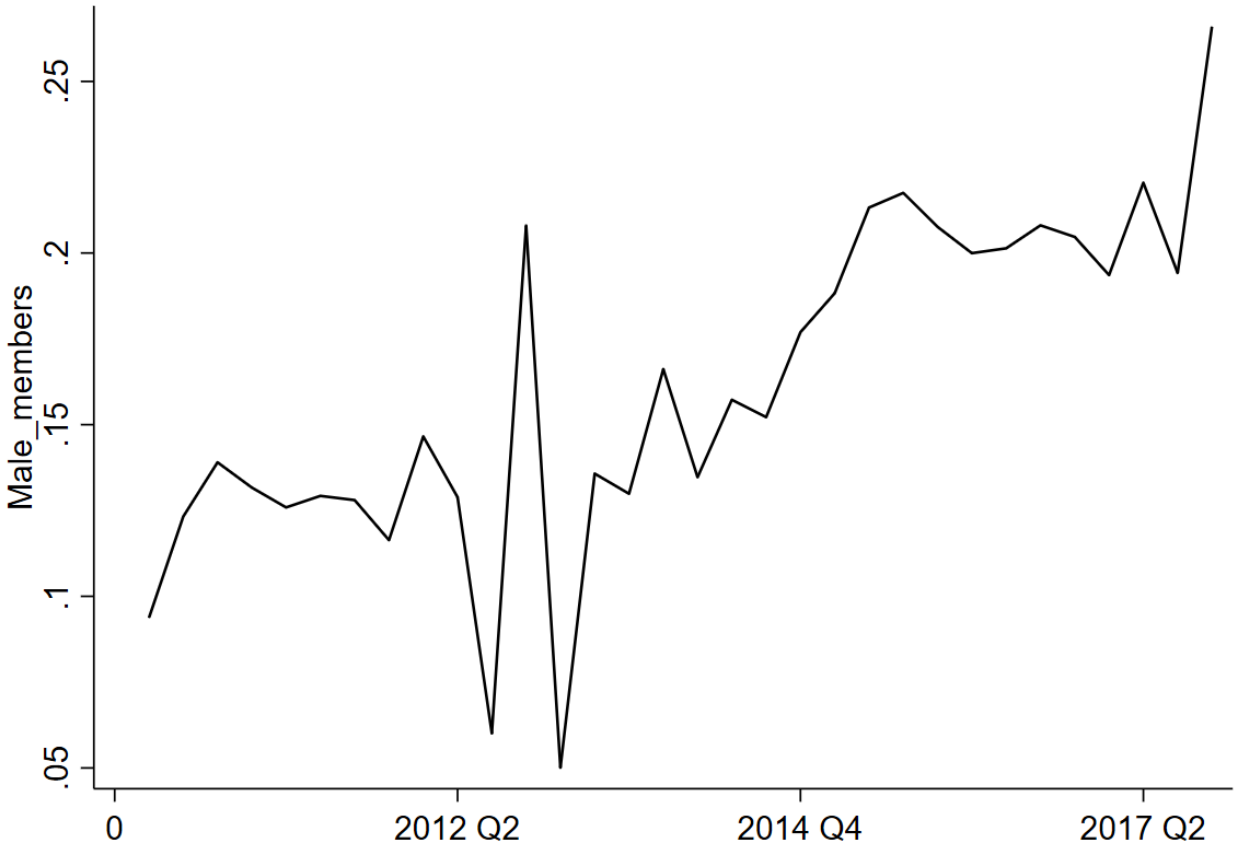
$$Y_{it} = \beta_0 + \beta_1 Gender_{it} + \delta X_{it} + c_i + u_{it} \qquad (1)$$

where Y_{it} captures the profit generating capacity, measured in terms of ROS. $Gender_{it}$ is the gender composition of the ith savings group at time t. X_{it} represents a vector of control variables i.e., age of the group, asset size, group size, welfare fund, rural dummy, facilitating agency, other development initiatives, population density, gross domestic product (GDP) per capita and the heritage index of economic freedom. I also include time dummies in the different regressions to cater for time fixed effects. c_i is the group specific unobserved effect and u_{it} is the idiosyncratic error term. Standard errors are clustered at the group level.

3.4 Gender composition of SGs over time

Although over 80 percent of savings groups' membership globally is comprised of women (Wheaton, 2019), figure 2 shows that the share of male members is growing rapidly over time. Male members have increased from around 9 percent in 2010 to over 27 percent in 2017. This shows the increasing significance of men in savings groups' operations.

Figure 2: Share of male members in savings groups over time.



3.5 Summary statistics

Table 2 presents the summary statistics for the variables used in the study. From the table, we see that the average group in the dataset is composed of 17 percent male members. The mixed gender dummy shows that about 55 percent of the groups have both male and female members. The other 45 percent is composed of only female members.

With regards to the profit generating capacity, the average group has a return on savings of 40.9 percent. The return on savings captures the profitability of the group and hence the wealth created for the group from member savings. A value

of 40.9 percent means that at each end-of-cycle share-out, each member on average makes 40 cents on each dollar saved. This further shows that savings groups typically lend out to high rates and fetch higher returns for group members as compared to other savings mechanisms like the formal financial institutions (Allen, 2002)

Regarding the moderating variable, global gender gap index, the average group is located in a country with a score of 0.65 which indicates that most groups are located in countries with moderate levels of gender equality. The minimum value (0.57) and maximum value (0.82) show that SGs in the sample are located in countries with diverse levels of gender equality i.e., from average levels to high levels of equality.

Moving on to the savings groups' characteristics, we observe that the average group has been in existence for 351 days (corresponding to about one year since its first savings were initiated for the first cycle), has an asset size of 667.6 USD and has 23 active members. Further still, 69.5 percent of the SGs keep a welfare fund and 59 percent are in the rural areas. A welfare fund is an emergency pot that group members draw on when faced with emergencies. 37.6 percent of the SGs incorporate other development initiatives like health education, women empowerment etc. along the core savings group activities of saving and borrowing. This shows that savings groups, in addition to being mechanisms for local intermediation of savings, are also channels through which multiple services can be offered to the people at the bottom of the pyramid to tackle multi-dimensional poverty. The table further shows that the majority of the SGs in the sample (29.3 percent) are supported by Plan International, closely followed by CARE (24.2 percent), Oxfam (19 percent) and Catholic Relief Services (14.4 percent) with the other facilitating agencies sharing the remaining 13 percent among them.

Looking at the macro economic conditions for the countries in our sample, the average country has a population density of 108.43 people per square kilometer, GDP per capita of 2531.6 USD and a heritage economic freedom score of 57 percent.

Table 2: Variable Definitions and Summary Statistics

Variable	Definition	Obs.	Mean	Median	Std. Dev.	Min	Max
Gender variables							
Male members	Proportion of male members in the group	227,388	0.170	0.067	0.210	0	0.968
Mixed gender	A dummy variable equal to 1 if the group is composed of both males and females and 0 if the group is composed of only females	227,388	0.550	1	0.497	0	1
Profit generating capacity							
ROS	Return on savings	227,388	0.409	0.275	0.466	-0.339	2.212
Gender equality indicator							
GGI	Global gender gap index of the country in which the group is located	211,513	0.653	0.650	0.061	0.568	0.822
SG characteristics							
Age	The age of the group in days	227,388	350.736	256	336.736	14	1756
Total Assets	The total assets of the group	227,388	667.558	366.591	809.380	4.096	4399.131
Asset size	The natural logarithm of total assets	227,388	5.802	5.904	1.336	1.410	8.389
Group size	The number of active members in the group	227,388	23.174	25	6.054	3	100
Welfare fund	1 if the group keeps an emergency fund	227,388	0.695	1	0.460	0	1
Rural	1 if the group is in the rural areas	227,388	0.591	1	0.492	0	1
Other development initiatives	1 if the group has integrated other development initiatives	227,388	0.376	0	0.484	0	1
Facilitating agency							
CARE	1 if the group is supported by CARE	227,388	0.242	0	0.428	0	1
Catholic Relief Services	1 if the group is supported by Catholic Relief Services	227,388	0.144	0	0.351	0	1
Oxfam	1 if the group is supported by Oxfam	227,388	0.190	0	0.393	0	1
Plan International	1 if the group is supported by Plan International	227,388	0.293	0	0.455	0	1
Others	1 if the group is supported by other facilitating agencies other than those indicated above	227,388	0.130	0	0.336	0	1
Macro indicator							
Population density	People per square km of land area	227,388	108.427	76.847	102.454	2.761	485.648
GDP per capita	GDP per capita of the country in which the group is located	227,388	2531.638	1959.434	1977.522	669.694	12533.94
Heritage	The heritage index of the country in which the SG is located	227,388	57.343	57.400	4.009	28.600	67.600

4. Results and Discussion

4.1 Gender and savings groups' profit generating capacity

Table 3 presents the random effects regression results for the effect of gender on the profit generating capacity of the group measured in terms of the return on savings (ROS). The results reported in column 1 indicate that the proportion of male members is negatively related to the profit generating capacity of the group. This means that a group with a higher proportion of male members exhibits lower return on savings. The estimated co-efficient shows that a unit increase in the proportion of male members by say a 100 percentage points leads to a 6.7 percentage point decrease in the ROS.

One potential argument for the observed effect is the perception that men are poor at loan repayment and hence have higher default rates than women (D'Espallier et al., 2011; Mutebi et al., 2017). The high default rates have a direct effect on the returns on savings as both the member savings and interest income are lost. Moreover, the potentially higher default rates could have an effect on the fund utilization rate if loans to men are rationed to mitigate the effects of their poor repayment rates. In groups composed of both men and women, women may tend to limit the amount of money that they allow men to take as loans and also reduce the overall lending in a group. A similar observation was made by Mutebi et al. (2017) where in some mixed gender groups, there was a limit to how many men were allowed in the group owing to the high default rates of men. Additionally, there were more stringent terms imposed when men required loans for example, they required that men have their spouses serve as their guarantors because women ensured that men fully paid back the acquired loan (Mutebi et al., 2017).

Another potential argument is that the nature of savings groups may not be suited to the socio-economic characteristics of men i.e., they more often require bigger loans that the group may not be able to offer. Johnson (2004) makes a similar observation with regards to ROSCAs being less suited to men's financial responsibilities. Moreover, since men usually have alternative forms of savings and sources of credit unlike women, they may not care much for the savings group's activities and may join for different purposes. Some men may join to monitor the activities of the women (Waller, 2014). In such instances, this may affect the savings and borrowing behavior of women especially if they do not want

the men to have knowledge of the same. For example, women may reduce how much they borrow because they do not want the men to know how much money they have under their control. Anderson & Baland (2002) observe that women keep their participation in informal savings groups secret from their husbands to hide their savings from misuse by the husbands so when men join such groups, it could infringe on the privacy that the women sought and influence their savings and borrowing behavior ultimately affecting the return on savings.

Table 3: Gender and SG profit generation capacity

	(1)	(2)
Variables	ROS	ROS
Male members	-0.0670***	
	(0.0061)	
Mixed gender		-0.0397***
		(0.0030)
Age	0.0001***	0.0001***
	(0.0000)	(0.0000)
Asset size	0.1562***	0.1569***
	(0.0010)	(0.0010)
Group size	-0.0093***	-0.0089***
	(0.0003)	(0.0003)
Other development initiatives	-0.0412***	-0.0416***
	(0.0038)	(0.0038)
Welfare fund	-0.0989***	-0.0966***
	(0.0032)	(0.0032)
Rural	-0.0105***	-0.0105***
	(0.0031)	(0.0031)
Population density	0.0001***	0.0001***
	(0.0000)	(0.0000)
GDP per capita	-0.0000***	-0.0000***
	(0.0000)	(0.0000)
Heritage	-0.0077***	-0.0079***
	(0.0005)	(0.0005)
Constant	0.3590***	0.3699***
	(0.0275)	(0.0276)
Agency dummies	Yes	Yes
Time dummies	Yes	Yes
Observations	227,388	227,388
R-squared	0.2024	0.2026
Number of SGs	81,853	81,853

Table 3 shows the random effects regression results for the relationship between gender and SG profit generating capacity (measured by return on savings). Refer to table 2 for the definition of the variables. Robust standard errors in parentheses. *, ** and *** represent significance at 10%, 5% and 1% respectively.

Taking a look at the control variables, some results are interesting. I observe a lower ROS for rural groups which hints to the poorer investment opportunities in rural areas hence the need to lend to members at lower interest rates or a lower share of the savings being converted into loans. Similarly, we observe that a lower return on savings is associated with SGs that deliver other development initiatives along the core group activities. This indicates that the other development initiatives may destruct the group from the core savings and borrowing activities, an area that should be researched further to find out how delivery of other initiatives influences savings groups operations and devise ways of constructively doing the same without harming the core group model. Further still, lower profit generating capacity is associated with groups that keep a welfare fund for emergency purposes. We also observe that SGs with a larger asset size exhibit a higher profit generating capacity.

In column 2, gender composition is measured using the dummy variable, mixed gender. The results are consistent with those obtained when gender is measured using the proportion of male members. There is a negative relation between the mixed gender dummy and the profit generating capacity of the group. Specifically, mixed gender savings groups have significantly lower ROS than savings groups composed of only female members.

4.2 Moderating effect of gender equality

Does the above relation between gender composition and group profit generating capacity vary with the level of gender equality of the country in which the group is located? To answer this, I include an interaction term between gender composition and the level of gender equality in the regression model. Gender equality is measured using the global gender gap index (GGI). Random effects regression results are presented in table 4. As in Table 3 column 1 reports numbers related to the share of male members while column 2 reports results when gender is measured using the mixed gender dummy variable.

As shown, contextual gender equality influences the effect of gender on group profit generating capacity. Specifically, the negative relation between gender and the ROS is worse as the level of gender inequality increases. The results shed light on the importance of understanding inherent gender norms for the functioning of savings groups.

Table 4: Moderating role of gender equality

Variables	(1) ROS	(2) ROS
Male members	-0.0886***	
	(0.0072)	
GGI	0.1144***	0.1909***
	(0.0177)	(0.0217)
Mixed		-0.0403***
		(0.0033)
Male members*GGI	-0.4838***	
	(0.0563)	
Mixed*GGI		-0.2789***
		(0.0267)
Control variables	Yes	Yes
Agency dummies	Yes	Yes
Time dummies	Yes	Yes
Observations	211,513	211,513
R-squared	0.2127	0.2129
Number of SGs[17]	75,361	75,361

Table 4 shows the results for the moderating effect of gender equality (measured by the gender gap index, GGI) on relationship between gender and SG profit generating capacity (measured by return on savings). Refer to table 2 for the definition of the variables. Robust standard errors in parentheses. *, ** and *** represent significance at 10%, 5% and 1% respectively.

4.3 Further analyses

I conduct a few other tests to ascertain the robustness of the results.

Alternative estimation method: To ascertain the robustness of the results and make an argument for a causal effect of gender composition on group profit generating capacity, I employ the difference-in-differences (DID) approach (Chen, Leung & Goergen, 2017). DID is used to estimate the effect of a treatment by comparing two similar groups, one with treatment and the other without treatment.

The SAVIX dataset contains data that is collected on a quarterly basis. To form the sample for this analysis, I include groups that experience an increase in group membership. I include data on the group one quarter before and one quarter after the increase in group membership. To make the treatment group, the increase in group membership had to bring in male members hence the group moved from

[17] Information on GGI is missing for some countries reducing the number of SGs used in this analysis as compared to table 3.

being all-female to mixed. This leaves 203 SGs making up the treatment group. In the control group, the increase in group membership still brings in female members and the group remains all-female. This leaves 1745 SGs making the control group.

Before performing the DID, I apply propensity score matching on the pre-treatment data to make the treatment and control groups as similar as possible. I use the nearest neighbor to select (Stuart & Rubin, 2008), for each SG in the treatment group an SG from the control group with the closest propensity score basing on several matching covariates. Specifically, each SG with mixed gender composition is matched to an SG with only female members that is as similar as possible to it along several covariates before male members joined the mixed SG. The control variables used in the previous regression models form the matching covariates that are adopted. The final dataset after matching contains data on 203 treated SGs and an equal number of matched control SGs.

To test the reliability of the matching, I conduct univariate t-tests for the matching covariates to compare the mixed gender groups with their matched control SGs. Panel A of Table 5 shows that there is no statistically significant difference between both groups along the observable matching covariates. I then estimate the DID model below on the matched sample.

$$ROS_{it} = \alpha + \beta_1 Male\ joiners_{it} + \beta_2 Post_{it} + \beta_3 Male\ joiners_{it} \times Post_{it} + \delta X_{it} + \varepsilon_{it} \qquad (2)$$

Where $Male\ joiners$ is an indicator variable equal to one if the SG is in the treatment group, and zero otherwise, $Post$ is an indicator variable equal to one if the quarter is after membership increase. X_{it} represents a vector of control variables as in equation 1. I include cycle, facilitating agency and time fixed effects. SGs may be in different cycles which could influence profit generating capacity so cycle fixed effects take this into account.

Panel B of table 5 presents the DID results. The coefficient on the Male joiners × Post is negative and statistically significant at the 5% level which suggests that after male members joining the group, SGs have lower ROS than after female members join. The coefficient shows that SGs have ROS that is 10 percentage points lower the quarter after male members join than when female members join.

Table 5: Difference-in-differences estimation results

Panel A: Matching reliability			
	Treatment	**Control**	**t-stat**
Age	247.059	212.493	-1.443
Total Assets	511.757	407.918	-1.534
Group size	17.828	17.872	0.083
SG plus	0.103	0.089	-0.504
Welfare fund	0.847	0.837	-0.272
Rural	0.286	0.256	-0.669
Population density	93.854	86.080	-1.302
GDP per capita	2911.756	2967.337	0.323
Heritage	57.467	57.449	-0.075

Panel B: Difference-in-differences results	
	ROS
Male joiners	0.0367
	(0.0385)
Post	0.0232
	(0.0418)
Male joiners*Post	-0.1019**
	(0.0463)
Control variables	Yes
Agency dummies	Yes
Cycle dummies	Yes
Time dummies	Yes
Observations	812
R-square	0.3527
Number of SGs	406

Panel A shows the univariate t-tests results comparing the treated and matched control groups. Panel B shows the DID results for the relationship between gender and SG profit generating capacity (measured by return on savings). Refer to table 2 for the definition of the variables. Robust standard errors in parentheses. *, ** and *** represent significance at 10%, 5% and 1% respectively.

Alternative definition of the gender variable: I recode the gender variable into four categories to assess if the manner of the composition has any effect on the profit generating capacity. The categories are; all female (takes the value of 1 if all members in the group are female and zero otherwise), minority men (assumes the value of 1 if the group is composed of less men than women and zero otherwise), balanced (assumes the value of 1 if the group is composed of an equal number of

men and women, and zero otherwise) and majority men (assumes the value of 1 if the group is composed of more men than women and zero otherwise).

The results of this analysis are presented in Table 6 and the "all female" is the reference category. Compared to groups that are composed of only female members, groups that have some men in them, have a lower ROS further confirming the previous results. This is evidenced by the negative significant results on all categories i.e., minority men, balanced and majority men. In fact, the coefficient for majority being men is the highest, illustrating again that the more 'male' a group becomes the worse the group performs.

Table 6: Robustness analysis - redefined gender categorization

Variables	ROS
Minority men	-0.0398***
	(0.0031)
Balanced	-0.0148*
	(0.0087)
Majority men	-0.0445***
	(0.0046)
Control variables	Yes
Agency dummies	Yes
Time dummies	Yes
Constant	0.3696***
	(0.0276)
Observations	227,388
R-squared	0.2026
Number of SGs	81,853

Robust standard errors in parentheses.

*, ** and *** represent significance at 10%, 5% and 1% respectively.

5. Conclusion

While there are increasing efforts to engage men in gender-focused development projects, little is known about how this influences the effectiveness of the projects. This is particularly true for savings groups which have become a 'darling' for development agencies which are interested in financial inclusion and empowerment through group efforts for people living at the bottom of the pyramid. In this paper, I investigate the relationship between gender composition and the

profit generating capacity of savings groups, i.e., the effectiveness of groups. I further probe whether this relationship is moderated by the gender equality situation in the country where the savings groups are located. Gender composition is measured through the proportion of male members, and a dummy variable that shows whether the group is composed of both male and female members or only female members. Profit generating capacity is measured through the return on savings which measures the wealth created from member savings. Using a large sample of data pertaining to 81,853 savings groups in 30 countries, I employ random effects regression analysis to investigate the effects of gender composition on SG profit generating capacity. I address endogeneity concerns due to simultaneity bias by doing the empirical analysis on observations from only the first cycle of group operations, i.e., the gender composition of the group is decided ex-ante the performance of the group.

Results indicate that there is a negative relationship between gender composition and group profit generating capacity suggesting that SGs with a higher proportion of male members have a lower return on savings. The results for the dummy variable for mixed gender group are consistent showing that SGs with both male and female members have a lower return on savings as compared to those that have only female members. Further, results for the interaction term between the gender composition and gender equality variable show that the negative relationship between gender composition and profit generating capacity is generally made worse in contexts with high gender inequality. These findings are robust to alternative estimation methods and alternative definitions of the gender composition variable. Results from the differences-in-differences robustness estimation further minimize endogeneity concerns.

A couple of recommendations emerge from the study. First, to avoid harming the savings group operational model, practitioners should be aware of the downsides that come with male engagement in SGs and should derive ways of solving such downsides. Male engagement can be an important component in the empowerment of women. However, as seen from the results, having both males and females in the same group has a negative effect on some core aspects of the savings group model. Thus, SG promoters should be wary about this and come up with necessary balancing efforts like for instance gender awareness training and increased monitoring of gender mixed groups.

Second, development actors should exercise increased contextual caution when implementing programs. Underlying gender norms of the different program areas should be taken into consideration before implementing uniform programs in different areas. This recommendation stems from the observation that the negative relationship between gender composition and SG profit generating capacity varies with the gender equality of the different countries in which the SGs are located.

Savings groups are often used by development actors to deliver other development initiatives apart from savings and credit. Gender equality dialogue and training is one such initiative that is often delivered through these groups. Further research can show how the effect of gender on group operations is moderated by gender equality training as an add-on. Could such trainings provide a potential solution to the observed negative effect that mixed gender groups have a lower ROS than groups that are all females?

Future studies are also needed to capture the effect on women which cannot be captured by the current quantitative investigation. Are women changing their behavior for example in terms of expression during group meetings when men join the groups? The lower ROS for mixed gender groups could signal a change in saving and borrowing behavior among female members when men join the groups. Understanding how women react to men joining the groups will expose the behavioral biases that women may have towards men and with this, solutions can be devised on how the two genders can collaborate for the overall good of the group and individuals in the group.

Moreover, on a more general level, a qualitative investigation may help decipher the reasons why men join SGs and particularly why they would like to be in the same group as women. Do they trust dealing with women more than fellow men? Do they join such groups to monitor activities of the women as suggested by Waller (2014) and have an idea of the financial position of the women? As gender norms paint women as a generally weaker gender in societies with high gender inequality, do the men join female groups to take advantage of the position of women? Do they join such SGs because they are lured by the development agencies, who are interested in driving the gender equality agenda, and are not interested in the group activities? Are development agencies more interested in the social function of the group as compared to the financial aspect?

References

Allen, H. (2002). CARE international's village savings & loan programmes in Africa: Micro finance for the rural poor that works.

Ambec, S., & Treich, N. (2007). Roscas as financial agreements to cope with self-control problems. *Journal of development economics*, 82(1), 120-137.

Anthony, D., & Horne, C. (2003). Gender and cooperation: explaining loan repayment in micro-credit groups. *Social psychology quarterly*, 293-302.

Anderson, S., & Baland, J. M. (2002). The economics of roscas and intrahousehold resource allocation. *The Quarterly Journal of Economics*, *117*(3), 963-995.

Beaman, L., Karlan, D., & Thuysbaert, B. (2014). *Saving for a (not so) rainy day: A randomized evaluation of savings groups in mali* (No. w20600). National Bureau of Economic Research.

Berge, L. I. O., Juniwaty, K. S., & Sekei, L. H. (2016). Gender composition and group dynamics: Evidence from a laboratory experiment with microfinance clients. *Journal of Economic Behavior & Organization*, *131*, 1-20.

Bouman, F. J. (1995). Rotating and accumulating savings and credit associations: A development perspective. *World development*, 23(3), 371-384

Burlando, A., & Canidio, A. (2017). Does group inclusion hurt financial inclusion? Evidence from ultra-poor members of Ugandan savings groups. *Journal of Development Economics*, *128*, 24-48.

Burlando, A., Canidio, A., & Selby, R. (2016). The economics of savings groups. Available at SSRN: https://doi.org/10.2139/ssrn.2785033

Casey, E., Carlson, J., Two Bulls, S., & Yager, A. (2018). Gender transformative approaches to engaging men in gender-based violence prevention: A review and conceptual model. *Trauma, Violence, & Abuse*, *19*(2), 231-246.

Cassidy, R., & Fafchamps, M. (2020). Banker my neighbour: Matching and financial intermediation in savings groups. *Journal of Development Economics*, 102460.

Chen, J., Leung, W. S., & Goergen, M. (2017). The impact of board gender composition on dividend payouts. *Journal of Corporate finance*, 43, 86-105.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic literature*, *47*(2), 448-74.

D'Espallier, B., Guérin, I., & Mersland, R. (2011). Women and repayment in microfinance: A global analysis. *World development*, *39*(5), 758-772.

D'Espallier, B., Guerin, I., & Mersland, R. (2013). Focus on women in microfinance institutions. *The Journal of Development Studies*, *49*(5), 589-608.

Eboh, E. C. (2000). Rural informal savings and credit associations as risk managers and the lessons for the design and execution of rural credit schemes in Nigeria. *African Development Review*, *12*(2), 233-262.

Ely, R. J. (2004). A field study of group diversity, participation in diversity education programs, and performance. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, *25*(6), 755-780.

Enimu, S., Eyo, E. O., & Ajah, E. A. (2017). Determinants of loan repayment among agricultural microcredit finance group members in Delta state, Nigeria. *Financial Innovation*, *3*(1), 21.

Flood, M. (2011). Involving men in efforts to end violence against women. *Men and masculinities*, *14*(3), 358-377.

Gonzales Martinez, R. (2020). Which social program supports sustainable grass-root finance? Machine-learning evidence. *International Journal of Sustainable Development & World Ecology*, *27*(5), 389-395.

Grant, W. J., & Allen, H.C. (2002). CARE's mata masu dubara (women on the move) program in Niger: successful financial intermediation in the rural Sahel. *Journal of Microfinance/ESR review*, *4*(2), 10.

Guérin, I. (2011). The gender of finance and lessons for microfinance. *The handbook of microfinance*, *589*, 612.

Gupta, J., Falb, K. L., Lehmann, H., Kpebo, D., Xuan, Z., Hossain, M., ... & Annan, J. (2013). Gender norms and economic empowerment intervention to reduce intimate partner violence against women in rural Côte d'Ivoire: a randomized controlled pilot study. *BMC international health and human rights*, *13*(1), 46.

Jahns-Harms, E. (2018). Let's look before we leap: challenging our ideas on how savings groups work. *Enterprise Development and Microfinance*, 29(3), 287-302.

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk averse?. *Economic inquiry*, *36*(4), 620-630.

Johnson, S. (2004). Gender norms in financial markets: Evidence from Kenya. *World Development*, *32*(8), 1355-1374.

Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & Development*, *13*(1), 13-24.

Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. Proceedings of the National Academy of Sciences, 114(12), 3079-3084.

Kevane, M., & Wydick, B. (2001). Microenterprise lending to female entrepreneurs: sacrificing economic growth for poverty alleviation?. *World development*, *29*(7), 1225-1236.

Kinkingninhoun-Mêdagbé, F. M., Diagne, A., Simtowe, F., Agboh-Noameshie, A. R., & Adégbola, P. Y. (2010). Gender discrimination and its impact on income, productivity, and technical efficiency: evidence from Benin. *Agriculture and human values*, *27*(1), 57-69.

Ksoll, C., Lilleør, H. B., Lønborg, J. H., & Rasmussen, O. D. (2016). Impact of Village Savings and Loan Associations: Evidence from a cluster randomized trial. Journal of Development Economics, 120, 70-85.

Lata, L. N., Walters, P., & Roitman, S. (2020). The politics of gendered space: Social norms and purdah affecting female informal work in Dhaka, Bangladesh. *Gender, Work & Organization*.

Le Polain, M., Sterck, O., & Nyssens, M. (2018). Interest Rates in Savings Groups: Thrift or Threat?. *World Development*, *101*, 162-172.

Ledgerwood, J. (1999). Sustainable banking with the poor microfinance handbook.

Ledgerwood, J., Earne, J., & Nelson, C. (eds.). (2013). *The new microfinance handbook: A financial market system perspective*. The World Bank.

Moret, W., Swann, M., & Lorenzetti, L. (2020). What happens when savings groups grow up? Examining savings group sustainability and perceived long-term benefits. *Development in Practice*, 1-15.

Mutebi, A., Muhumuza Kananura, R., Ekirapa-Kiracho, E., Bua, J., Namusoke Kiwanuka, S., Nammazi, G., ... & Tetui, M. (2017). Characteristics of community savings groups in rural Eastern Uganda: opportunities for improving access to maternal health services. *Global health action*, *10*(sup4), 1347363.

Nagarajan, G., Meyer, R. L., & Graham, D. H. (1999). Does membership homogeneity matter for group-based financial services? Evidence from the Gambia. *African Development Review*, *11*(1), 87-102.

Ojong, N. (2014). Credit unions as conduits for microfinance delivery in Cameroon. *Annals of Public and Cooperative Economics*, 85(2), 287-304.

Orlitzky, M., & Benjamin, J. D. (2003). The effects of sex composition on small-group performance in a business school case competition. *Academy of Management Learning & Education*, *2*(2), 128-138.

Ruane-McAteer, E., Amin, A., Hanratty, J., Lynn, F., Van Willenswaard, K. C., Reid, E., ... & Lohan, M. (2019). Interventions addressing men, masculinities and gender equality in sexual and reproductive health and rights: an evidence and gap map and systematic review of reviews. *BMJ global health*, *4*(5), e001634.

SEEP Network. (2016). *Delivering formal financial services to savings groups: A handbook for financial service providers*. Retrieved from https://mangotree.org/files/galleries/1752_SEEP_Delivering-Formal-Financial-Services-to-SGs_A-Handbook-for-FSPs-FINAL-20170407.pdf

Sharma, M., & Zeller, M. (1997). Repayment performance in group-based credit programs in Bangladesh: An empirical analysis. *World development*, *25*(10), 1731-1742.

Slegh, H., Barker, G., Kimonyo, A., Ndolimana, P., & Bannerman, M. (2013). 'I can do women's work': reflections on engaging men as allies in women's economic empowerment in Rwanda. *Gender & Development*, *21*(1), 15-30.

Slover, C. H. (1991). The Effect of Membership Homogeneity on Group Size, Funds Mobilization, and the Engenderment of Reciprocal Obligations among Informal Financial Groups in Rural Zaire.

Stern, E., Pascoe, L., Shand, T., & Richmond, S. (2015). Lessons learned from engaging men in sexual and reproductive health as clients, partners and advocates of change in the Hoima district of Uganda. *Culture, health & sexuality*, *17*(sup2), 190-205.

Stevens, E. (2018). Happiness in a land of sorrow: See how Saving for Change is making a difference in Darfur. Retrieved from https://www.oxfamamerica.org/explore/stories/happiness-in-a-land-of-sorrow-saving-for-change-in-darfur/

Stuart, E. A., & Rubin, D. B. (2008). Best practices in quasi-experimental designs. *Best practices in quantitative methods*, 155-176.

Subašić, E., Hardacre, S., Elton, B., Branscombe, N. R., Ryan, M. K., & Reynolds, K. J. (2018). "We for She": Mobilising men and women to act in solidarity for gender equality. *Group Processes & Intergroup Relations*, *21*(5), 707-724.

Waller, M. K. (2014). Empowering women through savings groups: A study from the Wellness and Agriculture for Life Advancement (WALA) Program. Retrieved from https://www.crs.org/sites/default/files/tools-research/empowering-women-through-savings-groups.pdf

Wheaton, A. (2019). Where are the Men? How Male Engagement in Savings Groups Can Contribute to Financial Inclusion and Women's Empowerment. Retrieved from https://mangotree.org/files/galleries/SEEP_Savings-Groups-and-Male-Enagement_20191207.pdf

Williams, K. Y. & O'Reilly III, C. A. (1998) Demography and diversity in organizations: a review of 40 years of research. *Research in Organizational Behavior*, *20*, 77-140.