

Changing households' investments and aspirations through social interactions: Evidence from a randomized transfer program in a low-income country¹

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Abstract

This paper analyzes the role of social interactions in determining households' responses to an asset transfer program. It analyzes whether investments and accumulation patterns are affected by the proximity to female leaders who themselves were also beneficiaries of the transfer program. We identify the role of female leaders through the randomized assignment of leaders and other beneficiaries to three different interventions within each community. This allows identifying the role of social interactions for the heterogeneity of program outcomes. We find large social spillover effects on human and physical capital accumulation and aspirations. Finally, we explore various mechanisms through which the social dynamics might play a role and investigate the relationship with the change in aspirations.

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1. Introduction

Low asset endowments are often considered a key constraint for households to escape poverty. Many development interventions hence aim to increase the asset base of the poor. Micro-finance programs aim to increase households' access to financial capital, while education, nutrition and health programs aim to increase their human capital. More and more middle-income countries, such as Mexico, Brazil, Colombia, and most recently Indonesia, are opting for nationwide conditional cash transfer (CCT) programs to augment households' human capital base. There is indeed a large body of evidence showing that such programs are effective in keeping children longer in school, increasing their nutrition status, and improving overall health outcomes.

Nonetheless, the feasibility and sustainability of using similar cash transfers or other asset-transfer schemes in low-income countries is often called into question. Some argue that such countries can simply not afford to distribute cash transfers to all poor households for long periods of time. A related concern exists for micro-finance programs, as many clients never reach a stage where they can graduate from the programs. For many low-income countries, the question then becomes whether 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 asset accumulation patterns, attitudes and/or social norms. Looking at empirical evidence from various countries, Banerjee and Duflo (2007) conclude that the poor often don't seem interested in accumulating wealth. They point out this might be due to saving commitment problems, in addition to possible lack of access to adequate savings mechanisms. On a related point Appadurai (2004) and Ray (2006) discuss the close association between poverty and aspirations. Upward mobility might be difficult for the poor because of a failure of aspirations, which itself might be caused by poverty. The poor might have low aspirations, in part because their own experiences and the experiences of those that are close to them seem to suggest that escaping poverty is not a feasible option. In this sense, learning about the positive experiences from others that are sufficiently "close" through social interactions can play an important role of changing and shaping such aspirations. These arguments suggest

that social dynamics might need to be considered when evaluating programs targeted at human and physical capital accumulation.

Yet, recent evidence based on randomized experiments suggests that the role of social dynamics 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. This evidence suggests the importance of understanding the consequences of social dynamics when considering the impacts of any particular intervention. Yet, this clearly poses a methodological challenge, not only because many unobservables could affect decisions of neighbors simultaneously (Manski, 1993), but also because the intervention itself might be affecting the social dynamics.²

This paper addresses this challenge using 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 on the short-term. 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 dynamics. Households were randomly assigned to 3 different intervention groups within randomly selected treatment communities. In doing this, 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. Given the timing of the implementation of the different packages, this provides us with an exogenous source of variation as we consider the impacts of proximity to the random group of leaders that had received the larger and more exciting package in order to identify social spillover effects.

² Community-based development programs often have the specific objective of social capital formation (see e.g. Rao and Ibanez, 2005; Gugerty and Kremer, 2006). There is also limited evidence regarding the impacts of conditional cash transfer programs on social dynamics. A qualitative evaluation of the Progreso/Oportunidades cash transfer program in Mexico describes impacts on social dynamics (Adato et al., 2000), and a recent non-experimental analysis looks at social capital formation of a similar program in Colombia (Attanasio et al. 2007). The experimental evidence in this paper shows that the program studied affected social interactions (see further).

When analyzing social dynamics and learning, and following Besley and Case (1994) and 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 farmers to identify “information neighbors” (Conley and Udry, 2004). In this paper, we primarily consider the impacts of proximity to female leaders, and specifically analyze communication patterns to further shed light on the relationship between these leaders and the other beneficiaries.³

We consider the impact of these social dynamics on various key outcomes related to income generation and investments in human capital accumulation of other beneficiaries.⁴ We also explore the impact of social interactions on aspirations and perspectives towards the future by considering both positive and negative attitudes, relying in part on a commonly used measure of depression. Recent empirical evidence suggests that adverse economic shocks can negatively affect mental health outcomes in developing countries (Das and Das, 2006; Friedman and Thomas, 2007). Similarly, evidence from a randomized evaluation in Tonga suggests that positive shocks might have the opposite effect (Stillman et al., 2006). Moreover, Das et al (2007) show a striking positive correlation between an individual’s mental health and average community mental health in 3 different countries, but they do not identify the underlying causal mechanism. By using the various aspects of the randomization design, this paper establishes the impact of the positive shock of the asset transfer program on positive attitudes and aspirations in particular, and sheds light on the role of social interactions in explaining why attitudes and mental health outcomes might be correlated.

Finally, we look at a number of mechanisms that might be underlying the identified social spillover effects exploring changes in social interactions themselves, differences in motivation and communication between leaders and beneficiaries of the different intervention packages, as well as testing for alternative explanations in the form of economic spillovers.

³ As such, our paper also relates to the literature on the importance of leaders (e.g. Jones and Olken, 2005).

⁴ Angelucci and De Giorgi (2008), Bobonis and Finan (2007) and Lalive and Cattaneo (2006) have studied social spillover and peer effects on non-beneficiaries in the context of the Progres/Oportunidades program.

The paper is 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 context of the program. Section 3 discusses the data and the empirical strategy. We also show that the randomization worked and compare outcomes for households with female leaders across the different intervention packages. In section 4, we turn to the main results of the paper and show that social dynamics play a key role for increasing program impacts on human capital, income diversification, attitudes and aspirations. We also explore several mechanisms that might be underlying the social spillover findings. Section 5 concludes.

2. Program design, social dynamics, and aspirations

2.1. The three different intervention 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.⁵ 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 reducing the impact of the aggregate shock on human and physical capital investments. This was facilitated via cash transfers, which were envisioned to reduce the need for ex-post, adverse coping mechanisms, such as asset sales, taking children out of school or reductions in food consumption. Second, the program also intended to promote long run upward mobility and poverty reduction through asset creation by enhancing households' asset base and income diversification capacity.

In order to achieve these objectives, and building on the already existing and successful conditional cash transfer (CCT) model in Nicaragua (Red de Protección Social - RPS), the program introduced 3 different packages in order to evaluate and compare the effectiveness of each to reach the objectives stated above. Specifically, a total of 3000 households were selected to participate in the program for one year. These households were allocated one of

⁵ For an extensive description on the program and evaluation design see Macours and Vakis (2005).

three different packages through a participatory lottery (see further below): (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.

Table 1 presents the various program components. All selected beneficiary households received the basic CCT component, which included cash transfers conditional on children's primary school and health service attendance during the one-year time period. It aimed at helping households cope with the drought shock in the previous year and at protecting children's human capital by re-inserting them in school and improving their health status. In addition to the CCT, one third of the beneficiary households also received a scholarship that allowed one of the 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, and included an opportunity cost transfer to compensate for transport cost and time spend in the course. These aimed at providing participants with new skills for income diversification outside of subsistence farming. These beneficiaries also participated in 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 outside of subsistence farming in new livestock or non-agricultural income generating activities. Beneficiaries also participated in business-skills training workshops organized in their own communities. While the basic CCT component's aim was to protect investments in human capital, the two additional components directly aimed at strengthening households' long-run ex-ante risk management.

2.2. *Program randomization*

The program was targeted to 6 municipalities of the drought region 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. 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.⁶ Baseline data were then used to define program eligibility based on poverty and vulnerability, resulting in the identification of 3000 households to participate in the program.⁷ Finally, from each eligible household, the female household member that was reported as the primary caregiver was invited to a registration assembly.⁸ 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.⁹ During the assemblies, the program objectives and its various components were explained and a number of volunteers were assigned to be the program's *promotoras* (see below). At the very end of each assembly, all the beneficiaries - including the *promotoras* - participated in a lottery

⁶ The budget for the pilot only allowed targeting 3000 households, which was much more than the population of the 6 municipalities. The program was therefore allocated randomly with the possibility of scaling-up to the control communities in the next year. People in the control communities knew that such a scale-up was possible, but also knew it was likely to depend on the result of the national elections end of 2006. In that election, the government changed and the project was not scaled up. Before the lottery, all communities in the 6 municipalities had been 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. This also revealed that communities tend to be geographically separated from each other, which reduces the potential for possible spillover effects from the treatment on the control communities.

⁷ The eligibility criteria were determined using the proxy means methodology developed for the RPS and based on the national household data from 2001 (EMNV). Additional discussions with local leaders from each intervention community were conducted to identify possible exclusion or inclusions errors. Based on this, the list of eligible households was finalized. 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.

⁸ Only in the few cases that there was no adult female in the household, an adult man was selected as the program recipient.

⁹ 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 was based on these house numbers, so that the group of beneficiaries in one 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 dispersed than others).

process through which the 3 packages described above were randomly allocated among the eligible households.¹⁰

2.3. Program design and households' aspirations

The program specifically aimed to address attitudes through several of its components. First of all, the education, health and nutrition conditionalities 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. Second, 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 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 (Macours and Vakis, 2007). Despite the frequent re-occurrence of weather shocks, few households seem to rely on ex-ante risk management strategies. One out of every five households reported in the baseline survey that they would do nothing other than pray to God to prevent negative impacts of future shocks. An even larger group of households (30 percent) planned to invest more in agriculture, which - given that they reside in a drought-prone subsistence farming region - arguably increases their exposure to future shocks.

¹⁰ Participation by the invited beneficiaries to the assemblies and lotteries was near 100%.

In many qualitative interviews, informants said that many households do not really plan ahead and instead live from “day to day”. Yet interviews during the qualitative evaluation also revealed that the program, and in particular those receiving the productive investment package, had made beneficiaries to begin thinking about the future. This is interesting as the productive interventions of the program aimed at increasing the households’ risk management potential. In the (translated) words of one respondent:

“Some people just dedicate themselves to survival. Others dedicate themselves to moving forward. It’s the way of thinking. There are people that don’t think about tomorrow. They hope that God will intervene, and that it will fall from the sky ... But there are people who changed. Before, they didn’t think about tomorrow, but now [with the program] they dedicate themselves to moving up.”

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

This anecdotal evidence suggest that aspirations and perspectives towards the future may be key for improving household welfare and program impact, and also indicates the potential role of social interactions in changing attitudes. This paper aims to shed quantitative light on these issues by taking advantage of the randomized design.

2.4. *Program design and social dynamics*

A number of program design elements are particularly relevant in allowing us to better explore social dynamics and aspirations. First, the level of transfers was substantial, ranging from 20 percent of average household income for those receiving the basic CCT package to 40 percent for those receiving the productive investment package. Such large relative transfers may facilitate shifts in asset accumulation and behavior. The differential size of

these transfers across households and the differences between the components of the three packages increase the likelihood of finding heterogeneity in impacts.

In addition, the program's design 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. For example, more than 90 percent of the households in treatment communities were eligible for the program as a result of the geographic targeting in poor rural areas and of the household-level targeting integrating vulnerability in the eligibility criteria. One implication of this widespread coverage is that while the program itself was at the household level, the vast majority of each community participated. This increased the opportunities for information sharing and interactions in the treatment communities, and possibly resulted in higher motivation and program ownership.

Further, program participants were required to participate in a number of local events and talks ranging from discussion on nutrition practices to 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 components) by which beneficiaries of the same program component 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, monitoring, motivation and to ensure compliance with the various program requirements and conditionalities.¹¹ Specifically, the *promotoras* were expected to frequently meet with the beneficiaries in their groups to talk about the objectives and the

¹¹ During the registration assemblies women were asked to volunteer for those positions. Volunteers were approved by the group, and beneficiaries were allocated to a *promotora* based on a joint decision, typically based on proximity. Only after this whole process was finished, did everybody (*promotoras* and the other beneficiaries) randomly draw a ball with 1 of 3 colors. At the end of the day each color was matched to an intervention package through another lottery to which all beneficiaries attended. Hence at the moment of *promotora* selection, nobody knew which intervention package the *promotoras* or any of the other beneficiaries would end up receiving.

conditionalities of the program. While these women self-selected to lead these groups, they were randomly allocated to one of the three program components during the assemblies. We rely on this randomization (of these and other female leaders) to identify the impact of social dynamics on program outcomes.

3. Data and empirical strategy

3.1. Data

The data comes 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.¹² This resulted in a control group of equal size as each of the three intervention groups (of about 1000 households). The follow-up data was collected 9 months after the start of the program. The attrition rate of the second round was 1.3 percent of the original households.¹³

A number of survey instruments were collected. The main household survey, collected in both rounds, contains household and individual level data on various socio-economic indicators on approximately 4400 households. In the follow-up survey, additional modules were added to specifically capture information about social dynamics, information sharing and attitudes. 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. This data was collected for all women who were the primary caregivers of

¹² 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.

¹³ The low attrition rate was the result of tracking both households and individual household members that had moved since the baseline.

children between 0 and 8 in treatment and control households. Following other recent impact evaluations (e.g. Paxson and Schady, 2007), 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 CESD score, these questions also allow us to look separately at questions expressing 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, two rounds of qualitative work preceded each round of data collection. The qualitative work was based on 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 it was used to explore qualitative evidence of the program's impacts as well as to explore issues related to program implementation (see Aguilera et al., 2006).

3.2 Overall randomization results

Table 2 presents the randomization results for the full sample of eligible households.¹⁴ It includes household characteristics at baseline, as well as baseline values for several income, education, and nutrition indicators. The differences between treatment and control communities are generally small and not statistically significant. The last three columns in table 2 show the P-values for differences between the three intervention packages (i.e. the result of the participatory lotteries in the communities).

¹⁴ Take-up of the overall program among eligible households was 95%, with the main attrition due to exclusion by leaders (see footnote 7). As for the different components: 89% of the households eligible for the vocational training had enrolled one of its household members in a course. The main reasons the remaining households did not take-up the course were lack of an interested household member and lack of basic literacy (for some courses). Take-up of the matching grant among 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 e.g. the households that migrated out).

Like any randomization process, there are a small number of statistically significant differences in some of the variables of interest. For example, at baseline, recipients of the productive investment package had lower average incomes from commercial activities and somewhat lower school assistance than beneficiaries of the vocational training package. This is likely to lead to an underestimation of the potential impact for these variables for the third treatment group. The height-for-age z-score is somewhat better for children from the first group compared to the second. Given the large number of variables, it is not surprising that there are some differences between the different groups. While the direction of the differences suggests there is no systematic bias, we will test the robustness of the results for inclusion of pre-program outcomes, when available.

3.3 *Defining social dynamics and identifying impact*

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 different types of local female leaders. This allows us to explore whether heterogeneity in impacts depends on social dynamics between beneficiaries and leaders (section 4).

The variables we use to identify social dynamics rely on the random allocation of female leaders to one of the three intervention groups. To define female leaders, 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.¹⁵ The lottery process described above implied that the distribution of female leaders across the three different program components is random across registration assemblies.

¹⁵ In most of the analysis, we consider both types of female leaders together, in part because they are not mutually exclusive (e.g. many health coordinators and teachers ended up as *promotoras*).

Table 3 confirms this by presenting randomization results for the subgroup of households with female leaders. Similar to the general randomization results above we do not find systematic significant baseline differences. We do note that total consumption per capita is significantly higher for leaders with the productive investment package, when compared to the vocational training beneficiaries. This is mainly due to a few outliers.¹⁶ Comparing table 2 and table 3 also sheds some light on the characteristics of the female leaders. Female leaders tend to be younger and more educated than the average beneficiary. Outcomes for their human capital investments also are generally somewhat better. On the other hand, total and food consumption, as well as income and the income structure are similar to those of the other beneficiaries.

For the analysis of the social interactions below, we consider all female leaders that participated in each enrollment assembly, and calculate the share of female leaders (to all female leaders in that assembly) 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 randomization. Yet, in some assemblies, the share will be relatively high while in others it can be low.¹⁷

A number of program implementation idiosyncracies provide additional help for our identification strategy. In particular, due to implementation delays, the vocational training courses had not started yet at the moment of the follow-up survey. At the time of the survey, the difference between the vocational training beneficiaries and those of the basic CCT package was that vocational training beneficiaries had participated in a number of meetings with other beneficiaries of the same component 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

¹⁶ For all variables, the only outliers that were trimmed are those with values that are more than 2 standard deviations away from the next largest value.

¹⁷ Given that leaders participated in the same lotteries than other beneficiaries, it can randomly occur that in one assembly 0 out of 3 leaders got the productive investment package, while in another assembly 2 out of 3 did.

hand, had received the largest amount of benefits at the moment of the follow-up survey: 2-3 months before being surveyed they had received \$175 to invest in a small business activity.¹⁸ 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 the qualitative fieldwork we expect that the share of female leaders that received the third package might be associated with larger program impacts. As such, we focus on the leaders that received this productive investment package and their effect on program outcomes of other beneficiaries.

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

$$Y_{ic} = \delta_0 + \delta_1 A_{ic} + \delta_2 (A_{ic} * S_c) + \varepsilon_{ic} \quad (1)$$

where Y_{ic} is an outcome indicator of interest for beneficiary i who participated in assembly c , A_{ic} is assignment of beneficiary i to any of the treatment groups, and S_c 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.¹⁹ Given that households were invited to particular assemblies based on geographic proximity, S_c will capture the share of leaders with the productive investment package that live in the proximity of beneficiary i .²⁰ 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 via the effect of social dynamics (δ_2).

We also explore how the share of leaders with the productive investment package affects impacts for beneficiaries of the productive package. As additional robustness of the main results, we also test whether outcomes of a given beneficiary depend on the share of leaders

¹⁸ The remaining \$25 was to be paid on the next payment day (after survey completion).

¹⁹ S_c is always zero for those in the control group and as such collinear with $A_{ic} * S_c$.

²⁰ Clearly, 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.

with the same benefit package, and whether the results hold when the definition of leader is restricted to only those related to the program (*promotoras*).

3.4. Outcomes for households with female leaders²¹

As we aim to understand the role of social interactions with leaders in affecting program outcomes, we first consider outcomes of female leaders themselves. Households with leaders of the three intervention groups appear to have relatively similar human capital outcomes (Table 4a), but outcomes on productive activities show strong differences between female leaders of the three different intervention groups (Table 4b). In particular, households with female leaders who received the productive investment package are more likely to have higher income from commercial activities, and more generally, from non-agricultural self-employment, than other leaders. They also have higher income from agricultural self-employment. These differences between the groups are much larger than for the non-leaders. Leaders who received the productive investment package have more than four times as much income from commercial activities than other leaders.

We also consider the attitudes of the female leaders towards the future (Table 4b). Positive feelings are generally the strongest for leaders with the productive investment package. Interestingly, we also find that leaders with the vocational training intervention have more positive feelings than those with the basic package (consistent with the role of expectations discussed above).

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. Leaders with the vocational training package have strong positive expectations about the future. Both might be key in understanding the impact that interactions with such leaders can have on other beneficiaries. This is what we turn to next.

²¹ In this section, we only compare outcomes between households with female leaders that were assigned to different interventions, and do not consider the program impacts on these outcomes. Because a large part of the female leadership positions were created by the program (as *promotoras*) we do not have an equivalent group in the control communities.

4. Do social dynamics affect outcomes?

4.1. *Spillover effects from female leaders: human capital and income*

We now investigate whether there is a relationship between households' outcomes, treatment and the presence or proximity to female leaders who received the productive investment package.^{22 23} The results show that the outcomes of other beneficiaries are higher when the share of leaders who randomly received the productive investment package in their assembly is higher. The interaction terms in table 5a show the spillover effects on different types of human capital investments. The higher the share of leaders with the productive investment package, the higher the impacts on various education and nutrition outcomes of other beneficiaries.

The effects are not only statistically significant, but are also quite large. For example, while school assistance increased with an estimated 5 percentage points when no leader in one's assembly received the productive investment package, it increases with an additional 6 percentage points if all the leaders in one's assembly got the productive investment package. Similarly, the impact on total consumption and on various food products almost doubles because of the spillover effects.

Table 5b shows that the positive spillover effects when considering productive activities of all beneficiaries are more limited. This is not surprising given that not all beneficiaries had received extra means to augment their productive activities. Still, when we consider the spillover effects on the beneficiaries that got productive investment package only (table 6b) we do observe strong and significant spillover effects. When all leaders in one's assembly received the productive investment package, the estimated impact on income from

²² Results in this and the following sections are qualitatively similar when we only consider the female leaders that volunteered to be program *promotoras*.

²³ The intent-to-treat estimators for the average treatment effect for all treatment households, and separately by beneficiary group, on the human capital, income and attitudinal variables are documented in appendix 1. In line with results from other conditional cash transfer program, there were strong impacts on education, consumption and nutrition. Income from commercial activities and more generally from non-agricultural self-employment increased significantly for the beneficiaries who received the productive investment package.

commercial activities is almost double the average program impact. Moreover overall income is estimated to increase with more than 50 percent for such households.

Finally, when we consider the spillover effects on human capital investments for the subset of household with the productive investment package we find strongly positive and significant impacts of female leaders with productive investment package, which are, not surprisingly, somewhat larger than the results for all beneficiaries (table 6a).

4.2. *Spillover effects from female leaders: aspirations and attitudes*

As discussed, outcomes on the attitudes among leaders vary (see table 4b). Compared to leaders with the basic package, leaders with the productive investment package are 19 percent point more likely to feel they are “moving forward” in life, and leaders with the vocational training package are 19 percent point more likely to be optimistic about the future. We therefore investigate whether leaders with more positive attitudes might have a positive effect on the aspirations of other people.

We first consider the impacts of proximity to leaders with the productive investment package. Table 7a shows striking evidence of spillover effects on reported risk-management itself. 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. Moreover, the effect is large: if all the leaders in an assembly randomly received the productive investment package, the likelihood of “doing nothing” decreased with 13 percentage points. The results also indicate that negative feelings among beneficiaries of the productive package are lower when there are more leaders with the same package in their proximity.

Table 7b shows that, more generally, proximity of leaders with the same package affects attitudes of all beneficiaries. In fact, the results show strong impacts on measures of both positive and negative feelings. Women caregivers in beneficiary households are more likely to express optimism about the future and have lower indicators of depression, the higher the share of leaders that received the same benefits as them. In particular, in the extreme case in

which all the leaders in an assembly happened to have received the same benefit package, the program reduces the CESD measurement of depression with almost a quarter of a standard deviation.²⁴ This suggests that the effect of leaders on the attitudes of other beneficiaries is not limited to leaders with the productive investment package. In fact, while the point estimates in the first regression are substantially higher, the results are less significant.²⁵

We interpret these results as evidence for spillover effects of leaders' positive attitudes on beneficiaries receiving the same package. Such aspirational spillover effects are different from the social learning related to technical issues and/or information asymmetries on which a lot of the literature has focused. In the context of the program that we analyze, one could alternatively hypothesize that it was in fact "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 attitudes or aspirations, but rather a change in expectations, more narrowly defined. Yet while there might have been scope for learning-from-others on business management in the productive investment group, there was – given the timing of the intervention - likely much less scope for technical learning from the leaders with the vocational or basic package.²⁶ The strongly significant results in table 7b, which suggests that changes in positive and negative feelings were not restricted to beneficiaries of the productive investment package, are therefore more consistent with the interpretation that relates to changes in aspirations. Because of the different activities related to the program, beneficiaries with similar interventions regularly attended meetings and workshops together. More positive leaders likely reflect their enthusiasm and positive attitudes in such meetings and in their interactions with other beneficiaries. This might have affected others' aspirations. Positive attitudes might hence be contagious.

²⁴ These results are robust but somewhat less precise when the control variables are excluded. While this is a relatively large impact, it is consistent with, and might help shed some causal light on, the correlation between an individual's mental health and community mental health that has been found in the literature (see Das et al., 2007).

²⁵ This might in part be driven by the smaller sample size.

²⁶ And even among beneficiaries in the productive investment group, social learning about technical issues might have been limited as they had different types of businesses.

4.3. *Underlying mechanisms*

The results in the sections 4.1 and 4.2 suggest strong social dynamics at play. In particular, the proximity of beneficiary women in leadership roles strengthened program impacts considerably for both types of program objectives: human capital investments and income diversification. In addition, there were large spillover effects of leaders' positive attitudes on beneficiaries' attitudes and aspirations. We now explore several reasons that can further explain these findings and provide evidence suggesting the importance of social interactions and effort/motivation of the leaders for these social spillover effects.

4.3.1. Impacts on social interactions

We first consider whether the program also influenced social interactions more generally. Table 8 shows both indicators of communication (interactions with others and interactions with leaders specifically), and indicators of participation in community activities. 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. While the impacts are the strongest for people with the productive investment package, they are also significant and large for the other beneficiaries. Conversations about businesses, for instance, are almost twice as likely for beneficiaries of the vocational package and the basic package, than they are in the control.

When considering communication with different types of male and female leaders in the community directly, we also find strong and significant impacts. Reported communication with the community leader, the health coordinators and the teachers is between 25 and 50 percent higher in treatment than in control. In light of the qualitative comments above, it is interesting that beneficiaries of the basic package reported talking more to the religious leaders too, while this is not the case for the other beneficiaries. On the other hand, beneficiaries of the vocational training and the productive investment package are more likely to talk to their *promotora* and to people of the same group or with the same benefit package than beneficiaries of the basic package.

Finally, we consider impacts on participation in organized activities. In the treatment communities, the participation in community workshops and meetings is significantly higher.

Interestingly, parents also participate much more in the parent-teachers associations (an increase of 9 percentage points, or about 30 percent), and there is some evidence of increased participation in sport activities. There are no strong differences in participation between beneficiaries of the various packages.

Clearly these measures might partly capture “mechanical” program impacts. Specifically, given that the program encouraged group formation and interactions via the *promotoras* and the various program related group activities (workshops for technical assistance, courses and business selection, payment days), the observed increase in interactions may be merely capturing the fact that women beneficiaries had to meet more often to participate in the various components of the program. This raises a question on whether the changes in social dynamics are sustainable. One could also argue that in order to capture social dynamics, one would need measures that do not rely on self-reported indicators, but instead are based on experimental games (as in Atanassio et al., 2007; Carter and Castillo, 2007). We aim to address these issues with a future round of data.

For the purposes of this paper however, we note that the reported changes, whether they are directly linked to program activities or not, do suggest that increased social interactions might have been one of the mechanisms underlying the social spillover effects that the paper has identified. Moreover, some of the reported changes in participation are regarding *non-program* group activities, such as general community meetings and participation in sport events. In addition, program beneficiaries also report to communicate and rely more on the support of other households in the community for help with issues that are not related to the program. Finally, possible reporting biases are unlikely to differ between the different intervention packages, so differences between intervention groups are likely to reflect real changes. Overall these results suggest that there are social interactions between the beneficiaries, and that these increased because of the program. This makes it at least plausible that these social interactions played a role for the social spillover effects.

4.3.2 Motivation of *promotoras* and beneficiaries

The results above also raise a question on whether there is any evidence on whether leaders and/or beneficiaries with the productive investment and vocational training packages 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. In order to explore this further, we 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.²⁷ 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 if they live farther from each other. We therefore 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 3 packages to both beneficiaries and leaders.

Table 9a shows that, in general, distance to a leader does indeed reduce the likelihood of talking to the *promotora*. Yet, the effect of distance is much larger for beneficiaries who only received the basic transfer package. The effect of distance is not significant from 0 for beneficiaries of the productive investment package. This could mean that people with this package, and to a lesser extent people with the vocational training transfer, put in more effort to go talk to their *promotoras*, or that *promotoras* put in more effort to go talk to those beneficiaries. Moreover, distance to leaders with the basic transfer package affects how often a beneficiary talks to a *promotora*. The effect is smaller for distance to leaders with the vocational training transfer, and distance to leaders with the productive investment package does not affect how often one talks.

We also find similar patterns in what the beneficiaries know 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 conditionalities and general program rules. Comparing table 9a with 9b shows that the relationship between communication and distance between different types of beneficiaries and *promotoras* is reflected in the knowledge score. For beneficiaries of the productive investment package, distance to leaders does not matter for communication with *promotoras* or for program knowledge. For beneficiaries of

²⁷ 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.

the basic package it does. These patterns appear even stronger when we consider distance to leaders with the same program component as the beneficiary.²⁸ Overall, we find strong evidence of increased effort to communicate by leaders and/or beneficiaries of the productive investment package, which sheds further light on the social spillover effects.

4.2.3 Alternative explanation: entrepreneurship and economic spillovers

Finally, we investigate whether the identified effects of leaders instead may reflect economic spillover effects. Specifically, people with leadership positions might also be better entrepreneurs. Indeed, the data suggest 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 (community) economy than when other people received the transfer. This in turn might have economic spillover effects on other beneficiaries, as they may now buy from other businesses or provide better access to (food) products for other households. If this were the only mechanism at play, it arguably has less to do with social interactions per se.

We therefore analyze the availability and prices of different products in the community. Table 10 shows that while the program had an impact in the availability of various consumption products in the community, it did not affect prices. More importantly, table 11 confirms that there is no strong evidence that leaders with the productive investment package had an impact on the availability or on prices of these products.

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 (table 12). This does not exclude however that leaders with the productive investment package might increase demand for other products in the community. Yet, similar to other beneficiaries, leaders report that they buy the majority of their products outside of the community, and leaders with the productive investment package are not more likely to buy food in their community than other leaders. Overall, these results suggest that economic spillover effects can probably not explain the findings in section 4.1. and 4.2.

²⁸ These patterns all hold when we consider *promotoras* only, instead of leaders more generally.

5. Conclusions

Many development programs have an explicit or implicit objective of social capital formation. Many other programs also aim, through a variety of mechanisms, to change the attitudes and perspectives of beneficiary households. When transfer or other types of programs are designed to only last for a limited period, the sustainability of the impacts might crucially depend on their success to affect attitudes and social dynamics. For instance, when conditional cash transfer programs are designed to last only for a limited period, the implicit assumption is that the program length will be sufficient to change households' attitudes and/or the social norms towards investment in the education, health and nutrition of the children.

Other work has looked at the role of social dynamics and households' perceptions about the future as factors for understanding the relative success or failure of program or development outcomes. Yet, it is often difficult to identify the causal relationship between these factors and the outcomes of interest. Very often, it is not possible to identify exogenous causes for changes in these factors. And even if there are such exogenous shocks related, for instance, to program implementation, it is often difficult to disentangle how these factors in turn affect program outcomes.

Using a unique experiment with two levels of randomization, this paper has been able to address some of these methodological challenges. We find that the program under study had significant social spillover effects and affected households' attitudes towards the future. Social spillover effects substantially increased program impacts on both human capital investments and income diversification. While these spillover effects may result from a variety of mechanisms, the available suggest that increased social interactions and motivation by female leaders played were important. A large remaining question is whether this type of changes can indeed lead to sustainable outcomes on the long run. A new round of data, to be collected 1.5 year after the program ended, will allow shedding light on this question.

References

- Adato, Michelle, Benedicte de la Briere, Dubravka Mindek and Agnes Quisumbing, 2000. "The impact of Progresa on women's status and intrahousehold relations". International Food Policy Research Institute, final report.
- Aguilera, Verónica, Ximena Del Carpio, Carold Herrera, Karen Macours, Miriam Enoe Moncada Carlos Obregón, and Renos Vakis, 2006. "Estudio Cualitativo del Componente de Atención a Crisis (CAC) del Ministerio de la Familia, Nicaragua", mimeo, Johns Hopkins University.
- Angelucci, Manuela, and Giacomo De Giorgi, 2008, "Indirect Effects of an Aid Program: How do Cash Transfers Affect Ineligibles' Consumption", *American Economic Review*, forthcoming.
- Appadurai, Arjun, 2004. "The Capacity to Aspire". In Rao, V., and M. Walton (eds.) 2004. *Culture and Public Action*. Palo Alto, CA: Stanford University Press.
- Attanasio Orazio, Luca Pellerano, and Sandra Polania, 2007. "The Effect of Familias en Accion on Social Capital: Evidence from a Public Good Game", paper presented at the 2007 LACEA conference, Bogota, Colombia.
- Bandiera, Oriana, and Imran Rasul. 2006. "Social Networks and Technology Adoption in Northern Mozambique." *Economic Journal*, 116(514):862–902.
- Banerjee Abhijit V., and Esther Duflo, 2007. "The Economic Lives of the Poor", *Journal of Economic Perspectives*, 21(1): 141-67.
- Besley, T. and A. Case (1994). "Diffusion as a Learning Process: Evidence from HYV Cotton." Discussion Paper. Princeton University, Woodrow Wilson School of Public and International Affairs, Princeton, NJ.
- Bobonis, Gustavo, and Frederico Finan, 2007. "Endogenous Social Interaction Effects in School Participation in Rural Mexico", mimeo University of Toronto and UCLA.
- Castillo, Marco, and Michael Carter, 2007. "Identifying Social Effects with Economic Experiments", mimeo, Georgia Institute of Technology and University of Wisconsin-Madison.
- Conley, Timothy G., and Christopher Udry. 2004. "Learning About a New Technology: Pineapple in Ghana." New Haven, CT: Yale University, Economic Growth Center Working Paper Series 817.
- Das, Jishnu and Das, V. 2006. "Mental Health in Urban India: Patterns and Narratives.", mimeo, The World Bank.
- Das, Jishnu, Quy-Toan Do, Jed Friedman, David McKenzie, and Kinnon Scott, 2007. "Mental health and poverty in developing countries: Revisiting the relationship", *Social Science and Medicine* 65 (2007): 467-480.
- Duflo, Esther and Emmanuel Saez, 2003. "The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence from a Randomized Experiment," *Quarterly Journal of Economics* 118(3): 815- 842.

- Dufló, Esther, Michael Kremer, and Jonathan Robinson. 2006. "Why Don't Farmers Use Fertilizer: Evidence from Field Experiments in Western Kenya." Massachusetts Institute of Technology. Cambridge, mimeo.
- Foster, Andrew D., and Mark R. Rosenzweig. 1995. "Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture." *Journal of Political Economy* 103(1995):1176–209.
- Friedman Jed and Duncan Thomas, 2007. "Psychological Health Before, During, and After an Economic Crisis", *Policy Research Working Paper* 4386, World Bank.
- Gugerty, Mary Kay, and Michael Kremer, 2006. "Outside Funding and the Dynamics of Participation in Community Associations", *BREAD Working Paper* No. 128.
- Jones, Benjamin F., and Benjamin A. Olken, 2005. "Do Leaders Matter? National Leadership and Growth Since World War II", *Quarterly Journal of Economics* 120 (3), pp. 835-864.
- Kremer, Michael, and Edward Miguel, 2007. "The Illusion of Sustainability", *Quarterly Journal of Economics*, 2007, 112(3), 1007-1065.
- Lalive, Rafael, and Alejandra Cattaneo (2006). "Social Interactions and Schooling Decisions", *IZA Discussion Paper* No. 2250.
- Macours, Karen and Renos Vakis, 2005. "Weather risk and poverty in Nicaragua: Expanding risk management options for the poor. Pilot program objectives and impact evaluation design, mimeo, Johns Hopkins University and World Bank.
- Macours, Karen and Renos Vakis, 2007. "Seasonal Migration and Early Childhood Development", *Social Protection Discussion Paper* 0702, World Bank.
- Manski, C. F. (1993) "Identification of Social Endogenous Social Effects: The Reflection Problem" *Review of Economic Studies* 60: 531-542.
- Munshi, Kaivan, 2004. "Social Learning in a Heterogeneous Population: Technology Diffusion in the Indian Green Revolution." *Journal of Development Economics*. 73(1): 185-215.
- Paxson, Christina and Norbert Schady, 2007. "Does Money Matter? The Effects of Cash Transfers on Child Health and Development in Rural Ecuador", *World Bank Policy Research Working Paper* No. 4226.
- Radloff, L.S. 1977. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Rao, Vijayendra, and Ana Maria Ibanez, 2005. "The Social Impact of Social Funds in Jamaica: A 'Participatory Econometric' Analysis of Targeting, Collective Action, and Participation in Community-Driven Development" *Journal of Development Studies*, v. 41(5): 788-838
- Ray, Debraj, 2006. "Aspirations, Poverty and Economic Change", in Banerjee, Abhijit V., Roland Benabou, and Dilip Mookherjee (eds.), *Understanding Poverty*, Oxford University Press, Oxford.
- Stillman, Steven, David McKenzie and John Gibson, 2006. Migration and mental health: Evidence from a natural experiment. *BREAD Working Paper* No. 123.

Tables and Figures

Table 1: Original program design and annual benefits by component

Transfer	Amount	Comments	# beneficiary households
Traditional CCT			All 3000
Food transfer	\$145/household per year	Partial transfer every 2 months over 1 year	
Education transfer	\$90/household per year	Partial transfer every 2 months over 1 year	
School “backpack” (supplies)	\$25/child per year	1 time transfer at the beginning of the school year	
School “supply-side” transfer	\$1.3/child	Every 2 months over 1 year	
Health transfer	\$90/household per year	Was to be paid to health provider (but was never implemented)	
Occupational training (Traditional CCT above plus)			+/-1000
Opportunity cost transfer	Up to \$90/household per year	\$15 per month for the duration of the course, up to 6 months. Paid every 2 months (not started)	
Course costs	Up to \$140/household per year	Paid directly to course provider upon selection of course	
Matching Grant transfer (Traditional CCT above plus)			+/-1000
Matching Grant transfer	\$200/household	1 time transfer upon successful completion of a business development plan (in 2 payments: 175 \$ + 25\$)	

Table 2: Baseline values of household characteristics and outcome variables for all households

	Nr. of Obs.	Control (C)	Treatment (T)			P-value T-C	P-value T2-T1	P-value T3-T1	P-value T3-T2
			Basic CCT package (T1)	Training package (T2)	Productive investment package (T3)				
Household demographics									
Age prime care giver	3968	40.81	40.55	39.51	39.31	0.16	0.12	0.04	0.74
Household size	3969	5.381	5.182	5.299	5.340	0.42	0.26	0.19	0.73
Number of men	3969	2.678	2.635	2.693	2.655	0.81	0.34	0.78	0.61
Number of boys under 5	3969	0.340	0.320	0.315	0.323	0.49	0.84	0.86	0.70
Number of boys between 5-14	3969	0.726	0.784	0.823	0.759	0.05	0.37	0.60	0.19
Number of women	3969	2.702	2.547	2.606	2.677	0.24	0.42	0.07	0.30
Number of girls under 5	3969	0.327	0.299	0.331	0.336	0.85	0.21	0.10	0.83
Number of girls between 5 and 14	3969	0.786	0.727	0.757	0.792	0.54	0.49	0.14	0.40
Household assets									
Years of education prime caregiver	3818	3.192	3.192	3.075	3.146	0.79	0.39	0.72	0.55
Literate prime caregiver	3969	0.650	0.637	0.655	0.650	0.91	0.34	0.54	0.75
Own land	3969	0.677	0.638	0.664	0.650	0.46	0.22	0.61	0.51
Total land cultivated (manzanas)	3969	4.138	3.618	3.399	3.418	0.24	0.78	0.75	0.98
Total land owned (manzanas)	3969	3.240	2.659	2.323	3.000	0.18	0.14	0.49	0.15
Own cattle	3968	0.231	0.209	0.227	0.207	0.58	0.25	0.93	0.25
Household welfare									
Own refrigerator	3968	0.0369	0.0387	0.0426	0.0480	0.58	0.67	0.17	0.51
Own radio	3968	0.196	0.205	0.209	0.210	0.72	0.83	0.80	0.95
Number of rooms	3969	1.642	1.608	1.657	1.596	0.79	0.18	0.74	0.07
Water access in house	3969	0.125	0.137	0.137	0.131	0.85	0.97	0.62	0.69
Electricity access	3968	0.374	0.401	0.401	0.407	0.67	0.99	0.70	0.69
Log(food consumption per capita)	3967	7.9282	7.927	7.9087	7.8913	0.71	0.54	0.32	0.66
Log(Total consumption per capita)	3967	8.3465	8.403	8.3681	8.3714	0.58	0.16	0.26	0.90
Context									
Time to health center (hours)	3969	1.194	1.115	1.137	1.112	0.63	0.45	0.94	0.39
Time to municipal headquarters (hours)	3969	1.630	1.504	1.507	1.518	0.46	0.93	0.65	0.77
Affected by drought in previous year	3968	0.963	0.957	0.961	0.947	0.45	0.58	0.37	0.24
Affected by plague in previous year	3968	0.639	0.647	0.656	0.661	0.69	0.73	0.52	0.80
Outcomes: Income (Cordobas per capita)									
Total income (excluding self-consumption from agriculture)	3962	2844	3073	2974	3059	0.41	0.56	0.94	0.58
Income from commercial activities	3966	46.75	54.31	84.67	42.55	0.32	0.12	0.37	0.01
Income from agricultural wages	3966	384.6	363.8	331.4	392.8	0.61	0.30	0.29	0.05
Income from non-agricultural self-employment	3967	175.1	132.9	189.8	156.1	0.71	0.10	0.38	0.36
Income from agricultural self-employment	3964	558.7	458.1	520.5	475.2	0.41	0.44	0.85	0.57
Outcomes: Human Capital (individual outcomes)									
Assisting to school (7-18 year)	5986	0.735	0.761	0.755	0.719	0.64	0.70	0.02	0.03
Days absent (if enrolled: 7-25 years)	5937	0.784	1.018	1.063	1.017	0.16	0.75	0.99	0.76
Passed grade (if enrolled: 7-25 years)	5930	0.0107	0.0183	0.0154	0.0177	0.19	0.74	0.95	0.69
Health control and weighted in last 6 months (0-5 years)	2574	0.924	0.896	0.911	0.901	0.20	0.42	0.74	0.62
Share of leaders in regristration assembly with productive package									
Average	3969	0	0.32	0.32	0.33				
Median	3969	0	0.33	0.33	0.33				
90th percentile	3969	0	0.60	0.60	0.67				

P-values based on standard errors clustered by community

Table 3: Baseline values of household characteristics and outcome variables for households of leaders in treatment communities only

	Nr. of Obs.	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	541	33.55	35.19	35.34	0.19	0.10	0.90
Household size	541	5.036	5.413	5.244	0.07	0.36	0.44
Number of men	541	2.544	2.703	2.608	0.20	0.64	0.50
Number of boys under 5	541	0.368	0.343	0.307	0.63	0.25	0.47
Number of boys between 5-14	541	0.850	0.959	0.790	0.23	0.53	0.03
Number of women	541	2.492	2.709	2.636	0.13	0.34	0.65
Number of girls under 5	541	0.311	0.320	0.261	0.88	0.40	0.35
Number of girls between 5 and 14	541	0.788	0.907	0.795	0.18	0.93	0.25
Household assets							
Years of education prime caregiver	540	5.280	4.918	5	0.31	0.29	0.78
Literate prime caregiver	541	0.876	0.913	0.915	0.19	0.15	0.95
Own land	541	0.663	0.680	0.682	0.77	0.70	0.97
Total land cultivated (manzanas)	541	3.291	2.579	3.159	0.31	0.85	0.31
Total land owned (manzanas)	541	2.343	2.347	2.554	0.99	0.72	0.71
Own cattle	541	0.192	0.221	0.256	0.43	0.06	0.35
Household welfare							
Own refrigerator	541	0.0622	0.0407	0.0852	0.43	0.35	0.08
Own radio	541	0.238	0.215	0.244	0.63	0.91	0.57
Number of rooms	541	1.756	1.663	1.716	0.34	0.68	0.60
Water access in house	541	0.145	0.145	0.165	0.99	0.55	0.64
Electricity access	541	0.446	0.436	0.489	0.88	0.39	0.30
Log(food consumption per capita)	540	7.9785	7.9354	8.0257	0.46	0.43	0.21
Log(Total consumption per capita)	540	8.4339	8.3483	8.5005	0.13	0.32	0.03
Context							
Time to health center (hours)	541	1.266	1.309	1.171	0.68	0.40	0.13
Time to municipal headquarters (hours)	541	1.659	1.560	1.535	0.38	0.24	0.81
Affected by drought in previous year	541	0.953	0.977	0.955	0.29	0.96	0.27
Affected by plague in previous year	541	0.705	0.703	0.642	0.98	0.16	0.25
Outcomes: Income (Cordobas per capita)							
Total income (excluding self-consumption from agriculture)	540	3479	2908	3043	0.10	0.31	0.65
Income from commercial activities	541	82.01	109.2	40.58	0.57	0.18	0.16
Income from agricultural wages	541	310.8	284.0	398.9	0.56	0.23	0.12
Income from non-agricultural self-employment	541	115.9	174.6	116.5	0.31	0.99	0.34
Income from agricultural self-employment	540	497.5	355.1	431.7	0.13	0.50	0.34
Outcomes: Human Capital (individual outcomes)							
Assisting to school (7-18 year)	851	0.811	0.830	0.767	0.65	0.18	0.07
Days absent (if enrolled: 7-25 years)	939	0.964	0.987	0.976	0.94	0.96	0.96
Passed grade (if enrolled: 7-25 years)	939	0.0149	0.0256	0.0103	0.39	0.62	0.28
Health control and weighted in last 6 months (0-5 years)	351	0.912	0.957	0.910	0.15	0.97	0.35

P-values based on standard errors clustered by community

Table 4a: Differences in human capital investments for leaders of 3 intervention groups

	Education		Consumption		Nutrition Number of days in the last week that child (0-8.5 years) drank/ate:			
	Assisting to school 7-18 year olds	Number of days absent from school (7-25 year olds)	Log (food consumption per capita)	Log(total consumption per capita)	Fruit juice	Vegetables	Cheese	Meat
LEADERS								
T2-T1	-0.0331	0.159	0.0426	0.00387	-0.355	0.501*	0.234	0.0256
T3-T1	-0.0197	-0.143	0.0834*	0.0867*	-0.266	0.519	0.263	0.318*
T3-T2	0.0134	-0.302	0.0408	0.0828*	0.0894	0.0180	0.0293	0.293
Observations	934	1038	539	539	547	548	548	548

Based on standard errors clustered by community. Results for other indicators of education and nutrition are similar.

*** p<0.01, ** p<0.05, * p<0.1

Table 4b: Differences in economic activity outcomes for leaders of 3 intervention groups

	ECONOMIC ACTIVITIES					ASPIRATIONS			
	Total income (per capita)	Income from commercial activities (per capita)	Income from non-agricultural self-employment (per capita)	Income from agricultural self-employment (per capita)	Income from agricultural wages (per capita)	Strong positive expectations about the future	Cheerful	Strongly Feels that moving forward in life	CESD depression scale internally standardized
LEADERS									
T2-T1	-1386**	3.061	-58.60	55.60	-11.70	0.188***	0.0185	0.124*	0.164
T3-T1	-319.5	231.4***	252.0***	399.8**	47.64	0.0891	0.0909*	0.194***	-0.0699
T3-T2	1067***	228.3***	310.6***	344.2*	59.34	-0.0991	0.0724	0.0701	-0.234*
Observations	540	541	540	540	541	332	333	333	331

Based on standard errors clustered by community

*** p<0.01, ** p<0.05, * p<0.1

Table 5a: Human capital investments for all beneficiaries : Spill-overs

	Education		Consumption	
	Assisting to school 7-18 year olds	Number of days absent from school (7-25 year olds)	Log (food consumption per capita)	Log(total consumption per capita)
Intent-to-treat *share of female leaders with productive investment package	0.0621* (0.032)	-0.679*** (0.22)	0.154* (0.090)	0.231** (0.10)
Intent-to-treat	0.0508*** (0.018)	-0.394** (0.18)	0.276*** (0.056)	0.219*** (0.066)
Constant	0.759*** (0.013)	1.648*** (0.14)	8.114*** (0.037)	8.525*** (0.043)
Observations	5168	5212	3286	3282
R-squared	0.01	0.01	0.08	0.06

	Nutrition			
	Number of days in the last week that child (0-8.5 years) drank/ate:			
	Fruit juice	Vegetables	Cheese	Meat
Intent-to-treat *share of female leaders with productive investment package	0.792* (0.41)	0.699 (0.49)	1.060** (0.51)	0.336* (0.19)
Intent-to-treat	1.038*** (0.22)	0.616* (0.31)	0.913*** (0.24)	0.779*** (0.100)
Constant	2.571*** (0.13)	1.530*** (0.16)	1.910*** (0.15)	0.581*** (0.058)
Observations	3071	3074	3074	3073
R-squared	0.05	0.03	0.05	0.08

Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Data for children 0-8.5 years old. Excluding households with female leaders. Intent-to

Table 5b: Economic activity outcomes for all beneficiaries : Spill-overs

	Total income	Income from commercial activities	Income from non-agricultural self-employment	Income from agricultural wages
	(per capita)	(per capita)	(per capita)	(per capita)
Intent-to-treat *share of female leaders with productive investment package	1172* (665)	84.85 (69.8)	102.4 (83.8)	-78.25 (93.9)
Intent-to-treat	243.4 (364)	23.74 (27.4)	40.46 (40.3)	-1.756 (72.7)
Constant	3237*** (174)	72.24*** (15.9)	158.1*** (26.3)	457.6*** (37.3)
Observations	3275	3287	3283	3287
R-squared	0.01	0.00	0.00	0.00

Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Household level data. Excluding households with female leaders. Intent-to-treat estim

Table 6a: Human Capital Outcomes for beneficiaries of productive investment package: Spill-overs

	Education		Consumption	
	Assisting to school 7-18 year olds	Number of days absent from school (7-25 year olds)	Log (food consumption per capita)	Log(total consumption per capita)
Productive investment package* share female leaders with productive investment package	0.0957** (0.047)	-0.665* (0.38)	0.130 (0.11)	0.287*** (0.10)
Productive investment package	0.0455** (0.022)	-0.172 (0.22)	0.298*** (0.058)	0.222*** (0.064)
Constant	0.759*** (0.013)	1.648*** (0.14)	8.114*** (0.037)	8.525*** (0.043)
Observations	2720	2678	1706	1703
R-squared	0.01	0.00	0.09	0.08

Nutrition

Number of days in the last week that child drank/ate:

	Number of days in the last week that child drank/ate:			
	Fruit juice	Vegetables	Cheese	Meat
Productive investment package* share female leaders with productive investment package	1.095* (0.56)	1.261** (0.52)	1.454** (0.58)	0.535** (0.24)
Productive investment package	1.019*** (0.21)	0.395 (0.28)	0.825*** (0.27)	0.776*** (0.12)
Constant	2.571*** (0.13)	1.530*** (0.16)	1.910*** (0.15)	0.581*** (0.058)
Observations	1651	1654	1654	1653
R-squared	0.06	0.03	0.06	0.11

Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Data for children 0-8.5 years old. Excluding households with female leaders. Intent-to-treat estimator

Table 6b: Economic activity outcomes for beneficiaries of productive investment package: Spill-overs

	Total income	Income from commercial activities	Income from non-agricultural self-employment	Income from agricultural wages
	(per capita)	(per capita)	(per capita)	(per capita)
Productive investment package* share female leaders with productive investment package	1633** (818)	204.1* (113)	273.4* (139)	-230.4 (152)
Productive investment package	26.61 (324)	31.09 (37.2)	60.22 (48.9)	46.33 (94.5)
Constant	3237*** (174)	72.24*** (15.9)	158.1*** (26.3)	457.6*** (37.3)
Observations	1700	1707	1707	1706
R-squared	0.01	0.01	0.01	0.00

Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Household level data. Excluding households with female leaders. Intent-to-treat estimators

Table 7a: Social dynamics and positive attitudes towards the future: beneficiaries with productive investment package

	No risk management: will not do anything or only pray to reduce impact of future shocks	Strong positive expectations about the future	Cheerful	Feels that moving forward in life	Sum positive feelings	Index of negative feelings CESD internally standardized	CESD depression scale internally standardized
Productive investment package* share female leaders with productive investment packa	-0.130** (0.052)	0.148 (0.10)	0.242** (0.10)	0.0767 (0.089)	0.449** (0.22)	-0.440* (0.24)	-0.450* (0.26)
Productive investment package	0.0228 (0.027)	-0.0195 (0.055)	-0.0667 (0.049)	0.0870 (0.053)	0.00324 (0.13)	0.114 (0.11)	0.0902 (0.11)
Observations	1661	1115	1113	1107	1107	1106	1106
R-squared	0.04	0.03	0.03	0.04	0.04	0.05	0.05

Table 7b: Social dynamics and positive attitudes towards the future: all beneficiaries

	No risk management: will not do anything or only pray to reduce impact of future shocks	Strong positive expectations about the future	Cheerful	Feels that moving forward in life	Sum positive feelings	Index of negative feelings CESD internally standardized	CESD depression scale internally standardized
Intent-to-treat* share female leaders with same package	-0.00512 (0.036)	0.0876* (0.045)	0.118*** (0.040)	0.0384 (0.052)	0.243** (0.099)	-0.233*** (0.086)	-0.233** (0.092)
Intent-to-treat	0.000679 (0.022)	-0.00303 (0.040)	-0.00671 (0.036)	0.0894** (0.040)	0.0789 (0.092)	0.0407 (0.076)	0.0165 (0.076)
Observations	3196	2111	2110	2099	2098	2095	2094
R-squared	0.05	0.02	0.02	0.03	0.03	0.05	0.04

Robust standard errors in parentheses, corrected for clustering at the community level. *** p<0.01, ** p<0.05, * p<0.1

Controlling for age, gender, and education respondent, demographic structure of the household, and distance to health clinic and municipal headquarters

Data from primary caregivers of children between 0 and 8 (except column 1) Excluding leaders themselves. Intent-to-treat estimators.

Table 8: Average impact on social interactions

	Talked to others in community				Talked to leaders (last 7 days)				
	About food prices	About businesses	Beneficiaries of same group	Beneficiaries with same package	Community leader	Health coordinator	Teacher	Religious leader	Promotora
All beneficiaries together									
Intent-to-treat	0.153*** (0.032)	0.225*** (0.020)			0.149*** (0.029)	0.107*** (0.032)	0.171*** (0.028)	0.0272 (0.024)	
Constant	0.491*** (0.027)	0.108*** (0.016)			0.311*** (0.021)	0.403*** (0.024)	0.481*** (0.023)	0.562*** (0.019)	
Observations	3965	3964			3666	3816	3905	3885	
R-squared	0.02	0.05			0.02	0.01	0.02	0.00	
By benefit package									
Basic package	0.140*** (0.034)	0.0804*** (0.022)	0.796*** (0.019)	0.805*** (0.018)	0.146*** (0.033)	0.104*** (0.033)	0.164*** (0.029)	0.0517** (0.026)	0.774*** (0.022)
Training package	0.132*** (0.035)	0.0950*** (0.022)	0.826*** (0.013)	0.838*** (0.015)	0.126*** (0.032)	0.106*** (0.036)	0.164*** (0.032)	0.0299 (0.028)	0.833*** (0.015)
Productive investment package	0.186*** (0.034)	0.496*** (0.029)	0.826*** (0.019)	0.852*** (0.015)	0.174*** (0.033)	0.110*** (0.035)	0.186*** (0.032)	0.000321 (0.027)	0.844*** (0.018)
Constant	0.491*** (0.027)	0.108*** (0.016)			0.311*** (0.021)	0.403*** (0.024)	0.481*** (0.023)	0.562*** (0.019)	
Observations	3965	3964	2800	2796	3666	3816	3905	3885	2601
R-squared	0.02	0.19	0.82	0.83	0.02	0.01	0.02	0.00	0.82

Robust standard errors in parentheses, corrected for clustering at the community level

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Average impact on social interactions (cont.)

	<u>Participation in community activities (last 12 months)</u>				<u>Could ask help from somebody in the community</u>	
	Workshops	Meetings	Parent-teacher association	Sport	In case of drought	In case of a plague
All beneficiaries together						
Intent-to-treat	0.214*** (0.034)	0.165*** (0.025)	0.0963*** (0.033)	0.0271* (0.015)	0.0586** (0.029)	0.0658** (0.030)
Constant	0.537*** (0.027)	0.750*** (0.023)	0.269*** (0.024)	0.0853*** (0.012)	0.708*** (0.024)	0.685*** (0.026)
Observations	3931	3932	3930	3930	3965	3965
R-squared	0.04	0.05	0.01	0.00	0.00	0.00
By benefit package						
Basic package	0.220*** (0.037)	0.162*** (0.026)	0.0742** (0.034)	0.0290* (0.017)	0.0649** (0.031)	0.0655** (0.032)
Training package	0.212*** (0.035)	0.164*** (0.026)	0.120*** (0.037)	0.0326* (0.018)	0.0453 (0.030)	0.0622* (0.031)
Productive investment package	0.211*** (0.037)	0.168*** (0.025)	0.0949*** (0.035)	0.0199 (0.017)	0.0655** (0.030)	0.0695** (0.033)
Constant	0.537*** (0.027)	0.750*** (0.023)	0.269*** (0.024)	0.0853*** (0.012)	0.708*** (0.024)	0.685*** (0.026)
Observations	3931	3932	3930	3930	3965	3965
R-squared	0.04	0.05	0.01	0.00	0.00	0.00

Robust standard errors in parentheses, corrected for clustering at the community level

*** p<0.01, ** p<0.05, * p<0.1

Table 9a: Probability of talking to the program *promotora* in the last week: comparison between treatment households

	(1)	(2)	(3)	(4)	(5)
Training package	0.0539** (0.023)		0.0233 (0.025)	0.0477* (0.025)	0.00779 (0.032)
Productive investment package	0.0652*** (0.021)		0.0321 (0.021)	0.0672*** (0.022)	0.00538 (0.032)
Distance to nearest female leader		-0.00966*** (0.0033)			
Distance to nearest female leader*basic transfer package			-0.0149*** (0.0040)		
Distance to nearest female leader*training package			-0.00678** (0.0029)		
Distance to nearest female leader*productive investment package			-0.00660 (0.0057)		
Distance to nearest female leader with basic package*basic package					-0.00398** (0.0016)
Distance to nearest female leader with training package *training package					-0.000510 (0.00063)
Distance to nearest female leader with productive investment package *productive investment packa					0.00138* (0.00070)
Distance to nearest female leader with basic package				-0.00368*** (0.0011)	
Distance to nearest female leader with training package				-0.00113* (0.00058)	
Distance to nearest female leader with productive investment package				-0.000672 (0.00055)	
Constant	0.715*** (0.023)	0.793*** (0.021)	0.773*** (0.025)	0.773*** (0.028)	0.756*** (0.030)
Observations	2425	2425	2425	2157	2157
R-squared	0.00	0.01	0.02	0.02	0.01

Robust standard errors in parentheses, corrected for clustering at the community level

*** p<0.01, ** p<0.05, * p<0.1

Sample: beneficiary households in treatment community, excluding female leaders themselves. Omitted category: basic package

Table 9b: Score on a knowledge test about the program: comparison between treatment households

	(1)	(2)	(3)	(4)	(5)
Training package	-0.0194 (0.061)		-0.0242 (0.077)	-0.0512 (0.064)	-0.0374 (0.088)
Productive investment package	0.209*** (0.054)		0.166** (0.067)	0.182*** (0.057)	0.133* (0.078)
Distance to nearest female leader		-0.0106* (0.0060)			
Distance to nearest female leader*basic transfer package			-0.0140** (0.0069)		
Distance to nearest female leader*training package			-0.0121 (0.011)		
Distance to nearest female leader*productive investment package			-0.00316 (0.0097)		
Distance to nearest female leader with basic package*basic package					-0.000140 (0.0038)
Distance to nearest female leader with training package *training package					-0.00157 (0.0022)
Distance to nearest female leader with productive investment package *productive investment packa					0.00391 (0.0025)
Distance to nearest female leader with basic package				0.000178 (0.0023)	
Distance to nearest female leader with training package				-0.00322* (0.0017)	
Distance to nearest female leader with productive investment package				0.00386* (0.0020)	
Constant	4.739*** (0.061)	4.845*** (0.057)	4.793*** (0.062)	4.723*** (0.087)	4.733*** (0.084)
Observations	2425	2425	2425	2157	2157
R-squared	0.01	0.00	0.01	0.01	0.01

Robust standard errors in parentheses, corrected for clustering at the community level

*** p<0.01, ** p<0.05, * p<0.1

Sample: beneficiary households in treatment community, excluding female leaders themselves. Omitted category: basic package

Table 10: Impacts on prices and availability of products^a

	Coffee	Beans	Tomatoes	Meat	Potatoes	Corn	Soap	Razors	Broom
Availability at the community									
Treatment	0.130*	0.104**	0.199**	0.0354	0.0481	0.144***	0.0832*	0.124	-0.00667
	(0.072)	(0.050)	(0.088)	(0.100)	(0.096)	(0.055)	(0.046)	(0.093)	(0.100)
Constant	0.776***	0.878***	0.612***	0.531***	0.612***	0.837***	0.898***	0.612***	0.449***
	(0.052)	(0.036)	(0.063)	(0.072)	(0.069)	(0.040)	(0.033)	(0.067)	(0.072)
Observations	102	102	102	102	102	102	102	102	101
R-squared	0.03	0.04	0.05	0.00	0.00	0.06	0.03	0.02	0.00
Prices at the community									
Treatment	-0.0993	-0.0500	-0.228	-0.0405	-0.124	-0.0703	0.388	0.447*	-2.112
	(1.01)	(0.15)	(0.27)	(0.28)	(0.28)	(0.057)	(0.31)	(0.27)	(2.01)
Constant	18.82***	4.667***	4.969***	16.70***	6.781***	1.982***	7.061***	6.312***	21.36***
	(0.73)	(0.11)	(0.20)	(0.20)	(0.20)	(0.042)	(0.23)	(0.20)	(1.46)
Observations	102	102	102	102	102	102	103	102	99
R-squared	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.03	0.01

^a: Results for sugar, salt, oil, rice, bread, chicken simiarly show no impact on prices but a positive impact on availability (not reported)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Impacts of leaders on prices and availability of products^a

	Coffee	Beans	Tomatoes	Meat	Potatoes	Corn	Soap	Razors	Broom
Availability at the community									
Treatment*share of female leaders with productive investment package	0.0986	-0.0914	0.152	0.968**	0.507	-0.167	0.138	0.173	0.443
	(0.27)	(0.12)	(0.36)	(0.43)	(0.43)	(0.12)	(0.12)	(0.40)	(0.45)
Constant	0.875***	1.010***	0.763***	0.262*	0.501***	1.034***	0.938***	0.681***	0.303*
	(0.093)	(0.043)	(0.12)	(0.15)	(0.15)	(0.043)	(0.043)	(0.14)	(0.16)
Observations	53	53	53	53	53	53	53	53	52
R-squared	0.00	0.01	0.00	0.09	0.03	0.04	0.02	0.00	0.02
Prices at the community									
Treatment*share of female leaders with productive investment package	-1.943	0.669	1.961	-0.230	1.793	-0.149	0.0962	0.318	-5.334
	(4.48)	(0.57)	(1.19)	(1.01)	(1.28)	(0.28)	(1.65)	(1.18)	(8.08)
Constant	19.33***	4.406***	4.122***	16.73***	6.092***	1.959***	7.419***	6.659***	20.95***
	(1.56)	(0.20)	(0.42)	(0.36)	(0.45)	(0.098)	(0.58)	(0.41)	(2.86)
Observations	53	54	54	54	54	54	54	54	52
R-squared	0.00	0.03	0.05	0.00	0.04	0.01	0.00	0.00	0.01

^a: Results for sugar, salt, oil, rice, bread, chicken show no spillover effects of leaders on availability or prices (not reported)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Probability of buying food products in own community

	All	Beneficiaries productive investment package only
Intent-to-treat	-0.0533 (0.058)	-0.0691 (0.060)
Share of female leaders with productive investment package	-0.0366 (0.075)	-0.0451 (0.098)
Constant	0.606*** (0.035)	0.606*** (0.035)
Observations	3813	1948
R-squared	0.00	0.01

Robust standard errors in parentheses, corrected for clustering at the community level

*** p<0.01, ** p<0.05, * p<0.1

Appendix 1. Average program impacts

Impacts on human capital and welfare outcomes

Table A1 shows the average treatment effects for human capital investments of all households, and separately by beneficiary group. We find strong impacts on education, consumption and nutrition. For example, children of beneficiary households are more likely to be assisting school and are missing fewer classes. Compared to parents in control communities, their parents are also more likely to report that their children are receiving better grades and that they have a more positive attitude towards school.

In terms of overall household welfare, we note large and significant increases in per capita expenditures for all three beneficiary groups (table A1). Most of these increases are driven by increases in food expenditures. This is further reflected in large improvements in the quality of food intake of young children. Specifically, children in beneficiary households are consuming a more varied diet and are more likely to eat higher nutrient products such as fruits, vegetables, meat, and eggs. For all these variables, impacts are significant and large in all three intervention groups.

We obtain similar results when controlling for baseline outcomes for those variables for which we have information at baseline, which is consistent with the results of the randomization discussed earlier.

Impacts on households' economic activities and income

Table A2 shows that income from commercial activities and more generally from non-agricultural self-employment increased significantly for the beneficiaries who received the productive investment package. For these households, income from non-agricultural self-employment almost doubled, while overall monetary income increased by almost 20% compared to the control group. Arguably, this is quite remarkable given that the actual transfers for the productive package only occurred 2-3 months before the data was collected. Table A2 also indicates that there were significant increases in total income for the

beneficiaries of the other packages.²⁹ Future work will focus on uncovering the explanation of this pattern. Similar results are obtained when controlling for outcomes at baseline.

Impacts on beneficiaries' depression and forward-looking attitudes

We also explore the quantitative program impacts on various indicators for attitudes and depression. Table A3 confirms that the program improved optimism about the future. In particular, beneficiaries are much more likely to report they are moving forward in life. This impact is the strongest for beneficiaries of the productive investment package. Other indicators, and in particular the index of positive feelings included in the CESD (capturing optimism, cheerfulness, and satisfaction) also show an impact.³⁰ Some of the positive feelings, and in particular the positive expectations about the future, are relatively large for the beneficiaries of the vocational training grant. Finally, the point estimates on the various indicators of depression suggest a possible decrease in negative feelings, but these are not significant.³¹

²⁹ Income excludes the direct program transfer.

³⁰ A negative sign on the CESD scale implies an improvement in mental health.

³¹ These results are similar when we control for individual and household characteristics that have been found to be related to mental health (age, education, gender, household demographics, and geographic variables, see e.g. Das et al. 2007).

Table A1: Average impacts on human capital investments

	Education				Consumption	
	Assisting to school (7-18 year olds)	If enrolled:			Log (food consumption per capita)	Log(total consumption per capita)
Number of days absent from school (7-25 year olds)		Better grades this year than last year (7-25 year olds)	More positive attitude this year than last year (7-25 year olds)			
All beneficiaries together						
Intent-to-treat	0.0730*** (0.015)	-0.605*** (0.15)	0.140*** (0.022)	0.160*** (0.026)	0.324*** (0.043)	0.289*** (0.051)
Constant	0.766*** (0.013)	1.606*** (0.13)	0.615*** (0.019)	0.594*** (0.022)	8.125*** (0.036)	8.540*** (0.043)
Observations	6333	6492	5889	6278	3964	3960
R-squared	0.01	0.01	0.02	0.02	0.07	0.05
By benefit package						
Basic package	0.0801*** (0.017)	-0.653*** (0.15)	0.135*** (0.024)	0.183*** (0.027)	0.327*** (0.045)	0.294*** (0.054)
Training package	0.0651*** (0.017)	-0.729*** (0.15)	0.145*** (0.025)	0.155*** (0.030)	0.303*** (0.045)	0.261*** (0.053)
Productive investment package	0.0741*** (0.017)	-0.439** (0.17)	0.138*** (0.024)	0.143*** (0.028)	0.341*** (0.043)	0.311*** (0.051)
Constant	0.766*** (0.013)	1.606*** (0.13)	0.615*** (0.019)	0.594*** (0.022)	8.125*** (0.036)	8.540*** (0.043)
Observations	6333	6492	5889	6278	3964	3960
R-squared	0.01	0.01	0.02	0.02	0.07	0.05

Robust standard errors in parentheses, corrected for clustering at the community level. Individual data, except for consumption variables.

*** p<0.01, ** p<0.05, * p<0.1

Table A1: Average impacts on human capital investments (cont.)

Nutrition								
<u>Number of days in the last week that child (0-8.5 years) drank/ate:</u>								
	Milk	Fruit juice	Bread	Potatoes	Vegetables	Eggs	Cheese	Meat
All beneficiaries together								
Intent-to-treat	1.322*** (0.21)	1.387*** (0.17)	1.576*** (0.28)	1.077*** (0.095)	0.856*** (0.23)	1.475*** (0.15)	1.297*** (0.21)	0.902*** (0.079)
Constant	1.481*** (0.15)	2.596*** (0.13)	2.457*** (0.20)	0.366*** (0.052)	1.543*** (0.16)	1.664*** (0.12)	1.934*** (0.16)	0.583*** (0.058)
Observations	3747	3743	3746	3747	3747	3747	3747	3746
R-squared	0.04	0.05	0.06	0.07	0.02	0.06	0.05	0.08
By benefit package								
Basic package	1.379*** (0.24)	1.332*** (0.19)	1.367*** (0.29)	0.924*** (0.12)	0.886*** (0.24)	1.439*** (0.18)	1.395*** (0.23)	0.849*** (0.096)
Training package	1.195*** (0.23)	1.432*** (0.20)	1.714*** (0.29)	1.072*** (0.10)	0.876*** (0.27)	1.407*** (0.18)	1.205*** (0.22)	0.885*** (0.089)
Productive investment package	1.401*** (0.23)	1.390*** (0.17)	1.626*** (0.29)	1.221*** (0.12)	0.808*** (0.24)	1.576*** (0.17)	1.301*** (0.24)	0.967*** (0.099)
Constant	1.481*** (0.15)	2.596*** (0.13)	2.457*** (0.20)	0.366*** (0.052)	1.543*** (0.16)	1.664*** (0.12)	1.934*** (0.16)	0.583*** (0.058)
Observations	3747	3743	3746	3747	3747	3747	3747	3746
R-squared	0.04	0.05	0.06	0.07	0.02	0.07	0.05	0.08

Robust standard errors in parentheses, corrected for clustering at the community level. Individual data, except for consumption variables.

*** p<0.01, ** p<0.05, * p<0.1

Table A2: Average impacts on economic activity

	Total income (per capita)	Income from commercial activities (per capita)	Income from non- agricultural self- employment (per capita)	Income from agricultural self- employment (per capita)	Income from agricultural wages (per capita)
All beneficiaries together					
Intent-to-treat	680.8** (333)	35.83 (23.6)	63.06 (39.1)	95.96 (97.7)	-45.29 (50.3)
Constant	3413*** (194)	89.63*** (19.2)	174.0*** (28.7)	601.8*** (65.5)	446.1*** (35.3)
Observations	3960	3967	3961	3955	3967
R-squared	0.00	0.00	0.00	0.00	0.00
By benefit package					
Basic package	847.6** (426)	-0.400 (27.9)	10.65 (45.8)	86.28 (106)	-60.53 (52.5)
Training package	548.8* (327)	9.109 (26.4)	21.56 (40.7)	95.22 (114)	-38.84 (53.9)
Productive investment package	647.2* (351)	97.74*** (29.4)	155.2*** (44.2)	106.2 (106)	-36.67 (55.1)
Constant	3413*** (194)	89.63*** (19.2)	174.0*** (28.7)	601.8*** (65.5)	446.1*** (35.3)
Observations	3960	3967	3961	3955	3967
R-squared	0.00	0.00	0.01	0.00	0.00

Robust standard errors in parentheses, corrected for clustering at the community level. Household level data

*** p<0.01, ** p<0.05, * p<0.1

Table A3: Average impacts on attitudes towards the future and depression

	No risk management: will not do anything or only pray to reduce impact of future shocks	Strong positive expectations about the future	Cheerful	Strongly Feels that moving forward in life	Sum positive feelings	Index of negative feelings CESD internally standardized	CESD depression scale internally standardized
All beneficiaries together							
Intent-to-treat	-0.00397 (0.018)	0.0234 (0.037)	0.0326 (0.033)	0.100*** (0.035)	0.155* (0.087)	-0.0527 (0.060)	-0.0792 (0.061)
Constant	0.191*** (0.015)	0.348*** (0.031)	0.644*** (0.028)	0.300*** (0.025)	1.292*** (0.069)	0.0000 (0.046)	0.0000 (0.045)
Observations	3969	2593	2593	2582	2580	2577	2575
R-squared	0.00	0.00	0.00	0.01	0.00	0.00	0.00
By benefit package							
Basic package	0.00511 (0.021)	0.00335 (0.039)	0.0221 (0.034)	0.0786** (0.037)	0.103 (0.091)	-0.0639 (0.065)	-0.0894 (0.064)
Training package	0.000452 (0.022)	0.0466 (0.040)	0.0563 (0.037)	0.0977** (0.039)	0.202** (0.094)	-0.0414 (0.068)	-0.0656 (0.069)
Productive investment package	-0.0173 (0.020)	0.0190 (0.043)	0.0186 (0.038)	0.123*** (0.038)	0.158 (0.097)	-0.0535 (0.068)	-0.0833 (0.070)
Constant	0.191*** (0.015)	0.348*** (0.031)	0.644*** (0.028)	0.300*** (0.025)	1.292*** (0.069)	0.0000 (0.046)	0.0000 (0.045)
Observations	3969	2593	2593	2582	2580	2577	2575
R-squared	0.00	0.00	0.00	0.01	0.01	0.00	0.00

Robust standard errors in parentheses, corrected for clustering at the community level. Data from primary caregivers of children between 0 and 8 (except column 1)

*** p<0.01, ** p<0.05, * p<0.1