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Can peers increase the voluntary contributions in community driven projects? Evidence from a field experiment☆

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ABSTRACT

This paper explores whether peer effects increased voluntary contributions in a community electrification project in Kenya. The project organized 30 community mobilization meetings to encourage financial contributions. Ten "low" meetings included only low contributors, ten "high" meetings included only high contributors, while ten "mixed" meetings were composed of both high and low contributors. We then followed contributions over one year. Low contributors increased their contribution after mixed versus low meetings. Effects were asymmetric: high contributors did not contribute less following mixed versus high meetings. Organizing mixed meetings was thus a "win-win" for the project. Detailed qualitative observations of meeting attendees suggest that much of the exposure in mixed meetings to peer encouragement, project criticisms, and neutral learning about the project came from high contributors.

1. Introduction

Many communities in low-income countries struggle to finance much needed local development projects. Few low-income countries are able to mobilize sufficient tax revenue, and traditional foreign aid, even if it were efficient and well-targeted, is unable to bridge the financing gap (Besley and Burgess, 2003; Burgess and Stern, 1993). In response, communities have increasingly turned to voluntary contributions by their own members. For example, Olken and Singhal (2011) find that voluntary contributions already represent a significant share of local development budgets. Community participation is also actively promoted by the international community. The World Bank alone has allocated close to USD 80 billion towards participatory development projects over the last decade (Mansuri and Rao, 2012). However, mobilizing sufficient local financial contributions is difficult to achieve in practice. For example, Gulyani and Conners (2002) estimate that, at best, local infrastructure projects typically recover only 5–10% of total project costs through community financial contributions.

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Against this background, this paper investigates whether smart design of a community mobilization campaign can generate peer effects that lead low contributors to increase their financial contributions in community based projects. In particular, when randomly mixed with high contributing community members, do low contributors increase their contributions? And, if so, through which mechanisms? And, is the effect symmetric: do high contributing community members lower their contributions when randomly mixed with low contributors, or can there be a win–win situation? These dynamics are investigated through a mobilization intervention in the context of a community based rural electrification project in Kenya that struggled to generate sufficient financial contributions from its members.

Findings from laboratory experiments suggest that peer effects can impact voluntary contributions. For example, having low contributors interact with high contributors may motivate contributions and induce participation (Gunnthorsdottir et al., 2007; Ockenfels and Weimann, 1999; Ones and Putterman, 2007; Burlando and Guala, 2005). Several peer effect mechanisms have been explored in laboratory settings, including the role of conditional cooperation where people contribute only if others do (Fischbacher et al., 2001), and also peer pressure in the form of punishment (Gächter and Thöni, 2005), shame (Masclet et al., 2003; Carpenter et al., 2004; Barr, 2001), or encouragement of low contributors (Chaudhuri et al., 2006). Peer effects in complex real world projects may differ from the laboratory setting. For example, they may be higher if low contributors can learn from high contributors about the project progress or about the project benefits once completed (see Bandiera and Rasul, 2006; Conley and Udry, 2010 for evidence of social learning). On the other hand, high contributors could have no effect on low contributors if the project is "bad", or if implemented in a "bad" community (Khwaja, 2009).

This paper contributes to this literature by exploring whether peer effects among project members can be harnessed to boost contributions in a large real world community based project. The context of the experiment is a community based rural electrification project in Central Kenya. Starting in 2004, Green Power (GP), a very small Kenyan NGO, began collaborating with a rural community on the slopes of Mt. Kenya to establish an off-grid micro hydro power system to supply electricity to participating project members. The system is financed, constructed, and co-owned by these same members. While the community achieved considerable success in completing the local dam and power house, it struggled to raise enough money to finance the needed turbines and power distribution. Concerned that the success of the project was threatened, GP approached the authors to design and evaluate an intervention aimed at increasing contributions. This provided for a unique opportunity to test the impact of peer effects on voluntary contributions in a real world community project that experienced financial difficulties common to many other community projects around the world.

The subsequent intervention was implemented in 2008 and 2009 and consisted of organizing 30 one-day community mobilization meetings. Each of the nearly 1500 project members received a personal invitation to one (and only one) of these 30 meetings. Altogether, 413 project members responded to the invitation by attending the assigned meeting. One project member attended a meeting he was not invited to. Other members did not attend. We used the historical records of financial contributions to the project by each member prior to the start of the meetings to identify high contributors (above the median contribution) and low contributors (below the median contribution).

Unbeknown to the organizers of the mobilization meetings and unbeknown to the members themselves, we had randomly assigned each member to one of two meeting options: a meeting in which all members were of the same ex ante contributor type (i.e. a low only meeting or a high only meeting), or a meeting in which low and high contributors were mixed (a mixed meeting), thus effectively creating three groups: low, mixed, high. This hidden random assignment guaranteed that members who decided to attend the meeting did not self-select based on the type of the meeting. To confirm this, we show that the observable characteristics of low (high) contributing attendees to low (high) or mixed meetings are not statistically different.

To measure peer effects, we compare subsequent project contributions of low contributors who attended (and were randomly assigned to) the low meetings with low contributors who attended (and were randomly assigned to) the mixed meetings. And, conversely, we measure peer effects on the high contributor group by comparing the subsequent contributions of high contributors in high versus mixed meetings. To explore the mechanisms underlying this effect, we collected detailed qualitative data on the behavior of meeting attendees, including recording and coding all the questions and comments raised by the meeting participants.

While the random assignment of meeting types conditional on the decision to attend ensures internal validity of our identification strategy of peer effects, a potential criticism is that we cannot claim that these peer effects extend to the non-attending members. However, our main interest is to understand peer effects in a real world setting, namely community mobilization meetings to which individuals voluntarily participate without any incentives to attend provided by the research team.

The main result of this paper is that low contributors contributed significantly (and substantially) more following mixed than following low meetings. Effects were asymmetric: high contributors did not contribute less in mixed versus high meetings. Organizing mixed meetings was thus a "win–win" for the project. Concerning the mechanism, we find no evidence of shaming in the meetings. Instead, we see that most of the positive encouragements, criticisms, and neutral comments and questions in mixed meetings came from high contributors. To the extent that messages from high contributors raised contributions of low contributors, these findings may help explain the main result of the paper.

Overall, this paper contributes to the literature on peer effects in voluntary contributions using a rigorous field experiment within a community project, including unique detailed qualitative participant observations. It finds strong support that peer effects among project members exist in voluntary contributions. The practical implications of this paper likely go beyond community based projects, and may be applicable to other contexts where contributions need to be raised, such as peer

effects in charity giving, or in political fund-raising. The paper also complements a small but growing literature on the effect of leaders on voluntary contributions. For example, Jack and Recalde (2013), in a controlled field experiment in Bolivia, find that local authorities increase public goods provision when prompted to lead by example. In a similar intervention, Beekman et al. (2014) find that corrupt officials tend to lower voluntary contributions in rural Liberia. Our paper is the first to look at high contributors, i.e., regular community members, rather than leaders.

Section 2 provides our conceptual framework. Section 3 describes the experimental design. Section 4 presents the results. Section 5 describes the meeting dynamics and peer comments. Section 6 concludes.

2. Project description and problem statement

2.1. The project

In Kenya in 2000, only 2% of rural households were connected to the national electric grid (World Bank, 2000). In 2004, the Government signaled its support to develop micro hydro (Government of Kenya, 2004). One area with considerable micro hydro potential lies on the slopes of Mt. Kenya, a densely populated coffee and tea growing zone. People living in several nearby communities formed Community Based Organizations (CBOs), a very common type of grassroots organization in Kenya relying mostly on voluntary contributions for labor, material, and financial support, with the intent to develop micro hydro. Several of these CBOs decided to partner with Green Power (GP), a very small (four person) Kenyan NGO that offered technical support to build off-grid micro hydro power stations to generate electricity. GP demonstrated its technical capacity in 2005 when it successfully installed a self-built prototype turbine in one of the communities.

Upon completion, GP estimated that each site could generate between 100 and 300 kW, enough to provide each participating household with a steady supply of approximately 100 Watts. Such an amount could run simultaneously several power saving lights and a television or radio. GP's value proposition to the local community members was that locally constructed micro hydro grids would be competitive and member owned: members would need to spend less money lighting their houses using the locally generated micro hydro than the USD 6.45 spent monthly per household on paraffin, car battery charging, and torch batteries. In addition, excess electricity supply could generate revenue for its members by selling it commercially, for example to the national grid.

While GP had technical expertise to contribute, it lacked financial resources to finance the necessary investments. The success of the project would hinge on both the manual labor and financial contributions of members for the construction of the infrastructure. They were first required to pay an initial registration fee of 300 Ksh (approx. USD 4) which made them a registered project member, and then were expected to make subsequent voluntary financial contributions.

The focus in this paper is on the CBO that held the most promise and became the main focus of GPs activities from 2004 onward. In this project group, 1496 individuals paid the 300 Ksh registration fee. These and all subsequent contributions were recorded in an electronic database that was accessible to all project members. GP estimated that this particular project would need to raise approximately USD 475k in cash financing to construct the small infrastructure (dam, powerhouse), two 100 kW turbines, and a local distribution network reaching 1600 households within a radius of up to 7 km around the powerhouse. This was assuming that most of the labor would consist of voluntary contributions by the CBO members and GP itself. Data on local population density indicate that approximately 5–10% of all households within the 7 km radius of the power generation site were registered members of this project group (Government of Kenya, 1997).

To ultimately be able to generate and distribute electricity, GP set a goal of 1000 members contributing eventually 25,000 Ksh each (approximately USD 333 per member or USD 333k in total), with the hope of raising the remaining USD 150k needed through grant or loan financing from donors, government, or private institutions. In comparison, for those households living within reach of the national grid (e.g. along a main route), the connection to the national grid cost approximately 35,000 Ksh. The 25,000 Ksh amount was a target, but individuals could contribute less than 25,000 Ksh or more. The eventual shareholding established once a formal company was registered for the purposes of generating and distributing electricity would be proportional to the size of their contribution. As such, this project could be viewed as a threshold public goods problem with risk of failure before the threshold is met.

2.2. Problem of low contributions

By 2007, three years into the project, none of the contributors had reached the 25,000 Ksh target. Average contributions were 5874 Ksh and the contributions had been used to complete the dam and powerhouse. There was a large variation in contributions, as evidenced in Fig. 1. The median contribution was 2000 Ksh in 2007. Below, we define high (low) contributors as individuals who had contributed more (less) than 2000 Ksh by 2007.[1] Fig. 2 shows that most of these low contributors had in fact only contributed 300 Ksh, the amount set by GP as the initial membership fee.

The project leadership publicly communicated their intent to allocate 30% of (future) shares to GP and 70% of shares to the community, to be divided proportionally based on members' financial contributions. However, the level of contributions fell well below the target as there were clear incentives to free-ride once the initial registration fee was made. Contributions

[1] Six people contributed exactly 2000 Ksh, and are treated as high contributors.

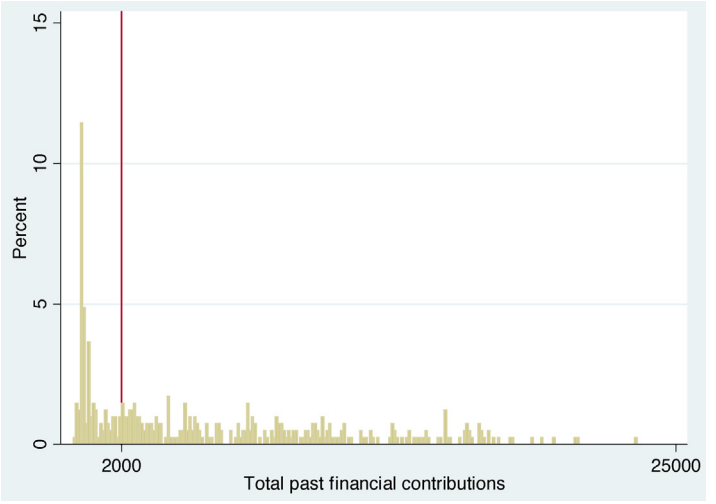

Fig. 1. Distribution of total past financial contributions.

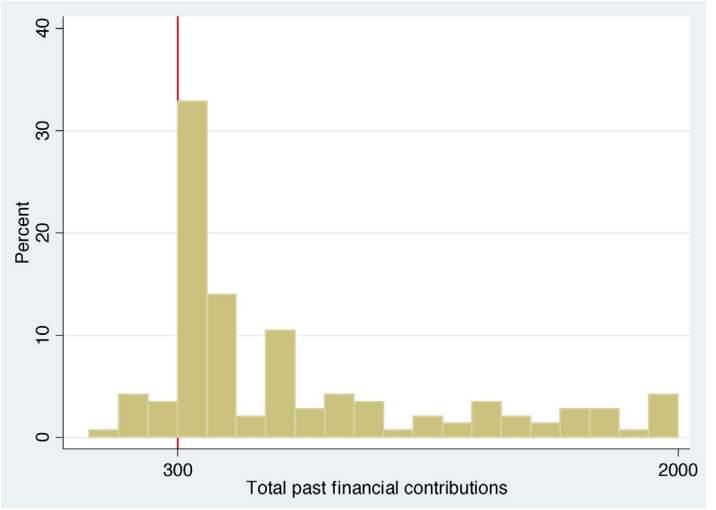

Fig. 2. Distribution of total past financial contributions of low contributors.

given today were equal in weight to those given later and there was no date set to incorporate a joint electricity company. There was in fact no clear project completion target date as this depended wholly on mobilizing sufficient aggregate community contributions. In case of project failure, a real option that eventually materialized in 2013 when not enough financial contributions had been raised, every investor would bear the full risk.

Table 1 shows basic descriptive statistics of the 414 high and low contributors who attended the meetings. By 2007, high contributors had contributed on average 8151 Ksh, while low contributors had contributed on average only 694 Ksh since the inception of the project in 2004. Contributions of high contributors had been decreasing over time. Average financial contributions of high contributors were 388 Ksh in the period 9–18 months and 218 Ksh in the period 0–9 months before the start of the community mobilization campaign in October 2008. There was no such decrease for low contributors since their contributions were essentially zero (0 Ksh 9–18 months before, and 1.4 Ksh 0–9 months before).

To understand why members of the project were not sufficiently contributing, a detailed socioeconomic survey on the project members was conducted from May to August 2007. Table 1 shows characteristics of the high contributors (column (1)), the low contributors (column (2)), and the difference between high and low contributors (column (3)). As shown in Table 1, high and low contributors have similar observable socioeconomic characteristics. High contributors are 88% male, on average 53 years old, with 8 years of education in a household of 3.8 individuals. 99% of these households farm on a plot, with an average size of 1.94 acres, owned in 83% of the cases by the household head. High contributors live, on average, 2.38 km from the power generation site. Low contributors are similar on all aspects, except for their age; they are 4.9 years younger. Low contributors are not less educated.

Table 1
Descriptive statistics of high vs low contributors.

	(1) High	(2) Low	(3) High – low (*p*-value)
Total past financial contributions	8151.08	694.07	7457.01*** (0.00)
Total past labor contributions	257.41	35.38	222.03*** (0.00)
Contributions 9–18 months before the meetings (Ksh)	387.55	0.00	387.55*** (0.01)
Contributions 0–9 months before the meetings (Ksh)	218.33	1.42	216.91** (0.01)
Socio-economic characteristics			
Sex (1 = male, 0 = female)	0.88	0.87	0.01 (0.89)
Age (years)	53.07	48.17	4.89*** (0.00)
Education (years)	8.00	8.40	−0.40 (0.41)
Household size	3.84	3.83	0.02 (0.94)
Household farms?	0.99	0.99	0.00 (1.00)
Total area of plot (acres)	1.94	2.32	−0.37 (0.47)
Household head is owner of plot	0.83	0.85	−0.02 (0.69)
Distance to site (km)	2.38	2.29	0.09 (0.89)
Wealth			
Monthly income per capita	2665.61	2058.45	607.16 (0.22)
Own car	0.05	0.05	0.01 (0.74)
Total savings in Merry-Go-Round	1161.67	2393.12	−1231.45** (0.03)
Savings account? (1 = yes, 0 = no)	0.73	0.73	−0.01 (0.92)
Trust in project			
Trust GP to manage your invested money to build more projects? (1–5)	4.72	4.81	−0.09 (0.35)
Duration taken if applied for GP (years)	0.95	0.98	−0.03 (0.90)
Duration taken if applied for KPLC (years)	5.95	6.54	−0.59 (0.39)
Willing to take a loan of 25,000 Ksh? (1–5)	4.80	4.85	−0.06 (0.47)
Closest friend is GP member? (1 = yes, 0 = no)	0.45	0.44	0.01 (0.81)
Trust GP members (1–5)	4.18	4.17	0.01 (0.95)
Benefits of electricity			
Envious of people with electricity (1–5)	4.93	4.94	−0.02 (0.74)
Members household complain due to lack of electricity (1–5)	4.75	4.81	−0.07 (0.45)
Energy spending last month (Ksh)	921.98	945.69	−23.72 (0.81)
Look forward to most when electricity: lighting in house	0.61	0.69	−0.08 (0.15)
Look forward to most when electricity: open a business	0.20	0.16	0.05 (0.30)
Own TV (black and white)?	0.41	0.35	0.06 (0.29)
Number of parafin, kerosene lanterns	1.99	1.53	0.45** (0.03)
(Attempted) theft of materials inside the homestead	0.86	0.69	0.17 (0.40)

* significant at 10%; ** significant at 5%; *** significant at 1%.

Importantly, low contributors are not significantly poorer. They earn 2058 Ksh per month per capita (approximately USD 1.3 per day per capita, SD = 2220), not significantly different from high contributors (M = 2665, SD = 4860).[2] They have a similar likelihood of owning a car, a rare occurrence in this community. In fact, they have more savings than high contributors in merry-go-rounds (informal savings groups) indicating that they are not more credit constrained than high contributors.

While qualitative insights suggested that many members were concerned with the slow pace of the project, a series of questions around trust in the project and in its membership suggested not only high levels of trust but little differences between high and low contributors. As indicated in Table 1, high contributors report to overwhelmingly trust GP to manage their contributions, report that it will take only 1 year for GP to supply the rural areas with electricity (compared to 6 years if they were to seek a connection with the governmental agency Kenya Power Lighting Company (KPLC)), and report that they are willing to take out a loan of 25,000 Ksh to meet the contribution goal if offered the option to repay the loan over 5 years. Low contributors do not differ significantly.[3] In 45% of the cases, high and low contributors say their closest friend is a GP member. Members reported to put great trust in GP members (4.18 on a scale from 1 (low) to 5 (high)).

High and low contributors were equally envious of people with electricity, were equally dismayed about the lack of electricity, and spent approximately similar amounts on energy.[4] High and low contributors did not differ in their assessments of what they planned to do with the electricity generated by the project; they most looked forward to light their house and to start a business.[5] The proportion of high and low contributors with TVs was similar. High contributors owned slightly more paraffin or kerosene lanterns. High contributors experienced a similar amount of attempted thefts of materials in their homestead as low contributors.

To summarize, low contributors are not poorer, more credit constrained, or less aware about the uses of and benefits of electricity than high contributors. We now describe how peers may increase contributions.

2.3. Peer effects

High contributors could increase contributions of low contributors in mixed meetings through three different channels: conditional cooperation, peer pressure, or learning.

2.3.1. Conditional cooperation

Conditional cooperation states that individuals contribute more when others contribute more. According to Fischbacher et al. (2001), conditional cooperation can be considered as a motivation in its own or be a consequence of some fairness preferences like “altruism”, “warm-glow”, “inequity aversion”, or “reciprocity”. Rigorous evidence for this channel has been found in numerous lab experiments. For example, Gunnthorsdottir et al. (2007) use an initial public goods game to define high and low contributors.[6] Three types of groups are then formed: groups of high contributors only, low contributors only (both called “sorted groups”); and groups mixing high and low contributors (called “random groups”). Gunnthorsdottir et al. (2007) find that low contributors contribute more in mixed versus low groups. The evidence is mixed for high contributors, and depends on the particular parameters for the public goods game used. They contribute less in mixed versus high groups when the marginal per capita return (MPCR) is low, and do not contribute less when the MPCR is high (Gunnthorsdottir et al., 2007). Conditional cooperation thus predicts that, in our experiment, low contributors will contribute more when exogenously matched with high contributors. The prediction is more ambiguous for high contributors in mixed versus high meetings. Besides conditional cooperation, high contributors in the mixed meetings may also be motivated to lead by example, which would have the opposite effect in comparison. In addition, promise keeping may also motivate those who publicly declared they would contribute more following the meeting.

2.3.2. Peer pressure

Peers may also influence others by pressuring them (Kandel and Lazear, 1992). In a similar lab experiment, Gächter and Thöni (2005) find that low contributors contribute more in mixed groups where high contributors can punish them. In lab experiments where high contributors may distribute disapproval points (Masclet et al., 2003), show pictures with an unhappy face (Carpenter et al., 2004), or criticize low contributors (Barr, 2001), low contributors are always found to contribute more. Encouraging low contributors has also been found to increase contributions (Chaudhuri et al., 2006). Thus, in our experiment, low contributors are expected to contribute more if high contributors pressure them to do so. The effect of low contributors on high contributors is ambiguous, and depends on the pressure applied by low contributors. High contributors may feel pressure to contribute less. Alternatively, they may receive no pressure, and contribute equal amounts when exogenously matched with low contributors.

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[2] Although income per capita is 22% less for low contributors, the standard deviations are large due to measurement error in the income measure.

[3] Concern about the accuracy of these self-reported attitudes is raised by the fact that despite their stated willingness to contribute 25,000 Ksh, no single contributor had reached this target. In this paper, we look at actual contributions of low and high contributors, not self-reported willingness to contribute.

[4] Charcoal, wood, paraffin/kerosene, car battery charging, solar, petrol, LPG, batteries for torch.

[5] Examples of businesses cited by members are: barber shop, welding, rearing chicken (incubator), salon, battery charging, posho mill (maize grinder), chuff cutter (cutting stalk for animal feed), carpentry, ironing clothes, plumbing, video show.

[6] Ockenfels and Weimann (1999), Ones and Putterman (2007), and Burlando and Guala (2005) follow a similar methodology.

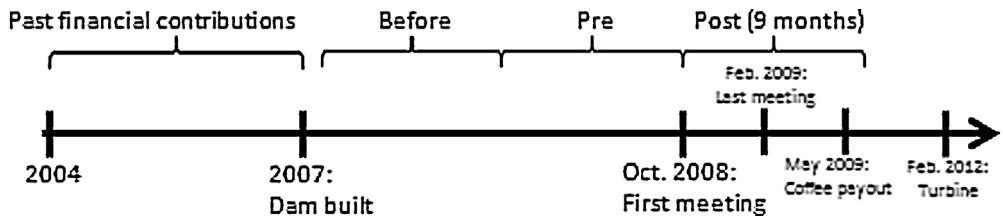

Fig. 3. Timeline of project.

2.3.3. Peer learning

An additional channel that may arise in the case of complex projects with uncertain benefits is peer learning, which may be of two sorts. First, low contributors may learn about the project from high contributors. To build the dam from 2004 to 2007, high contributors spent on average 257 labor-days, while low contributors contributed 35 labor-days. It is thus reasonable to assume that high contributors have better information about the project than low contributors. High contributors may know more about the project management, the project progress (building of the main site, state of generation and distribution network), and the financial situation of the overall project. Second, low contributors may learn about the benefits of electricity from high contributors. The effect on high contributors is less clear: they have a clear understanding of the project and the benefits of electricity, and cannot "unlearn" from the less informed low contributors.

Through these three channels (conditional cooperation, peer pressure, and learning), it is possible that high contributors would increase the contributions of low contributions.

3. Experimental design

3.1. Treatment

To understand whether low contributors would contribute more when matched with high contributors, we implemented the following experimental design. Before the start of the mobilization meetings, we used the historical records of financial contributions to the project by each member to identify 750 high contributors (on or above the median contribution) and 750 low contributors (below the median contribution). Unbeknown to the organizers of the meetings and to the members themselves, we randomly assigned two thirds of the low contributors to be in low meetings, i.e. meetings comprised of only low contributors, and one third to be in mixed meetings, i.e. meetings comprised of a mix between high and low contributors. Similarly, we randomly assigned two thirds of the high contributors to be in high meetings, and one third to be in mixed meetings. This created 10 low, 10 high, and 10 mixed meetings.

Project members know their own contribution status and often know the status of others. Members meet regularly in general and on labor day meetings, and know each other in this tight community. The contributions of all members are publicly available and can be consulted in the local project office. Second, the classification used (above or below 2000 Ksh) ensures that high and low contributors are radically, not marginally, different. Table 1 shows that high contributors contributed on average 8151 Ksh and 257 days of labor in the past. Low contributors contributed only 694 Ksh, 35 days of labor, and almost nothing in the 9 months before the meetings. While high contributors contribute regularly to the project, most of the low contributors paid the initial registration fee and did not contribute thereafter (as evidenced in Fig. 2).

After the randomization, each of the members received a personal invitation to one (and only one) of 30 meetings. Invitations to a meeting were only distributed approximately 2 weeks before a meeting, and delivered in person to people's homes. Fig. 3 shows the timeline. The meetings were titled "Together We Move Darkness," and were designed by the project leadership to emphasize progress and encourage contributions. The outline of the presentation was the same for each meeting. It included a discussion about the past work, the current situation, the administrative structure (explaining the shareholder structure, the customers, and dividends), and other related projects. The meetings generally lasted for a day and attendees were provided with lunch. In all of these meetings, attendees were given the opportunity to ask questions and make comments.

Detailed data was collected during each meeting to shed light on the mechanisms through which peer effects operate. Each meeting was attended by an evaluation fieldworker who was responsible for taking detailed minutes and collecting detailed behavioral data. A local member of the evaluation team took attendance (indicating both the name and project ID of all attendees), recorded arrival and departure times, indicated where people sat in the room, studied and noted levels of attention and concentration, and documented all comments/questions raised in full detail (including identifying the person speaking). All meetings were audio recorded. Subsequently, during the analysis the detailed minute transcripts of each meeting were coded for content and thus provided the means of analyzing peer pressure and peer learning.

Table 2
Number of attendees per meeting.

Meeting id	Low	Mix	High	# high contributors	# low contributors	Total	Proportion high
28	1	0	0	0	4	4	0.0
4	1	0	0	0	5	5	0.0
10	1	0	0	0	8	8	0.0
7	1	0	0	0	9	9	0.0
19	1	0	0	0	10	10	0.0
25	1	0	0	0	10	10	0.0
22	1	0	0	0	13	13	0.0
16	1	0	0	0	13	13	0.0
13	1	0	0	0	14	14	0.0
1	1	0	0	1	10	11	9.1
30	0	1	0	4	5	9	44.4
15	0	1	0	6	6	12	50.0
27	0	1	0	7	7	14	50.0
18	0	1	0	8	7	15	53.3
3	0	1	0	11	5	16	68.8
24	0	1	0	11	4	15	73.3
12	0	1	0	11	4	15	73.3
21	0	1	0	14	5	19	73.7
9	0	1	0	10	2	12	83.3
6	0	1	0	10	0	10	100.0
5	0	0	1	12	0	12	100.0
14	0	0	1	16	0	16	100.0
17	0	0	1	17	0	17	100.0
29	0	0	1	17	0	17	100.0
26	0	0	1	17	0	17	100.0
8	0	0	1	18	0	18	100.0
2	0	0	1	19	0	19	100.0
11	0	0	1	20	0	20	100.0
20	0	0	1	22	0	22	100.0
23	0	0	1	22	0	22	100.0

3.2. Basic meeting characteristics

Out of the 1500 invited, 414 individuals decided to attend.[7] Table 2 shows the actual attendance to each meeting by high or low contributors. Overall, compliance with the treatment was very high. There were no high contributors in 9 low meetings, and only 1 high contributor in 1 low meeting (meeting id = 1). The presence of this high contributor is endogenous, i.e., driven by factors unobserved by the econometrician. In the econometric analysis, we will present an Intent-To-Treat analysis, i.e., we will regress contributions of low contributors on the original assignment to low or mixed meetings, which is the only exogenous variable (following Banerjee et al., 2015). To the extent that high contributors increase the contributions of others, the Intent-To-Treat analysis will provide a lower bound on the true estimates.

In any case, there was a very low proportion of high contributors in low meetings. In contrast, there was a much higher proportion of high contributors in mixed meetings, ranging from 44 to 100% (there were no low contributors in meeting id = 6). Finally, there were no low contributors in high meetings.

The hidden random assignment nearly guaranteed that members who decided to attend the meeting did not self-select based on the type of the meeting. Table Appendix 2 (in the online appendix) presents the simple averages of the observable characteristics of Table 1 for low contributors who attended mixed or low meetings. Low contributors in mixed meetings contributed less in the past, are less educated, are older, have a lower probability to have a car, own less land, live further from the project, and spend less on energy than low contributors in low meetings. None of the differences, however, are statistically significant. Still, these factors may all be negatively correlated with contributions to the project, essentially stacking the deck against finding an effect. It will be important to control for all these variables in an econometric analysis. Concerning high contributors, only three differences are statistically significant in mixed versus high meetings. High contributors assigned to mixed versus high meetings are slightly wealthier, trust less the project, and own fewer black and white TVs. Below, we control for all the variables of Table 1 in subsequent regressions.

[7] Table A1 in the Online Appendix shows that some basic characteristics differ between those who attended and those who did not. This paper does not analyze or discuss these differences.

Table 3
Descriptive statistics on contributions in meetings.

	Before	Pre	Post	Difference
Low contributors				
Mixed meetings	0	4.4	295.7	291.3
($N=45$)	(0)	(4.4)	(247.7)	(247.7)
Low meetings	0	0	117.7	117.7
($N=96$)	(0)	(0)	(114.6)	(114.6)
Difference	0	4.4	178	173.6
	(0)	(3)	(238)	(238.1)
p-Value of Wilcoxon rank-sum test	(·)	(0.14)	(0.19)	(0.96)
High contributors				
Mixed meetings	333	158.6	557.5	398.9
($N=92$)	(114.3)	(57.3)	(134.6)	(134.6)
High meetings	415.2	248.7	431.3	182.6
($N=181$)	(148.3)	(86.4)	(75)	(114.4)
Difference	−82.2	−90.1	126.2	216.3
	(223.5)	(128)	(136.4)	(184.6)
p-Value of Wilcoxon rank-sum test	(0.91)	(0.64)	(0.19)	(0.23)

Standard errors in parentheses.

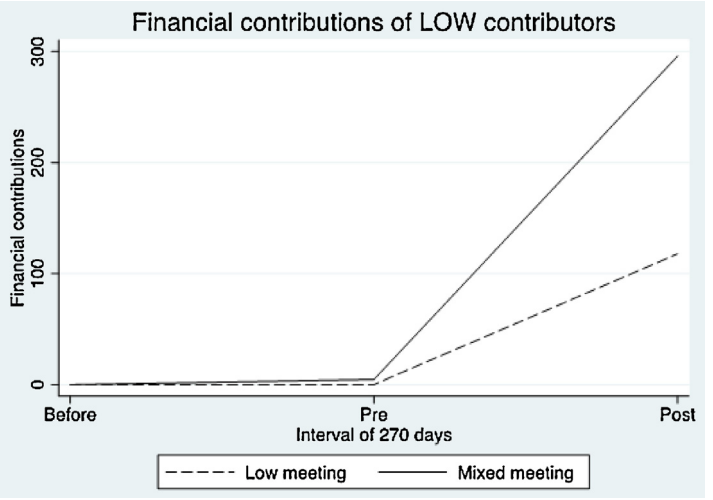

Fig. 4. Financial contributions of LOW contributors.

4. Results

4.1. Descriptive statistics

Table 3 shows a basic comparison of means. The top panel shows the financial contributions of low contributors in mixed vs low meetings. The period Before corresponds to an interval of 9–18 months before the meeting, Pre to an interval of 0–9 months before the meeting, and Post to an interval of 0 to 9 months after the meeting.[8] Low contributors contribute on average 173 Ksh more following mixed meetings than low contributors following low meetings. This is confirmed in Fig. 4.

The bottom panel of Table 3 shows the same results for high contributors. As evidenced in this table, and confirmed in Fig. 5, high contributors do not contribute less following mixed vs high meetings.

The differences in Table 3 are not significantly different according to a t-test or a non-parametric Wilcoxon rank-sum test, however it is important in this context to control for other factors, such as individual characteristics, and the size of the meetings. Table Appendix 2 showed that low contributors in mixed meetings are slightly less educated, older, and poorer than low contributors in low meetings. These individual characteristics are usually associated with lower contributions. Moreover,

[8] We choose intervals of 9 months since the first meeting was organized in October, i.e., 8 months before May, when coffee payouts are delivered. Most farmers in this community are coffee producers, and are heavily credit constrained, except in May when they receive large coffee payouts from their cooperative. We thus chose the shortest interval (to minimize the risks of coincidental shocks that may influence contributions) that allows every individual in the sample to have experienced a coffee payout. In the empirical analysis below, we discuss results when using time intervals of 1, 4, 7, 14, 30, 60, 90, 120, 150 and 365 days.

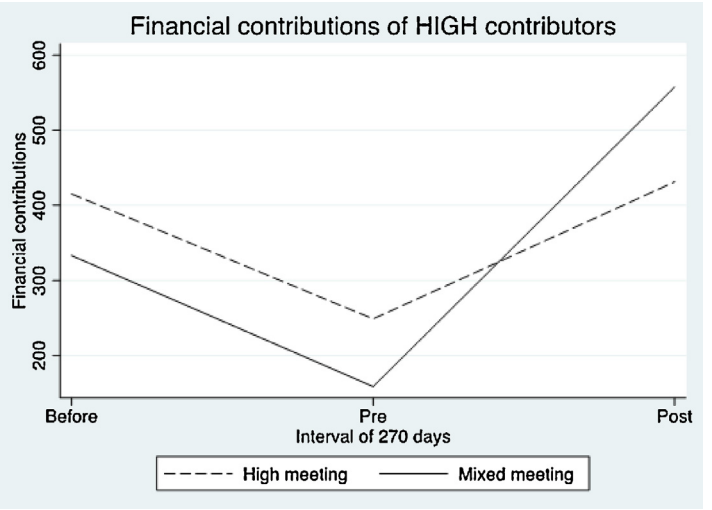

Fig. 5. Financial contributions of HIGH contributors.

Table 2 showed that mixed meetings were on average bigger in size than low meetings, due to the higher attendance rate of high contributors. The size of the meeting could influence contributions. To control for these factors, and increase the precision of our estimates, we now turn to the regression analysis.

4.2. Panel analysis

In the econometric analysis, we present an Intent-To-Treat analysis; i.e. we regress contributions on the original assignment to low or mixed meetings (following Banerjee et al., 2015). We also present an instrumental variable analysis to get the Treatment-on-the-Treated (TOT) estimator. In the TOT analysis, we regress contributions on the proportion of high contributors in meetings, and instrument this proportion by the original assignment to low or mixed meetings.

Our main estimator is based on Intent-To-Treat analysis:

$$Contributions_{it} = \alpha_0 + \alpha_1 Attended_i + \alpha_2 Attended_i * Post_t + \alpha_3 Attended_i * Mix_i + \alpha_4 Attended_i * Post_t * Mix_i + X_{it} + u_{it} \quad (1)$$

where i corresponds to individual i, t corresponds to the three time intervals ($Post_t = 1$: from 0 to 9 months after the meeting, $Pre_t = 1$: the reference category from 0 to 9 months before the meeting, and $Before_t = 1$: from 9 to 18 months before the meeting). The dependent variable is the sum of financial contributions over these intervals. $Attended_i$ is a dichotomous variable equal to 1 if the individual attended the meeting, 0 otherwise. Mix_i is a dichotomous variable equal to 1 if the individual was in a mixed meeting. $Attended_i * Post_t * Mix_i$ is the interaction of $Attended_i$, $Post_t$ and Mix_i, and is a difference-in-differences coefficient measuring the impact of a mixed meeting on contributions of those who attended the meetings.

Besides these main explanatory variables of interest, we include the following variables in X_{it}. First, we define a variable $Unattended_i$ as a dichotomous variable equal to 1 if individual i did not attend. The group of project members who did not attend the meeting to which they were invited allows us to perform an important falsification exercise. Unless there were substantive spillover effects from the meetings, we should find no impact of the meetings on these non-attending project members. We interact $Unattended_i$ with $Post_t$, Mix_i, and $Post_t * Mix_i$ to assess the impact of meetings on this group. The final sample thus includes our 414 participants and these 1082 non-participating project members, observed over three time periods.

Second, we include $Before_t$, for the period 9 to 18 months before the meeting. This allows us to perform a falsification exercise for the assumption underlying these panel estimates that the randomly assigned groups would have had the same trends in contributions without the meetings (the common time trend assumption). $Before_t$ is interacted with Mix_i, and the (non-)significance of $Attended_i * Before_t * Mix_i$ coefficient represents a test of the common time trends assumption. Intuitively, low contributors randomly assigned to mixed meetings versus low contributors assigned to low meetings should not contribute differently from 9 to 18 months *before* any meeting is organized (and the same for high contributors).

Third, we control for the meeting size, which differs across low, mixed or high meetings. There are 96 individuals in the 10 low meetings, and 45 low plus 92 high, i.e. 137 individuals, in the 10 mixed meetings. To control for meeting size, we define the number of (other) attendees in each meeting ($Number\_attendees_i$) as the total number of attendees minus one. We then include $Number\_attendees_i$ in specification (1), together with its interactions with $Post_t$. And, finally, all control

Table 4
Impact of mixed meetings on financial contributions (dependent variable: financial contributions).

	(1) Low	(2) High
Attended*Post*Mix	341.5**	274.7
	(153.0)	(275.5)
Attended*Post	233.3	−285.5
	(225.3)	(676.2)
Attended*Mix	9.2	−164.4
	(108.9)	(196.4)
Attended	23.8	0.0
	(348.6)	(0.0)
Unattended*Post*Mix	45.1	−32.3
	(76.6)	(217.0)
Unattended*Post	62.7	28.9
	(99.6)	(519.5)
Unattended*Mix	1.6	−76.9
	(54.7)	(154.7)
Unattended	25.8	−182.5
	(313.7)	(608.6)
Attended*Before	−0.0	−1094.2
	(225.3)	(676.2)
Attended*Before*Mix	−0.0	435.9
	(153)	(275.5)
Individual controls	Yes	Yes
Meeting size	Yes	Yes
Observations	1455	1566
R-squared	0.042	0.070

Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. In column (1), the sample is restricted to low contributors. The dependent variable is the sum of financial contributions from 0 to 9 months after the meeting (Post = 1), from 0 to 9 months before the meeting (reference category), or from 9 to 18 months before the meeting (Before = 1). "Attended" is a dichotomous variable equal to 1 if the individual attended the meeting, 0 otherwise. "Post" is a dichotomous variable equal to 1 if the observation is taken after the meeting, 0 otherwise. "Mix" is a dichotomous variable equal to 1 if the individual was in a mixed meeting, 0 otherwise. "Attended*Post*Mix" is the coefficient of interest and shows the impact on financial contributions after a mixed meeting. Control variables include: "Unattended", a dichotomous variable equal to 1 if the individual did not attend the meeting, 0 otherwise, the interaction of "Unattended" with all combinations of "Post" and "Mix", "Before", a dichotomous variable equal to 1 if the observation is taken from 9 to 18 months before the meeting, the interaction of "Unattended" with all combinations of "Post" and "Mix". All individual-level control variables, and meeting size interacted with all combinations of "Attended*Post" and "Attended*Mix" are also included. In column (2), the sample is restricted to high contributors.

variables of Table 1 are included in X_{it}. Table 4 presents the main results associated with specification 1 for the sample of the low contributors.[9]

First, column (1) of Table 4 shows the analysis for low contributors. The main coefficient of interest is for $Attended_i * Post_t * Mix_i$, which is significantly positive at 341 Ksh (or USD 4.7 at the October 2008 conversion rate). This means that low contributors in mixed meetings contribute significantly more than low contributors in a low meeting. Considering their average past contribution from 2004 to 2007 was 694 Ksh, this represents a 50% increase in their total contribution. Relative to the average monthly income per capita of 2058 Ksh of low contributors, or 18,522 Ksh over 9 months, this additional contribution represents almost 2% of their total income devoted to the project, which is a sizeable amount for individuals at the poverty line.

Column (2) of Table 4 replicates the analysis for high contributors. Consistent with the graphical evidence, high contributors in mixed meetings do not contribute less than in high meetings. Mixed meetings appear to be a "win–win" strategy for the NGO, by raising contributions of low contributors, while not decreasing those of high contributors.

[9] The total sample includes 141 low contributors who attended, and 608 low contributors who did not attend. This represents a total of 749 individuals. Observations are for three time periods, hence a total of 2247 observations. Column (1) includes only 1,455 observations since we were not able to collect the detailed socio-economic survey on all contributors. A subsequent robustness check presents the results on the full sample of 2247 observations without individual-level control variables. The results are similar, as explained below.

4.3. Robustness checks

The main results in Table 4 allow us to do several robustness checks. First, the Mix_i coefficient in column 1 shows the difference in contributions by low contributors in the period before the meeting (pre). It represents an important check of the randomization process. This coefficient is not significantly different from zero and confirms that low contributors assigned to mixed meetings were similar to low contributors assigned to low meetings before these meetings. Second, the coefficient of $Unattended_i * Post_t * Mix_i$ is not significantly different from zero, indicating that the meetings had no effect on individuals who did not attend the meetings, as expected. And all variables interacted with $Before_t = 1$ are not significantly different from zero, indicating that individuals in mixed or low meetings were on similar contribution time trends in the period 9–18 months before the meetings.

Another robustness check comes from exploiting the timing of coffee payouts. Column (1) of Table 4 finds a significant impact on contributions from low contributors in a 9-month window after the meeting. One may wonder whether this effect happens during the meeting, or after. When we repeat the analysis for low contributors with 1, 4, 7 (shown in column (2) of Table 5), 14, 30, 60, and 90 days intervals, we find no significant impact of the meetings. This is understandable if low contributors are credit constrained, and cannot provide contributions on short notice. In fact, in this community, most farmers are coffee producers, who receive large coffee payouts from their cooperative in May each year. Therefore, one can expect contributions to be made after individuals have experienced a coffee payout.

The timing of the meetings helps to shed light on the importance of these credit constraints. Fig. 3 shows that the last meeting was organized in February 2009, i.e. 3 months before May. A 5 month window around the meeting has different implications on credit constraints depending on the timing of the meeting. An individual in a meeting organized in October 2008 will not have experienced a coffee payout in a 5 month window after the meeting. In contrast, an individual invited to a meeting in February 2009 did. In fact, in this sample, only 53% of the contributors have experienced a coffee payout in the next 5 months after a meeting. The impact of mixed meetings on low contributors will thus be lower in a 5 month window than in a 9 month window. This is exactly what we find in column (3) of Table 5.

We may further define a dichotomous variable $Coffee_i$ equal to 1 if individual i has experienced a coffee payout. This variable is exogenous since the timing of the meetings was randomized. To test the presence of credit constraints, we perform the following regression:

$$\begin{aligned} Contributions_{it}\alpha_0 &+ \alpha_1 Attended_i + \alpha_2 Attended_i * Post_t + \alpha_3 Attended_i * Mix_i + \alpha_4 Attended_i * Post_t * Mix_i \\ &+ \alpha_5 Attended_i * Coffee_i + \alpha_6 Attended_i * Coffee_i * Post_t + \alpha_7 Attended_i * Coffee_i * Mix_i \\ &+ \alpha_8 Attended_i * Coffee_i * Post_t * Mix_i + X_{it} + u_{it} \end{aligned} \quad (2)$$

where $Coffee_i$ is interacted with all other variables of regression (1). Column (4) of Table 5 shows that the positive impact of mixed meetings is entirely captured by individuals who have experienced a coffee payout. Finally, note that these findings allow us to discard reputation effects as a possible mechanism. In a real-world setting with repeated interactions, it is possible that low contributors wish to acquire a reputation among high contributors, and contribute more in mixed meetings. But to do so, they should contribute directly in the meeting in front of high contributors. However, Table 5 finds that they contribute later, when they are less credit constrained, but when high contributors are also not around to witness the contributions.

The causal impact of the meetings should slowly fade over time, as past meetings become less and less important. We find that the coefficient for the 1-year window in column (5) of Table 5 is smaller (but not significantly different) than the 9-month window.

Finally, columns (6) through (10) present four additional robustness checks:

Column (6) of Table 5 does not include any individual-level variables of Table 1. The main coefficient is smaller, exactly in line with our simple comparison of means in Table 3. This estimate is not significantly different from the main result of Column (1) of Table 3 (p-value = 0.11).

Column (7) includes 749 individual fixed effects, thus confirming that the main result – low contributors contributing more in mixed meetings – is not due to the fact that low contributors in mixed meetings are systematically different from those in mixed meetings.

Columns (8) and (9) implement the instrumental variable analysis. In column (8) presenting the first stage, we find that mixed meetings increase the proportion of high contributors by 60 percentage points, compared to a low meeting. In column (9) presenting the second stage, we find that moving a low contributor from a meeting with no high contributors to a meeting with 100% of high contributors increases his/her contributions by 523 Ksh. Considering mixed meetings have on average 60% of high contributors, moving a low contributor from a low meeting to a mixed meeting will increase his/her contributions by 523 * 0.6 = 313.8 Ksh, very similar to our intent-to-treat estimates.

In Column (10), we exclude meeting id = 1 from the analysis. Excluding this meeting where one high contributor attended while not being invited does not affect the results.

Finally, we can investigate whether the ratio of high to low contributors in mixed meetings matters. Having a 2:1 ratio in the mixed group, with roughly 10 high- to 5 low contributors, may exert a stronger effect on low contributors. Conversely, having an equal number of high versus low contributor may not result in similar improvement on low contributors.

Table 5
Robustness checks on low contributors.

	(1) Time interval	(2)	(3)	(4)	(5)	(6) No controls	(7) Fixed effects	(8) Instrumental variable	(9)	(10) Excluding meeting 1	(11) 2:1 ratio
	9 months	1 week	5 months	5 months	1 year			First stage	Second stage		
Attended*Post*Mix	341.5**	0.0	101.0***	29.0	313.7**	182.7*	182.7*	0.6***		322.8**	75.9
	(153.0)	(0.0)	(24.1)	(37.2)	(153.7)	(100.0)	(100.0)	(0.008)		(160.6)	(187.9)
Attended*Post*Mix*Coffee payout				106.0**							
				(43.2)							
Proportion high contributors									523.1**		
									(236.4)		
Post*Mix_2to1											572.9**
											(236.3)
Individual controls	Yes	Yes	Yes	Yes	Yes						Yes
Meeting size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects							Yes	Yes	Yes	Yes	
Observations	1455	1455	1455	1455	1455	2247	2247	1455	1455	1356	1455
R-squared	0.042	0	0.047	0.066	0.043	0.021	0.346	0.966	0.047		0.049

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Column (1) replicates column (1) of Table 2. All specifications includes all control variables of column (1) of Table 2. Only the difference-in-differences coefficient "Attended*Post*Mix" is reported. Instead of 9 months before and after the meetings, time intervals of 1 week, 5 months, and 1 year are used in columns (2), (3), (4) and (5). "Coffee payout" is a dichotomous variable equal to 1 if the individual experienced a coffee payout during the interval, 0 otherwise. "Coffee payout" is interacted with all other variables of the model, and only the coefficient of interest "Attended*Post*Mix*Coffee payout" is reported. In Column (6), the individual-level control variables of Table 1 are not included. In Column (7), 749 individual fixed effects are included. In Column (8), the first stage of an instrumental variable strategy is shown. The dependent variable is the proportion of high contributors in the meetings. In Column (9), the second stage of an instrumental variable strategy is shown. The dependent variable is the contributions of low contributors, while the proportion of high contributors in the meetings is instrumented by the mixed meetings treatment. In Column (10), we exclude meeting id = 1 from the analysis. In Column (11), Mix_2to1 is a dichotomous variable equal to 1 if the meeting has at least a 2:1 ratio of high to low contributors.

Table 6
Comments in meetings (number in brackets is per capita).

	Total number of			
	Number attendees	Encouraging comments	Questions/comments	Negative comments
Low contributors				
Low meetings	96	18	161	19
		(0.19)	(1.68)	(0.20)
Mixed 1:1	25	0	42	0
		(0)	(1.68)	(0)
Mixed 2:1	20	1	9	0
		(0.05)	(0.45)	(0)
High contributors				
Mixed 1:1	25	3	33	2
		(0.12)	(1.32)	(0.08)
Mixed 2:1	67	11	80	11
		(0.16)	(1.19)	(0.16)
High meetings	181	14	191	20
		(0.08)	(1.06)	(0.11)

Table 2 shows that four mixed meetings (30, 15, 27 and 18) had an approximately 1:1 ratio of high versus low contributors, while six mixed meetings (3, 24, 12, 21, 9, and 6) had a higher ratio, above 2:1. Although this ratio was not experimentally manipulated, we use this variation to gauge whether peer effects are stronger with a 2:1 versus 1:1 ratio of high contributors.

We define Mix_2to1_i, a dichotomous variable equal to 1 for meetings 3, 24, 12, 21, 9, and 6 (with a ratio of high contributors higher than 2:1). We interact this variable with $Post_i$, and introduce both level terms and interactions in the main regression. Column (11) of Table 5 shows that the effects are much stronger in the 2:1 mixed group. The effect is 573 + 76, larger than 341 Ksh previously found when comparing low contributors in mixed versus low groups. The effect is not significant for the 1:1 mixed group. We now turn to the mechanisms that may explain these peer effects.

5. Meeting dynamics and peer comments

Low contributors increase their contributions following meetings where they were mixed with high contributors, with contributions increasing in the proportion of meeting participants being high contributors. This section, which relies on the detailed meeting observations, explores what may be driving this finding.

One mechanism of these peer effects may be peer pressure. Low contributors may increase contributions following direct shaming or encouragement of low contributors by high contributors. A number of lab experiments have found that shaming low contributors through distributing disapproval points, showing unhappy faces, or criticizing them, increased their contributions (Masclet et al., 2003; Carpenter et al., 2004; Barr, 2001). However, the detailed meetings minutes reveal no use of shaming in any of the meetings. Criticisms raised were directed at the project more generally and not at the contributors. In contrast, we find that high contributors did use positive reinforcement and encouragement through statements such as: "Don't despair or let anyone discourage you, be strong and patient," "I appeal to members to continue supporting the project," and "We are to attain many benefits for our children, and so let's wake up and pull up our socks." They also offered positive encouragement by promising to contribute more themselves: "I thank you for the seminar for it has restored my lost hope and am now strong to continue with the project," "I am revived and very ready to continue."

Table 6 compiles the total number of encouraging comments, provided by high or low contributors, in the different types of meetings. Several things stand out from this table. There were 47 encouragements across the three types of meetings, divided fairly equally: low (18), mixed (15), high (14). However, in the mixed meetings, 14 of the 15 positive encouragements came from high contributors, with 11 of these occurring in the 2:1 mixed meetings. Who voices encouragement may matter if, for example, "I appeal members to continue supporting the project" is less effective when coming from someone who does not contribute him/herself.

Conversely, attendees also made negative comments about the project, the majority of which focused on members' frustration with project delays: "Will power really be generated?"; "You will die doing the same thing without any progress."; "You have started a supermarket even before completing the project."; "The ideas are very great but long term and will mostly benefit the young generation but for the sake of the old people it would be better if power was provided first since it was the prime reason of starting the project." Table 6 shows that the number of strictly negative comments (54) was similar to the number of positive encouragements (47), and did not involve direct shaming of fellow members. All of the 19 negative comments by low contributors were made in low meetings. In mixed meetings, 13 negative comments were raised, all by high contributors, however. These meeting dynamics could support the main empirical impact finding if negative comments from high contributors have the effect of pressuring the project leadership to finalize the project in ways that negative comments from low contributors do not, thus boosting morale (and contributions) of the low contributors.

Finally, attendees also raised many (more) neutral comments/questions about the project that may reveal information about the project.[10] There were 517 questions or comments raised by attendees during the meetings, distributed fairly equally: low (161), high (191), and mixed (164). However, as with positive and negative comments, in the mixed meetings, 113 of the 164 (69%) questions/comments came from high contributors. And, this proportion was particularly high in 2:1 mixed meetings: 90% of questions/comments were by high contributors.

In sum, Table 6 shows that low contributors (and project leadership leading the meetings) in mixed meetings were exposed to relatively more encouragements, questions/comments, and criticisms by high contributors. To the extent that messages from high contributors raise contributions of low contributors, these findings support the main result of the paper. However, since there was no experimental design randomly assigning questions/comments, we cannot confirm this.

Part of the mixed meeting impact may also occur outside of the meetings. For example, high contributors in mixed meetings may visit the low contributors in these meetings to shame or encourage them into contributing more. These interactions would not be captured by our data collection of encouragements, questions and comments in meetings. However, the randomization into meetings ensures that low contributors in mixed meetings are not obviously the nearest neighbors of high contributors in these same meetings. Using GPS data, we find that the average distance from a high contributor to the nearest low contributors who attended the same mixed meeting is 3.2 km. In contrast, the average minimum distance from a high contributor to any low contributor who attended a low meeting is 0.3 km. Considering roads are in poor conditions, and only 7% of participants have cars, it would be less costly to first visit the nearest low contributors who attended a low meeting. If indeed high contributors from mixed meetings visited low contributors from low meetings to shame them, our main result may actually be an underestimate of peer effects within the meetings.

6. Conclusion

This paper is the first to rigorously explore whether peer effects can be harnessed to boost contributions in a large real world community based project. It exogenously varies the proportion of high contributors in mobilization meetings designed to encourage the contributions of low contributors in a community based rural electrification project in Kenya. We find that low contributors contribute 341 Ksh more (equivalent to 50% of their total past contribution) after attending a mixed meeting, i.e. with some high contributors, rather than a low meeting without high contributors. The findings also show that this result is importantly driven by those mixed meetings where the ratio high:low contributors was 2:1 as opposed to 1:1; low contributors contribute 573 Ksh more when the ratio is 2:1. Conversely, we do not find evidence that high contributors reduce contributions when paired with low contributors instead of fellow high contributors.

To explore the mechanisms that could explain this result, we collect detailed qualitative data on the behavior of high and low contributors in these meetings. Based on these observational data, first, we see no evidence of shaming, i.e. emotional disapproval of low contributors by high contributors. Instead, we see that most of the positive encouragements, criticisms, and neutral comments and questions in mixed meetings come from high contributors. To the extent that messages from high contributors raise contributions of low contributors – possibly by pressuring the project leadership to deliver better results – these findings may explain the main result of the paper. However, we cannot rule out other mechanisms, such as a herding effect independent of any encouragement, questions, or criticisms.

This paper highlights that community mobilization can be more effective than individual mobilization, if organized carefully. In fact, Fig. 4 shows that the mixed meetings essentially turned low contributors into high ones, while Fig. 5 shows that high contributors did not reduce their contributions in mixed meetings. In this sense, peer effects can represent a “win–win” and an important way to mobilize the community. Replication is needed to see whether these findings hold in other geographic contexts too. The presence of peer effects has important practical implications given how common voluntary contributions are to community driven projects in developing countries struggling to finance much needed local development projects. These findings likely go beyond community based projects, and may be applicable to other contexts where contributions need to be raised, such as charity giving, or political fund-raising.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jebo.2016.10.002.

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[10] They can be sorted into the following 11 categories, listed by decreasing frequency, (1) project management organization, (2) general positive comments about the project, (3) project management: contributions, (4) project progress (site, generation, distribution), (5) project management: days of communal work, (6) financial personal contributions, (7) provision of distribution poles, (8) seminar (i.e., organization of these meetings), (9) the financial situation of the overall project, (10) the supermarket (a side project), and (11) other comments on other projects. See Table Appendix 3 (in the online appendix) for a definition of these categories, total number of questions/comments for each category, and some examples.

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