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Group Meeting Frequency and Borrowers' Repayment Performance in Microfinance: Evidence from a Quasi-natural Experiment in South Africa

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Abstract

A quasi-natural experiment has been carried out at The Small Enterprise Foundation, a South African microfinance institution offering group lending with joint liability. In a pilot project, the frequency of meetings was reduced from fortnightly to monthly and the members of the groups were no more required to attend all the meetings but they could send a representative. After selecting a suitable control group using propensity score matching techniques, we ran difference-in-difference regressions to evaluate the impact of the policy changes. Estimates suggest that the pilot project increased loan repayment delays and decreased groups' deposits, but it had a negligible impact on groups' savings balances. Text mining techniques, applied to survey data, pointed towards the lack of trust within the groups whose members did not meet frequently outside the repayment meetings as one of the causes of the negative outcomes of the pilot experiment. We conclude that group meetings are an effective tool to stimulate the accumulation of social capital among microcredit borrowers.

Keywords: microfinance, group lending, group meetings, quasi-natural experiment, repayment delay, savings

JEL Classification: G21, I25, L31, O15

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1. Introduction

Microcredit is considered as one of the most important tools for the economic development of poor countries (Aagaard, 2011). In several contexts, this form of access to credit may prove effective in giving non-bankable people adequate financial autonomy and support to initiate new economic activities (Amin *et al.*, 2003; Dalla Pellegrina, 2011; Milana and Ashta, 2012; Adler and Waldschmidt, 2013; Banerjee, 2013).

In this paper, we study the specific characteristics and the operational methods of a microcredit programme launched by the leading institution that operates in South Africa, the Small Enterprise Foundation (SEF). SEF was founded in 1992 in Tzaneen, Limpopo, in order to combat poverty in a sustainable manner. To achieve this goal, SEF chose the microcredit tool to provide relief to the poorest people, who otherwise would be excluded from the traditional financial system. To date, the organisation has operated in five of the nine provinces in South Africa (The Small Enterprise Foundation, 2016), i.e., Eastern Cape, Gauteng, Limpopo, Mpumalanga and North West.

SEF has adopted the methodology of group lending with joint liability: loans are disbursed to groups of five people, who jointly become liable for the payment of the instalments. Furthermore, SEF clients are required to participate at the fortnightly *Centre Meetings* (CMs). These are the meetings of all microcredit groups existing in the surroundings of the village identified as a centre by SEF. The unjustified absence from these meetings involves a series of penalties, including the payment of a fine for the absent member and the reduction of the maximum amount of future loans.

Some studies have identified group meetings as one of the microcredit success factors and have used the frequency of meetings and attendance rates as proxies to measure the presence of social capital among customers, in the form of relational networks, social norms and reputation (Feigenberg *et al.*, 2009, 2010, 2013, 2014). Social capital is in fact widely recognised, in the microfinance literature, as a substitute for traditional forms of collateral that allows lending institutions to mitigate various forms of information asymmetries. Customers of microfinance institutions (MFIs) are normally selected and monitored on the basis of the presence of social capital (Stiglitz and Weiss, 1981; Stiglitz, 1990; Varian, 1990; Besley and Coate, 1995; Ghatak, 1999; Ghatak and Guinnane, 1999; Armendáriz de Aghion and Gollier, 2000; Armendáriz de Aghion and Morduch, 2004; Karlan, 2005).

In particular, frequent group meetings, conducted to encourage interactions among MFI clients, can contribute to fostering the accumulation of social capital by group members, which can eventually be associated with better performance in terms of repayment (Feigenberg *et al.*, 2009, 2010, 2013). However, group meetings often represent a burden for customers, in terms of both the actual costs (transport and penalties as a result of absences) and the opportunity costs (lost earnings due to the time spent participating in the meetings) (Dehem and Hudon, 2013). Several SEF customers have reported such problems, which have often resulted in a decreased participation in the CMs and, in some cases, in clients dropping out.

In order to address this problem, SEF launched a pilot project named 'Non-Centre Meeting' in May 2014. The purpose of the pilot project was to decrease the time commitment required to clients for attending CMs and therefore to give customers more time to spend on their businesses. SEF management wanted to test whether this greater time available would have led to higher revenues and therefore greater deposits and savings by clients. In the

pilot project, the standard rules of CMs were changed for some centres. In these centres, the frequency of the meetings was reduced from fortnightly to once per month and the members of a group were no more required to attend all the meetings but they could send a representative. In fact, the pilot project name, Non-Centre Meeting, indicated that under the new rules, the CMs as meetings of all the clients of a centre would no longer be held on a regular basis but only exceptionally. The pilot project ended in April 2015.

The objective of this research has been to investigate the impact of the pilot project on the customers' repayment performance and saving behaviour. In particular, we have been interested in assessing whether the reduced frequency of CMs and the removal of the obligation of attendance at CMs for all group members have improved or deteriorated customers' repayment rates and saving performance.

With this purpose, we collected the SEF's administrative data at the centre-level relating to the 6 months before the launch of the pilot project and to the pilot project period, both for the set of centres who underwent the new rules and for a control set of centres to which the standard rules continued to apply. Then, we applied propensity score matching (PSM) techniques to balance the treated and control centres and digitalized group-level data in the centres selected by the PSM. We used these data to conduct difference-in-difference (DID) regressions with the purpose of identifying the causal effect of the pilot project on microcredit groups' repayment performance and saving accumulation. We found that the policy changes increased loan repayment delays and had a negative impact on groups' deposits, but they had no impact on groups' savings balances.

The second goal of the paper has been to investigate the possible reasons for the outcomes of the pilot project. To this aim, we conducted a survey investigation, and this was supported by a text-mining analysis. The results point towards two main reasons for the observed outcomes: (a) the absence of (within group) self-organisation and therefore the inability to take advantage of the new rules; and (b) the lack of trust among group-members, especially for groups whose members did not meet frequently outside the CMs.

The paper is structured as follows. An overview of the literature is presented in Section 2. The institutional context, the design of the project and the PSM analysis are discussed in Section 3. The final database is illustrated in Section 4. The empirical analysis is performed in Section 5, along with a discussion of the results. The reasons for the failure of the project are investigated in Section 6. Finally, Section 7 concludes the paper.

2. Literature

Microcredit, the provision of small collateral-free loans for income-generating activities by the poor, has gained importance in recent years as a development policy tool (Aagaard, 2011). Several studies document its success. Since the poor lack physical and financial collateral, MFIs have set up forms of social guarantees. The latter are sometimes embedded in the loan structure, as in the case of group lending (Ahlin, 2015).

The group-lending practice establishes a close link between the social capital of the clients of an MFI and the success of a microcredit programme. Bourdieu (1986, p. 248) defined social capital as 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition'. Putnam *et al.* (1993, p. 167) referred to social capital as the 'features of social organization, such as trust, norms and networks that can improve the efficiency of society by

facilitating coordinated actions'. The two definitions are not equivalent. The first definition highlights the importance of social capital for individuals, as part of their overall capital (economic, cultural and social), while the second underlines the importance of social capital for economic development, focusing on the properties of the social structure that facilitate a positive social action (Wacquant, 1998; Portes, 2000).

Social capital was also defined by Coleman (1988, p. 392) as a both formal and informal 'social organization', which creates value 'in aiding one to achieve goals [...] through facilitating the provision of public goods'. Coleman indicated, as examples of public goods, social norms and the sanctions that enforce them and social relations between people based on solidarity, trust and trustworthiness.

Nonetheless, in some circumstances, the accumulation of social capital by individuals may contrast its accumulation by the society, because individuals may exploit it for individual self-advancement rather than for collective benefit, and in ways that violate social norms or exploit the trust of others (Levien, 2015). In this sense, existing networks in a society can represent an obstacle to the development of trust and fair rules.

The enhancement of social capital is usually a by-product of microcredit and not the primary objective of MFIs (Anderson *et al.*, 2002). However, even though Grameen Bank, for instance, was established primarily to provide credit to the poor, it was also aimed at creating social capital as a means to achieve the broader goal of alleviating poverty (Dowla, 2006). Furthermore, in some cases, the provision of microcredit is part of a larger development project that also extends to social capital creation through, for example, education, healthcare and promotion of the role of women in society (Mirpourian *et al.*, 2016).

Since their origins, using the joint liability methodology, MFIs have exploited the clients' social capital to select safe borrowers and less risky projects, to monitor their execution and enforce debt repayment (Stiglitz and Weiss, 1981; Stiglitz, 1990; Varian, 1990; Besley and Coate, 1995; Ghatak, 1999; Ghatak and Guinnane, 1999; Armendáriz de Aghion and Gollier, 2000; Armendáriz de Aghion and Morduch, 2004; Karlan, 2005).

Hence, group lending with joint liability has been considered as a methodology that enables MFIs to obtain higher efficiency in their lending activities, as well as higher repayment rates. Both of these phenomena eventually lead to lower interest rates (Armendáriz de Aghion and Gollier, 2000; Carpenter and Williams, 2010). However, this practice has been criticised because it may create excessive pressure and discourage reliable clients from borrowing (Giné and Karlan, 2014). In addition, it has been observed that, in practice, good borrowers are usually not excluded from access to credit when another member of the group defaults (Matin, 1996). When questioned, as in Bangladesh and Uganda, borrowers expressed dissatisfaction with both paying for others and having others pay for them (Women's World Banking *et al.*, 2003). Furthermore, Giné and Karlan (2014), who conducted two randomised trials in the Philippines, found that removing joint liability from pre-existing groups and randomly assigning new groups to either joint or individual liability loans—while maintaining the weekly group meetings—has not been a significant impact on loan repayments and default rates.

Recently, the Grameen Bank and other MFIs have shifted from group lending with joint liability to group lending with individual liability (Dowla and Barua, 2006; de Quidt *et al.*, 2016). The maintenance of the group lending methodology highlights the importance that MFIs ascribe to this practice. Attention, even in the literature, has therefore moved from the use of the clients' social capital by the MFIs to the enhancement of clients' social

capital. Griffin and Husted (2015), for instance, in their study on an MFI in Mexico, found that establishing harmonious social relations within a group, rather than imposing social sanctions, enhances borrowers' repayment rates.

Group meetings are considered an example of social capital creation, aimed at promoting good conduct rules among microfinance borrowers. For example, in the case of the Grameen Bank, group meetings are used to promote the 'Sixteen Decisions', i.e., the rules designed to disseminate good social and economic behaviour, hygiene practices and generally a sense of self-esteem and a commitment to self-promotion among clients (Yunus and Jolis, 2003).

Furthermore, participation in group meetings can help borrowers to establish networks for information sharing regarding business opportunities and trust relationships beyond the family. Larance (2001) illustrated how these meetings enable customers to expand their networks and facilitate the starting up of small economic activities in social contexts in which women usually only interact with members of their own family. Borrowers benefit from group meetings in different ways. For instance, they can learn about the availability of school funds and the use of new savings accounts, share the best practices adopted by other group members, and even find solutions to personal problems. In a research done by the Women's World Banking *et al.* (2003) in Uganda and Bangladesh, borrowers who were asked to indicate which features of the meetings they preferred indicated the social aspects, such as the opportunity to share ideas and learn from each other.

Feigenberg *et al.* (2014) focused on the relationship between the frequency of group meetings, as a measure of social interactions, and the new social capital accumulated by micro-borrowers. Studying Indian microcredit programmes, based on group lending with individual liability, they found that more frequent group meetings—weekly meetings versus monthly meetings—were associated with improvements in informal risk-sharing, reductions in default rates and increased economic cooperation among clients (Feigenberg *et al.*, 2009, 2010, 2013). Furthermore, it was observed that social capital gains continued to accumulate across multiple lending cycles and were higher for clients who started with relatively low levels of empowerment (Feigenberg *et al.*, 2014).

However, group meetings also involve transaction costs, for both clients and MFIs, which increase with the frequency of the meetings. The transaction costs for borrowers include real costs, such as transportation and fines given because of the absence of a member from a meeting, and opportunity costs, such as the loss of income due to the necessity of having to attend a meeting. MFI transaction costs include real costs, such as the cost of stationery and books, and opportunity costs, such as travelling and meeting time costs (Dehem and Hudon, 2013). In order to reduce these costs, the Association for Social Advancement introduced an innovation named pay and leave, i.e., clients can leave the meeting as soon as they have paid, without waiting until all transactions have been completed (Women's World Banking *et al.*, 2003).

Dehem and Hudon (2013), studying the transaction costs of self-help groups in rural and urban Indian areas, estimated that, considering both the opportunity costs and fines, borrowers' charges are higher in urban areas, both in absolute terms and in relation to the borrowers' outstanding loans. Instead, borrowers' transaction costs in rural areas double those in urban areas, compared with household expenditures. However, they estimated that the total transaction costs are relatively small, compared with the average costs of lending in India, and minimal compared with the average interest rates normally paid by borrowers.

Reducing the frequency of the group meetings could allow MFIs to decrease both the operational and the transactions costs involved in collecting frequent payments. However, reducing the frequency of the required instalments and of the group meetings is usually associated with an increase in the default rates, as shown by some cases in Nepal, BRAC in Bangladesh and BancoSol in Bolivia (Armendáriz de Aghion and Morduch, 2005, p. 131). Furthermore, Feigenberg *et al.* (2013) found that the initial frequency of group meetings generates persistent results. When the group meetings are weekly (in the first loan cycle) rather than monthly, the clients accumulate higher social capital, in terms of interactions with other group members and willingness to pool risks with them. This social capital enables them to repay the subsequent loans more punctually, even when all the groups meet monthly in the second loan cycle.

In light of the contradictory evidence provided by the literature on the potential benefit of reducing CMs, the 'Non-Centre Meeting' pilot project was undertaken at SEF. The purpose of the project was to (a) reduce the frequency of the CMs in a selected number of (treated) microcredit centres and (b) reduce the number of participants in the meetings in the treated centres. We implemented a quasi-natural experiment in order to study the effects of this pilot experience while paying particular attention to borrowers' repayment delays and savings accumulation.

3. Project design

3.1. Institutional context

SEF is a large, non-profit MFI operating in South Africa that was founded in January 1992, with the goal of fighting poverty in a sustainable manner. SEF, in particular, allows the poor to increase their income through microcredits and assists them in the accumulation of savings, by creating an environment where financial services can encourage business development.

On 30 June 2016, SEF had 138,827 active clients in 28,200 groups, with an average outstanding portfolio of around 294 million Rand; 99% of the customers were women and 70% of the staff was female (The Small Enterprise Foundation, 2016).[1] The headquarters of SEF are in Tzaneen, in the Limpopo province. The business is divided into four regions: Limpopo, Eastern Cape, Expansion (which includes North West and Gauteng) and Mpumalanga.

Loans are disbursed through the group lending methodology (The Small Enterprise Foundation, 2016).[2] The groups are made up of five women, who are jointly liable for the payment of the instalments. A potential client forms a group with four other women. Then, each of the five members has to apply for a loan for her individual business. All group members have to apply simultaneously. No collateral is required. The duration of the loans is for 4, 6 or 10 months, and repayments are made monthly. However, first- and second-time

1 SEF's primary programme is the Tšhomisano Credit Programme, which explicitly targets women who have an income below half the income corresponding to the poverty line.

2 At the date of the experiment, SEF had started introducing individual lending in some branches. However, our analysis has only focused on those branches with group lending.

borrowers can only access 4- and 6-month loans and are required to repay fortnightly. These latter clients are in fact still considered vulnerable, and with this loan term policy, SEF tries to limit the risks related to financial liability for which the clients are not yet sufficiently prepared. We will account for this feature in our analysis.

The loan amount ranges from 1,000 Rand to 2,200 Rand for the first loan and from 1,000 Rand to 22,000 Rand for the next (The Small Enterprise Foundation, 2015, 2016). Groups cannot apply for a new loan without having finished repaying the previous ones. Repayments start 1 month after the disbursement.

All the groups belonging to the same centre meet fortnightly at the CMs. CMs are in fact held in order to (a) collect payments and issue payment receipts, (b) track deposits and savings balances, (c) approve new requests for loans, (d) discuss issues related to the development of customers' businesses and (e) allow new groups and new members to join the centre and apply for loans.

All the CMs at SEF are scheduled to take place either at 8 am or at 12 pm and normally last no more than 1 hour and a half. They are held in a public place in the village identified as a centre. Including the travel time, the time commitment required for attending CMs is at most about half a day.

The attendance at the CMs by all five members of a group is compulsory. The reasons that SEF accepts for not attending a CM are limited to pregnancy or maternity leave, illness, funerals and mourning periods. However, any absence must be justified by means of a written document and approved by the centre. It is sometimes necessary to send a representative to replace a person who is absent. If a member is absent for reasons other than the aforementioned ones, a fine is imposed. In addition, delays are also subject to sanctions, for a minimum amount of 5 Rand.

Loan repayments usually take place in the first CM of the month, under the supervision of a development facilitator (DF) and a treasurer, in charge of collecting the sums due. The DF also updates the group's repayment documents (see next section). Some centres use an alternative method called direct deposits or prepaid methodology: all refunds are deposited in a bank account, held by SEF, using the centre code as a reference number. All the groups belonging to a centre that follows this methodology must pay the instalment amount into the bank/post office account of the organisation before the CM takes place and, on that occasion, they only have to deliver the original copy of the deposit receipt. If the group does not deliver the original copy of the receipt, a delay is recorded. Any repayment portion that is not paid by the end of the CM is defined as arrears.

Furthermore, the groups are required to accumulate savings at the bank/postal office in their deposit accounts. SEF has no direct control or access to the groups' savings[3] but provides customers with the necessary training to be able to manage an account and encourages them to save. In 2014, at the end of the financial year, the customers' savings amounted to 41 million Rand (The Small Enterprise Foundation, 2014).

3 Clients are required to bring their group savings book to each centre meeting, as proof, for the DF, of the actual deposits and savings balances.

Table 1: CM and Non-Centre Meeting

	Standard rules 'CM' (pre-treatment)		Pilot project 'Non-Centre Meeting' (treatment)	
	First and second loan borrowers	Other clients	First loan borrowers	Other clients
CMs	Fortnightly		Monthly	
Attendance at CMs	Mandatory		Mandatory	Each group can send a representative
Loan repayment	Fortnightly	Monthly	Monthly	
Deposits and savings balances recording	Fortnightly		Monthly	

3.2. Selection of treated and control centres using baseline centre characteristics

The Non-Centre Meeting pilot project lasted 1 year, from the beginning of May 2014 to the end of April 2015. The purpose of the pilot project was to decrease the time commitment required to clients for attending CMs and therefore to give customers more time to spend on their businesses. SEF management wanted to test whether this greater time available would have led to higher revenues and therefore greater deposits and savings by clients.

According to the new rules, which Table 1 shows in comparison with the standard ones (see also Appendix 5), the CMs were reduced to only one per month and took place solely in order to repay the loan instalments and verify the status of savings.[4] Moreover, each group was allowed to send only one representative—when a member was present, the whole group was considered present—thus waiving the necessity for the other members to attend and leaving them free to devote more time to their businesses.

Twelve prepaid centres were selected for the pilot project and were thus assigned to the group that received the treatment. As shown in Appendix 1 (Table A.1.1), 139 groups were present in these centres, which belong to two SEF branches: Tlatja and Trichardsdal, both of which are part of the Central Zone. These branches are located not far from the Tzaneen headquarters; this facilitated monitoring.

The selection criterion of the treated centres was non-random, since the SEF zonal manager and the branch manager of the Tlatja and Trichardsdal branches identified those DFs who, on the basis of their past performance, could most effectively manage the project. Subsequently, the managers, together with the DFs, selected those centres where the day of the meeting did not overlap with others, although this choice should not have altered the randomness in any way. In short, the choice was somehow oriented towards centres with good repayment performance.

4 As in Feigenberg *et al.* (2013), the frequency of meetings was only reduced for the treated groups, whereas the frequency of payments was left unchanged (apart from those borrowers in the first and second loan cycles that under the new rules repaid loans monthly instead of fortnightly).

The information reported in Table 2 was drawn from the SEF database. Each variable is time-invariant, calculated as the average specific characteristic in each centre in the 6 months preceding the pilot experiment (November 2013 to April 2014). The choice of the first three variables (attendance, arrears and savings) was dictated by the necessity of matching the measures SEF used to identify the best-performing centres. Upon suggestion of SEF staff members, we also considered the loan cycle in order to account for the experience accumulated by the customers, in terms of money management. We added a geographical distance variable (distance from the headquarters) to take into account the fact that SEF selected the treatment group by choosing the centres that were closer to the SEF headquarters. Finally, we included the centre dropout rate.

3.3. Propensity score matching

As aforementioned, the treated group was not selected randomly. SEF chose the centres for the pilot project considering their geographic proximity to the SEF headquarters, the clients' repayment performances, saving accumulation and attendance at the CMs.

As a solution to the non-random selection of the treated group, we decided to identify the control group through PSM methods (Rosenbaum and Rubin, 1983), given that the information related to both the excluded centres and the allocation mode of the treatment were known. In particular, we applied the nearest-neighbour matching technique[5], which is based on the idea of combining each treated unit with the most similar non-treated unit according to the observable characteristics, which should plausibly be related to the selection mechanism and relevant variables observed in the pre-treatment period.[6]

We draw up the control group by selecting units from an initial larger pool of 72 non-treated centres. This pool included all (i.e., the universe of) the centres that, as the treated ones, were located in the Central Zone and applied the prepaid methodology. By applying the nearest-neighbour matching, we obtained a control group made up of 12 centres divided into three different branches: Dzumeri, Letsitele and Sekgosese. These centres comprised 122 microcredit groups (details are in Table A.1.2, Appendix 1).

In the upper part of Table 2 (Columns (b1) and (d1)) we compare the performance of the treated centres with initial pool of 72 non-treated centres emerge, in terms of the variables used for the PSM, but before it. In the lower part of Table 2, we report the details of the selected control centres, comparing their performance with the treated group, after PSM. Mean comparison and associated t-statistics show that all differences in means are not statistically significant after applying PSM.[7]

5 Nearest-neighbor matching method produced the best results in terms of matching compared with other applicable techniques (see Appendix 1 for details).

6 A 1-to-1 matching has been chosen with the aim of perfectly balancing the two (treated and control) groups. Other PSM techniques have been implemented to support the main analysis. In Appendix 1, we show that the improvement in balance is worse with other more sophisticated methods, while results are not substantially different compared with the output provided by the nearest-neighbor technique.

7 We are aware of the fact that potential spillovers between treated and control centres may undermine the quality of the results of our analysis. Nevertheless, spillovers are not likely to occur because the distance between centres is considerable. In fact, microcredit customers do not have efficient and

Table 2: Summary Statistics and *t*-Tests on Centres' Baseline Characteristics before and after PSM: Treated and Control Centres (-Level Observations)

		Control centres (C)		Treated centres (T)		Diff. (C)-(T)		
	No. centres	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Err.	t stat
Baseline characteristics by centre: all centres	(a1)	(b1)	(c1)	(d1)	(e1)	(f1)	(g1)	(h1)
Attendance rate	84 (12 T; 72 C)	0.630	0.150	0.666	0.129	−0.035	0.045	−0.773
Monthly Savings[1]	84 (12 T; 72 C)	20,173	11,508	27,367	14,737	−7,194	3,739	−1.924
Monthly arrears (%)	84 (12 T; 72 C)	0.113	0.243	0.014	0.049	0.099	0.071	1.402
Loan cycle	84 (12 T; 72 C)	9.468	2.931	10.605	2.858	−1.137	0.911	−1.248
Distance (Km)	84 (12 T; 72 C)	93.333	51.308	56.667	6.649	36.667	14.906	2.460
Dropout rate	84 (12 T; 72 C)	0.036	0.003	0.025	0.004	0.011	0.008	1.435
Baseline characteristics by centre: selected centres	(a2)	(b2)	(c2)	(d2)	(e2)	(f2)	(g2)	(h2)
Attendance rate	24 (12 T; 12 C)	0.681	0.144	0.666	0.129	0.015	0.056	0.276
Savings[1]	24 (12 T; 12 C)	23,019	10,195	27,367	14,737	−4,348	5,173	−0.841
Monthly arrears (%)	24 (12 T; 12 C)	0.014	0.049	0.014	0.049	0.000	0.020	0.000
Loan cycle	24 (12 T; 12 C)	10.493	2.528	10.605	2.858	−0.112	1.101	−0.101
Distance (Km)	24 (12 T; 12 C)	47.167	27.119	56.667	6.649	−9.500	8.060	−1.179
Dropout rate	24 (12 T; 12 C)	0.028	0.004	0.025	0.004	0.003	0.006	0.520

Note: All data refer to the period before the pilot experiment (November 2013 to April 2014). Information is available at the aggregated centre level.

[1]Cumulative monthly savings for the overall centre.

However, before PSM, significant differences in means emerged only in terms of distance from the headquarters and savings. Moreover, notice that the difference in savings is significant only at 10%, while average distance from the headquarters does not properly relate to saving or repayment performance (i.e., the core behaviours investigated in our study). These aspects are important for the external validity of the experiment. In fact, although to balance the number of centres in the treated and the control groups we will make a selection through PSM, the external validity of the experiment should reasonably be preserved as the excluded centres were not substantially different from the selected ones.

4. The database

The data collected for the analysis ranged from November 2013 to April 2015, covering a 6-month period before the start of the pilot project (May 2014) and the 12-month duration of the pilot project, for a total observation period of 1 year and a half, on a fortnightly basis.

Before PSM, we collected centre-level administrative data from the SEF database for the 12 treated centres and for all the 72 non-treated centres in the Central Zone that applied the prepaid methodology. These data consisted of the average centres' performance variables in the 6-month period before PSM. After PSM, we collected group-level administrative data from the microcredit registers for the 12 treated centres and for the 12 control centres selected by the PSM for the overall period of analysis (November 2013 to April 2015).

Information at the group level was digitalized by one of the authors. This data collection phase has been particularly challenging because the information available from the SEF's digital archives was available only at the aggregated centre level. Group-level administrative data were analysed with the aim of measuring the impact of the pilot project on customers' repayment and saving performance.

Additional information from a survey was collected, according to the timetable shown by Figure 1. The survey, conducted on both customers and DFs, was carried out in the second half of May and during the first week of June 2015, when the pilot project had already run its course. This survey was used to understand the reasons for the results of the pilot project.

4.1. Group-level information from repayment schedules

The repayment schedules are paper forms that each DF must fill in manually during each CM. They are the official records of the CM and contain all of the information, divided by group. The group is the unit of observation in the next regression analysis. The repayment schedules report, in particular, the name and code of the centre, and the date when the meetings take place. Furthermore, for each meeting and for each group, the repayment schedules report the identification number of the group, the savings balance and deposits, the amount of the loan instalment due and the amount actually paid.

fast means of transport for travel. In addition, looking at Table A.1.6 (match matrix from PSM relating to the 24 selected centres) one may notice that there is a high variability in the distance of each centre (initial location upon centre establishment) from the headquarters. Centres are also quite distant from each other. In Appendix 6, we provide a map indicating the location of both treated and (selected) control centres (Figure A.6.3). Not all centres excluded by the PSM were geolocatable.

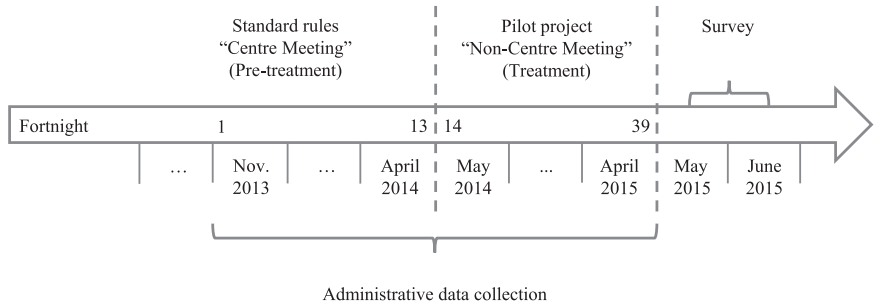

Figure 1: Data Collection

The DFs fill in repayment schedules from Monday to Thursday during the CMs and submit them to the branch manager on Friday, when the branch meeting of the DFs takes place. Repayment schedules are then sent to the central SEF office, where data punching of the relevant information takes place.

By using the savings account balances and the deposits of groups in the treated and control centres, we built two variables: deposits and savings balance.

The variable deposits reports the average amount deposited by each group per fortnight. We computed this variable by summing the deposits made by each group between two subsequent meetings in which there was a loan repayment and by dividing this sum by the number of fortnights that had elapsed between the two meetings. During the CM, each group or group's representative declares the deposits made by the group after the previous meeting and the DF records them in the repayment schedules besides the savings balances, after checking the savings books. Withdrawals from the savings accounts are not reported.

On the other hand, the variable savings balance coincides with the value of the group's savings account and therefore accounts for both deposits and withdrawals. It indicates the overall saving capacity of a group. Being able to save money with perseverance and not dissipating it for personal use is also considered by SEF as an educational tool to increase self-awareness.

Both deposits and savings balances recorded in the repayment schedules may contain a margin of error (although limited) because it can happen that they are not registered or are registered with errors in the book, due to the oversight of the DF. Therefore, we checked the data taken from the repayment schedules to correct the obvious inconsistencies.

4.2. Group-level information from deposit slips

Deposit slips from each group are attached to the repayment schedules. They are the receipts issued by the banks/post offices that receive the cash for the payment of the instalment. The DF has the duty to collect, preserve and deliver the deposit slips to the headquarters at the end of the week, along with the repayment schedules. These reports were particularly relevant for our purposes, since data on intra-week delays are not traceable elsewhere.

In fact, according to SEF's policy, group members must pay the instalment before the start of the CM and submit the deposit slip to the DF during the meeting. If this does not occur, the

group is technically in arrears.[8] However, since reconciliation of information and transactions occurs on Friday during the branch meeting, the DFs have time to recover the outstanding arrears from Monday to Thursday and update the repayment schedules, which will then be sent to the head office. Therefore, arrears recovered by Thursday (or before the repayment schedules are sent to the head office) will not be indicated in the official SEF reports. It may therefore happen that a payment due on Monday is actually collected on Thursday, without any delay appearing in the repayment schedule.

This method of identification of delays unquestionably discriminates between customers of different centres, as those who have the meeting scheduled on Monday are granted up to 4 days before the actual delay is registered in the SEF archives. Instead, groups with meetings that take place on Thursday do not share this 'privilege'. In short, SEF only considers those delays that exceed the week of the CM, which, it has emerged, are very rare events.

Abandoning this logic, we decided to consider all payments that occurred after 2 pm on the day of the CM, the time at which all meetings had surely ended, as late payments. Thus, we introduced two variables: delay, a dummy variable indicating a late payment, and amount delayed, the amount of the late payment. The arrears, even if recovered within the same week as the CM, still represented a source of additional costs and challenges: the CM might have lasted longer in an attempt to resolve the problem and the DF might have invested time and effort in the following up and recovery of the arrears. Deposit slips are the only documents from which the exact date and time of the actual payment can be verified.

4.3. Panel data

The paper-based information of the repayment schedules and deposit slips was digitalized and a panel composed of 4,041 group-based observations (261 groups) was formed for a period of 18 months (November 2013 to April 2015). The panel was not balanced because the composition of the centres had changed over time due to new groups having joined or groups dropping out at the end of their loan cycle. In the pre-treatment period (November 2013 to April 2014) observations are on a fortnightly basis, as in these months all groups were required to attend CMs fortnightly. For the post-treatment period (May 2014 to April 2015), we considered only the observations related to the CMs in which the groups had to repay a loan instalment, to take into account the fact that groups belonging to centres included in the pilot project were required to attend CMs once a month. Table 3 reports summary statistics of the variables included in the dataset, computed using observations at the group-level. Besides repayment performance (delays, amount delayed, deposits and savings balance), from the repayment schedules and deposit slips, we also collected information on savings balance and the amount due. These two variables will be used in the multivariate analysis as (time-variant) covariates, along with the (time-invariant) centre-level characteristics reported in Table 2.

8 Focusing solely on the monthly delays recorded in the SEF report might lead to an understatement. In fact, as reported in Table 2, this is a rare event as these delays are the only outstanding arrears after the Friday of the centre meeting week. These are the only arrears captured by the official SEF reports. We instead focused on those repayments that arrive a few hours or days after the Official Centre Meeting, which are not reported in the SEF archives because they are often recovered in a short period and therefore are not included in the report drawn up by the headquarters.

Table 3: Summary Statistics and *t*-Tests on Baseline Characteristic, Group-level Observations: Treated and Control Centres

		Control (C)		Treated (T)		Diff. (C)-(T)		
	Obs. (No. groups * fortnights)	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Err.	t stat
Summary of variables: before pilot	(a1)	(b1)	(c1)	(d1)	(e1)	(f1)	(g1)	(h1)
Weekly delay	680 T; 520 C	0.152	0.359	0.065	0.246	0.087	0.018	4.983
Amount delayed	680 T; 520 C	546.192	1628	198.094	1,128	348.098	79.690	4.368
Deposits	555 T; 420 C	156.341	116.599	153.411	131.240	2.930	8.094	0.362
Amount due	680 T; 520 C	3,654	2,523	3,759	3,046	−104.999	164.923	−0.637
Savings balance	680 T; 520 C	3,146	2,552	2,657	2,803	488.071	157.110	3.107
Summary of variables: after pilot	(a2)	(b2)	(c2)	(d2)	(e2)	(f2)	(g2)	(h2)
Weekly delay	1,564 T; 1,277 C	0.122	0.328	0.125	0.331	−0.003	0.012	−0.254
Amount delayed	1,564 T; 1,277 C	441.132	1,620	447.070	1,594	−5.938	60.557	−0.098
Deposits	1,550 T; 1,255 C	166.247	123.863	114.282	106.786	51.965	4.357	11.927
Amount due	1,564 T; 1,277 C	3,766	2,922	3,793	2,957	−27.425	110.932	−0.247
Savings balance	1,564 T; 1,277 C	3,109	2,659	2,632	2,512	476.883	97.274	4.903

4.4. Test for constant pattern of PSM covariates and parallel trends in the pre-treatment period

Exploiting group-level data on the same variables used (at the centre-level) for the PSM analysis, in this section, we test two fundamental assumptions of PSM selection and DID methodology, respectively.[9]

To this purpose, we define Equation (1) including time-leads (dummies for pre-treatment fortnights), also interacting these leads with a binary variable that identifies the treated groups (e.g., Pischke, 2005; Angrist and Pischke, 2009, pp. 113–218). Specifically, we estimate the following equation:

$$Y_{it} = \alpha + \beta_1 \, Treated_i + \lambda_t + \sum_{j=2}^{39} \theta_t \left(\lambda_t_Treated_i\right) + \varepsilon_{it}, \tag{1}$$

where Y_{it} is a time-variant performance variable of group i at time t, λ_t are time fixed-effects (fortnights) and α is a constant term. $Treated_i$ is a dummy variable that takes on the value 1 if a group is part of a treated centre and 0 otherwise (it is constant over time but varies across groups), whereas $\lambda_t_\ Treated_i$ are interactions between the treatment dummy and time fixed-effects. We include 11 fortnights pre-treatment period, using the first fortnight (1.FN) as a baseline category and omitting the last fortnight before treatment (12.FN). Finally, X_{it} are time-variant, group-level, covariates and ε_{it} is a zero-mean normally distributed error term.

A test for a constant pattern of the variables used for the PSM consists of verifying that the λ_t in the pre-treatment period are jointly non-significant. This is confirmed by the F-statistics reported in the bottom-left part of Table 4, which imply non-rejection of the null hypothesis that the time fixed-effects (λ_t) are jointly equal to zero in the pre-treatment period.

The estimation of Equation (1) also allows testing for parallel trends in the main outcome variables (delays and savings) in the next section. This is useful to support the choice of the DID methodology in the next multivariate analysis. In particular, the hypothesis of a pre-treatment common trend among the key outcome variables holds if the parameters θ_t associated to the interaction terms between the time dummies and the treatment variable in the pre-treatment period are jointly non-significant. The test outcome coincides with the F-statistics reported in the bottom-right part of Table 3. The presence of a common trend is confirmed by the non-rejection of the null hypothesis that the θ_t are jointly equal to zero. As expected, the parameters associated with the interaction between treatment and the time dummies are jointly significant in the post-intervention period. The presence of a common trend in the pre-treatment period (first two quarters, from November 2013 to April 2014) is also confirmed by the graphical inspection of the pattern of the outcome variables in Figure 2.

9 Notice that in the variables used for the PSM analysis were constant and aggregated at the centre level, following the same practice used by SEF to select the treated centres. Hence, it was not possible to use them to analyse their pattern. To this aim, we used time-variant (group-level) variables. For the same reasons, we only investigate the evolution of three among the six criteria used for the PSM: attendance, weekly delays (instead of monthly arrears) and savings. Formal tests on the pattern of the other three criteria could not be conducted, either because the variables are constant by nature (distance), or because they constantly evolve through time (loan cycle), or due to missing information (dropout).

Table 4: Test on Parallel Trends and Constant Pattern of PSM Covariates

	(1a) Attendance	(2a) Weekly delay	(3a) Savings		(1b) Attendance	(2b) Weekly delay	(3b) Savings
2.FN	−0.00356	−0.234	−0.684**	2.FN_Treat	0.0217	−0.203	0.286
	(0.0301)	(0.394)	(0.318)		(0.0219)	(0.195)	(0.354)
3.FN	−0.0318	0.169	−0.991	3.FN_Treat	0.00238	−0.428	0.608
	(0.0509)	(0.382)	(0.734)		(0.0564)	(0.295)	(0.487)
5.FN	−0.0273	1.205	−0.579	5.FN_Treat	0.0194	−1.592**	0.295
	(0.0496)	(0.812)	(0.351)		(0.0490)	(0.744)	(0.372)
6.FN	0.0182	1.102	−0.108	6.FN_Treat	0.000	−1.538	−0.219
	(0.0157)	(1.299)	(0.218)		(0.001)	(1.295)	(0.290)
7.FN	−0.00507	2.533	−0.111	7.FN_Treat	0.00242	−2.457	−0.0306
	(0.0265)	(1.721)	(0.249)		(0.0325)	(1.777)	(0.243)
8.FN	−0.0182	−0.173	−0.629	8.FN_Treat	−0.0232	0.129	−0.00499
	(0.0197)	(0.262)	(0.672)		(0.0318)	(0.301)	(0.323)
9.FN	−0.0294	1.743	−0.184	9.FN_Treat	−0.0149	−1.450	−0.240
	(0.0293)	(1.236)	(0.185)		(0.0382)	(1.222)	(0.239)
10.FN	−0.00265	0.718	−0.471*	10.FN_Treat	−0.0596	−0.852	−0.122
	(0.0296)	(0.677)	(0.259)		(0.0451)	(0.620)	(0.380)
11.FN	0.0182	1.615	−0.212	11.FN_Treat	−0.0417	−0.929	−0.337
	(0.0157)	(1.722)	(0.211)		(0.0307)	(1.843)	(0.273)
14.FN	−0.0614	0.124	−0.686*	14.FN_Treat	0.0217	−0.0958	0.288
	(0.0521)	(0.447)	(0.387)		(0.0553)	(0.336)	(0.422)
15.FN	−0.204	0.271	−1.846*	15.FN_Treat	−0.232	0.630	−0.728
	(0.193)	(0.778)	(1.046)		(0.311)	(0.848)	(1.587)
16.FN	−0.0127	−0.0184	−0.560**	16.FN_Treat	−0.00269	−0.228	0.00692
	(0.0150)	(0.359)	(0.269)		(0.0216)	(0.247)	(0.351)
17.FN	−0.148	0.00236	−0.854	17.FN_Treat	−0.75***	−0.439	−3.99***
	(0.113)	(0.413)	(0.687)		(0.144)	(0.301)	(0.808)
18.FN	−0.0541	1.143**	−0.788*	18.FN_Treat	−0.0004	2.906*	0.462
	(0.0646)	(0.545)	(0.455)		(0.0737)	(1.427)	(0.541)
19.FN	0.0182	−0.436	−1.749**	19.FN_Treat	−0.462	0.000	−0.592
	(0.0157)	(0.298)	(0.792)		(0.283)	(0.001)	(1.723)
20.FN	−0.0618	1.904	−0.687	20.FN_Treat	−0.0595	−2.341*	0.168
	(0.0799)	(1.193)	(0.686)		(0.103)	(1.199)	(0.786)
21.FN	−0.0163	−0.256	−0.625*	21.FN_Treat	−0.0149	0.0224	0.601
	(0.0327)	(0.191)	(0.364)		(0.0372)	(0.183)	(0.493)
22.FN	−0.0545	2.766*	−0.579	22.FN_Treat	−0.115	−2.123	−0.391
	(0.0432)	(1.376)	(0.401)		(0.0989)	(1.480)	(0.612)
23.FN	−0.0196	0.0657	−0.581	23.FN_Treat	−0.0105	0.143	0.309
	(0.0441)	(0.267)	(0.388)		(0.0495)	(0.554)	(0.484)
24.FN	−0.0141	0.320	0.00829	24.FN_Treat	−0.328**	0.795	−1.694**
	(0.0323)	(0.797)	(0.222)		(0.141)	(0.962)	(0.772)
25.FN	−0.0532	−0.0315	−0.714	25.FN_Treat	0.00143	0.483	0.387
	(0.0482)	(0.354)	(0.440)		(0.0491)	(0.418)	(0.506)
26.FN	0.0182	0.889	−0.223	26.FN_Treat	−0.50***	−0.947	−2.50***
	(0.0157)	(0.687)	(0.208)		(0.138)	(0.752)	(0.730)

(Continued)

Table 4: Continued

	(1a) Attendance	(2a) Weekly delay	(3a) Savings		(1b) Attendance	(2b) Weekly delay	(3b) Savings
27.FN	−0.0356	−0.100	−0.523*	27.FN_Treat	0.0207	−0.0667	0.422
	(0.0377)	(0.314)	(0.287)		(0.0336)	(0.282)	(0.353)
28.FN	−0.0727	−0.436	−0.626	28.FN_Treat	−0.74***	1.989	−3.77***
	(0.0941)	(0.298)	(0.472)		(0.187)	(1.295)	(0.966)
29.FN	0.000638	−0.0756	−0.87**	29.FN_Treat	−0.00854	0.0804	0.790*
	(0.0213)	(0.273)	(0.376)		(0.0182)	(0.283)	(0.433)
30.FN	0.0182	3.283	−5.3***	30.FN_Treat	−0.0149	−0.122	−0.332**
	(0.0157)	(2.728)	(0.0502)		(0.0219)	(0.334)	(0.160)
31.FN	0.000164	0.328	−0.381*	31.FN_Treat	−0.0255	−0.432	0.0370
	(0.0204)	(0.262)	(0.202)		(0.0232)	(0.358)	(0.270)
32.FN	0.0182	−0.436	−1.189	32.FN_Treat	−0.533**	0.887	−1.431
	(0.0157)	(0.298)	(1.327)		(0.227)	(0.651)	(1.845)
33.FN	0.0182	0.735	−0.0878	33.FN_Treat	−0.146**	−0.367	−0.191
	(0.0157)	(1.067)	(0.272)		(0.0534)	(1.151)	(0.324)
34.FN	−0.0131	−0.193	−0.370	34.FN_Treat	−0.0576	−0.00415	−0.426
	(0.0386)	(0.166)	(0.325)		(0.0565)	(0.294)	(0.508)
35.FN	0.0182	−0.436	0.209**	35.FN_Treat	−0.180*	0.884***	−1.64***
	(0.0157)	(0.298)	(0.0792)		(0.101)	(0.279)	(0.558)
36.FN	−0.0136	1.184	−0.511	36.FN_Treat	−0.0414	0.831	0.0475
	(0.0386)	(1.273)	(0.338)		(0.0550)	(1.633)	(0.510)
37.FN	0.0182	4.927*	−0.156	37.FN_Treat	−0.417**	−2.742	−0.816
	(0.0157)	(2.491)	(0.231)		(0.188)	(2.529)	(0.594)
38.FN	−0.0909	1.146	−1.13**	38.FN_Treat	0.0329	−0.699	0.321
	(0.0584)	(0.758)	(0.420)		(0.0683)	(0.850)	(0.603)
39.FN	−0.482	−0.436	−2.559	39.FN_Treat	−0.192	1.252*	−1.130
	(0.365)	(0.298)	(1.968)		(0.413)	(0.718)	(2.206)
Constant					0.982***	0.436	5.258***
					(0.0157)	(0.298)	(0.0502)
Joint test parameters FN (1–11, pre-Pilot) F(8, 23) Prob > F in brackets					1.08	1.91	1.68
					(0.4121)	(0.1023)	(0.1507)
Joint test parameters FN_Treat (1–11, pre-Pilot) F(8, 23) Prob > F in brackets					1.42	1.64	0.72
					(0.2391)	(0.1626)	(0.1507)
Joint test parameters FN_Treat (14–39, pre-Pilot) F(22, 23) Prob > F in brackets					81.74	8.81	28.49
					(0.0000)	(0.0000)	(0.0000)
Observations					4,041	3,780	4,041
No. of groups					261	261	261
R-squared					0.162	0.158	0.095

Note: Test conducted on 11 fortnights before pilot. FN are fortnight fixed-effects; FN_Treat are fortnight*Treat dummy fixed-effects. FN 1 is the residual category. FN 12 and 13 omitted due to treatment changes. Fortnight 4 dropped due to collinearity. Standard errors clustered at the centre level in parentheses. All variables are in log form (ln (1 + x)) except delay (=1 if yes).

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

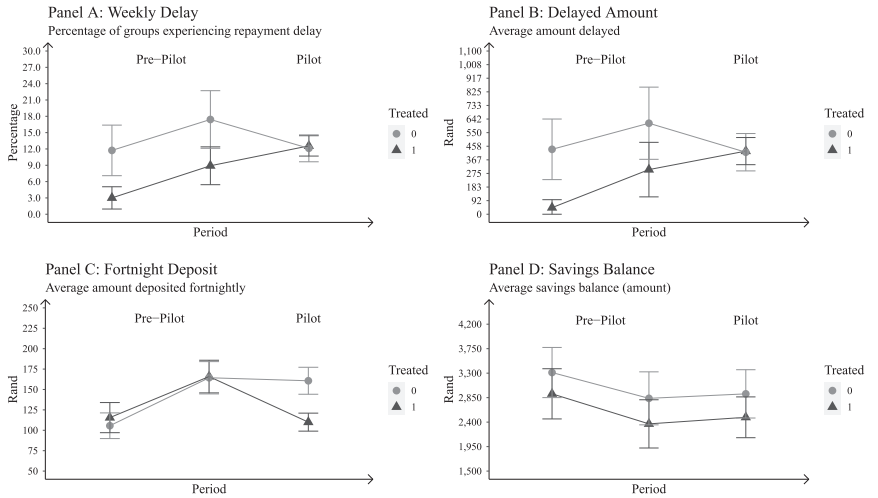

Figure 2: Trends of the outcome variables: before and after the start of the pilot project.
Note: Panels show the mean of each variable in the period considered and the corresponding 95% confidence interval for both the treated and the control groups. The three periods considered are the first and second quarters of the 6-month pre-pilot period and the pilot period. The observation period is November 2013 to April 2015. Pilot project starts in May 2014 and ends in April 2015. Appendix 4 contains a more detailed visual inspection of the trends.

4.5. Survey

In order to investigate the reasons behind the pilot projects outcomes, a survey was carried out on both the treated and control groups. The questionnaire (see Appendix 2) focused more on the qualitative side of the pilot scheme rather than on quantitative issues.

A total of 255 women were surveyed. All the treated centres were covered, for a total of 161 customers, while only six centres belonging to the control group (DZAC, LTAM, DZAF, DZAB, LTAD, DZAY) were visited and 94 customers were interviewed.

The questionnaire, in its final form, was composed of 22 questions. These questions can be classified into three broad categories: personal information, relationship between members of the same group[10] and questions that focused on the role of the CMs and the pilot scheme.

Another survey was administered to the DFs involved in the pilot scheme. It contained questions related to both the management of the programme and the problems encountered in applying the new rules.

10 In this section of the questionnaire, we included questions designed to understand the intensity of the reciprocal trust between the different members of each group as this aspect may have influenced the meeting participation dynamics. In fact, as suggested by the branch managers, some non-representative members continued to attend the CMs despite being granted permission not to attend in order to focus more on their job activities.

5. Regression analysis

5.1. Methodology

Given the quasi-experimental nature of the pilot scheme, we conducted the empirical analysis using DID techniques.[11] We initially estimated the following fixed-effects model:[12]

$$Y_{it} = \alpha + \beta_1 Treated_i + \beta_2 Pilot\ Project_t + \beta_3 \left(Treated_i_Pilot\ Project_t\right) + u_i + \varepsilon_t, \qquad (2)$$

where Y_{it} is the outcome of interest, in terms of delays and saving behaviour, of microcredit group i at time t; $Treated_i$ is a dummy variable that takes on the value 1 if a group is part of a treated centre and 0 otherwise, it is constant over time and varies between groups.[13] $PilotProject_t$ is a binary variable that covers the period of observation and takes on the value 1 during the pilot project (1 treatment, 0 pre-treatment); it is the same for the treated and the control group but varies over time. $Treated_i_PilotProject_t$ is the interaction between the two previous variables.

Note that $Treated_i$ denotes the actual treatment if we consider the reduction in the frequency of CMs from fortnightly to monthly. However, $Treated_i$ denotes only the intention to treat rather than the actual treatment if we consider the abolition of the mandatory attendance of all group members at the CMs. In fact, groups selected for the pilot project were allowed to send one member as representative to the CMs, but the other members of the group could still participate in the CMs. Finally, u_i are group fixed-effects and ε_{it} is a zero-mean normally distributed error term.

In (2), the β_3 parameter measures the effect of the treatment on the outcome variables, reflecting the difference between the pre- and post-variation of the dependent variable for the treated groups, compared with the counterfactual.

As a further step of the analysis, we considered the role of the covariates, both at the group and centre levels (i.e., the centres' pre-treatment variables considered by SEF in the selection of the treated group and by us in the matching with the control centres).[14]

11 Several other studies address the causal effects of field experiments that change some features of microcredit products through randomized control trials, mainly using simple difference (SD) techniques (among the most recent and quoted contributions to the literature see Angelucci *et al.*, 2015; Attanasio *et al.*, 2015; Augsburg *et al.*, 2015; Banerjee *et al.*, 2015; Crépon *et al.*, 2015; all included in the AEJ:AE special issue on microcredit). Despite the application of PSM techniques allowed us to construct a control sample that meets the mean equality requirement for all the variables across the treated and control groups, the quasi-experimental nature of our study makes us lean towards the use of DID techniques instead of SD. This more conservative attitude produces less efficient estimates but preserves consistency.

12 The use of the nearest-neighbour matching method to select the control centres, the absence of significant differences between the treated and control groups (Table 2), the visual inspection of the trends (Figure 2; Appendix 4) and the formal tests in Table 4 allow us to consider as satisfied the usual requirements regarding the presence of a common trend in the pre-treatment period.

13 We include this variable in the model specification for completeness. Notice, however, that in the fixed-effects regressions, it will be omitted due to collinearity with the group-level dummies.

14 Notice that the model with time-invariant centre covariates does not admit group fixed-effects. For this reason, we use a random-effects model to estimate (3).

It is reasonable to suppose that, if the new rules for CMs produced some changes, these were primarily related to the groups' financial performance, in terms of timely repayment of the instalments and saving capacity. Unfortunately, no data are available to separate the effect of the reduced frequency of CMs from the effect of the reduced number of participants, as when the representative member of a treated group was present at the CM, all of the group members were recorded as present and the actual number of attendees was not recorded. However, we know that handling the presence at CMs during the pilot project was challenging for both the customers and the DFs. These aspects will be dealt with later on and supported with considerations drawn from the survey data.

As far as the outcome variables are concerned, we focused on delays (one if the group recorded a delay within the CM week), on the amounts repaid with delays (amount delayed), on the average deposits per fortnight (average deposit), and on average group savings balances (savings balance) (see Section 4.3 for details). As previously discussed, we decided to concentrate on intra-week delays because there were almost no monthly delays and they would not have been particularly informative.

SEF expected that the reduction in the CMs frequency and the possibility to send a single representative to the CMs would have allowed group members to focus more on their own business, thereby helping them to increase their revenues. Therefore, the pilot project should have been reflected in a decreasing frequency of delays and increasing deposits and savings balances for the groups. This, however, contradicts the claims by various scholars who explained that the success of microcredit programmes was due to the benefit of the activities conducted during public and frequent meetings (Larance, 2001; Feigenberg *et al.*, 2009, 2010, 2013, 2014). Thus, if the potential advantages of the reduced frequency of CMs were offset by a reduced intensity of these benefits, including social capital, the impact of the policy changes may be adverse. The balance between these two effects is left to empirical measurement.

5.2. Results

The estimates of the effects of the pilot project are reported in Table 5.[15] Columns differ in terms of the estimated outcome: delays ((Columns (1a)–(1c)), amount delayed (Columns (2a)–(2c)), deposits (Columns (3a)–(3c)), savings balance (Columns (4a)–(4c))). Columns (1a), (2a), (3a) and (4a) report the results of the baseline specification (2) that includes only the variables *Treated* and *PilotProject*, along with their interaction term. The following columns report the outcome of the more comprehensive models including the covariates. In particular, we add group covariates in Columns (1b), (2b), (3b) and (4b) and centre covariates Columns (1c), (2c), (3c) and (4c). All the variables are in natural logarithms in all specifications.

15 Due to the reduced number of clusters (12) in the pilot group, standard errors could be underestimated. We provide robustness check conducting a correction of standard errors for a small number of clusters through wild cluster bootstrap using the Roodman *et al.* (2019) methodology. *t*-Statistics for the treatment effect (Treated∗Pilot project), along with bootstrap p-values and the associated 95% confidence intervals are reported in Appendix 3. Results do not substantially depart from those obtained with non-bootstrap estimation.

Table 5: Delays, Deposits and Savings—DID estimates—November 2013 to April 2015

VARIABLES	(1a) Weekly delay (y = 1) Fixed-Eff.	(1b) Weekly delay (y = 1) Fixed-Eff. With group covariates	(1c) Weekly delay (y = 1) Rand.-Eff. With centre-level and group covariates	(2a) Amount delayed Fixed-Eff.	(2b) Amount delayed Fixed-Eff. With group covariates	(2c) Amount delayed Rand.-Eff. With centre-level and group covariates	(3a) FN Deposit Fixed-Eff.	(3b) FN Deposit Fixed-Eff. With group covariates	(3c) FN Deposit Rand.-Eff. With centre-level and group covariates	(4a) Savings balance Fixed-Eff.	(4b) Savings balance Fixed-Eff. With group covariates	(4c) Savings balance Rand.-Eff. With centre-level and group covariates
Treated[(1)]			−0.106**			−0.894**			0.148			−0.0389
			(0.0513)			(0.401)			(0.212)			(0.178)
Pilot project	−0.00545	0.0354	0.0810	−0.453	0.0979	0.443	−0.320	0.821	−0.645	−0.404**	−0.333*	−0.229
	(0.126)	(0.118)	(0.122)	(0.757)	(0.672)	(0.705)	(0.771)	(0.737)	(0.984)	(0.161)	(0.161)	(0.167)
Treated∗pilot project	0.0972**	0.0980**	0.0984**	0.819**	0.830**	0.825**	−0.671***	−0.657***	−0.655***	−0.006	−0.00466	0.00691
	(0.0469)	(0.0470)	(0.0461)	(0.378)	(0.376)	(0.369)	(0.051)	(0.142)	(0.141)	(0.088)	(0.0878)	(0.0883)
Saving balance group		0.00792	−0.0121*		0.0418	−0.114**		0.127∗	0.211***			
		(0.00791)	(0.00677)		(0.0620)	(0.0506)		(0.0687)	(0.0776)			
Amount due group		0.0147	0.0233**		0.209**	0.275***		0.587***	0.506***		0.0280	0.0736***
		(0.0155)	(0.0119)		(0.101)	(0.0868)		(0.124)	(0.102)		(0.0232)	(0.0258)
Centre attendance			−0.752**			−5.655**			−0.745			−0.402
			(0.341)			(2.692)			(1.649)			(1.779)

(Continued)

Table 5: Continued

VARIABLES	(1a) Weekly delay (y = 1) Fixed-Eff.	(1b) Weekly delay (y = 1) Fixed-Eff. With group covariates	(1c) Weekly delay (y = 1) Rand.-Eff. With centre-level and group covariates	(2a) Amount delayed Fixed-Eff.	(2b) Amount delayed Fixed-Eff. With group covariates	(2c) Amount delayed Rand.-Eff. With centre-level and group covariates	(3a) FN Deposit Fixed-Eff.	(3b) FN Deposit Fixed-Eff. With group covariates	(3c) FN Deposit Rand.-Eff. With centre-level and group covariates	(4a) Savings balance Fixed-Eff.	(4b) Savings balance Fixed-Eff. With group covariates	(4c) Savings balance Rand.-Eff. With centre-level and group covariates
Centre savings			0.0265			0.222			0.939***			0.776***
			(0.0327)			(0.256)			(0.296)			(0.209)
Centre arrears			−0.306			−2.308			−2.799			−5.412***
			(0.321)			(2.471)			(3.399)			(1.861)
Centre loan cycle			0.130			1.043*			−0.372			0.794**
			(0.0826)			(0.622)			(0.558)			(0.390)
Centre distance			−0.0711			−0.563			0.0520			−0.164
			(0.0510)			(0.405)			(0.272)			(0.109)
Centre dropout			−3.456***			−28.21***			1.209			−4.721
			(1.315)			(10.44)			(6.179)			(5.227)
Constant	0.0805***	−0.0996	0.227	0.579***	−1.416	0.908	4.616***	−0.889	−9.496***	7.970***	7.750***	−1.389
	(0.0231)	(0.152)	(0.479)	(0.180)	(1.026)	(3.677)	(0.241)	(1.088)	(3.227)	(0.0806)	(0.203)	(1.914)

(Continued)

Table 5: Continued

VARIABLES	(1a) Weekly delay (y = 1) Fixed-Eff.	(1b) Weekly delay (y = 1) Fixed-Eff. With group covariates	(1c) Weekly delay (y = 1) Rand.-Eff. With centre-level and group covariates	(2a) Amount delayed Fixed-Eff.	(2b) Amount delayed Fixed-Eff. With group covariates	(2c) Amount delayed Rand.-Eff. With centre-level and group covariates	(3a) FN Deposit Fixed-Eff.	(3b) FN Deposit Fixed-Eff. With group covariates	(3c) FN Deposit Rand.-Eff. With centre-level and group covariates	(4a) Savings balance Fixed-Eff.	(4b) Savings balance Fixed-Eff. With group covariates	(4c) Savings balance Rand.-Eff. With centre-level and group covariates
Time (fortnight) F-E	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
No. of observations	4,041	4,041	4,041	4,041	4,041	4,041	3,780	3,780	3,780	4,041	4,041	4,041
No. of groups	261	261	261	261	261	261	261	261	261	261	261	261
R-squared: within	0.13	0.13	0.13	0.14	0.14	0.14	0.12	0.18	0.18	0.11	0.11	0.11
R-squared: between	0.01	0.01	0.19	0.02	0.01	0.20	0.03	0.17	0.45	0.01	0.11	0.25
R-squared: overall	0.09	0.09	0.14	0.09	0.09	0.16	0.09	0.20	0.29	0.03	0.05	0.21

Note: Standard errors clustered at the centre level in parentheses. All variables are in log form (ln (1 + x)). Fixed/random effects are at the group level. Covariates (savings balance group, amount due group) are at the group level. Other covariates are at the centre level (baseline initial characteristics time-invariant). (1)Omitted in fixed-effects models due to collinearity with group fixed-effects.

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Regarding the delays (Columns (1a)–(2c)), the coefficients associated with the interaction term *Treated_PilotProject* are always significantly different from zero (at 5% level) and positive. The estimated effect is similar across all columns. Considering the average outcomes of the three regressions in Columns (1a)–(1c), we quantified that the treatment increased the delay rate of the treated group by 9.8 percentage points.

Turning to the delayed amount, consider the estimated effect of 0.825 (average parameter in Columns (4a)–(4c) of Table 5). Being the dependent variable defined as the natural logarithm of the delayed amount, we calculated that the program almost doubled the delayed amount, increasing it by 82.5% (about 198.094∗82.5% = 163.428 Rand at the mean).

Regarding the deposits (Columns (3a)–(3c)), the coefficients associated with the interaction term *Treated_PilotProject* are always significantly different from zero (at 1% level) and negative. The estimated effect is almost uniform across all columns, indicating that the pilot project led to an average decrease in the deposits by 67.4% (about 153.411∗67.4% = 103.399 Rand at the mean).

Regarding the savings balance (Columns (4a)–(4c)), the coefficients associated with the interaction term *Treated_PilotProject* is not significantly different from zero.

There are several possible explanations for these results. The groups' deposits, as encouraged by SEF, seem to depend on the frequency with which they are registered, i.e., the frequency of the CMs. During the pilot project, SEF recorded deposits only once a month, instead of fortnightly. Treated groups decreased their average deposits to a degree higher than the decrease in the frequency of CMs, i.e., 67.4% versus 50%. Hence, we deduct that microcredit groups seems to have continued to make deposits of the same amount, but once a month instead of fortnightly, with the result of halving the monthly deposits. The reduction of deposits may be attributed to the problems of coordination and trust within the groups that will be discussed below.

The pattern of savings balances of the treated groups did not decrease significantly, even if the visual inspection shows a decrease of the average savings balance of the treated groups that starts about 6 months after the launch of the pilot project. This result indicates that the decrease in average deposits has been accompanied by an equivalent decrease in withdrawals from the savings accounts, at least in the first 6 months of the pilot project. These two results, taken together, indicate that the SEF rules aimed at encouraging savings were made less effective by the pilot project. However, these results also seem to indicate that these same rules do not produce real effects because when CMs are more frequent, groups deposit more but withdraw even more. This would be a worrying result for the objectives set out by SEF because it indicates that the fortnightly monitoring of deposits induces fictitious transactions in the savings accounts, i.e., more deposits and more withdrawals. Overall, empirical evidence suggests that the SEF rules aimed at encouraging savings were made less effective by the pilot project.

In conclusion, results on average deposits and savings balances indicate that the decrease in the frequency of the CMs, which certainly has saved time for SEF customers, has not led to an increase in savings of the treated groups. On the other hand, because the delayed amounts considered are the instalments that groups have not paid on time during the CMs but paid within the week, the increase in the delays of the treated groups indicates the emergence of coordination or trust problems within the groups and not an inability to repay loans. We will deepen this aspect with the results of the survey. Furthermore, the parallel trends of deposits and withdrawals of the treated groups seem to indicate the absence of higher

revenues because of the greater time available to devote to the businesses. In fact, an increase in revenues should be associated with a decrease in withdrawals more than proportional to the decrease in deposits.

6. Understanding the reasons for the outcomes of the 'Non-Centre Meeting' pilot project

We conducted a survey (see Appendix 2) in the rural villages where SEF operates, interviewing both the treated customers and the customers belonging to the control group. In addition, we also interviewed the DFs involved in the changes in order to establish their level of knowledge about the pilot scheme and the way they managed the 'Non-Centre Meeting' pilot project.

The analysis was based on a categorisation of the answers through text mining techniques, which can provide an objective coding of open-ended responses. We encoded all the answers in as exhaustive and exclusive categories as possible, depending on the frequency with which keywords were present among the provided answers. The categories are discussed in this section, but only those that are useful to explain the reasons for the failure of the project and to provide hints, in terms of possible new changes of the CM policy, have been extrapolated.

6.1. Did customers understand the rules and the reasons for the pilot scheme?

The understanding of the pilot scheme has been analysed (Question 17) in order to distinguish between those who had declared that they had understood the new rules and the reasons for their introduction (133 customers out of 157 respondents) and those who had not (the remaining 26). We also investigated the degree of understanding of each specific change. Different levels of understanding had been created: the first included customers who appeared to be familiar with both (i) the reduced frequency and (ii) the reduced number of participants at the CMs; the second included those who declared they had only understood one of the two rules and had specified which one; the third refers to women who simply declared they had understood the programme, without detailing which rule they had in fact understood. The remaining category was made up of those who had failed to understand both rules. The latter group consisted of only 22% of the respondents. Therefore, we can reasonably infer that a lack of knowledge of the rules of the pilot scheme should not have represented a key element of the observed failure.

Although, in principle, the two main changes were known, several elements that emerged from the answers to other questions showed a lack of understanding of both the way these new rules should have been implemented, in the SEF intention, and of how the new dynamics that were created after the change should have been managed. Several issues in fact arose concerning the point about the rotation of representative members and the need to show the payment receipt to non-representative members. This can be interpreted as a lack of capability of implementing the new mechanisms, particularly at the group level. Indeed, the pilot scheme did not explicitly require a fixed representative to be identified, but it was instead intended to allow groups to implement a rotation or whatever they considered suitable for their needs. Apart from this, it did not even require that the payments at the banks/post offices were to be made by the chosen representative; each member could have made her own payment and delivered the receipt to the representative.

We also analysed how the knowledge and the subjective opinion of the SEF employees involved in the implementation of the pilot scheme may have influenced its outcome. To this aim, we interviewed one zonal manager, one branch manager and the five DFs of the treated centres. Although they acknowledged several benefits of the new rules, such as a more orderly conduct of meetings with fewer people being present, and the possibility of obtaining more time to devote to other activities, such as follow-up visits, the majority of employees expressed a preference for the standard methodology. This may be indicative of the DF's lack of trust in the self-organisation skills of the customers, which actually seems to be a reason for the outcomes of the pilot project. This could also have influenced customers and somehow have demotivated them.

6.2. Why did customers participate in the meetings despite not being representatives of the group?

The general rules of the pilot scheme did not prevent non-representative members from taking part in the CMs. In fact, most of the interviewed women stated they participated in the CMs every now and then, even though they were not the representative members. Only 21% of those interviewed never attended the meetings. Then, why did the customers still go to the meeting places? The reasons that were given were mixed and included the need to replace or help the representative, as well as the habit of going to share ideas and experience with other groups. Of all the reasons, the highest frequency (35%) was found for 'the pleasure of attending and seeing what happens during meetings'.

However, even the issue related to the mutual trust among members of a group is a possible explanation for the not foreseen and not desired great rate of participation. During the months of the pilot scheme, many customers declared that some members of their group did not pay or forgot to do so, thus creating delays and awkward situations for all the other members. We included two specific questions (11 and 12) in the survey to investigate the degree of mutual trust. The first asked whether the interviewee trusted her companions. Only 1% of the respondents stated 'not much', 11% said 'enough' and the remaining respondents answered they trusted their peers. We found similar frequencies in the answers to the second question, which reversed the relationship of trust and investigated how the members of the group were likely to trust the interviewee. We found a bias towards a 'courtesy response', and this prevented us from identifying a low level of trust among members as a clear cause of continued participation and therefore as being responsible for the outcomes of the pilot scheme.

Although the answers to these questions tend to exclude trust from the reasons for the outcomes of the pilot scheme, we believe that the answers to other questions show a low level of confidence among the members of a group. In particular, very vague answers like 'to see what happens', 'the representative does not provide proper feedback' or 'we are not up to date on the behaviour of the other members' still leave the doubt regarding the presence of a certain level of distrust among group members.

6.3. How often did the members of a group meet with other members?

During the pilot scheme, customers could, and should have in the SEF intention, simply meet outside and/or before the CM to reconcile all the payments and balances and/or to discuss

their problems. Their answers to the survey confirm that, in some circumstances, this did not occur.

The questions pertaining to this context asked how many times a client met with the rest of the group outside the SEF meeting, and if the frequency of these meetings had changed during the last year of the pilot scheme. Although 63% of the respondents stated they saw each other outside the SEF meeting places more often, 37% of them said they met less often, thus showing they had not been able to create other opportunities for discussion and coordination. The presence of the latter group in the pilot scheme cannot be disregarded, as it may have significantly and negatively affected its success.

7. Conclusions

SEF CMs gather all the members of the groups belonging to a microcredit centre every fortnight. In the CMs, groups repay instalments and access new loans, but they are also important places of socialisation and discussion. In the literature, the frequency and the attendance at group meetings is largely used as a proxy to estimate the extent of the clients' social capital. Some studies show that a better repayment performance is associated with a higher attendance at these meetings. However, group meetings also represent an opportunity cost and a real cost for clients who are called upon to participate.

SEF has witnessed the awkwardness that is caused by the compulsory attendance of its customers at CMs. In fact, some of the centres recorded poor participation and a high number of dropouts. In order to address this problem, SEF launched a pilot project, entitled Non-Centre Meeting. The frequency of the meetings was reduced from fortnightly to monthly. The mandatory participation of all group members was also relaxed, and only one representative member was allowed to attend the meetings.

The objective of the present research has been to investigate the impact of these policy changes on the clients' repayment and saving performance. We have used the DID methodology to compare the microcredit groups belonging to a treated group of centres, previously defined by SEF, with a control group, selected by means of PSM techniques. The obtained results show that late payments increased and the deposits made by treated groups actually dropped.

In the second part of the analysis, we focused on shedding light on the reasons for these results. The reasons can be summarised as follows. First, the non-representative members still wanted to participate in the meetings and thus did not spend that time on their business. Second, the programme lacked detailed rules that could have improved the self-organisation of the groups and mutual trust.[16] Third, the pilot project ended up by deteriorating the repayment performance of those groups that had no other opportunities to meet, thus confirming the importance of CMs as a place of socialisation and discussion.

We are aware of the fact that while all the treatment centres were covered by the survey (for a total of 161 customers), only six centres belonging to the control group were visited, although more customers per centre were interviewed (94 overall). This may undermine the

16 Such as pointing out that non-representative members were not obliged to deliver money to the representative members, they could have simply gone together to the bank, made each individual payment and picked up the (collective) receipt to be delivered by the representative member at the meeting.

representativeness of the survey. For larger samples, in fact, it would be possible to randomly select sub-samples between the two groups and perform the analysis. However, since our sample size is small, the problem remains in this study, although the balance test shows that both groups are globally similar. Future research points towards deepening the survey-based investigation in this or similar experimental contexts.

The SEF pilot project ended in April 2015; in the following month SEF re-established the standard rules in the treated centres. A new research could also verify if the performances of the treated groups have subsequently changed in the long run.

As a general conclusion, in the case of SEF, reducing both the frequency of meetings and the number of groups' members for which participation was mandatory resulted in deterioration in clients' repayment and saving performance. The potential benefits of the time saved, which customers could theoretically have spent in their businesses, have not been realised. This case indicates that a higher frequency of the meetings is associated with a better performance of the microcredit groups, both in the repayment of loans and in savings. However, this case also shows the importance of distinguishing between deposits and saving balances. Frequent monitoring of clients deposits may encourage fictitious transactions, i.e., an increase in both deposits and withdrawals. Savings balances appear to be a more reliable indicator of the actual savings capacity. However, it is clearly not possible to establish a direct link between the trend of savings balances and the trend of businesses profitability.

The SEF case also highlights the need to identify ways to monitor microcredit groups outside institutional meetings. The fact that the possibility of sending a representative to CMs has put several groups in difficulty indicates both the importance of institutional meetings, such as the CMs, and the absence of an autonomous organisational capacity of the groups.

Finally, external validity is an issue that arises with any sort of evaluation of a program's feature of microcredit conducted through natural or quasi-natural experiments. Microfinance, indeed, operates in very many different locations, using several different models. One may thus wonder why the results obtained in a South African region could be of any guide to what one would obtain in another context. As discussed by Banerjee *et al.* (2015), our experiment has been conducted in an institution that uses a standard 'plainvanilla' model, like the one adopted in their study. Thousands of other organisations all over the world adopt this model: group lending to poor women, weekly or monthly repayment and fixed-term loans usually lasting close to a year. Although the literature encourages the replication of experiments in several different contexts, we are reasonably confident that, although the impact of changing the centre-meeting rules may vary in magnitude, the direction of the effects is likely to replicate our research.

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Supplementary material

Supplementary material is available at *Journal of African Economies* online.

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