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Changing Households' Investments and Aspirations through Social Interactions

Evidence from a Randomized Transfer Program

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Abstract

Low aspirations can limit households' investments and contribute to sustained poverty. Vice versa, increased aspirations can lead to investment and upward mobility. Yet how aspirations are formed is not always well understood. This paper analyzes the role of social interactions in determining aspirations in the context of a program aimed at increasing households' investments. The causal effect of social interactions is identified through the randomized assignment of leaders and other beneficiaries to three different interventions within each treatment community. Social interactions are found to affect households' attitudes toward the future and to amplify program impacts on investments in human capital and productive activities. The empirical evidence indicates that communication with motivated and successful nearby leaders can lead to higher aspirations and corresponding investment behavior.

Changing Households' Investments and Aspirations through Social Interactions: Evidence from a randomized transfer program[1]

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and

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1. Introduction

Low levels of investment in human capital and productive activities are often considered a key constraint for households to escape poverty. Many development interventions hence aim to increase investment by the poor. Conditional cash transfer programs aim at augmenting households' investment in human capital in at least 29 countries (Fiszbein and Schady, 2009) and microfinance programs provide means for productive investment for more than 100 million households around the world (Microcredit Summit Campaign, 2009). A key question related to such programs is whether their impact on households' investments can go beyond the immediate impact of relieving liquidity constraints and result in upward mobility. The answer is not obvious, as other economic, social, and behavioral constraints for wealth accumulation may often remain.[2] Indeed, Appadurai (2004) and Ray (2006) have argued that upward mobility might be difficult for the poor when they lack the capacity to aspire, which itself can be caused by poverty. The poor might have low aspirations, and no orientation to the future, in part because their own experiences and the experiences of those that are close to them may suggest that escaping poverty is not a feasible option. But they also discuss how learning about the positive experiences from others that are sufficiently "close" through social interactions can be instrumental in changing aspirations and shaping positive attitudes to the future, and in turn lead to investments in education and income generating activities.[3]

This paper provides empirical evidence of the positive impact of social interactions on aspirations in the context of a transfer program. It shows in particular that social interactions with nearby leaders can play a role in affecting investments and positive attitudes of other beneficiaries. Aspirations are analyzed by considering both attitudes and investments in human capital and productive activities, as the latter are the economic outcomes that can result from the shift in aspirations. We focus on female leaders that live in the proximity of other beneficiaries

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[2] Banerjee and Duflo (2007) indicate, for instance, that the consumption patterns in a wide set of countries suggest that many among the poor don't seem interested in accumulating wealth.

[3] Appadurai (2004) describes how mobilization by social movements can expand the capacity to aspire, in part through regular social gatherings and sharing ideas and experiences about future-oriented activities (such as savings or investment in new housing technologies) among the poor. Ray (2006) proposes the concept of an aspiration window, with an individual, through social comparisons, drawing her aspirations from the achievements and attitudes of her peers and near-peers. He indicates that a widening of this aspiration window then can result in deliberate action through investments that can help raise future standards of living.

and have similar socio-economic backgrounds, which make their experience relevant for the other beneficiaries. We hypothesize that such leaders may affect aspirations by setting good examples and that their experiences can help open the aspiration window of others. This could be further enhanced by talking about these experiences and otherwise motivating others.

Psychologists have long emphasized that social comparisons can influence attitudes as well as actions (Festinger, 1954, Karlson et al. 2004). Psychological evidence has also shown that goals or aspirations can affect performance in various ways (Locke and Latham, 2002), and that this can be further enhanced by leaders who communicate an inspiring vision and behave supportively (Latham and Saari, 1979; Bass, 1985). In economics, the role of aspirations for decision-making has been incorporated in the theoretical micro literature (Borgers and Sarin, 2000; Diecidue and van de Ven, 2008) and aspiration-based learning has also been introduced in game theory (Bendor, Mookherjee, Ray, 2001). Aspiration levels are modeled to be constant, to evolve over time, or to be based on experiences of others (Bendor, Diermeier and Ting, 2008; Dixon, 2000; Karandikar et al., 1998). In the theoretical macro literature, aspirations have been incorporated in overlapping generation models with trade-offs between human capital investment and current consumption. In these models, aspirations often depend only on own or parents' past consumption (Alonso-Carrera, et al. 2007; De la Croix, 2001). But in Mookherjee, Napel and Ray (2009) aspirations are based on achievements of one's neighbors and the resulting social externality can lead to equilibria with segregation. Aspirations in Genicot and Ray (2009) also depend on average outcomes of others, or alternatively only on outcomes of those that are doing better than one. Individuals react to aspirations through investment in own self-improvement or in their children, and the model predicts a lot of upward mobility when other people's experiences result in aspirations that are challenging, yet attainable.

Hence, while some theoretical models assume aspirations are formed based on own experiences, others assume that aspirations are being shaped in part by social interactions with peers or with people that are doing (slightly) better. These differences in assumptions lead to very different predictions. This paper provides empirical evidence that helps shed light on these assumptions. Such evidence is rare in part due to the reflection problem that complicates most empirical

analysis of social interactions (Manski, 1993). We use a randomized experiment to address the identification challenge.

In particular, we rely on the two-staged randomized design of a short-term transfer program aimed at protecting and augmenting the asset base of the rural poor in a shock-prone area in Nicaragua. The program combined conditional cash transfers with interventions aimed at increasing households' productive potential. Because it targeted the vast majority of households in each community and explicitly encouraged group formation, it provides a unique opportunity to analyze the role of social interactions. Households were randomly assigned to three different intervention groups within randomly selected treatment communities. Leaders were also randomly allocated to one of the three interventions. This implies that there is random variation in whether beneficiaries live close to leaders with a particular benefit package. The largest of the three packages offered resources for productive investments, and, as we will show, leaders who randomly received this package successfully started new productive activities. This provides us with the exogenous source of variation for our analysis, as we consider the impacts of proximity to the random group of leaders that had received this package and analyze whether the successful examples affected investments and attitudes of other beneficiaries.[4]

We hypothesize that such social interactions affect households' attitudes and amplify the program impacts on investments in human and productive capital. Evidence based on other randomized experiments suggests that the role of social interactions to further positive development outcomes is not always straightforward. Duflo et al. (2006) find no evidence of social learning for the adoption of fertilizer in Kenya, despite its demonstrated profitability. And Kremer and Miguel (2007) find negative social effects for the adoption of de-worming drugs in the same setting.[5] This further indicates the importance of understanding the consequences of social interactions when considering the impacts of any particular intervention.

When analyzing social interactions and learning, and following Besley and Case (1994) and

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[4] In focusing on leaders, this paper also relates to the literature on the importance and the role of (female) leaders in developing countries (Beaman et al., 2009; Chattopadhyay and Duflo, 2004; Jones and Olken, 2005).

[5] Evidence on social interaction effects based on randomized assignment in the Moving Out of Poverty experiment is also mixed (Kling, Liebman and Katz, 2007).

Foster and Rosenzweig (1995), a growing number of studies consider geographic neighbors (Munshi 2004), networks of friends and neighbors (Bandiera and Rasul, 2006), or use additional, detailed information about communication patterns between households to identify "information neighbors" (Conley and Udry, 2008). In this paper, we primarily consider geographical neighbors by using proximity to female leaders, and analyze communication patterns to further shed light on the relationship between these leaders and the other beneficiaries.

Much of the literature on social interactions focuses on social learning related to the use or the benefits of new or existing technologies, and its impact on technology adoption.[6] In relation to conditional cash transfer programs, social interactions have also been studied with regard to consumption and human capital investment. The focus has primarily been on spillovers through direct transfers (Angelucci and De Giorgi, 2008; Angelucci et al., 2009) or peer effects in education (Bobonis and Finan, 2008; Lalive and Catteneo, 2006). All of these papers find substantial spillover effects.[7]

In this paper, we focus on social interactions between leaders and other beneficiaries and similarly find large effects. Yet, by focusing on aspirations, we highlight a mechanism that is different than technical learning, economic spillovers, or peer effects in school. In the empirical analysis, we distinguish between these various mechanisms. Overall the empirical evidence supports the hypothesis that examples of, and communication with, motivated and successful leaders led to higher aspirations and corresponding investment behavior by other beneficiaries, while it does not provide support for the alternative mechanisms.

The paper is hence organized as follows: in the next section we discuss the key features of the program and the relevance of social dynamics and households' attitudes towards the future in the

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[6] A closely related literature looks at how information from role models (Nguyen, 2008) or product endorsement by trusted sources (Cole et al., 2009) affects investment and adoption behavior.

[7] Angelucci and De Giorgi (2008) find that direct transfers caused food consumption increases for the ineligible of 10% (compared to approximately 20% among eligible), Bobonis and Finan (2008) focus on peer effects in secondary school enrolment and find that a 10% point increase in enrollment of a child reference group, increases probability of enrollment with 5% points. Lalive and Catteneo (2006) find that enrollment of non-eligible increased about 1/3 of the increase for the eligible. Angelucci et al. (2009) find no impact on secondary school enrollment among eligible without extended families, while there is an 8% point increase among households with extended families.

context of the program. Section 3 discusses the data and the empirical strategy. We show that the randomization worked and establish that female leaders who randomly received the largest package have better economic outcomes and more positive attitudes than others. Section 4 and 5 contain the main results of the paper and show that social interactions with these successful leaders increased program impacts on human capital, productive investments and attitudes, and particularly so for beneficiaries that themselves also received the largest package. Changes in attitudes are shown to be related to the investment outcomes and attitudes of leaders. We also shed light on the distinction between interactions with peers and interactions with local leaders. Section 6 further investigates the mechanisms underlying the social interaction effects. We show evidence of higher levels of communication and motivation among leaders and beneficiaries of the productive investment package. We also investigate alternative mechanisms in the form of economic spillovers or technical learning and do not find empirical support for those. Section 7 concludes.

2. Program design, social interactions, and aspirations

2.1.   Description of the program and the three transfer packages

The *Atención a Crisis* program was a one-year pilot program implemented between November 2005 and December 2006 by the Ministry of the Family in Nicaragua.[8] The program was implemented in the aftermath of a severe drought and had two objectives. First, it aimed to serve as a short-run safety net by providing cash transfers to reduce the need for adverse coping mechanisms, such as taking children out of school or reductions in food consumption. Second, the program intended to promote long-run upward mobility and poverty reduction by enhancing households' asset base and income diversification capacity. A total of 3,000 households were selected to participate in the program. These households were allocated one of three different packages through a participatory lottery: (i) the basic CCT; (ii) the basic CCT plus a scholarship for an occupational training; and (iii) the basic CCT plus a grant for productive investments. While the basic CCT's aim was to protect investments in human capital, the two additional components aimed at strengthening households' ex-ante risk management.

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[8] The pilot design built on the already existing and successful conditional cash transfer (CCT) model in Nicaragua *Red de Protección Social,* evaluated by Maluccio and Flores (2004).

All selected beneficiary households received the basic CCT, which included cash transfers conditional on children's primary school and health service attendance during the one-year time period. Households received a transfer of US $145 even if they did not have children. Households with children between 7 and 15 enrolled and attending in primary school received an additional US $90 per household and an additional US $25 per child (with all amounts referring to the total transfer received over the year). The school enrollment and attendance requirement was carefully monitored. However, due to implementation problems, children's visits to the health centers were not monitored by the program (see Aguilera et al., 2006).

In addition to the CCT, one-third of the beneficiary households also received a scholarship that allowed one of the adult household members to choose among a number of vocational training courses offered in the municipal headquarters. The scholarship was conditional on regular attendance to the course. The courses aimed at providing participants with new skills for income diversification outside of subsistence farming. These beneficiaries were also offered labor-market and business-skill training workshops organized in their own communities.

Finally, another third of the beneficiary households received, in addition to the basic CCT, a grant for productive investments aimed at encouraging recipients to start a small non-agricultural business activity with the goal of asset creation and income diversification. This grant was conditional on the household developing a business development plan, outlining the objectives of the business and proposed investments in new livestock or non-agricultural income generating activities. Beneficiaries received technical assistance to make a business plan and also participated in business-skills training workshops organized in their own communities.[9]

Due to implementation delays, the vocational training courses had not started at the moment the data of the follow-up survey, used for this paper, were collected. At the time of the survey, the

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[9] Take-up of the overall program among eligible households was 95%. As for the different components: 89% of the households eligible for the vocational training grant had enrolled one of its household members in a course. Take-up of the productive investment grant among eligible households in the program was near 100%. About 10% of the business development plans had initially been refused by the ministry, but these were sent back to the households and virtually all of them developed a new plan, with the help of technical assistance (with the few exceptions being the households that migrated out).

difference between the vocational training beneficiaries and those of the basic CCT package was hence that vocational training beneficiaries had participated in a number of meetings with other beneficiaries of the same package with the objective to select the courses they were going to take. They might also have had, off course, other expectations about future skills, about related future income and/or expectations about compensation for the time spend in training. The beneficiaries of the productive investment package, on the other hand, had received the largest amount of benefits: 2-3 months before being surveyed they had received $175 to invest in a nonagricultural activity.[10] In addition they had received technical assistance to select the activity and develop a business plan, help which they were still receiving during the follow-up survey. Given these insights and the enthusiasm observed about the productive investment package during qualitative fieldwork, we focus on whether social interactions with leaders that received the productive investment package affected investments and attitudes of other beneficiaries.

2.2.   Attitudes about the future and social interactions in the context of the program

The main economic activity of most of the beneficiaries of the program is the cultivation of corn and beans, mainly for subsistence purposes. With the frequent occurrence of droughts, this livelihood is quite precarious as harvests are often completely lost. Many households attempt to cope with these shocks through seasonal migration. Despite the frequent re-occurrence of weather shocks, few households seem to rely on ex-ante risk management strategies. Data from control communities show that 38 percent of households planned to invest more in agriculture, which - given that they reside in a drought-prone region - arguably increases their exposure to future shocks. And 20 percent of control households report that they would do nothing or only pray to God to prevent negative impacts of future shocks.

In qualitative interviews, informants often said that households do not really plan ahead and instead live from "day to day". But they also testified that they had started to think more about the future because of the program, and in particular the productive investment package. Beneficiaries also described the importance of learning about other's experiences in changing these attitudes.[11] This is interesting as the productive interventions of the program aimed at

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[10] The remaining $25 was to be paid on the next payment day (after survey completion).

[11] A beneficiary, who received the productive investment package, noted: *"Before the program, I just thought about working in order to eat from day to day. Now I think about working in order to move forward through my business.*

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increasing the households' risk management. Anecdotal evidence hence suggests that aspirations and perspectives towards the future may have been a key part of program impact, and also indicates the potential role of social interactions in changing attitudes.

The program could have an impact on household's investment behavior through several of its design features. First, the level of transfers was substantial, ranging from 18 percent of average household income for those receiving the basic CCT package to 34 percent for those receiving the productive investment package. Such large relative transfers may facilitate shifts in asset accumulation and behavior. Second, the conditionalities and social marketing on education, health and nutrition aimed at changing households' perspectives about investment in long-term human capital. This was emphasized through repeated communications during program enrollment, pay-days and other capacity training activities. Similarly, the vocational training and productive investment interventions specifically aimed at increasing households' risk management through income diversification, and these messages were also repeatedly conveyed during program implementation.

The program's design also created many opportunities to enhance interactions between beneficiaries, and in particular between women, who were the recipients of the cash transfers and were given a leading role as the main participants in the implementation of the different components of the program. Moreover, more than 90 percent of the households in treatment communities were eligible for the program, increasing the opportunities for information sharing and interactions, and possibly resulting in higher motivation and program ownership.

Program participants were also required to participate in a number of local events and talks ranging from discussions on nutrition practices to workshops on business development and labor market skills. The division of program beneficiaries in three distinct groups with different benefits created an exogenous channel (via the random allocation of the three packages) by

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Through experiences, one learns and opens up towards the future. By talking to others, one understands and learns."

which beneficiaries of the same program package would have more opportunities to interact among each other.

Finally, and as part of the program design, a subset of beneficiary women were selected during the registration assemblies to serve as *promotoras* or leaders of small groups of beneficiary women (approximately 10 per group) in order to further enhance information flows and motivation and to enhance compliance with the various program requirements and conditionalities. Specifically, the *promotoras* were expected to frequently meet with the beneficiaries in their groups to talk about the objectives and the conditionalities of the program. While these women self-selected to lead these groups, they were randomly allocated to one of the three program packages (see below). The program hence created a lot of new leadership positions for women in these communities, whereas before the program, leadership positions for women in these communities were limited mostly to positions as teachers and health coordinators.

2.3. Program randomization

The program was targeted to 6 municipalities in the Northwest of Nicaragua. These were municipalities that met both criteria of having been affected by a drought the previous year and by the high prevalence of extreme rural poverty based on the national poverty map.[12] From the list of all communities in the 6 municipalities, 56 intervention and 50 control communities were randomly selected through a lottery to which the mayors of the 6 municipalities were invited to attend and participate.[13] Baseline data were then used to define program eligibility based on

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[12] The budget for the pilot allowed targeting 3000 households for a one-year period, which was much smaller than the population of the 6 municipalities. The program was therefore allocated randomly. Households were notified that funding of the project implied that the program would last 1 year, and would only cover the treatment communities. Households in the control communities did not receive any program benefits. They were notified that if there was a decision to scale up the program after the initial year, the control communities would be incorporated. People in the treatment communities understood the program was only to last for a year, and people in the control communities knew that there was a possibility they may receive the program the next year, but they also knew it was likely to depend on the result of the national elections that were to be organized at the end of that year. In that election, the government changed and the project was not scaled up.

[13] Before the lottery, all communities in the 6 municipalities were grouped in pairs based on similarity in road access, infrastructure, (micro-) climate, crop mix, and proximity. Through the lottery, one community of each pair was selected as a treatment community, the other as control. In case of uneven number of communities, a "pair" consisted of the largest community and the combination of the two other communities. The identification of communities and community pairs was based on maps and discussions with municipality technical personnel.

poverty and vulnerability, resulting in the identification of 3000 households to participate in the program.[14] From each eligible household, the female household member that was reported as the primary caregiver was then invited to a registration assembly.[15] If there were more than 30 eligible households in a community, several assemblies were organized at the same time, and households were assigned to one of the assemblies based on the geographic location of their house.[16] In total, there were 134 assemblies.

During the assemblies, the program objectives and its various components were explained and women were asked to volunteer for the *promotora* positions. Volunteers were approved by the assembly and beneficiaries were allocated to a *promotora* based on a joint decision, typically based on proximity. At the very end of each assembly, all the beneficiaries - including the *promotoras* - participated in a lottery process through which the three packages described above were randomly allocated among the eligible households. Specifically, each beneficiary - including the *promotoras,* any other women with already existing leadership positions in the community, and all other beneficiaries - was asked to randomly draw a ball with 1 of 3 colors from a black, nontransparent bag. For each assembly, the bags contained an equal number of balls from each color, and the total number of balls matched the total number of beneficiaries in the assembly. At the end of the day each color was matched to an intervention package through another lottery to which all beneficiaries from the community attended. Hence at the moment of

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Communities tend to be geographically separated from each other, which reduces the potential for spillover effects from the treatment on the control communities.

[14] The eligibility criteria were determined using the proxy means. Additional discussions with local leaders from each intervention community were conducted to identify possible exclusion or inclusions errors. Based on the discussions with leaders, 3.72% of all the households considered were re-assigned from non-eligible to eligible, and 3.65% from eligible to non-eligible. To avoid any possible selection bias resulting from the re-assignment by the leaders, all estimates in this paper are intent-to treat estimates, using the intent-to-treat as defined by the proxy means methodology.

[15] Only in the few cases that there was no adult female in the household, an adult man was selected as the program recipient.

[16] During baseline data collection, existing maps that identify the location of each house in the communities were updated, and each house received a number based on the location on these maps. Each community has a community leader who is the mayor's contact person in his community and who helped the survey teams identify the borders of the community, as used for all other administrative purposes. Neighboring houses were given subsequent numbers. Invitations to the registration assemblies were based on these house numbers, so that the beneficiaries invited to the same assembly are likely to live in relative proximity to each other (though the geographical distance differs from community to community, as some communities are more disperse than others).

promotora selection, nobody knew which intervention package the *promotoras* or anybody else would end up receiving. [17]

3. Data and empirical strategy

3.1. Data

The data come from a household panel in the control and treatment communities. In treatment communities, data were collected from all households. In control communities, a random sample of households was selected so that the sample size in each control community was equal to one-third of the population in the intervention community that belonged to the same pair. This resulted in a control group of equal size as each of the three intervention groups (of about 1000 households). [18] The follow-up data was collected 9 months after the start of the CCT component of the program. The attrition rate of the second round was very low - 1.3 percent of the original households – due to tracking of households that had migrated. Attrition is uncorrelated with treatment - in a regression of attrited households on a dummy for treatment the coefficient is -.004, with a standard error of .005.

A number of survey instruments were used for data collection. The main household survey, collected in both rounds, contains household and individual level data on various socio-economic indicators for approximately 4400 households. In the follow-up survey, additional modules were added to specifically capture information about social dynamics and information sharing. A community survey was also collected to track, among other things, possible price changes and the presence of new programs.

During the follow-up survey, a separate team of female enumerators administered an additional questionnaire on early childhood development and women's socio-emotional state and attitudes.

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[17] Due to the transparency of the process, the lottery process was widely perceived as fair. Participation by the invited beneficiaries to the assemblies and lotteries was near 100%.

[18] If the number of households in the control community was less than one-third of the population of the treatment community, additional control households were sampled in a nearby control community. About 1100 households were sampled in the control communities. Out of those about 1000 are identified as "eligible" households using the same proxy means method as used for the treatment. These are the control households included in the intent-to-treat estimates.

This data were collected for all women who were the primary caregivers of children between 0 and 8 in treatment and control households. Mental health was measured using the Center for Epidemiological Studies Depression scale (CESD). The CESD is a widely-used measure of depression (Radloff, 1977), and consists of 20 questions on self-reported depression. Besides calculating an aggregate depression score, these questions also allow to look separately at positive and negative feelings, including expectations about the future. Finally, the questionnaire also included direct questions about aspirations and perceptions on upward mobility. This allows us to consider the relationship between attitudes towards the future and social interactions.

In addition to the quantitative data, qualitative work preceded each round of data collection. The qualitative work consisted of focus groups and semi-structured interviews with a wide set of beneficiaries and other local actors in treatment and control communities, and in municipal headquarters, and explored qualitative evidence of the program's impacts as well as issues related to program implementation (Aguilera et al., 2006).

3.2   Identifying social interactions

Our identification strategy relies on two key program design elements, namely the randomized allocation of beneficiaries to one of the three program packages, and the random allocation of these same packages among local female leaders. This allows us to explore whether program impacts depend on social interactions between beneficiaries and leaders.

Table 1 presents the randomization results for the full sample of eligible households. The baseline differences between treatment and control communities are generally small and not statistically significant. The last three columns in Table 1 show the P-values for differences between the three intervention packages (i.e. the result of the participatory lotteries in the communities). As expected, there are only a small number of statistically significant differences and the direction of the differences suggests there is no systematic bias.

The variables used to identify social interaction effects rely on the random allocation of female leaders to one of the three intervention groups. We consider both *promotoras* and other women with leadership positions. Specifically, information was collected for each household member on

leadership responsibilities in the community. About 17% of eligible households are households with a female leader. The share of households with female leaders is higher (19%) in the treatment than in the control communities (11%), given that about half of the leadership positions in the treatment communities were directly created by the program in the form of the program *promotoras*. Other female leadership positions in the communities are mainly responsibilities as health coordinators and teachers, which already existed before the program.[19] The lottery process described above implied that the distribution of female leaders across the three different program packages is random across registration assemblies.

Table 2 confirms this by presenting randomization results for the subgroup of households with female leaders. There are no systematic significant baseline differences between leaders with the three packages. Comparing Table 1 and Table 2 also sheds some light on the characteristics of the female leaders. Female leaders tend to be younger and more educated than the average beneficiary. While beneficiaries have on average 3 years of education, leaders have on average 5 years. For the leaders that received the productive investment package, these higher education levels, and in particular higher levels of numeracy, are likely to be important for a more successful management of their new nonagricultural activities. Leaders' outcomes for human capital investments in their children also are generally somewhat better than those of others. On the other hand, income level and the income structure at baseline were similar to those of the other beneficiaries. The similar socio-economic status of leaders and others might make it easier for the others to identify with the positive experiences of the leaders.[20]

For the analysis of the social interactions, we consider all female leaders that participated in each registration assembly, and calculate the share of female leaders that was randomly allocated productive investment packages. The share varies between 0 and 1. On average, 32 percent of female leaders received the productive investment package, which further confirms the

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[19] We consider both types of female leaders together, in part because they are not mutually exclusive (as many health coordinators and teachers volunteered to be *promotoras*). Empirically, we cannot reject that proximity to *promotoras* and other leaders has the same impact.

[20] Descriptively, the data further show that living standards are very low. Only 13% of households have access to water in their homes, 40% have access to electricity, about a quarter do not have latrines, and average per capita income is less than a dollar per day. The data also show that monetary income from self-employment or local agricultural wage work is very limited, with households depending to a large extent on self-consumption of their agricultural production, migration income, and transfers.

randomization (Table 1). Yet, in some assemblies, the share will be relatively high while in others it can be low. Given that leaders participated in the same lotteries than other beneficiaries, it can randomly occur, for instance, that in one assembly 0 out of 3 leaders got the productive investment package, while in another assembly 2 out 3 did. It is this random variation that we rely on to identify social interaction effects.

Based on the above, our general specification is of the following form:

$$Y_{ia} = \delta_0 + \delta_1 T_{ia} + \delta_2 (T_{ia} * S_a) + \varepsilon_{ia} \qquad (1)$$

where Y_{ia} is an outcome indicator for beneficiary i who participated in assembly a, T_{ia} is assignment of beneficiary i to any of the treatment groups, and S_a is the share of female leaders (over all female leaders in the assembly) that randomly received the productive investment package in beneficiary i's registration assembly.[21] Given that households were invited to particular assemblies based on geographic proximity, S_a will capture the share of leaders with the productive investment package that live in the proximity of beneficiary i.[22] A finding, for example, that δ_1 and δ_2 are both positive would imply that while assignment to the treatment group increases the outcome of interest (δ_1), there is an additional impact of the program that comes from the social interactions (δ_2). We also explore how the share of leaders with the productive investment package affects impacts for beneficiaries of each of the three packages separately. All regressions are estimated on the sample of beneficiaries that are not leaders themselves.

3.3. Outcomes for households with female leaders

Before turning to the social interaction results, this section describes the follow-up outcomes of female leaders in order to further motivate the focus on leaders with the productive investment package. In particular, we show how the outcomes of these leaders differ both compared to other

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[21] S_a is always zero for those in the control group and hence collinear with $T_{ia} * S_a$.

[22] Location of one's house might be endogenous, and people living in the proximity of leaders might also be more likely to be their family members, or otherwise have similar characteristics. The identification in this paper does not depend however on the proximity to the leader per se, but instead it depends on the random allocation of certain packages to those leaders.

leaders and compared to other beneficiaries with the same package. For human capital investments, we focus on education and nutrition because the social marketing of the program was heavily focused on these investments and because the education conditionalities were rigorously monitored by the program (in contrast to the health conditionalities). Specifically, we consider school attendance and spending on education for children between 7 and 18, as well as the share of food expenditures used for nutrient-rich food (animal proteins and fruit and vegetables) at the household level.[23] In terms of economic activities, we focus on income from local wage and self-employment. Specifically, we consider increases in income in nonagricultural activities and especially commercial activities, and shifts away from agricultural wages. And given that investments in livestock take a longer period to result in income, we consider the value of the animal stock.

Households with female leaders who received the productive investment package are, at follow-up, more likely to have higher income from commercial activities, and more generally, from non-agricultural self-employment, than other leaders (Table 3). By the time of the survey, they had earned about 16 US$ more per capita in non-agricultural employment than the other leaders. They also have larger animal stocks (about 26 US$ per capita more). On the other hand, we do not find significant differences between the three types of leaders with regard to human capital investments. Considering the attitudes of the female leaders towards the future, positive feelings are generally the strongest for leaders with the productive investment package, who are for example 20 percentage points more likely to report that they are moving ahead in life than leaders with the basic package.[24] Overall, outcomes for leaders that received the productive investment package hence appear to differ from other leaders and they generally seem to be doing better. This is particularly true for economic activities and for their attitudes regarding upward mobility.

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[23] Focusing on cognitive development in early childhood and related investments, Macours, Schady, and Vakis (2008) show that the program caused an overall shift in parental investment and spend proportionally more on animal protein, fruit and vegetables.

[24] Leaders with the vocational training intervention have more positive expectations than those with the basic package (consistent with the expectations about the delayed intervention).

Compared to the other beneficiaries with the productive investment package, leaders appear to be investing more in human capital and productive activities (Table 3). Their income from commercial activities is more than twice as high compared to other beneficiaries, and the value of their animal stock is higher. Leaders also have higher overall income levels, and have a stronger feeling that they are moving forward in life. The distribution of the type of activities leaders and other beneficiaries invested in with the productive grant is also different, with leaders investing more in commercialization of specialized products or general corner stores, while other beneficiaries invest more in small livestock (Table 4). This difference in the type of activity may in part help explain why leaders had higher outcomes 2-3 months after receiving the grant, as income gains from livestock activities take more time. More generally, it is not surprising to find better outcomes for leaders, since they might be more likely to be entrepreneurial and/or have other unobserved characteristics correlated with leadership. Independently of the mechanism, the data indicate that human capital and productive outcomes, as well as positive attitudes, were higher for leaders, leaving room for positive effects on other beneficiaries.[25]

4. Social interaction effects on human capital and productive investments

4.1 Main results

We first consider all eligible households, excluding the leaders themselves, and investigate whether there is a relationship between program impacts and the presence or proximity to female leaders who received the productive investment package.[26] The interaction terms in Table 5 show that social interaction effects increased program impacts on human capital investments. The higher the share of leaders with the productive investment package in one's proximity, the higher the impacts on various education and nutrition investments of other beneficiaries.[27] The effects are not only statistically significant, but are also quite large. For example, while school attendance is estimated to increase with 5 percentage points when no leader in one's assembly

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[25] Note that any positive social effects would reduce the observed differences between leaders and non-leaders, implying that the differences in Table 3 are an underestimate of the potential for social effects.

[26] The average treatment effects for all eligible households are in line with results from other conditional cash transfer program with strong impacts on education, consumption, and nutrition. Also average income from commercial activities and more generally from non-agricultural self-employment increased significantly for the beneficiaries who received the productive investment package (results available from authors).

[27] Similar results are obtained with variables capturing individual food intake of young children (0 to 8 years old).

received the productive investment package, it increases with an estimated additional 6 percentage points if all the leaders in one's assembly got the productive investment package.

Table 6 shows the social effects on human capital investments separately for each treatment group. We find that social interactions are the strongest for beneficiaries of the productive investment package. For instance, the share of food expenditures used for nutrition-rich food is estimated to double for beneficiaries of the productive package in the extreme case that the share of leaders with the same package changes from 0 to 1. The social effects are smaller for the beneficiaries of the training packages and the basic packages (about half the size) and many of the interaction terms are not individually significant. Nevertheless, the P-values indicate that we can generally not reject that the social effects are different for the three groups. When pooling the basic and the training packages together, the interaction effects for the number of days absent, school expenditures, and expenditures for fruit and vegetables are significant.

Turning to shifts in economic activities, there are no significant social effects on all beneficiaries together (Table 7). But Table 8 shows however that the higher the share of leaders with the productive investment package in one's assembly, the higher the income from nonagricultural activities, and in particular from commercial activities, for beneficiaries with the productive investment package. This seems to be compensated with a shift away from agricultural wages. There are also substantial social effects on livestock holdings.

Social interactions hence enhanced investments in nonagricultural activities (commerce and livestock), and as such augmented the program's objective of income diversification. This is the case for the beneficiaries of the productive investment grants, but not for the other beneficiaries. The point estimates of the interaction effects are small for the other beneficiaries, and the P-values indicate that the social interaction effects for economic outcomes are significantly different between the beneficiaries with the productive package, when compared with the other

beneficiaries. This is consistent with the fact that the other beneficiaries had not received any extra resources that would allow for such investments.[28]

To put the magnitude of the social interaction effects in perspective, it is useful to know there are on average about 4 leaders in a registration assembly. Hence the coefficients suggest that having one additional leader with the productive investment package in one's assembly increases school attendance with approximately 2.5% points, and reduces absences with about .85 days per month. Looking at the social effects on productive investments, one additional leader increases income from nonagricultural activities with about 60 cordobas (about 3.3 US$) per capita, and value of the animal stock with about 220 cordobas (about 12US$) per capita, on average (with average household size about 5). Given that the beneficiaries had received 175$ of the productive investment grant 2 to 3 months before the survey, and different households invested in different types of activities, these are substantial effects.[29]

4.2. Robustness checks

The results on social interaction effects on human capital and productive investments are robust to several alternative specifications.[30] A first concern could be that the results are driven by extreme values in the independent variable. While the average share of leaders with the productive investment grant is .33, the range varies between 0 and 1. However, for 95% of the observations, it is between 0 and .67. In the first robustness check in Table 9, we therefore exclude the observations with values above .67, and show this does not substantially alter any of the results, even if, as expected, the standard errors increase. The results are also robust to

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[28] One could alternatively hypothesize that for beneficiaries of all packages impacts might be larger for if they received the same packages than the leaders in their proximity. However, we do not find evidence of such social interaction effects for beneficiaries with the basic or the training grant (results available from the authors).

[29] The results in Table 8 also suggest that in the extreme case that there are no leaders with the productive investment package in one's registration assembly, there are no significant impacts of the productive investment package. This could possibly be explained by slower implementation of the new activities in those cases and does not necessarily mean that on the long-term the intervention does not have an impact on those households. Anecdotal evidence suggests that some beneficiaries with the productive investment package had delayed implementation of their plans, even after receiving the cash. On the other hand, some others had started to invest in their nonagricultural activities even before receiving the actual transfer, drawing on other income sources and possibly some of the CCT money.

[30] Table 9 presents robustness checks for the beneficiaries with the productive investment grant. The social effects on human capital investment when all beneficiaries are considered together are similarly robust to these alternative specifications.

clustering the standard errors at the level of the registration assembly, as opposed to at the community-level, and to not excluding outliers. The next two specifications control for the total number of people in an assembly, or the total number of peers (defined as beneficiaries that are not leaders) in an assembly. This accounts for the fact that as the share of leaders with the productive investment package increases in an assembly, the share of peers with that package automatically decreases. One could hypothesize this might have an effect on its own, but in that case we would expect the total number of persons in the registration assembly (which varies because of the different sizes of the communities) to be correlated with such an effect. The results are robust to including these controls.

The next specification includes a community fixed effect. This sheds light on whether, once we control for any community-level social effects, we still find social effects of leaders that live in beneficiaries' proximity (i.e. that were in their registration assembly). While the fixed effects specification reduces the variation in the independent variable (as 13 of the 56 treatment communities only had one registration assembly), the results still show significant social interactions effects for productive activities and educational outcomes.

Table 9 further shows alternative specifications using the number of female leaders with the productive investment grant instead of the share as independent variable. These specifications also control for the total number of female leaders in the registration assembly. The coefficient on the number of leaders with the productive investment grant shows results that are largely consistent with the ones with the share variable in terms of sign, size, and magnitude. One drawback of this specification is that the total number of leaders living in one's proximity is likely to be correlated with many different unobservables. The community fixed effects in the next specification controls for some, but not all of these unobservables, which is why this is not our preferred specification.

Nevertheless, an advantage of considering the number of leaders, as opposed to the share, is that we can compare the coefficient of the number of leaders with the productive investment grant, with the coefficient of the number of peers with the productive investment grant (last specification in Table 9). This is interesting as one might hypothesize that social effects might

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not only be generated by leaders, but also by peers with the same package. Given that one-third of the beneficiaries in each registration assembly received the productive investment package, once we control for the share of leaders with the productive investment package, there is very little variation in the share of peers with that package.[31] Yet, registration assemblies varied in size, implying that there is more variation when we consider the number of peers as opposed to the share. The results in Table 9 suggest that social interaction effects from peers might be more limited, as the coefficients for the number of peers with the productive investment package are generally not significant, and smaller than the coefficients for the number of leaders. T-tests confirm that the coefficients for leaders and peers are significantly different for the economic outcomes (except animal stock) and the educational variables. Nevertheless, these results should be interpreted with caution, given that they could be driven by the fact that there is less variation to identify the social effects of peers, and given the concern related to the endogeneity of the total number of leaders in an assembly.[32]

5. Social interaction effects and attitudes

We now turn to investigating the relationship between social interactions with leaders and the attitudes of other beneficiaries. Given the above findings, we focus on beneficiaries with the productive investment package. As the literature on attitudes and mental health in developing countries has found strong correlations between an individual's mental health and average community mental health in different countries (Das et al., 2007), Table 10 shows estimates of the basic specification and a specification with community fixed effects.[33] The results show that women caregivers in beneficiary households with the productive package are more likely to

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[31] There is some variation coming from the fact that the number of people in a registration assembly was not always a multiple of three, but this is very limited.

[32] An alternative approach to analyze the social effects of leaders versus peers could be to consider the share of leaders and peers in the smaller groups that were formed around the *promotoras* during the registration assemblies. But, while the results of the social effects of leaders by group are qualitatively similar than the results by assembly, the coefficients are smaller and less precisely estimated. This could be because social effects are not restricted to the smaller groups, but it is also possible that beneficiaries reorganized the groups after the assemblies, so that the effective groups do not correspond to the administrative data on groups. Moreover, the administrative information on group composition itself is less precise than the information on who participated in which assemblies, introducing more measurement error in these estimations.

[33] We only have information on positive attitudes and mental health from a subsample of households (those where the primary beneficiary was the caregiver of small children), which might affect the precision of the basic specification. Including the community fixed effects helps to increase the precision of these estimates.

express positive attitudes when there are more leaders with the productive investment package in their proximity: they are more optimistic about the future, are happier in life, and have lower indicators of depression. Further, the higher share of leaders with the productive investment package, the less likely beneficiaries of the productive investment package answered they would not do anything (or anything else besides praying) to reduce the impact of future shocks. The social effects are large: given an average of 4 leaders per assembly, an additional leader with the productive investment package in one's assembly implies that beneficiaries are about 6.5 percentage points more likely to be optimistic about the future, and about 2.5 percentage points less likely to report they will "do nothing" to manage future risks.

A possible interpretation of these findings is that the successful outcomes of the leaders in their new activities helped to open the aspiration window of the other beneficiaries. We investigate this in Table 11 by regressing the attitudes variables of the beneficiaries with the productive investment package on outcomes of the leaders. In particular, we consider whether the maximum values of leaders' income in nonagricultural activities, their total income, and their perceptions on whether they are moving forward in life are positively correlated with the attitudes of other beneficiaries that were part of the same registration assembly. While there are clearly many unobservables that could affect both the leaders' outcomes and the beneficiaries' attitudes, we control for many of these by including 3 variables to separately capture outcomes of leaders with the basic package, the vocational training package and the productive investment package. We also add a community fixed effect to further control for unobservables. While these results are more suggestive because of possible remaining concerns about unconfoundness, they are quite striking. Table 11 shows a positive relationship between the economic outcomes of leaders with the productive investment package and the attitudes of the other beneficiaries with the productive package. We do not find a similar relationship between the outcomes of the other leaders and attitudes (and in fact, some of the results suggest an opposite relationship for the leaders with the basic package). [34]

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[34] Similar regressions to look at whether investment outcomes of leaders with the productive package are directly correlated with the same investment outcome of others show that these correlations are much weaker.

Returning to the question on whether the social effects of peers are similar to the social effects of leaders, we estimate a similar regression as above, but now also include the outcomes of peers with the three different packages separately. These results show that in general the positive correlations between positive attitudes and outcomes of leaders with the productive investment package are larger and more significant than the correlations with the outcomes of peers with the same package (Table 12). However the differences between leaders and peers are only significant for some of the outcomes. Taking these results together with the results on peers in Table 9, we interpret this as tentative evidence that the outcomes of leaders generate more social effects than those of peers.

6. Underlying mechanisms

The results in sections 4 and 5 show that the proximity to female leaders who received the productive investment package considerably strengthened program impacts on households' investments and attitudes. There is also a strong relationship between leaders' outcomes and other beneficiaries' attitudes. This is consistent with our interpretation that leaders are affecting others by increasing their aspirations. We now explore this mechanism further, before turning to possible alternative mechanisms.

6.1 Social interactions and motivation of leaders and beneficiaries

First, we analyze whether there is evidence on whether leaders and beneficiaries with the productive investment are more motivated and whether they share more information with each other. One indication of their motivation is the effort that either of them uses to communicate with the other. We therefore use information about the location of different houses and define a proximity metric based on the distance of a beneficiary's house to the closest female leaders' house.[35] We expect people to communicate less with each other as distance increases. This could be the case either because of increased transaction costs (time) that come with distance, or purely because they might be less likely to be close family or friends, and more likely to be different from each other along various dimensions, when they live farther from each other. We therefore

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[35] Since we do not have information about the exact physical distance between the different houses we use information on the order by which dwellings were numbered as an indicator of proximity. This information was obtained from detailed community maps that were updated during baseline data collection.

analyze whether there is a difference in the impact of distance for the different types of leaders and beneficiaries, taking advantage again of the randomized allocation of the three packages to both beneficiaries and leaders.

Table 13 shows the relationship between distance and communication with leaders. The dependent variable in the first three columns measures whether the beneficiary talked to her *promotora* in the last week. The dependent variable in column 4, 5, and 6 measures whether the beneficiary talked to her *promotora*, a health coordinator, or a teacher.[36] The results in column 1 and 4 first establish that, in general, distance to a leader does indeed reduce the likelihood of talking to the leaders. Column 2 and 5 show the evidence on motivation. In particular, we find that distance does not significantly reduce communication between leaders of the productive investment package and other beneficiaries, while the effect of distance is the largest for leaders with the basic package. The point estimate is in between the two others for the distance to leaders with the vocational training package (column 2 and 5).[37] The contrasts between the distances to different leaders are even bigger when only considering beneficiaries of the productive investment grant (column 3 and 6). P-values of the t-test for equality of the coefficients show that the differences between leaders with different packages are highly significant. These results could mean that leaders with this package, and, to a lesser extent, leaders with the vocational training transfer put in more effort to go talk to the beneficiaries, or that beneficiaries put in more effort to go talk to those leaders. Overall, it is clear however that the leaders and beneficiaries of the productive investment package are communicating more.

It also appears that they specifically talked about the program while meeting as we find similar patterns in beneficiaries' knowledge about the program. Specifically, a short test with nine yes-no questions on program knowledge was applied. The test dealt with issues related to targeting, program objectives and conditionalities, and general program rules. Comparing the last 3 columns in Table 13 with the previous results shows that the relationship between

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[36] As indicated above, *promotoras*, teachers and health coordinators represent the vast majority of female leaders. Unfortunately, we don't have information about whether the beneficiaries talked to other types of female leaders.

[37] As expected because of the randomization, the main distances to leaders with specific packages are three times larger than distance to any leader, explaining why the point estimates on distance in column 2 and 5 are overall smaller than in column 1 and 4.

communication and distance between different types of beneficiaries and *promotoras* is generally reflected in the knowledge score. While the differences are less stark than before, the results show a negative relationship between program knowledge and distance to leaders with the basic or the vocational package, and not for distances to leaders with the productive investment packages. The results on knowledge make it unlikely that the frequent communication merely reflect pure business transactions. Hence, overall distance to leaders with the productive investment package does not reduce communication with leaders or program knowledge, while distance to other leaders does. And these patterns are stronger when we only consider beneficiary with the productive investment package.

It is of course possible that beneficiaries and leaders with the productive investment package make more effort to talk to each other because as they start to engage in their new activities, they have a greater need to share experiences. And the results might also partly capture "mechanical" program impacts. Specifically, because of the different activities related to the program, beneficiaries with productive investment package regularly attended meetings and workshops together. Yet, whether the reported communication is directly linked to program activities or not, overall the results show that there is frequent communication between leaders and beneficiaries of the productive investment package.[38] Such communication with leaders may have facilitated and enforced the possibility for beneficiaries to get inspired by the positive examples of these leaders. It is hard to separate out to what extent the results are driven by the motivation of leaders, and to what extent they are driven by the positive examples these leaders provide, exactly because these two mechanisms are likely to reinforce each other.[39] More positive leaders likely shared their positive experiences and reflect their enthusiasm and positive attitudes in their interactions with other beneficiaries, and by observing and learning about these successes, others became more excited and optimistic. Hence the positive attitudes appear to have been contagious.

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[38] The program also influenced communication more generally. Reported communication with the community leader, the health coordinators and the teachers is between 25 and 50 percent higher in treatment than in control communities. Moreover, in the treatment communities, people are 31 percent more likely to talk about food prices and 200 percent more likely to talk about businesses than in the control communities, and these impacts are stronger for beneficiaries of the productive investment package than other beneficiaries.

[39] The evidence does suggest that the social effects do not primarily result from better monitoring and enforcement of the program rules by the more motivated leaders, as this would be unlikely to lead to positive effects on attitudes.

6.2 Alternative explanations: technical learning or economic spillovers

The social effects through aspirations discussed in this paper are different from other social interaction effects in the literature. In particular, it is distinct from social learning related to technical issues and/or information asymmetries. The mechanism is also different from a purely economic spillover effect through monetary transfers. We now discuss why, in the context of *Atencion a Crisis*, it seems unlikely that these alternative types of social effects can explain the results.

First, one could hypothesize that it was "technical" social learning, together with a relaxation of the liquidity constraints that changed households' perspectives about the future because it gave them access to new opportunities for wealth accumulation. This then, arguably might not reflect a change in aspirations, but rather a change in expectations, more narrowly defined. Yet the scope for learning-from-others on business management in the productive investment group was limited, as there were different types of businesses, and the type of activities in which leaders tended to specialize were somewhat different than those of others (see Table 4).[40] To shed more empirical light on whether beneficiaries were likely to imitate leaders, or were learning about specific activities from their leader, we consider commercial, noncommercial, and livestock activities separately and analyze whether a beneficiary has (higher) income from each of those if their leaders are active in that same activity. Specifically, Table 14 shows the relationship between the beneficiaries' incomes from a certain activity and variables capturing the income or participation of the leaders in their proximity in that same activity, controlling for community fixed effects. We find no evidence of a positive correlation between the activities of the leaders with the productive investment package and the type of activities of the other beneficiaries with the same package. This makes it unlikely that the observed social effects resulted from technical learning or imitation of specific activities. [41]

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[40] Also, households were receiving ongoing technical assistance from technical staff related to the program, whom they could ask more technical advice on the specific activity they were undertaking.

[41] It is further unlikely that the results can be explained by households pooling resources for a joint project. In fact, households were given the explicit option to pool resources with other beneficiaries and submit a joint plan but less than 5% of households did. Given that few beneficiaries decided to submit joint plans, and given that the implementation of the plans was monitored by the technical staff of the program, it is unlikely that households pooled resources ex-post.

Second, we investigate whether the identified effects of leaders instead may reflect pure economic spillover effects. This could be because people with leadership positions might also be better entrepreneurs. Indeed, Table 3 shows that leaders did better than non-leaders, especially on outcomes related to productive activities. If more of them received the productive investment package in a given community, this might then have caused a larger boost to the local economy than when other people received the transfer. This in turn might have economic spillover effects on other beneficiaries, as successful leaders now buy from other businesses or provide better access to (food) products for other households. However, the data do not provide support for this alternative hypothesis. First, we analyzed the availability and prices of 20 products (basic food and household products) in the community. The share of leaders with the productive investment package only increases the availability of one out of the 20, and does not affect any of the prices. Consistent with these findings, the share of leaders with the productive investment package does not seem to induce people to buy their products in their own community (P-value =0.97 for all beneficiaries, P-value = 0.80 for beneficiaries with productive investment package). And, similar to other beneficiaries, leaders report that they buy the majority of their products outside of the community. Leaders with the productive investment package are also not more likely to buy food in their community than other leaders. Further, it seems likely that any type of economic spillovers from increased supply or demand by leaders would affect the larger community. But Tables 9 and 10 showed that the social interaction results are largely robust to the inclusion of a community fixed effect, further making it unlikely that they are driven by such economic spillovers.

The social effects in this context also do not result from monetary transfers as increasing the share of leaders with the productive investment package in a registration assembly does not lead to increased transfer income for other beneficiaries (P-value is .66).[42] And, as shown in Table 8, it does also not lead to increases in agricultural wage earnings by other beneficiaries (in fact the

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[42] Results for the CCT program in Mexico (Angelucci and De Giorgi, 2008) show considerable spillovers through monetary transfers on non-beneficiaries. Unfortunately, the design of *Atencion a Crisis* does not allow for a rigorous analysis of spillover effects on non-beneficiaries, given that 90% of all households were eligible, and 3.72 % of the remaining 10% had received the program because of reallocation by the leaders (see footnote 14).

coefficient is negative).[43] Overall, these results suggest that economic spillover effects cannot explain the social interaction effects identified in this paper.

7. Conclusions

Many development programs aim, through a variety of mechanisms, to change the attitudes and aspirations of beneficiary households. Indeed, when programs are designed to only last for a limited period, the sustainability of the impacts might crucially depend on their success to affect attitudes toward the future, and as a consequence lead to long-term changes in investment behavior. For example, an implicit or explicit objective of many conditional cash transfer programs is to change households' attitudes and/or the social norms toward investment in the education, health and nutrition of their children. Yet, the mechanisms through which such change in attitudes can be reached and reinforced are not always clear. The evidence in this paper suggests that social interaction effects can contribute to such changes in attitudes and investment behavior.

While it appears intuitive that social interactions can be key for changes in aspirations, it can be difficult to identify the causality of this relationship. This paper uses a unique experiment with two levels of randomization to address this identification problem. We find that there were large and significant social interaction effects in the program studied. Social interactions with leaders who randomly received the largest program package substantially increased program impacts on both human capital investments and income diversification and affected households' attitudes toward the future. While social effects may result from a variety of mechanisms, the evidence suggests changes in aspirations facilitated by increased communication and motivation by female leaders were important in this context. The evidence does not support alternative mechanisms, such as technical learning or economic spillovers.

These results suggest that witnessing local success stories of upward mobility can be important to change households' investment behavior. While the design of the experiment analyzed does

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[43] Agricultural wage jobs are typically the only wage jobs available in the communities. The new businesses were small and did not employ others.

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not allow shedding definite light on possible social effects generated by peers, the results show that natural leaders living in people's close proximity can be important vehicles for such changes in behavior, both because they may motivate and encourage such changes, and because they may provide the examples that people aspire to follow.

In contrast with a common focus on the possible negative roles of leaders through elite capture, the evidence in this paper hence draws attention to the positive role local leaders can play. In particular, it points to the importance of assuring that development program designs leave room, and possibly enhance, a positive role for natural leaders. It does not however suggest that interventions should be primarily targeted to such leaders. Indeed, we find that social effects are particularly large when leaders and beneficiaries received the same package, and find much smaller effects on households that received smaller packages. Overall, these findings suggest that examples of positive experiences of nearby leaders can help open people's aspirations window, and particularly so when they are provided with resources to follow those examples.

More generally, the results have implications for the debate on the feasibility and sustainability of using cash or asset transfer programs in low-income countries. Some argue that such countries can simply not afford to distribute transfers to all poor households for long periods of time. The question then becomes whether and how short-term transfer programs can be designed to launch households on a sustainable pathway out of poverty. Sustainability of short-term interventions may depend on whether they manage to change households' attitudes toward the future and the related social norms. The evidence in this paper suggests that designing such programs in ways that facilitate and encourage social interactions may be important to create such shifts in aspirations.

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Table 1: Baseline values of household characteristics for all households

	Control (C)	Basic CCT package (T1)	Training package (T2)	Productive investment package (T3)	P-value T-C	P-value T2-T1	P-value T3-T1	P-value T3-T2
		Treatment (T)						
Household demographics								
Age prime care giver	40.81	40.55	39.51	39.31	0.16	0.12	0.04	0.74
Household size	5.381	5.182	5.299	5.340	0.42	0.26	0.19	0.73
Number of men	2.678	2.635	2.693	2.655	0.81	0.34	0.78	0.61
Number of boys under 5	0.340	0.320	0.315	0.323	0.49	0.84	0.86	0.70
Number of boys between 5-14	0.726	0.784	0.823	0.759	0.05	0.37	0.60	0.19
Number of women	2.702	2.547	2.606	2.677	0.24	0.42	0.07	0.30
Number of girls under 5	0.327	0.299	0.331	0.336	0.85	0.21	0.10	0.83
Number of girls between 5 and 14	0.786	0.727	0.757	0.792	0.54	0.49	0.14	0.40
Household assets and living standard								
Years of education primary caregiver	3.192	3.192	3.075	3.146	0.79	0.39	0.72	0.55
Literate primary caregiver	0.650	0.637	0.655	0.650	0.91	0.34	0.54	0.75
Own land	0.677	0.638	0.664	0.650	0.46	0.22	0.61	0.51
Total land owned (manzanas)	2.819	2.368	2.167	2.498	0.18	0.32	0.59	0.15
Own refrigator	0.037	0.039	0.043	0.048	0.58	0.67	0.17	0.51
Own radio	0.196	0.205	0.209	0.210	0.72	0.83	0.80	0.95
Number of rooms	1.642	1.608	1.657	1.596	0.79	0.18	0.74	0.07
Water access in house	0.125	0.137	0.137	0.131	0.85	0.97	0.62	0.69
Electricity access	0.374	0.401	0.401	0.407	0.67	0.99	0.70	0.69
Toilet or latrine	0.774	0.744	0.760	0.749	0.55	0.34	0.76	0.51
Context								
Time to school (hours)	0.275	0.249	0.262	0.245	0.59	0.17	0.67	0.03
Time to health center (hours)	1.184	1.105	1.111	1.096	0.69	0.82	0.73	0.60
Time to municipal headquarters (hours)	1.575	1.500	1.522	1.515	0.45	0.53	0.61	0.85
Affected by drought in previous year	0.963	0.957	0.961	0.947	0.45	0.58	0.37	0.24
Affected by plague in previous year	0.639	0.647	0.656	0.661	0.69	0.73	0.52	0.80
Human capital investments								
Attending school (7-18 year olds)	0.793	0.825	0.828	0.793	0.23	0.83	0.05	0.01
Days absent from school, if attending (7-18 year olds)	0.660	0.895	0.961	0.916	0.13	0.59	0.86	0.75
Total days absent from school (7-18 year olds)	5.087	4.590	4.572	5.288	0.51	0.96	0.06	0.03
School expenditures (7-18 year olds)	241	233	231	248	0.91	0.91	0.41	0.35
Share of food expenditures for animal products	0.155	0.149	0.158	0.155	0.97	0.12	0.17	0.58
Share of food expenditures for vegetables and fruit	0.048	0.050	0.048	0.049	0.89	0.44	0.76	0.54
Economic activities								
Total income	4240	4402	4387	4358	0.62	0.94	0.83	0.86
Income from commercial activities	39	40	49	35	0.82	0.42	0.52	0.17
Income from agricultural wages	357	351	327	355	0.76	0.41	0.87	0.35
Income from non-agricultural self-employment	140	114	150	111	0.62	0.18	0.92	0.17
Monetary income from agr. self-employment	470	431	424	370	0.41	0.90	0.24	0.28
Total land cultivated (manzanas)	3.405	2.882	2.715	2.981	0.19	0.46	0.72	0.31
Value animal stock	1067	763	966	782	0.15	0.04	0.86	0.07
At least one member is seasonal migrant	0.482	0.450	0.485	0.465	0.67	0.16	0.51	0.33
Share of leaders in assembly with productive package								
Average	0	0.32	0.32	0.33				
Median	0	0.33	0.33	0.33				
90th percentile	0	0.60	0.60	0.67				

Note: Income is measured in cordobas per capita. Exchange rate in 2005 was about 16 cordobas per US$. Monetary income from agricultural self-employment does not include the value of products consumed by the household. Total income includes nonmonetary income such as value of self-consumption from agriculture, transfers, and rent-equivalent of housing assets. Land is measured in manzanas, with one manzana = 0.7 hectares. N = 3932 for household level variables; N = 6333 for child-level variables (values for those 7-18 year old in 2006). For continuous variables (income, value animal stock, distances, and land amount) highest and lowest .5% outliers trimmed. P-values based on standard errors clustered by community.

Table 2: Baseline values of household characteristics for households of female leaders in treatment communities only

	Basic CCT package (T1)	Training package (T2)	Productive investment package (T3)	P-value T2-T1	P-value T3-T1	P-value T3-T2
Household demographics						
Age prime care giver	33.55	35.19	35.34	0.19	0.10	0.90
Household size	5.036	5.413	5.244	0.07	0.36	0.44
Number of men	2.544	2.703	2.608	0.20	0.64	0.50
Number of boys under 5	0.368	0.343	0.307	0.63	0.25	0.47
Number of boys between 5-14	0.850	0.959	0.790	0.23	0.53	0.03
Number of women	2.492	2.709	2.636	0.13	0.34	0.65
Number of girls under 5	0.311	0.320	0.261	0.88	0.40	0.35
Number of girls between 5 and 14	0.788	0.907	0.795	0.18	0.93	0.25
Household assets and living standard						
Years of education primary caregiver	5.280	4.918	5.000	0.31	0.29	0.78
Literate primary caregiver	0.876	0.913	0.915	0.19	0.15	0.95
Own land	0.663	0.680	0.682	0.77	0.70	0.97
Total land owned (manzanas)	2.343	2.347	2.554	0.99	0.72	0.71
Own refrigator	0.062	0.041	0.085	0.43	0.35	0.08
Own radio	0.238	0.215	0.244	0.63	0.91	0.57
Number of rooms	1.756	1.663	1.716	0.34	0.68	0.60
Water access in house	0.145	0.145	0.165	0.99	0.55	0.64
Electricity access	0.446	0.436	0.489	0.88	0.39	0.30
Toilet or latrine	0.756	0.767	0.755	0.81	0.99	0.79
Context						
Time to school (hours)	0.227	0.252	0.226	0.29	0.97	0.28
Time to health center (hours)	1.272	1.287	1.123	0.89	0.15	0.06
Time to municipal headquarters (hours)	1.640	1.578	1.552	0.59	0.43	0.81
Affected by drought in previous year	0.953	0.977	0.955	0.29	0.96	0.27
Affected by plague in previous year	0.705	0.703	0.642	0.98	0.16	0.25
Human capital investments						
Attending school (7-18 year olds)	0.871	0.878	0.839	0.80	0.24	0.22
Days absent from school, if attending (7-18 year olds)	0.951	1.019	0.876	0.89	0.77	0.54
Total days absent from school (7-18 year olds)	3.671	3.574	4.301	0.89	0.28	0.32
School expenditures (7-18 year olds)	253	253	304	1.00	0.34	0.31
Share of food expenditures for animal products	0.145	0.158	0.163	0.32	0.19	0.76
Share of food expenditures for vegetables and fruit	0.053	0.047	0.050	0.42	0.70	0.66
Economic activities						
Total income	4847	4401	4823	0.23	0.96	0.36
Income from commercial activities	82	65	41	0.58	0.18	0.38
Income from agricultural wages	311	259	353	0.22	0.52	0.14
Income from non-agricultural self-employment	116	175	116	0.31	0.99	0.34
Monetary income from agr. self-employment	498	355	432	0.13	0.50	0.34
Total land cultivated (manzanas)	2.944	2.579	3.159	0.53	0.73	0.31
Value animal stock	561	774	865	0.14	0.07	0.60
At least one member is seasonal migrant	0.472	0.501	0.466	0.59	0.92	0.57

Note: Income is measured in cordobas per capita. Exchange rate in 2005 was about 16 cordobas per US$. Monetary income from agricultural self-employment does not include the value of products consumed by the household. Total income includes nonmonetary income such as value of self-consumption from agriculture, transfers, and rent-equivalent of housing assets. Land is measured in manzanas, with one manzana = 0.7 hectares. N = 541 for household level variables; N = 934 for child-level variables (values for those 7-18 year old in 2006). For continuous variables (income, value animal stock, distances, and land amonths) highest and lowest .5% outliers trimmed. P-values based on standard errors clustered by community.

Table 3: Comparison of follow-up outcomes of leaders with productive investment package with other leaders and non-leaders

	Leader T1	Leader T2	Leader T3	Non-leader T3	P-value Leaders T3-T1	P-value Leaders T3-T2	P-value Leaders T3-Non-leader T3
Human capital investment							
Attending school (7-18 year)	0.90	0.87	0.88	0.83	0.527	0.530	0.035**
Number of days absent from school (7-18 year olds)	2.90	3.49	3.23	4.37	0.614	0.607	0.013**
School expenditures (7-18 year olds)	623	598	594	560	0.567	0.931	0.467
Share of food expenditures for animal products	0.22	0.22	0.23	0.22	0.244	0.130	0.068*
Share of food expenditures for vegetables and fruit	0.10	0.10	0.10	0.09	0.498	0.540	0.027**
Economic activities (in cordoba per capita)							
Income from non-agricultural self-employment	186	128	438	250	0.003***	0.000***	0.006***
Income from commercial activities	58	61	289	106	0.001***	0.001***	0.004***
Income from agricultural wages	261	249	309	382	0.443	0.306	0.212
Value animal stock	781	863	1290	923	0.034**	0.042**	0.092*
Total income	5630	5337	6598	5690	0.03**	0.001***	0.017**
Attitudes							
Strong positive expectations about the future	0.33	0.52	0.41	0.38	0.189	0.146	0.555
Happy	0.63	0.66	0.73	0.67	0.050**	0.342	0.216
Strongly feels that moving forward in life	0.37	0.50	0.57	0.43	0.006***	0.413	0.027**
Sum positive feelings	1.33	1.69	1.71	1.47	0.009***	0.911	0.098*
Depression scale	-0.15	0.00	-0.22	-0.08	0.387	0.085*	0.193
No risk management	0.17	0.15	0.17	0.18	0.941	0.679	0.617

Note: Sample includes intent-to-treat households in treatment communities. Economic outcomes, food expenditures, and risk management are household level data. Data on education are child-level data. Data on other attitudes are from eligible women that are primary caregivers of children between 0 and 8. Depression measured with CESD scale and internally standardized (mean 0 and standard deviation 1 in control). No risk management indicates that will not do anything or only pray to reduce impact of future shocks. Highest and lowest .5% outliers of income and expenditures data trimmed. P-values account for clustering at the community level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4. Type of activity for beneficiaries with the productive investment package

Activity	Leaders	Non-leader
	170	688
	%	%
Small livestock	0.34	0.50
Commercialization specialized products	0.24	0.20
Cornerstore	0.22	0.12
Food manufacturing	0.09	0.09
Services	0.08	0.06
Other	0.03	0.03

Note: Small livestock includes chicken raising, pig raising, pig fattening, pig commercialization. Commercialization specialized products includes commercialization of grains, cloths, vegetables, coffee, meat, ice-cream, millk products, fertilizer, cosmetics, or medicine. Cornerstores are community stores offering variety of food products and other products for daily needs (soap, shampoo, …). Food manufacturing are mostly bakers (bread, pastry…) but also nacatameles, tortilla, etc. Services includes carpenters, bicycle workshop, mechanic workshop, slaughter, clothing repair, clothing washing/ironing.

Table 5: Social interaction effects on human capital investments

	Education			Nutrition	
	Attending school (7-18 year olds)	Number of days absent from school (7-18 year olds)	School expenditures (7-18 year olds)	Share of food expenditures for animal products	Share of food expenditures for vegetables and fruit
Intent-to-treat*	0.062*	-1.760***	191.7***	0.022	0.014**
share of leaders with productive investment package	(0.032)	(0.669)	(70.9)	(0.017)	(0.006)
Intent-to-treat	0.050***	-1.352***	188.6***	0.055***	0.019***
	(0.019)	(0.405)	(34.8)	(0.010)	(0.004)
Mean of the dependent variable in the control	0.761	6.209	300.9	0.152	0.066
Observations	5176	5169	5153	3278	3279

Note: The share of leaders measures the share of female leaders with the productive investment package over all female leaders in a beneficiary's registration assembly. Individual level data education, household level data for nutrition. Excluding households with female leaders. Intent-to-treat estimators. Highest and lowest .5% of outliers in school expenditures trimmed. Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Social interaction effects on human capital investments by intervention group

	Education			Nutrition	
	Attending school (7-18 year olds)	Number of days absent from school (7-18 year olds)	School expenditures (7-18 year olds)	Share of food expenditures for animal products	Share of food expenditures for vegetables and fruit
Productive investment package*	0.097**	-2.579***	291.6***	0.044**	0.019*
share of leaders with productive investment package	(0.047)	(0.975)	(102.5)	(0.019)	(0.011)
Productive investment package	0.045**	-1.107**	174.3***	0.049***	0.020***
	(0.022)	(0.458)	(39.5)	(0.011)	(0.005)
Training package*	0.047	-1.356	145.6*	0.017	0.008
share of leaders with productive investment package	(0.041)	(0.844)	(81.9)	(0.021)	(0.007)
Training package	0.049**	-1.438***	181.4***	0.057***	0.018***
	(0.023)	(0.479)	(39.4)	(0.011)	(0.004)
Basic package*	0.045	-1.293	149.3*	0.006	0.016
share of leaders with productive investment package	(0.052)	(1.128)	(82.8)	(0.021)	(0.010)
Basic package	0.057**	-1.574***	211.8***	0.058***	0.020***
	(0.026)	(0.584)	(42.2)	(0.011)	(0.005)
Mean of the dependent variable in the control	0.761	6.209	300.9	0.152	0.066
Observations	5176	5169	5153	3278	3279
P-value test social effect on T1 versus T2	0.964	0.959	0.964	0.603	0.518
P-value test social effect on T3 versus T1	0.306	0.238	0.124	0.0325**	0.810
P-value test social effect on T3 versus T2	0.434	0.360	0.151	0.174	0.327

Note: The share of leaders measures the share of female leaders with the productive investment package over all female leaders in a beneficiary's registration assembly. Individual level data education, household level data for nutrition. Excluding households with female leaders. Intent-to-treat estimators. Highest and lowest .5% of outliers in school expenditures trimmed. Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Social interaction effects on economic activity outcomes

	Income from non-agricultural self-employment (per capita)	Income from commercial activities (per capita)	Income from agricultural wages (per capita)	Value animal stock (per capita)
Intent-to-treat	75.06	33.11	-93.64	376.0
*share of leaders with productive investment package	(56.69)	(32.35)	(83.72)	(327.1)
Intent-to-treat	32.03	17.49	-8.482	-55.27
	(33.71)	(18.68)	(63.79)	(169.6)
Mean of the dependent variable in the control	146.2	60.3	443.4	934.6
Observations	3283	3283	3284	3283

Note: The share of leaders measures the share of female leaders with the productive investment package over all female leaders in a beneficiary's registration assembly. Household level data. Excluding households with female leaders. Intent-to-treat estimators. Highest and lowest .5% of outliers of dependent variables trimmed. Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Social interaction effects on economic activity outcomes by intervention group

	Income from non-agricultural self-employment (per capita)	Income from commercial activities (per capita)	Income from agricultural wages (per capita)	Value animal stock (per capita)
Productive investment package*	235.1**	172.1***	-265.8**	882.7**
share of leaders with productive investment package	(98.1)	(50.2)	(126.4)	(351.1)
Productive investment package	46.8	13.7	42.8	-156.7
	(38.9)	(16.7)	(82.1)	(150.7)
Training package*	3.8	-22.4	42.3	148.6
share of leaders with productive investment package	(99.4)	(83.0)	(110.8)	(481.9)
Training package	41.0	36.6	-57.6	43.8
	(54.4)	(38.3)	(64.3)	(241.3)
Basic package*	30.9	-21.5	-63.5	136.9
share of leaders with productive investment package	(81.1)	(40.9)	(123.1)	(434.1)
Basic package	-3.0	-3.9	-15.2	-50.0
	(40.3)	(21.0)	(70.3)	(209.0)
Mean of the dependent variable in the control	146.2	60.3	443.4	934.6
Observations	3283	3283	3284	3283
P-value test social effect on T1 versus T2	0.839	0.993	0.466	0.981
P-value test social effect on T3 versus T1	0.072*	0.002***	0.171	0.106
P-value test social effect on T3 versus T2	0.090*	0.055*	0.053*	0.096*

Note: The share of leaders measures the share of female leaders with the productive investment package over all female leaders in a beneficiary's registration assembly. Household level data. Excluding households with female leaders. Intent-to-treat estimators. Highest and lowest .5% of outliers of dependent variables trimmed. Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Table 9. Robustness checks and alternative specifications : beneficiaries of productive investment grant

	Income from non-agricultural self-employment	Income from commercial activities	Income from agricultural wages	Value animal stock	Attending school (7-18 year olds)	Number of days absent from school (7-18 year olds)	School expenditures (7-18 year olds)	Share of food expenditures for animal products	Share of food expenditures for vegetables and fruit
Base specification	235.1**	172.1***	-265.8**	882.7**	0.097**	-2.579***	291.6***	0.044**	0.019*
	(98.1)	(50.2)	(126.4)	(351.0)	(0.047)	(0.975)	(102.5)	(0.019)	(0.011)
Robustness checks									
Excluding extreme values independent variable	216.5*	171.3***	-358.7**	1200**	0.067	-1.853*	296.4**	0.041*	0.026**
	(124.9)	(61.7)	(140.7)	(549.7)	(0.050)	(1.050)	(125.6)	(0.023)	(0.013)
S.e. clustered at level of assembly	235.1**	172.1***	-265.8**	882.7*	0.097**	-2.579***	291.6***	0.044**	0.019*
	(115.8)	(58.5)	(125.8)	(492.9)	(0.042)	(0.894)	(88.2)	(0.021)	(0.011)
Not excluding outliers	265.6*	195.5*	-218.2	1768*	0.097**	-2.579***	468.3**	0.053**	0.018*
	(139.9)	(112.5)	(154.8)	(938.0)	(0.047)	(0.975)	(212.1)	(0.021)	(0.011)
Controlling for number of people in assembly	240.7**	171.5***	-266.8**	905.5**	0.097**	-2.583***	293.0***	0.045**	0.020*
	(93.0)	(49.3)	(125.8)	(346.5)	(0.047)	(0.977)	(103.6)	(0.018)	(0.011)
Controlling for number of peers in assembly	243.2***	173.4***	-265.1**	919.0***	0.098**	-2.630***	297.7***	0.045**	0.020*
	(88.3)	(49.6)	(126.8)	(326.7)	(0.047)	(0.978)	(103.5)	(0.018)	(0.011)
With community fixed effects	243.6**	208.4***	-473.3***	425.9	0.113***	-2.688***	137.7	0.025	0.019
	(116.2)	(67.5)	(144.8)	(337.1)	(0.041)	(0.862)	(88.7)	(0.018)	(0.013)
Alternative specifications with # number of leaders									
# leaders with productive investment grant controlling for total nr leaders	43.79*	40.70***	-60.06*	181.1*	0.026**	-0.680**	86.56***	0.008	0.004
	(24.67)	(12.97)	(32.49)	(102.4)	(0.013)	(0.281)	(26.54)	(0.006)	(0.003)
# leaders with productive investment grant controlling for total nr leaders and community f.e.	58.48*	62.50***	-134.8***	175.7	0.030**	-0.734**	45.25	0.003	0.006
	(29.68)	(17.72)	(37.26)	(118.1)	(0.013)	(0.276)	(27.21)	(0.006)	(0.004)
# leaders with productive investment grant controlling for total nr leaders	82.84**	48.23**	-183.3***	401.3**	0.036**	-0.859***	44.07*	0.006	0.005
	(34.38)	(18.34)	(60.58)	(179.4)	(0.014)	(0.286)	(25.60)	(0.008)	(0.004)
# peers with productive investment grant controlling for total nr peers and community f.e.	32.75	-19.98	-66.96	326.9**	0.007	-0.149	-4.22	0.005	-0.001
	(26.62)	(20.00)	(42.80)	(151.7)	(0.013)	(0.272)	(27.19)	(0.007)	(0.003)
P-value test social effect leader = social effect peer	0.091*	0.002***	0.002***	0.376	0.041**	0.017**	0.107	0.881	0.145

Note: See notes table 6 and 8. Every line corresponds to a seperate specification, with the exception of the last specification where the number of leaders and peers are included in the same specification. Peers are defined as all beneficiaries with the same package that are not leaders. Specification with extreme values of independent variable excluded: excludes observations for which the value of the share is in the upper 5% of the distribution.

Table 10: Social interactions and positive attitudes towards the future: beneficiaries with productive investment package

	Strong positive expectations about the future	Happy	Feels that moving forward in life	Sum positive feelings	Depression scale	No risk management: will not do anything or only pray to reduce impact of future shocks
Base specification						
Productive investment package*	0.168	0.232**	0.051	0.432*	-0.305	-0.109*
share leaders with productive investment package	(0.120)	(0.113)	(0.100)	(0.234)	(0.248)	(0.055)
Productive investment package	0.001	-0.037	0.155***	0.119	-0.004	0.013
	(0.059)	(0.057)	(0.055)	(0.140)	(0.128)	(0.029)
With community fixed effects						
Share leaders with productive investment package	0.253**	0.269**	0.017	0.510***	-0.450**	-0.102*
	(0.105)	(0.101)	(0.132)	(0.165)	(0.180)	(0.057)
Mean of the dependent variable in the control	0.327	0.637	0.254	1.219	0.018	0.208

Note. The share of leaders measures the share of female leaders with the productive investment package over all female leaders in a beneficiary's registration assembly. Data from eligible women that that are primary caregivers of children between 0 and 8 (except last column), excluding leaders themselves. N = 869 (N last column = 1608) in base specification (including those eligible for productive investment package and the control); N = 410 (N last colum =768) in specification with community fixed effects, as it only includes observations from treatment communities. Depression measured with CESD scale and internally standardized (mean 0 and standard deviation 1 in control). Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Table 11. Relationship between outcome of female leaders with different packages and attitudes of beneficiaries with the productive investment grant

	Strong positive expectations about the future			Happy			Depression scale			No risk management		
Nonagricultural self-employment income of												
leader with productive investment package	0.089***			0.095***			-0.138*			-0.043*		
	(0.033)			(0.034)			(0.082)			(0.022)		
leader with training package	0.032			-0.047			0.071			-0.004		
	(0.071)			(0.048)			(0.138)			(0.069)		
leader with basic package	-0.090			-0.063			0.133			0.026***		
	(0.057)			(0.041)			(0.099)			(0.010)		
Total income of												
leader with productive investment package		0.009**			0.012**			-0.011			-0.006***	
		(0.004)			(0.005)			(0.012)			(0.002)	
leader with training package		-0.007			0.000			0.010			0.007	
		(0.007)			(0.008)			(0.012)			(0.005)	
leader with basic package		-0.009***			0.002			0.002			0.003**	
		(0.002)			(0.002)			(0.002)			(0.001)	
Positive opinion about moving forward in life of												
leader with productive investment package			0.052			0.109*			-0.375***			-0.022
			(0.080)			(0.059)			(0.109)			(0.044)
leader with training package			0.013			0.001			-0.033			-0.013
			(0.077)			(0.069)			(0.105)			(0.050)
leader with basic package			-0.030			0.081			-0.044			0.005
			(0.067)			(0.068)			(0.110)			(0.064)
Mean dependent variable in the control	0.327	0.327	0.327	0.637	0.637	0.637	0.018	0.018	0.018	0.208	0.208	0.208

Note: Outcome of leaders are measured as the maximum value among the leaders with a given package in the registration assembly of the beneficiary. All estimates include community fixed effects. Sample includes intent-to-treat households with productive investment grant in the treatment communities for risk management; and the women beneficiaries with the productive investment package that were also caregivers of children below 8.5 years old. N = 410 (N last colum =768). Depression measured with CESD scale and internally standardized (mean 0 and standard deviation 1 in control). Robust standard errors clustered by community (in parentheses). *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 12. Relationship between outcome of female leaders with different packages and attitudes of beneficiaries with the productive investment grant

	Strong positive expectations about the future			Happy			Depression scale			No risk management		
Nonagricultural self-employment income of												
leader with productive investment package	0.083**			0.104***			-0.126			-0.040*		
	(0.034)			(0.036)			(0.082)			(0.023)		
peer with productive investment package	-0.010			-0.005			0.005			0.011		
	(0.029)			(0.017)			(0.021)			(0.013)		
leader with training package	0.068			0.011			0.038			0.008		
	(0.083)			(0.068)			(0.164)			(0.092)		
peer with training package	0.022			0.009			-0.032			0.003		
	(0.020)			(0.013)			(0.027)			(0.017)		
leader with basic package	-0.073			-0.053			0.108			0.026		
	(0.058)			(0.041)			(0.100)			(0.017)		
peer with basic package	-0.010*			0.015**			0.021			0.003		
	(0.005)			(0.006)			(0.014)			(0.001)		
Total income of												
leader with productive investment package		0.008**			0.012**			-0.012			-0.006**	
		(0.004)			(0.005)			(0.013)			(0.002)	
peer with productive investment package		0.016**			0.003			0.004			-0.001	
		(0.007)			(0.006)			(0.013)			(0.001)	
leader with training package		-0.001			0.003			0.009			0.006	
		(0.008)			(0.009)			(0.014)			(0.005)	
peer with training package		0.003			-0.003**			-0.001			0.000	
		(0.002)			(0.001)			(0.002)			(0.001)	
leader with basic package		-0.013***			0.001			0.002			0.003*	
		(0.002)			(0.002)			(0.003)			(0.001)	
peer with basic package		-0.001			0.001**			0.000			-0.000	
		(0.001)			(0.001)			(0.001)			(0.000)	
Positive opinion about moving forward in life of												
leader with productive investment package			0.043			0.106*			-0.314***			-0.019
			(0.081)			(0.057)			(0.109)			(0.044)
peer with productive investment package			0.078			0.047			-0.144			-0.033
			(0.114)			(0.105)			(0.173)			(0.084)
leader with training package			-0.003			-0.010			-0.008			-0.003
			(0.070)			(0.072)			(0.118)			(0.048)
peer with training package			0.005			0.003			-0.146			-0.018
			(0.069)			(0.062)			(0.105)			(0.061)
leader with basic package			-0.048			0.067			-0.048			0.015
			(0.069)			(0.069)			(0.112)			(0.063)
peer with basic package			-0.004			-0.015			-0.116			0.022
			(0.092)			(0.070)			(0.095)			(0.051)
Mean dependent variable in the control	0.327	0.327	0.327	0.637	0.637	0.637	0.018	0.018	0.018	0.208	0.208	0.208
P-value leader T3 = leader T3	0.075*	0.323	0.805	0.010***	0.184	0.633	0.111	0.450	0.409	0.030**	0.083*	0.887

Note: Outcome of leaders and peers are measured as the maximum value among the leaders with a given package in the registration assembly of the beneficiary. All estimates include community fixed effects. Sample includes intent-to-treat households with productive investment grant in the treatment communities for risk management; and the women beneficiaries with the productive investment package that were also caregivers of children below 8.5 years old. N = 410 (N last colum =768). Depression measured with CESD scale and internally standardized (mean 0 and standard deviation 1 in control). Robust standard errors clustered by community (in parentheses). *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 13: Relationship between distance to leaders and communication with leaders and knowledge about the program

	Talked to promotora in last week			Talked to leader in last week			Knowledge about the program		
	All eligible	All eligible	Eligible Productive investment package (T3)	All eligible	All eligible	Eligible Productive investment package (T3)	All eligible	All eligible	Eligible Productive investment package (T3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance to nearest leader	-0.0097***			-0.0078***			-0.0106*		
	(0.0034)			(0.0029)			(0.0060)		
Distance to nearest leader with basic package		-0.0038***	-0.0042***		-0.0037***	-0.0044***		-0.0000	-0.0021
		(0.0011)	(0.0009)		(0.0007)	(0.0008)		-0.0023	(0.0030)
Distance to nearest leader with training package		-0.0011*	-0.0020***		-0.0007	-0.0007		-0.0033*	-0.0008
		(0.0006)	(0.0006)		(0.0007)	(0.0008)		(0.0017)	(0.0029)
Distance to nearest leader with productive investment package		-0.0006	0.0017**		-0.0004	0.0007		0.0041**	0.0041
		(0.0006)	(0.0007)		(0.0004)	(0.0006)		(0.0020)	(0.0025)
Observations	2425	2157	728	2425	2157	728	2425	2157	728
Mean of dependent variable	76	75	78	88	87	88	4.8	4.8	4.9
P-value test distance T1 leader = distance T2 leader		0.037**	0.060*		0.004***	0.001***		0.229	0.784
P-value test distance T1 leader = distance T3 leader		0.028**	0.000***		0.001***	0.000***		0.192	0.115
P-value test distance T2 leader = distance T3 leader		0.558	0.000***		0.720	0.099*		0.020**	0.255

Note: Distance is measured as the number of houses between the beneficiary's house to the closest female leaders' house. Average distance to nearest leader is 4 houses. Average distance to leader with a specific package is 12 houses. Talked to promotora (column 1,2,3) indicates whether person talked to her promotora; Talked to leader (column 4, 5, 6) indicates whether person talked to her promotora, a health promotor or a teacher. Knowledge about the program is a the result of a 9-item test about the program. Sample includes beneficiary households in treatment communities, excluding female leaders themselves. Omitted category: basic package. Column 2, 5, and 8 have fewer observations because not all comunities have leaders with the 3 types of packages. Robust standard errors in parentheses, corrected for clustering at the community level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 14: Relationship between activities of leader and non-leaders with productive investment grant

	Income from commercial activities	Income from commercial activities	Income from commercial activities	Income from other non-agricultural self-employment	Income from other non-agricultural self-employment	Income from other non-agricultural self-employment	Value animal stock	Value animal stock	Value animal stock
<u>Maximim values of leader with productive investment package</u>									
Income from commercial activities	-0.032			0.021			0.263		
	(0.028)			(0.021)			(0.216)		
Income from other non-agricultural self-employment	0.078			0.044			-0.333		
	(0.057)			(0.054)			(0.238)		
Total value animal stock	0.011*			0.004			0.026		
	(0.006)			(0.007)			(0.044)		
<u>At least one leader with productive investment package</u>									
with income from commercial activities		52.51			79.49**			95.12	
		(48.25)			(33.39)			(247.1)	
with income from other non-agricultural self-employment		45.34			44.77			-443.9	
		(32.90)			(34.99)			(323.2)	
with animal stock		-36.72			-97.56***			176.6	
		(45.69)			(36.23)			(442.3)	
<u>Share of leader with productive investment package</u>									
with income from commercial activities			28.96			189.4**			516.9
			(113.5)			(79.8)			(605.2)
with income from other non-agricultural self-employment			73.15			85.31			-1975**
			(68.27)			(67.29)			(823)
with animal stock			155.4			-168.1**			1128
			(125.9)			(74.3)			(794)
Observations	809	809	809	808	808	808	812	812	812
R-squared	0.012	0.004	0.015	0.005	0.010	0.009	0.006	0.004	0.017

Note: Household level data. Income and value animal stock measured in cordobas per capita. Excluding households with female leaders. N = 812. Intent-to-treat estimators. Highest and lowest .5% of outliers of dependent variables trimmed. Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1