

Cash Transfers and Social Capital¹

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Abstract

Many conditional cash transfers (CCT) have important social components. In 2007, we conducted a public good game in Cartagena, Colombia. We interpret the behaviour in the game as a measure of what in the literature has been called social capital. We played the game in two similar and adjacent neighbourhoods: *El Pozón* had been targeted for over two years by a conditional cash transfer (CCT) program, *Familias en Acción*; the ‘control’ neighbourhood, *Ciénaga de la Virgen*, had not. In 2008, with the program being implemented in both neighbourhoods, we played the same public good game, and were therefore able to implement a difference in difference strategy to estimate the impact of the CCT on our measure of social capital.

The level of cooperation we observed in the public good game in 2007 in the ‘treatment’ neighbourhood was considerably higher than in the ‘control’ one. Although similar in many dimensions, the two neighbourhoods turned out to be significantly different in some observable variables; the positive result was robust to controls for these differences. In 2008, we found that the level of cooperation in the two neighbourhoods was statistically identical and not dissimilar from the levels observed in 2007 in the treatment neighbourhood. We conclude that the conditional cash transfer program did improve cooperation.

In analysing the effect of the CCT on cooperation, we also look at other (individual and group) determinants of individual behaviour in the game, and we compare our measure based on behaviour in the game to more traditional measures of social capital used in the literature that we collected in a context-specific survey.

Keywords: Cash transfer programs, social capital, social networks, collective action, cooperation, VCM, experiments, public goods provision

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1. Introduction and motivation

Changes in the structures of social relationships and their forms of organization can improve economic outcomes. In fact, especially in poor communities, social relationships among family members, friends, partners or peers constitute an important asset that can be resorted to in moments of crisis, to be enjoyed like an aim and to be used to obtain material gains (Woolcock and Narayan (2000)). Many of these relationships are based on trust and on pro-social behaviour. For a lack of a better name, we will be referring to the structure of such relationships as social capital.

Empirical evidence indicates that social capital accumulation can improve economic outcomes and household welfare. For example, studies in Tanzania (Narayan and Pritchett (1999)); Bolivia, Burkina Faso, Indonesia (Grootaert and Oh and A. Swamy (1999), Grootaert and Narayan (2000), Grootaert (2001)) and South Africa (Haddad and Maluccio (2000)) have argued that household social capital improves well-being levels. Most of these studies define social capital as norms and social networks that facilitate collective action to reach common objectives (Coleman (1990), Putnam (1993)).

Social capital improves well-being mainly through mechanisms such as cooperative action, diffusion of technology and information, a reduction in transaction costs, and an increase of security and protection of common pool resources. In many cases, government policies may trigger these mechanisms in order to enhance social capital accumulation. However, there are no studies that examine the role of a government's economic or social policy on social capital outcomes.

Conditional Cash Transfer (CCT) programs have recently become very popular. International financial organizations, aid workers and policy makers have been promoting them as an effective way of simultaneously reducing short run poverty and breaking the intergenerational transmission of poverty by providing incentives to the accumulation of human capital. Many commentators have noticed that they can be very effective ways to redistribute resources and reduce inequality. For instance, it has been estimated that a large fraction of the reduction in inequality experienced in Brazil in recent years can be attributed to the deployment of its CCT *Bolsa Familia* (Hoddinott, Gilligan and Roy (2010)).

A distinctive feature of most CCT programs, in addition to the fact that most of them typically target women, is the fact that some of the conditions imposed on the beneficiaries often involve social activities, such as participating to meetings and courses or simply visiting a health centre jointly with other beneficiaries. For many women, especially in rural areas, these conditions represent an opportunity to interact on a regular basis with other

women within their community. It has been claimed that these activities improve trust and social relations within the community.

The impacts that CCT programs have had on schooling, nutritional status and a variety of other outcomes in many different contexts are well documented (Fiszbein, Schady, Ferreira, et al. (2009)). However, whether they have had an effect ‘social capital’ remains substantially unexplored. A number of anecdotes are available, but hard quantitative evidence on the impact that CCTs might have had on pro-social behaviour in the communities where they have been implemented is limited. One important reason for this lack of evidence is the difficulty in measuring social capital. This study uses a quantitative approach to measure social capital in a community and a quasi-experimental approach to estimate the impact of a CCT program on social capital.

Familias en Acción (FA) is a CCT program that has become the flagship of the Colombian government’s social policy. Started in 2002 in small rural areas, it was subsequently expanded to large metropolitan areas. The program has an educational component, conditional on school attendance, and a nutritional component, conditional on health centre visits as well as participation in meetings on the part of the mothers. The rural version of the program has been evaluated (see Attanasio, Battistin, Fitzsimon, et al. (2005)) and been found to have effects similar to those found in the case of PROGRESA and other CCT in rural areas. In particular, FA seems to have a positive effect on some nutritional and health outcomes for young children living in rural areas and to have some considerable effects on enrolment in secondary school in rural areas. A recent study (Attanasio et al. 2012) shows that these positive effects are still noticeable amongst beneficiaries 10 years after their first enrolment in the program.

In July 2007, we carried out the first stage of this study. We implemented a public good game and used individual behaviour in that game as our measure of social capital. We conducted this experiment in two different neighbourhoods: one in which the program had operated for about two years (*El Pozón*) and one in which the program had not yet started (*Ciénaga*). Under the assumption that, in the absence of the program the two neighbourhoods were similar, we could test the hypothesis that the program, where it was implemented, had improved social capital (Attanasio, Pellerano and Polanía-Reyes (2009))

Although, as we argue below, the two neighbourhoods are indeed very similar, one could always argue that difference in the behaviour observed in the games played in the two places could be due to subtle differences in their social fabric, rather than to the impact of the program. Indeed, when we tested for differences in observable variables, we found that

the ‘control’ neighbourhood was slightly poorer. And although one can control for such variables, it is always possible that the observed differences are due to unobserved characteristics of the two places.

In September 2007, FA started operating in *Ciénaga*. By applying our measures again in the two neighbourhoods in July 2008, we could therefore examine whether the CCT had an effect on social capital in a much more convincing way. In this paper, we use a difference in difference approach to estimate the impact of a prototypical CCT on social capital, as measured by the behaviour of individuals in a public good game. In addition, we relate our measures of social capital to other variables that we observe in our sample and that have been used in the literature as traditional measures of social capital.

The rest of this paper is organized as follows. In the next section, we discuss some of the issues in measuring social capital and present the approach we follow. In section 3, we give some background information on the FA program and on the context where we measure its impact on social capital. Section 4 discusses different measures of social capital. We focus on the extent to which different measures that have been used in this literature to measure pro-social behaviour (based on individual interviews) are correlated with each other, and with the results of the experimental games. In Section 5, we present our results on the effect of FA on social capital, using both our measure and more traditional measures based on self-reported behaviour. In section 6, we discuss other determinants of social capital. Section 7 concludes.

2. Social capital and its measurement through a public good game

There is now a large literature, covering several disciplines, that discusses social capital (see for instance Durlauf and Fafchamps (2005)) and the positive effect of social capital on economic development (Woolcock and Narayan (2000), Grootaert (2001), Woolcock (2002)). One of the main obstacles to its quantitative study, however, is its measurement and the difficulties associated with it.

Often, social capital measures are based on answers to questions on trust or participation to social activities. Several international organizations, such as the World Bank and the United Nations, for instance, promote the use of World Values Survey (WVS) for such a purpose. Researchers have used different types and combinations of qualitative, comparative and quantitative research methodologies (Woolcock and Narayan (2000)). However, these measures are not able to consider social preferences such as trust, attitudes to cooperate and group behaviour attributes, such as ability to coordinate and overcome social dilemmas. This dimension of social capital has been almost unexplored in CCT’s

impact evaluation studies.

In this study, we propose a measure of social capital based on the behaviour in a public good game.² Field experiments as an alternative method to study social preferences within a community and to measure social capital is not new (Carpenter (2002), Carpenter, Daniere and Takahashi (2004), Karlan (2005), Cárdenas, Chong and Ñopo (2009)). However, this study is one of the first to use a public goods game for such a purpose.

We designed our public good game to examine how social preferences such cooperate and trust have been determined by the presence of a CCT and measure a dimension of trust among the members of a group. The possibility of cooperation within a group is determined by multiple factors such as repetition, communication, punishments or rewards and inequality in the payments. In our game, the incentives to invest in the group account are given by the specific features of the design, but also by the individual motivations concerning the group well being. Individual attributes such as altruism, trust, social distance from the other members (Cardenas (2003)), fairness (Rabin (1993)), reciprocity (Andreoni (1988), (1995), Bowles and Gintis (2004)), a sense of affiliation as a member of a common group, or sympathy toward others in the group (Attanasio, et al. (2009)) determine social cohesion in a group and strengthen the ability of its members to cooperate and overcome collective action problems. In addition, group attributes such as social norms and institutions, informal enforcement mechanisms (Attanasio, et al. (2009)), concerns for social reputation, social reciprocity (Bowles and Gintis (2004)) and group identification enforce the group interests over the individual and lead to overcome the dilemma and to attain a higher level of contribution.

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² In 2008, in addition to (and after) the public good game we describe in what follows, we also played a ‘minimum effort coordination game’, which could measure ‘social’ capital as the ability to co-ordinate on the best Nash equilibrium. As this game was only played in the follow up when the program was operating in both neighborhoods, we cannot use it to evaluate the impact of FA on social capital. We therefore do not discuss its details here.

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The Voluntary Contribution Mechanism

The Voluntary Contribution Mechanism (VCM) is a public good game that has been applied in a variety of different situations, both urban and rural, and is one of the experimental methods that have been often used in the literature to examine behavioural motivations such as trust and cooperation in groups. A version of the game similar to the one we use has been used extensively in Colombia (Cárdenas and Jaramillo (2007), Márquez, Chong, Duryea, et al. (2007), Attanasio, Barr, Cardenas, et al. (2012)).

The VCM game captures trust and the willingness to cooperate among the members of a specific group by choosing whether to invest the voucher in the private account with private benefits or to invest the voucher in the group account (the public good) where the benefits of all members increases and the well-being of the entire group is improved. The general design is given in such a way that there is no incentive to invest in the group account due to a higher individual payoff by investing in the private account. The dominant strategy is not to contribute at all, undermining the social outcome. However, if all in the group invest the voucher in the private account, the group will be worse-off than if all the members invest in the group account, which constitutes the social optimum.

In our particular version of the game, each individual in a session of 25 participants is given one voucher. The player has the possibility of investing the voucher in a 'group' account or in a 'private' account. Voucher placed in private accounts are eventually redeemed at \$5³, while those placed in the group account are redeemed at \$10. At the end of the game, players who placed their vouchers in the private account, they will be entitled to \$5 and an equal share of what is in the group account⁴. Those who put their vouchers in the group account are only entitled to a share of what is in the group account. Given that there are 25 players, a player contributing to the group account will get more than the \$5, which is the minimum she gets if she contributes to the private account, if at least 13 players contribute to the group account. The individuals' private decisions are made simultaneously and contributions are private and anonymous. Moreover, players are not allowed to

³ Units in thousands; thus \$5 means COL\$5000 (US\$2.8, according to the official exchange rate at that date TRM: US\$1=COL\$1783.09 (monthly mean average for July 2008, <http://www.banrep.gov.co>)).

⁴ This is equivalent to regardless of how she invested her own token, each player would receive \$0.40 for each token invested in the group account by any other member in the group of 25 players.

communicate. At the end of the session, only the percentage of players contributing to the group account is revealed and players are paid after they take a short socio-economic survey⁵.

The situation just described constitutes a typical social dilemma. The experimental literature has extensively documented that, in similar contexts, the Nash equilibrium is not observed, either in the lab or in the field. Groups of individuals seem to be able to internalize at least in part the externality built in the game. In general, contributions to the public good are in a range of forty to sixty per cent of the group optimum (Ledyard (1995), Croson (1996), Camerer and Fehr (2004), Attanasio, et al. (2009)). At the same time, there seems to be considerable amounts of heterogeneity in the ability different groups have to solve this kind of problems. For this reason, this set up seems particularly attractive in devising a measure of ‘social capital’.

In the context of our public good game, we analyse different measures of social capital. A first natural measure we consider is the proportion of players who contribute to the group account in each session. This measure captures the ability of a group to internalize an externality and the trust individual players have in the ability to act as a group.

3. *Familias en Acción* and its expansion.

The main goal of this paper is to estimate the impact of conditional cash transfers on social capital. We do so by studying the expansion of the Colombian Conditional Cash Transfer (CCT) *Familias en Acción* (FA) to an urban context. In this section we provide information on the program and its expansion.

3.1 Familias en Acción: Background.

Familias en Acción, inspired by the Mexican CCT PROGRESA, started in 627 relatively small towns. In August 2007, FA, which targets the poorest 20% of Colombian households,⁶ was expanded to include 1.5 million beneficiary households, including those living in large cities. The program became the flagship program of the Colombian government’s social policy.

⁵ Participants played the VCM game for 2 rounds. After playing the first round, individuals are allowed to talk and communicate. Ten minutes later, there is a second round. For more details, see Appendix.

⁶ In Colombia, most welfare programs are targeted using the so called SISBEN score, a poverty indicator that is updated periodically. On the basis of this score, households are assigned to one of six categories. FA targets the level 1 of SISBEN.

The program's goal is to help reducing extreme poverty in the medium term. The objective is to provide resources to improve the nutritional status of poor households and in particular their children as well as school enrolment. Beneficiary households have to comply, to get access to the program's grants, with a number of requirements.

FA has three components: a nutritional and health component aimed at households with children less than five, an education grant for children in primary school and an education grant for children in secondary school. The health and nutrition grant, roughly equal to US\$25, independently of family size, is conditioned on attending regularly growth and development check-ups for children, a vaccination program and some 'classes' on hygiene, diet and contraception. The educational grants, aimed at households with children aged seven to seventeen, are conditional on enrolment and regular attendance in school. Each child in primary (secondary) school entitles the household to about US\$8 (16) per month. The program also includes an important social component, articulated around periodic meetings of beneficiaries, called *Encuentros de Cuidado* (EC) [Meetings on caring].

Most beneficiary mothers (97% in our sample) participate in the EC where, in addition to discussing hygiene, nutrition or other health-specific issues, they have the possibility to talk about different topics or even simply chat together. Conversations with program's officials and with beneficiary mothers indicate that these social aspects are indeed an important feature of the program: beneficiary mothers start new activities, get to know each other better and improve their ability to act as a group.

This means that FA may create networks and improve trust among beneficiaries, promote leadership and give mothers the opportunity to start working as a "social group" by perceiving a strong identification with the program, facilitating group decision making and finally, overcoming social dilemmas.

Additionally, the beneficiaries elect a representative, called *Madre Líder* (ML) who is in charge of communication with the local office and is also in charge of organizing the social activities and educational meetings (such as the EC) to which the beneficiaries are supposed to participate. As a consequence, the ML's often assume a prominent and visible role in the community.

3.2 *The urban expansion: El Pozón and Ciénaga.*

After its initial expansion in rural areas, the government decided to expand the program to urban areas. When this decision was taken, FA identified *El Pozón*, a neighbourhood in Cartagena to pilot the program in 2005. The program administration was

undecided among three different neighbourhoods of Cartagena, *El Pozón*, and another two called *Nelson Mandela* and *Ciénaga de la Virgen*. In the end, *El Pozón* was chosen. Between 2005 and the first half of 2007, the program operated in *El Pozón* but had not been implemented in other neighbourhoods. After conversations with the program administrator it was felt that, ex-ante, *El Pozón* and *Ciénaga* were very similar. For this reason, we base our evaluation strategy on a comparison between these two neighbourhoods⁷.

In September 2007, a new wave of massive inscriptions to the program started in every municipality of the country, regardless of its population size. In this context, the program was also rolled out in all poorest neighbourhoods of Cartagena, including *Ciénaga*. The expansion to *Ciénaga* allows us to implement a difference in difference strategy to control for the possibility that the two neighbourhoods differ in some unobserved (and constant) dimension. As we describe in detail below, in July 2007 we conducted a VCM game in *El Pozón* and *Ciénaga* and, at the same time, administered a survey among the participants to the game. Participants were recruited among FA beneficiaries in *El Pozón*, (and among potential beneficiaries in 2007 in *Ciénaga*). In July 2008, we ran the same experiment again in both neighbourhoods and collected the same survey. The survey gathered information on individual and household level variables, as well as on the links (relatives and friends) among the participants to the sessions. By the time we run the follow up experiments, *Ciénaga* had been already targeted for over 7 months and several EC had been organized.

3.3 Descriptive statistics: *El Pozón* and *Ciénaga*.

In Table 1, we provide descriptive statistics on the participants to the game in the two neighbourhoods in 2007. We report the means of several variables as well as tests of significance for the difference between the two neighbourhoods.

The statistics give a good representation of the main characteristics of this population. Participants come from very poor families, with low levels of income and education. Some important contradictions emerge. It is striking that more people have access to a colour TV than to proper sanitation or a non-dirt floor.

Although the two neighbourhoods are very similar in many dimensions, and they are next to each other, important differences emerge quite clearly. In particular for 2007, participants from *El Pozón* are significantly less likely to be head of household (indicating a

⁷ *Ciénaga* and *El Pozón* are adjacent to each other and they are both on the edge of a lagoon. The third neighborhood (*Nelson Mandela*) is geographically distant and has received a much larger influx of displaced households from the countryside. For more information see Attanasio, et al. (2009).

larger presence of husbands). They are further away from the nearest health centre, but have better access to public services. Moreover they are more likely to be educated. Most importantly, participants from *El Pozón* seem considerably less poor than those in *Ciénaga*. They are more likely to own the house where they live, to be connected to piped water, to own several durables and other assets and less likely to have a dirt floor in the house (although there is no significant difference in the level of income or food security). They are also less likely to be unemployed.

Some of the differences observed in Table 1 could have been induced by the program and, given the nature of the data, it is hard to disentangle the effect that FA may have had on many of the socio economic outcomes in both neighbourhoods. For instance asset tenure and monthly income may be clearly affected by the fact that participants from *El Pozón* already received the benefits from FA in 2007.

4. Measuring social capital in a FA locality.

The data we collected both during and after the games allowed us to construct several social capital measures. In what follows, we consider three different sets of measures: those derived from the behaviour we observe in the games, those we can derive from the socio-economic questionnaire and those we derive from the network data we also collect.

(i) *Measures based on the behaviour in the VCM game.* From the game behaviour, we consider the propensity to contribute to the public good as a measure of attitude to cooperate and trust in a group. An index of social capital could then be the proportion of individuals who contribute to the public good.

(ii) *Traditional measures of social capital.* Although the use of direct survey questions on trust has been strongly questioned as a poor indicator of social capital in comparison with experimental outcomes, in order to compare our data with the literature, we included in the post game survey traditional questions regarding trust (such as those derived from the WVS) and membership in organizations and participation in political and social processes within the community. We also considered perception of cooperative attitudes. These variables have been widely used as a proxy for social capital in the non-experimental literature.

(iii) *Measures based on network data.* In our survey, each player was asked about her relation with all the other players, where the options given were: (a) relative, (b) friend; (c) acquaintance or (d) unknown. In addition, we also asked questions about whether a given person could be trusted and whether she was considered a leader in

the community. For every session, we can construct a relationship matrix that describes the shape of existing networks among players. This information allows us to calculate a set of variables on session connectivity and eventually control for the strength of relationships in each group. We construct measures of how well-connected were the participants within the session. The simplest measure of the “social integration” of each player within the session is the number of acquaintances, relatives and friends a participant had in her session. We also use an index of connectivity defined as the total number of connections (i.e. as an acquaintance, as a friend or as a relative) in the session, a dummy if she was considered a leader and a dummy if she was considered a trustworthy person (See appendix).

4.1 *Behaviour in the VCM*

In July 2007, and again in July 2008, we implemented several sessions of the game in Cartagena. The local office of FA is very well organized and the program official (*Enlace Municipal*) is well known and popular in the communities. We recruited the participants to the game through the local office of FA. In 2007, in *El Pozón*, the participants were chosen from the list of program beneficiaries. As the program was already planning the expansion in *Ciénaga*, the office also had list of ‘future’ beneficiaries in that neighbourhood. These lists were used in recruiting the participants in *Ciénaga*.

In the base line, we conducted 28 sessions, 14 in each neighbourhood. In the follow up, we conducted 53 sessions, 26 in *El Pozón* and 27 in *Ciénaga*. The data for the entire set of experimental and survey data contains information on a sample of 676 and 1303 participants in the baseline and the follow up, respectively. Participants in both neighbourhoods were selected from the list of beneficiaries of FA. At baseline, although the program was not operating in *Ciénaga*, such list existed already because of the planned expansion. The 28 sessions in 2007 resulted in 676 individuals playing the VCM game. In 2008, we were faced with the issue of whether to play with the same individuals or to recruit a fresh sample of players. Both strategies had advantages and disadvantages. Playing with ‘old’ players would allow us to construct a longitudinal data set and potentially control for individual fixed effects. At the same time, however, behaviour in 2008 would also reflect learning of the game that occurred in the previous year. In the end, we decided to pursue both strategies and recruited 777 new participants. In addition, we managed to re-contact 526 of the 676 individuals that had played in 2007. This led us to organize 25 sessions played exclusively by 619 ‘new’ recruits, 18 sessions that were played exclusively

with ‘old’ participants and 10 mixed sessions. These figures are reported in Table 2. Overall we obtained a sample with 1,453 different subjects who participated in 71 sessions with an average size of 24.5 people in which 98.8% of the participants were women.

Table 1
2007 Demographic Characteristics of the Participants in the game

| | Descriptive statistics | El Pozón | Ciénaga | Difference | Standard errors of the difference * |
|---------------------------------------|--|----------|---------|------------|-------------------------------------|
| General characteristics | Percentage of female participants | 100 | 97.9 | 2.1 | 1.03 |
| | Average age (years) | 38.0 | 33.6 | 4.4 | 0.89 |
| | Number of years living in the neighbourhood | 14.5 | 22.4 | -7.9 | 0.63 |
| | Percentage displaced | 19.1 | 8.2 | 10.9 | 2.60 |
| | Percentage household head | 21.3 | 30.5 | -9.2 | 4.00 |
| | <i>Marital status</i> Percentage Single | 5.6 | 11.7 | -6.1 | 2.06 |
| | Percentage married of civil partnership | 76.9 | 62.9 | 14 | 4.10 |
| Educational level (percentage) | None (level 0) | 2.1 | 4.2 | -2.1 | 1.74 |
| | Primary incomplete (level 1) | 18.1 | 18.6 | -0.5 | 3.48 |
| | Primary complete (level 2) | 13.5 | 13.8 | -0.3 | 2.55 |
| | Secondary incomplete (level 3) | 37.4 | 30.2 | 7.2 | 4.05 |
| | Secondary complete (level 4) | 24.0 | 25.5 | -1.5 | 3.81 |
| | More than secondary complete (level 5) | 5.0 | 7.8 | -2.8 | 1.70 |
| Dwelling characteristics | Household size | 5.6 | 5.8 | -0.2 | 0.19 |
| | Number of people per room | 3.2 | 2.9 | 0.3 | 0.14 |
| | Percentage with dirt floor | 24.3 | 41.0 | -16.7 | 3.60 |
| | Percentage owning own house | 82.7 | 58.7 | 24 | 3.51 |
| | Time to the nearest health centre (minutes) | 28.1 | 32.3 | -4.2 | 5.78 |
| Public services (percentage) | Water by pipe | 94.7 | 76.9 | 17.8 | 3.87 |
| | Sewer system | 64.3 | 12.6 | 51.7 | 4.01 |
| | Land phone | 9.6 | 26.6 | -17 | 2.59 |
| Assets (percentage) | Mobile phone | 86.3 | 67.1 | 19.2 | 3.04 |
| | Bicycle | 21.9 | 14.4 | 7.5 | 3.65 |
| | Colour TV | 80.7 | 74.6 | 6.1 | 3.28 |
| | Washing machine | 23.7 | 13.8 | 9.9 | 3.41 |
| | Sound Player | 39.8 | 25.1 | 14.7 | 3.88 |
| Income variables | Percentage unemployed | 2.9 | 10.8 | -7.9 | 2.29 |
| | Percentage with access to credit | 67.8 | 66.8 | 1 | 3.44 |
| | Percentage with access to formal credit | 21.1 | 22.2 | -1.1 | 2.49 |
| | Percentage with food insecurity level (high) | 9.6 | 9.9 | -0.3 | 0.02 |
| | Per capita monthly income (US\$) | 27.4 | 24.2 | 3.2 | 1.74 |
| Participation in FA | Percentage ML | 16.7 | - | - | - |
| | Percentage participation in EC | 97.1 | - | - | - |

* Standard errors that are clustered at the session level.

The protocol followed in the two years was identical. After collecting their identification documents and checking their names on the recruitment lists, the participants in each session were taken to a room where the instructions of the game was read and explained. After the participants have played the two rounds of the game we described above, we collected a network questionnaire on the existing relationships among them. Finally, players answer a relatively short survey that gathers information on a wide range of socio-economic variables.

Table 2
Number of players (sessions)

| | Baseline | Follow-up Sessions | | |
|-----------------|----------|---------------------------|---------------------------|--------------------|
| | | New recruits ^a | Old recruits ^b | Mixed ^c |
| <i>El Pozón</i> | 342 (14) | 299 (12) | 173 (7) | 169 (7) |
| <i>Ciénaga</i> | 334 (14) | 320 (13) | 271 (11) | 71 (3) |
| Total | 676 (28) | 619 (25) | 444 (18) | 240 (10) |

^a with 95% or more people who were playing the game for the first time. ^b with 95% or more people who were playing the game for the second time. ^c with 94% or fewer people who were playing the game for the first and the second time.

As mentioned, the unique Nash equilibrium of that game is that individuals invest their voucher in the private account. As it turns out, many individuals do deviate from the Nash equilibrium and contribute to the public good. The results on the average level of cooperation of those participants that played the game for the first time (i.e. the baseline sessions and the new recruits session in the follow up) are summarized in Table 3. In the first round, only 12% of the sessions did not contribute at all. However, the overall level of cooperation we observe in our sample is low relative to that observed in other contexts playing similar games in the field. An almost identical VCM game was played in 2006 in 70 small municipalities across Colombia. These municipalities were part of the evaluation sample of the rural component of FA and some of them were exposed to the program. The results, analysed in Attanasio, et al. (2012), indicate a contribution rate of around 35⁸.

Table 3
First round cooperation levels in a VCM in Cartagena

| | 2007 | 2008 |
|--|--------|--------|
| Average percentage of contributors in a session | 20.0 | 29.4 |
| (Standard deviation) | (40.0) | (45.6) |
| Percentage of sessions with no contribution | 14.8 | 12.1 |
| Median percentage of contributors across sessions | 16.0 | 25.0 |
| Maximum percentage of contributors across sessions | 66.7 | 84 |

For the first round, the overall contribution rate in 2008 is at 29.4% but significantly higher than in 2007, 20%. This means that on average only seven players per session contributed to the public good. At this level, the contributors to the public good obtained about \$2.8 instead of the \$5 they could have obtained playing private even in the event of nobody contributing to the public good.

⁸ List (2004) reports that 37% of endowment is contributed to the public good in the United States. Other results include: 53% of endowment in Zimbabwe (Barr and Kinsey (2002)); 58% in Kenya (Ensminger (2000)); 52% in Russia (Herrmann, Gächter and Thoni (2008)) and 23% in Peru (Henrich and Smith (2004)). Note, however, that unlike in our game, in most of the VCM played in the field players may allocate a fraction of their endowment between the public and private project. We impose a nothing or all choice so that our percentages are not strictly comparable to those in the literature.

4.2 Measures based on the socio economic questionnaire.

In Table 4, we report the descriptive statistics on several measures of ‘social capital’ that can be obtained from the questionnaire. These measures are divided into three groups: variables based on individual participation to civic association and neighbourhood activities; variables reflecting voting behaviour⁹ and variables derived from answers to questions about trust and perception of cooperativeness. The two columns of the table refer to 2007 and 2008.

In the first panel, we report the percentage of participants that actively involved in neighbourhood decisions and meetings and membership in (at least one) organization, attendance to the association meetings as well as the percentage of participants that perceives her or himself as a leader, or as a decision maker or that supports any civic association. In the second panel, we report the percentage of individuals who vote y local an presidential elections. In the third panel, we report statistics derived from the questions on trust, and perception on cooperative, reciprocal and selfish behaviour in the community, taken from the WVS. Individuals may also perceive either a reciprocal (a dummy if most people help if others help), selfish (a dummy if most people care only about themselves), or cooperative (a dummy if most people help others unconditionally) behaviour by their neighbours.

Table 4
Traditional Social Capital Measures

| | | Percentage | 2007 | 2008 |
|---|---|---|------|------|
| Civic Participation | | Participation in neighbourhood decisions | 54.3 | 40.4 |
| | | Participation in the neighbourhood meetings | 61.8 | 47.8 |
| | | Membership in at least one organization | 38.6 | 27.5 |
| | | If is Attendance to the meetings | 38.5 | 27.0 |
| | | member of Decision-Maker | 33.6 | 24.4 |
| | | any civic Leader | 18.5 | 10.2 |
| | association Supports with money or voluntary work | 35.7 | 23.7 | |
| Voting behaviour | | Vote Local Elections (2003 and 2007) | 52.4 | 72.4 |
| | | Vote Presidential Elections (2006) | 67.0 | 78.4 |
| Trust and cooperation perception | Trust | Most people | 6.4 | 6.8 |
| | | Few people | 59.2 | 59.9 |
| | | None | 29.9 | 29.9 |
| | Perception within the community | Cooperation | 24.7 | 32.3 |
| | | Reciprocity | 22.6 | 13.4 |
| | Selfishness | 46.0 | 51.1 | |

Compared to what observed in other studies (see Latorre López (2004), Polania-Reyes (2005)), the participants reported higher levels of participation in organized groups.

⁹ We asked for the last local elections in Cartagena (Governor, mayor, members of the *Asambleas Departamentales*, Municipal council and *Juntas Administradoras Locales*). They were held seven months after the inscription in the program and four months before the beginning of the program in *El Pozón*. Presidential elections were held eleven months after the beginning of the program.

However, our measures of civic participation are significantly lower in the follow up. Voluntary organizations accounted for the participation of the largest number of participants to groups, followed by religious groups; about two out of five individuals reported participating in one of these. Voting behaviour in 2008 is significantly higher than in 2007 for both local and presidential elections. In the local context, voting participation is higher than the one at the municipality level, 44.9 in 2007. Participants also had a higher participation rate in the presidential elections, than the national level, 45.1%.

Direct measures of trust are not significantly different across time and yield particularly low estimates of 'social capital', with just 6.7% of the players manifesting to trust the majority of their neighbours in 2007 that is not statistically different from 7% in 2008. Moreover, participants report a different perception of others' social preferences in the community: the perception of cooperative and selfishness behaviour are significantly higher in the follow up whereas we observe a significant decrease in the perception that people help in the community only if others do the same.

4.3 *Network data*

In Table 5, we present the average number of friends and connections each participant reports in the session where she is playing, the density of friendship (connectivity), measured as the ratio of the total number of identified friends (connections) in the session and the total possible number of friends (connections) among connected people. i.e. those individuals that are identified as an acquaintance at least once by other player. In addition, we present two measures of leadership (trustworthiness) as the percentage of players identified as leaders (trustworthy) in each session, at least by one other player in the session.

In the follow up survey the number of friendships in the sessions is significantly higher than at baseline, at the 1% level. Average friendship density is also significantly higher in the follow up than in the baseline. However, when we use our overall measure of connectivity, which subsumes the three possible categories of relationship, the opposite occurs for the average and median density across sessions.

We also find that the percentages of players identified as leaders in the session is significantly lower in the follow up, suggesting that a certain fragmentation affects the patterns of leadership consolidation in the social context of the study. Interestingly, the rate of reported leaders in baseline and follow up is significantly higher than the proportion of ML (elected FA beneficiary representatives) in the cross-section sample (8.4% and 5.5%

respectively)¹⁰.

Table 5
Networks characteristics across sessions

| | | 2007 | 2008 |
|--|---|-------|-------|
| Individual Social Integration | Average number of friends of participants | 1.04 | 1.39 |
| | Average friendship density ^a | 0.04 | 0.1 |
| | Median friendship density | 0.03 | 0.09 |
| | Average number of connections | 8.91 | 1.95 |
| | Average connections density | 0.38 | 0.13 |
| | Median connections density | 0.35 | 0.13 |
| Percentage of players identified as leader in the session | | 33.40 | 17.60 |
| Percentage of players identified as trustworthy in the session | | - | 85.17 |

^a Friendship density is calculated as the number of friends/(number of connected people)*(number connected people -1)

4.4 Comparing different measures

Given the three sets of measures we have described, an interesting question is the extent to which they co-vary. We conclude this section with such an analysis, that we conduct at the individual level and at level of sessions. We explore the association between individual cooperative behaviour in the first round of the VCM game and each of our possible measures of social capital at the session level. For any given social capital measure, Table 6 shows the coefficients obtained in a number of probit regressions that relate the probability that an individual contributes to the public good in the first round to each of the measures of social capital considered in Table 4 and Table 5 at the individual level. The purpose of these table is simply to illustrate the association between the behaviour in the VCM game we observe and other (self-reported) forms of behaviour that have been used in the literature as indicators for pro-social behaviour.

In the Table 6 we report three coefficients for each variable: that estimated using baseline data, the one estimated with follow up data (using only ‘new’ players) and the one obtained pooling all observations. For the baseline, the coefficients on all measures of social capital have the expected sign and most of them are significantly different from zero. For instance, a participant is less likely to contribute to the public good in the game if she does not participate in community decisions or meetings and if she perceives a selfish attitude in the community. Individuals who consider no one can be trusted are more likely to not to cooperate. However, in the follow up, no individual measure is significantly associated with our measure of pro-social behaviour. It seems that the relationship between our measure of social capital and several of the variables traditionally used is much harder to capture in the follow up. As with the follow up, when we pool the data, we are unable to detect any

¹⁰ We find that 84.2% (for baseline) and 29.4% (for follow up) of MLs are identified as leaders in the session.

significant association between our variable and the traditional measure of social capital. In addition to looking at individual behaviour, it might be useful, to complement the evidence in Table 6, to look at different measures of social capital in *groups*. Our context offers a natural definition of a group, as the game session. While a session is an artificial construct generated by the administration of the experiment, considering session means can be informative about the performance of different measures to the extent to which individual behaviours and idiosyncrasies averaged out. In the end, these variables are supposed to measure ‘social’ capital in a community or in a social group.

Table 6
Social capital measures at individual level and individual cooperation

Dependent variable: 1 if player contributed to the group account in the first round

| Probit marginal effects | | 2007 | 2008 | Pooled |
|--|---|-------------------------------|-------------------|-------------------------------|
| Civic Participation | Membership in at least one organization | 0.030 (0.032) | 0.016 (0.039) | 0.012 (0.026) |
| | Participation in neighbourhood decisions | 0.082* (0.031) | 0.003 (0.041) | 0.031 (0.026) |
| | Participation in the neighbourhood meetings | 0.056+ (0.029) | -0.020 (0.034) | 0.005 (0.024) |
| Voting behaviour | Vote Local Elections (2003 and 2007) | 0.026 (0.033) | -0.014 (0.041) | 0.028 (0.028) |
| | Vote Presidential Elections (2006) | 0.077* (0.026) | -0.025 (0.056) | 0.048 (0.030) |
| Trust and cooperation perception | Most people | 0.034 (0.061) | -0.034 (0.097) | 0.002 (0.057) |
| | Trust | | | |
| | Few people | 0.068* (0.025) | -0.007 (0.032) | 0.033 [^] (0.020) |
| | None | -0.081* (0.028) | 0.012 (0.042) | -0.036 (0.025) |
| | Cooperation | 0.048 (0.031) | -0.021 (0.033) | 0.021 (0.024) |
| | Perception within the community | | | |
| | Reciprocity | 0.084+ (0.036) | 0.022 (0.054) | 0.045 (0.031) |
| | Selfishness | -0.083+ (0.035) | 0.007 (0.026) | -0.035 (0.023) |
| Individual Social Integration | Average number of friends of participants | -0.000 (0.009) | 0.012 (0.012) | 0.006 (0.007) |
| | Average friendship density | 0.580 (0.688) | -0.540 (1.025) | 0.606 (0.642) |
| | Average number of connections | 0.003 [^] (0.002) | 0.005 (0.011) | -0.001 (0.003) |
| | Average connections density | 0.562* (0.177) | -0.132 (0.954) | -0.018 (0.163) |
| Percentage of players identified as leader in the session | | -0.014 (0.029) | -0.012 (0.050) | -0.032 (0.027) |
| Percentage of players identified as trustworthy in the session | | | 0.028 (0.046) | -0.034 (0.048) |
| Observations | | 676 | 619 | 1,295 |

[^] significant at 10%; + significant at 5%; * significant at 1%. Marginal effects reported. Robust standard errors, clustered by session, in brackets after probit estimation.

In Table 7, we report, for both years and for the pooled data, the Pearson correlation coefficients across sessions, between the percentage of individuals contributing to the

public good in the first round, and the session averages of the various measures we have considered in Tables 4 and 5.

Table 7
Correlation coefficients at the group level

| Percentage | | 2007 | 2008 | Pooled ^a | |
|--|---|--------------|---------------------|---------------------|---------|
| Civic Participation | Membership in at least one organization | 0.543* | 0.226* | 0.357* | |
| | Participation in neighbourhood decisions | 0.661* | -0.068 [^] | 0.343* | |
| | Participation in the neighborhoods meetings | 0.550* | 0.013 | 0.302* | |
| Voting behaviour | Vote Local Elections (2003 and 2007) | 0.358* | 0.270* | 0.302* | |
| | Vote Presidential Elections (2006) | 0.6390* | -0.176* | 0.313* | |
| Trust and cooperation perception | Trust | Most people | 0.193* | 0.018 | 0.100* |
| | | A few people | 0.532* | -0.241* | 0.107* |
| | | Nobody | -0.581* | 0.178* | -0.188* |
| | Perception within the community | Cooperation | 0.402* | -0.074 [^] | 0.150* |
| | | Reciprocity | 0.329* | 0.354* | 0.340* |
| | | Selfishness | -0.505* | -0.300* | -0.404* |
| Individual Social Integration | Average number of friends of participants | 0.135* | 0.266* | 0.179* | |
| | Average friendship density | 0.145* | -0.094 ⁺ | 0.025 | |
| | Average number of connections | 0.404* | -0.029 | 0.317* | |
| | Average connections density | 0.444* | 0.326* | 0.271* | |
| Percentage of players identified as leader in the session | | 0.556* | 0.161* | 0.380* | |
| Percentage of players identified as trustworthy in the session | | | 0.328* | 0.245* | |
| Observations | | 28 | 25 | 53 | |

[^] significant at 10 per cent; ⁺ significant at 5 per cent; * significant at 1 per cent. ^a Clustered at time level

The picture that emerges is mixed. In 2007, all the ‘traditional’ social capital measures are significantly associated with cooperation in the game and with the expected sign. For instance, in sessions in which many participants perceive their community as populated by selfish individuals and report that nobody can be trusted, contributions rates to the public good are low, which explain the two negative signs in the first column of the Table 7. However, this evidence does not seem completely robust. In 2008, while the relationship between measures based on Civic Participation is still positive and significant, for the first two variables considered, the correlation coefficient is much lower. As for the measures based on voting behaviour, the one based on local elections is still positive, significantly different from zero and roughly of the same order of magnitude. The measure based on voting in the presidential elections, however, is now negatively related to contribution rates to the public good. A similar picture emerges for the measures based on answers to the ‘trust’ questions. The correlation with the first and third indicator (trusting most people and trusting nobody) is now not significantly different from zero and the one with the middle one (trusting a few people in the community) changes sign. As for the measure based on perceptions on cooperation, the correlation coefficient changes sign, while the correlation coefficient with the measures based on the perception of reciprocity and selfishness stay the same.

Interestingly, the pattern of correlations of contributions rates in the VCM game and the

prevalence of friendships in the sessions is not only positive and significant but does not change much over time. The measure based on connections, however, changes sign in 2008. When we pool the data, in the last column, we find a pattern which is very similar to the one observed in baseline.

The overall picture that emerges from this analysis indicates that, if we believe the behaviour in the VCM game is a good indicator of the prosocial behaviour of an individual, traditional measures exhibit a weak correlation with such behaviour. What is most worrying is that the correlations are not stable over time. This should make one worry about using these measures in the analysis of social capital.

5. Do CCTs build social capital?

To identify the effects of FA on our experimental measure of social capital, we start by comparing contribution rates to the group account in our VCM in the two neighbourhoods in 2007. We then use data from both 2008 and 2007 to take into account possible pre-existing differences between the two neighbourhoods. Finally, we analyse the impact of the program on different and more traditional measures of social capital.

5.1 Comparing *El Pozón* and *Ciénaga* in 2007.

In 2007, the program had been operating only in *El Pozón*. Table 8 reports the results of this analysis, which reproduces some of the results in Attanasio, et al. (2009). The comparison is staggering: in the ‘treatment’ neighbourhood, the participants to the first round of VCM are five times more likely to contribute to the group account than in the ‘control’ neighbourhood. This difference is large and significantly different from zero. Analogously, we find large and significant differences in the median number of contributors and in the percentage of sessions with zero contribution.

The comparison between *El Pozón* and *Ciénaga* can be affected, however by differences between the two neighbourhoods other than the operation of the program. Indeed, in Table 1, we saw that these differences are present and important. If ‘social capital’ is a ‘luxury’, the fact that participants from *El Pozón* are marginally less poor could explain why they show a larger propensity to contribute to the public good.

One first possibility to address this issue is to control for observable variables. In Table 9, we show the impact of being a player from *El Pozón* on the probability to contribute to the group account in 2007, after controlling for a variety of observable variables. All four columns show results obtained from a probit regression. In Column I, we do not add any controls. In column II we control only for individual characteristics, such as the age and

the education level of the participant (the complete set of results can be found in the Appendix, B1). The introduction of these variables does not affect much the size of the measured impact, which remains large and significantly different from zero.

Table 8
Contributions in 2007 between ‘treatment’ and ‘control’ in the first round

| | El Pozón | Ciénaga | Difference | Standard errors* |
|--|----------|---------|------------|------------------|
| Average percentage of contributors in a session | 33.0 | 6.6 | 26.4 | 4.4 |
| Percentage of sessions with no contribution | 0.0 | 30.0 | -30.0 | 12.7 |
| Median percentage of contributors across sessions | 31.6 | 4.3 | 27.3 | 0.65 |
| Maximum percentage of contributors across sessions | 66.7 | 24.0 | 42.7 | 0.22 |

* of the difference. All inferences are performed computing standard errors that are clustered at the session level.

While in specification II we control only for individual and household characteristics (such as age, education and so on), in Column III, we control for session characteristics. An issue that worried us considerably on the field was the possibility that individuals who played in early sessions would ‘contaminate’ other individuals that were about to enter subsequent session by talking to them and commenting on the game. While we tried to avoid these contacts as much as possible and instructed the subjects not to talk to subsequent players, some contacts were unavoidable. For this reason, we control for the sequence order in which a particular session is played in a day and also for results in previous sessions¹¹. We do find these session effects to be significant. However, their introduction does not change the size of the marginal impact, partly because these effects were present in both treatment and control sessions.

Table 9
Program's Impact on the Cooperative Decision - First Round in 2007

| <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | | | |
|--|---------|---------|---------|---------|
| Independent Variables | I | II | III | IV |
| Dummy <i>El Pozón</i> | 0.265* | 0.283* | 0.283* | 0.207* |
| | (0.044) | (0.072) | (0.068) | (0.052) |
| <i>Basic Controls - Participant's characteristics</i> | No | Yes | Yes | Yes |
| <i>Session Characteristics</i> | No | No | Yes | Yes |
| <i>Session composition (info within session)</i> | No | No | No | Yes |
| Observations | 676 | 656 | 656 | 656 |

^ significant at 10%; + significant at 5%; * significant at 1%. Marginal effects reported. Robust standard errors, clustered by session, in brackets after probit estimation.

In Column IV we control for session composition effects. In particular, we control for session heterogeneity with variables such as the deviation of standard deviation of level of

¹¹ Particularly, in order to control for contiguous sessions correlation, we include in specification (IV): a) a dummy for the first session each day; b) a variable capturing the deviation from the neighborhood mean of the average contribution to the public account in the previous 2 sessions.

education in the session with respect to the mean of the neighbourhood and percentage of participants in the session with less than secondary incomplete. Controlling for these variables decreases the point estimates of the treatment effect substantially. However, the coefficient is still significantly different from zero and of a sizeable magnitude. We will come back to the interpretation of the coefficients on the various control variables.

The results in Table 9 can still be misleading. In the same way in which the two neighbourhoods can be systematically different in terms of observable variables, there might be differences in terms of unobservable variables. Such differences would bias the estimates of the impact of the program derived from comparisons that control only for observable variables.

5.2 *Difference in differences*

Fortunately, the expansion of the program in September 2007 to *Ciénaga*, our ‘control’ neighbourhood, allows us to control for such systematic dissimilarities implementing a difference in difference strategy, provided that ‘unobservable’ differences do not change over time. Implementing such a strategy was the main motivation to go back to the same locations in 2008 and play the same games.

As we discussed in Section 2, when going back, we decided to play both with individuals who had played already in 2007 and with new recruits. To avoid confounding the impact of the program with learning effects, in what follows we report the results obtained with the ‘new recruits’. In what follows, we comment briefly on the results obtained with the old players. We start with a simple comparison of the first round behaviour in the two neighbourhoods and in the two years.

The top panel of Table 10 reproduces some of the results in Table 8. The bottom panel contains the same results for 2008. In the follow up year, there is surprisingly little difference between the two neighbourhoods, despite the large differences observed in 2007. While only 6.6% of the participants in *Ciénaga* contributed to the group account in the first round of the game in 2007, 36.2% did in 2008. In *El Pozón*, the contribution rate in the first round was 33% in 2007, and it is actually lower in 2008, at 22.1%. Moreover, the individual contribution rate in *El Pozón* in 2008 is not statistically different from that in *Ciénaga* in 2008 or from the contribution rate in *El Pozón* in 2007.

The figures in Table 10 can be used to compute the difference in difference estimate of the impact of the program, which is 40.55 with a standard error of 2.44. These results are impressive. Not only once the program is implemented in *Ciénaga* the cooperation in the

two neighbourhoods is not significantly different, but it goes to a level where it is not significantly different from the level observed in *El Pozón* in 2007.

Table 10
Contribution in 2007 and 2008 between ‘treatment’ and ‘control’ in the first round

| | El Pozón | Ciénaga | Difference | Standard errors* | |
|------|--|---------|------------|------------------|------|
| 2007 | Average percentage of contributors in a session | 33.0 | 6.6 | 26.4 | 4.4 |
| | Percentage of sessions with no contribution | 0.0 | 30.0 | -30.0 | 12.7 |
| | Median percentage of contributors across sessions | 31.6 | 4.3 | 27.3 | 0.65 |
| | Maximum percentage of contributors across sessions | 66.7 | 24.0 | 42.7 | 0.22 |
| 2008 | Average percentage of contributors in a session | 22.1 | 36.2 | -14.15 | 3.6 |
| | Percentage of sessions with no contribution | 16.7 | 7.8 | 8.9 | 2.6 |
| | Median percentage of contributors across sessions | 24.0 | 36.0 | -12.0 | 4.1 |
| | Maximum percentage of contributors across sessions | 48.0 | 84.0 | -36.0 | 0.11 |

* of the difference. All inferences are performed computing standard errors that are clustered at the session level.

A literal interpretation of these results imply that the program has a very strong effect on cooperation. If there were pre-existing differences between the two neighbourhoods they actually indicate a higher pre-program social capital in *Ciénaga* and therefore, relative to the comparison based on the 2007 experiment, the estimate of the CCT impact actually increases.

Of course, the evidence presented in Table 1 still indicates that the two neighbourhoods are different in terms of observable variables at the individual and household level and that there were some intra session effects that were significant and significantly different between the two neighbourhoods. It is therefore worthwhile to redo the analysis that controls for these factors.

In Table 11, we report the results we obtain in a probit analysis similar to that reported in Table 9, as the control variables are the same. However, we now pool together the 2007 and 2008 data and add three indicator dummies: one which takes the value 1 for the observations in *Ciénaga*, one which takes the value 1 in 2007 and one which takes the value 1 when the program is operating, that is *El Pozón* in 2007 and both *Ciénaga* and *El Pozón* in 2008. We interpret the marginal effect of this last variable as the impact of the program. Table B2 in the Appendix reports the coefficients on the control variables in the specifications reported in table 11.

As with Table 9, the first column in Table 11 does not control for any additional variable. As one would have guessed from Table 10, the time effect has a negative sign and the indicator for *Ciénaga* attracts a positive sign. Both of these two parameters, however, are estimated with low precision and are significantly different from zero only at the 10% level. The impact of the program, as measured by the coefficient reported in the third row of the

table, is large (at 0.32) and significant at the 1% level.

Table 11
Program's Impact on the Cooperative Decision - First Round

| <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | | | |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Independent Variables | I | II | III | IV |
| Dummy <i>Ciénaga</i> | 0.123 [^] (0.067) | 0.097 (0.064) | -0.044 (0.073) | -0.011 (0.077) |
| Dummy 2007 | 0.097 [^] (0.053) | 0.095 [^] (0.052) | 0.119 [^] (0.063) | 0.138 ⁺ (0.057) |
| Program impact | 0.319* (0.048) | 0.305* (0.049) | 0.189 ⁺ (0.076) | 0.189* (0.064) |
| <i>Basic Controls - Participant's characteristics</i> | No | Yes | Yes | Yes |
| <i>Session Characteristics</i> | No | No | Yes | Yes |
| <i>Session composition (info within session)</i> | No | No | No | Yes |
| Observations | 1295 | 1282 | 1282 | 1282 |

Marginal effects reported. Robust standard errors, clustered by session, in brackets after probit estimation. [^]significant at 10%; ⁺significant at 5%; * significant at 1%

Once we introduce individual controls in Column II, the coefficient that measures the impact of the program and the time effect do not change much. The coefficient on the *Ciénaga* indicator, instead, is reduced in size and becomes insignificantly different from zero.

In the specifications in Column III and IV, we control for session features and for session composition. The point estimates of the impact of the program are now lower, but they are still significantly different from zero at the 5%. The main message of the table, therefore, is that FA had a strong impact on social capital, at least as measured by the behaviour in the VCM game we played in Cartagena. This result seems to be robust to the presence of systematic differences between the two neighbourhood we have compared, both in terms of observable and unobservable variables.

5.3 Impact on traditional measures

In table 12, we analyse the impact of the program on the traditional measures of social capital we summarized in table 6. We model the probability that an individual engages in a 'pro-social' activity with a probit regression in which we include the same individual control variables that we considered in the specification II for the decision to contribute in the game in table 9. Table 12 reports the impact of the program on each of these measures of social capital in a way which is comparable to the impacts in Table 11.

In the first specification (Column I), in which we do not control for any additional variable except time, neighbourhood effects and their interactions, shows that the program has a significant and positive on the first two measures of social capital based on 'civic participation'. However, the effect is negative on the measure that refers to participation to at least one civic organization. This evidence is consistent with what reported by Pellerano

(2004) who, considering the rural program, observed that participation into the ‘*Encuentros de Cuidado*’ seemed to substitute for participation into other organizations. Similarly, we find that the program has a positive impact on social capital as measured by voting behaviour. Finally, if we move to the last set of measures, based on trust and cooperation perceptions, as measured in our questionnaire, which reproduces some of the World Value Survey questions, we see that the impact of the program is much smaller and, in the case of cooperation perceptions, not significantly different from zero.

Table 12
Program’s impacts on traditional measures of social capital

| | | I | II |
|---|--|-------------------|-------------------|
| <i>Controls - Participant’s characteristics</i> | | No | Yes |
| | Membership in at least one organization | -0.053 (0.075) | -0.103 (0.072) |
| Civic Participation | Participation in neighbourhood decisions | 0.219* (0.053) | 0.205* (0.058) |
| | Participation in the neighborhoods meetings | 0.144* (0.049) | 0.093^ (0.052) |
| Voting behaviour | Vote Local Elections (2003 and 2007) | 0.159* (0.055) | 0.128+ (0.060) |
| | Vote Presidential Elections (2006) | 0.155+ (0.062) | 0.086 (0.064) |
| Trust and cooperation perception^a | Trust | 0.031+ (0.013) | 0.025* (0.014) |
| | Perception of Cooperation within the community | -0.006 (0.007) | -0.007 (0.006) |
| Individual Social Integration | Number of friends of participants | 0.758 (0.455) | 0.669 (0.434) |
| | Average friendship density ^b | 0.020 (0.023) | 0.018 (0.023) |
| | Number of connections | 3.164+ (1.209) | 2.953+ (1.184) |
| | Average connections density ^b | 0.108+ (0.050) | 0.108+ (0.048) |
| Player identified as leader in the session | | 0.147* (0.044) | 0.129* (0.048) |

Marginal effects reported. Robust standard errors, clustered by session, in brackets after probit estimation. ^significant at 10%; +significant at 5%; * significant at 1%. ^a Marginal coefficient for the measures of Trust (outcome that most people can be trusted) and perception of cooperation in the community (outcome) are from ordered probit estimations. ^b Average densities of friends and connections are dependent variables at the sesión level. Coefficient for the measures of Individual social integration are OLS estimates.

When we control for individual and household characteristics, as we do in Column II, the impact of the program is somewhat reduced and loses its statistical significance except in the case of the ‘participation in neighbourhood decisions’ measure and voting in the local elections. In the case of trust, the level of significance decreases from five to 10%.

Overall, these results are consistent with the evidence presented in Table 6 and 7. While the traditional measures deliver similar results in terms of impact, the evidence is much less

precise and, often, the results are not statistically different from zero. The use of our social capital measures instead affords us much more precise estimates.

6. The determinants of pro-social behaviour

The evidence we have presented so far seems to indicate that FA had a strong impact on social capital and trust. In the process of getting this result, in section 5, we have controlled for several variables, at the individual, household and session level, to ensure that the results we obtained could not be explained by differences in these variables between the two neighbourhoods considered. While the main focus of that section (and of the paper) is on establishing the effects of a CCT on social capital, the coefficients on these variables are interesting on their own, as they are informative about the main determinants of trust and cooperative behaviour. In this section, we discuss the coefficients we obtained on the various variables we considered as determinants of the behaviour in the VCM games.

6.1 *Individual and session variables effects on pro-social behaviour*

In the first panel of Table B1, in the appendix, we report the coefficients on the individual and household level variables in the regressions that were used to compute the impact of the program as reported in Table 11. Age is an important determinant of cooperation: older players seem to be more likely to contribute to the group account. The few men who participated (mainly in 2007) into the game were less likely to cooperate. Finally, we find that the individuals who understood better the game were less likely to cooperate. As for household level variables, we find that players with a large household size tend to cooperate more. Interestingly, we do not find any education effects and very limited effects of other household level variables, including various wealth indicators. Several of the session level variables are significant determinants of cooperation. Whilst men are less likely to contribute, the presence of a man in the session seems to induce cooperation. Players in the first session of the day were much more likely to cooperate, while the total number of players in a session had a negative effect on cooperation. Finally, when we consider (in Column IV) another set of variables controlling for the *composition* of the sessions, we find that inequality in the age and of seniority in the neighbourhood

reduces cooperation¹².

6.2 Leadership and pro-social behaviour

An important feature of the FA program is the importance that the role of the ML acquires in the community activities. We therefore investigate whether being an ML is a determinant of the attitudes to cooperate, not only to the beneficiary that was elected as a ML by her community, but also for the beneficiaries that are under her supervision and coordination. Table 13 presents the results we obtain if we consider, among the determinants of individual behaviour, the presence of a ML among the participants and whether the individual is herself a ML. The probit regression whose marginal effects are reported in Table 13 is estimated using data from the follow up and baseline data from *El Pozón* in 2007. We exclude the data from *Ciénaga* in 2007 as the program was not operating there and, as a consequence, there were no ML in those sessions. It is obviously possible to add these observations and add an interaction term for time and neighbourhood. The results are not very different from those in Table 13 and are reported, for completeness, in Appendix B in Table B3.

Table 13
Role of the Leaders (First Round)

| <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | | | |
|--|--------------------|---------|---------|---------------------|
| Independent Variables | V | VI | VII | VIII |
| Dummy <i>Ciénaga</i> | 0.123 [^] | 0.097 | -0.043 | -0.010 |
| | (0.067) | (0.065) | (0.074) | (0.078) |
| Dummy 2007 | 0.508* | 0.495* | 0.351* | 0.373* |
| | (0.103) | (0.108) | (0.135) | (0.112) |
| 1 if the participant is a ML | -0.049 | -0.059 | -0.062* | -0.064 [^] |
| | (0.037) | (0.038) | (0.037) | (0.038) |
| 1 if there is at least a ML in the session | 0.449* | 0.432* | 0.239+ | 0.241+ |
| | (0.090) | (0.094) | (0.113) | (0.097) |
| <i>Basic Controls - Participant's characteristics</i> | No | Yes | Yes | Yes |
| <i>Session Characteristics</i> | No | No | Yes | Yes |
| <i>Session composition (information within session)</i> | No | No | No | Yes |
| Observations | 1,295 | 1,282 | 1,282 | 1,282 |

Marginal probit. Marginal effects reported. Robust standard errors, clustered by session, in brackets after probit estimation. [^] significant at 10%; + significant at 5%; * significant at 1%.

For the sake of brevity we do not report the results we obtain on the other control variables. It will suffice to say that the pattern of coefficients does not change relative to those we have discussed above and reported in Table A 2. Instead, in Table 13 we report the coefficients on the presence of a ML and on the behaviour of ML. Cooperation is positively associated with the presence of at least one ML in the session. The marginal

¹² We calculate group heterogeneity as the standard deviations of selected characteristics in each session. In addition to these variables that reflect heterogeneity, we also control for the average level of education in the session.

effect is large at around 24%, when we control for session characteristics and composition, and above 40% when we do not control for session these variables (see specifications V and VI). However, the probability that a ML contribute to the group account is lower, although this effect is significant only at the 10% level in specification VIII and at 5% in specification VII.

6.3 *Measurement issues again.*

We conclude this discussion with two observations about the use of experimental games to measure features of a population, such as social capital, or of an individual, such as pro-social behaviour. First, we note that, although the three game administrators (who were rotated across the sessions in both neighbourhoods) were instructed to read exactly the same protocol and their behaviour in the sessions differed (necessarily) only when answering the questions posed by the participants, we find strong ‘administrator’ effects. These effects, and the partial contaminations across sessions (probably due to some communication across players of different sessions), points to the fragility of these measurement tools. Second, as we mentioned above, in 2008, we played the VCM games both with individuals who had played it in 2007 and with ‘new’ players. It was immediately clear that the behaviour of the old players was completely different from those of the new ones. Virtually none of the ‘old’ players contributed to public good and they almost uniformly played the Nash equilibrium. This result is obviously driven by learning and by the fact that in the previous year contribution rates had been relatively low so that, even in *El Pozón*, those who contributed to the public good received considerably less than the other players. Once again, this consideration points out to the fragility of these measurement tools.

Having pointed out this fragility, however, it is important to stress that most measurement tools in social science are very fragile. It is well known that answers to simple survey questions yield very different answers depending on the way they are framed, on the presence of anchoring effects and so on.

7. **Conclusions**

Our main purpose is to examine, by combining survey and experimental methods, the effect of a social intervention on individual and group behaviour and their ability to obtain better social and economic outcomes. There are two main difficulties in testing rigorously the hypothesis that CCTs increase social capital. The first lies in the difficulty in

obtaining a quantitative measure of social capital. The second is the standard evaluation problem of observing the counterfactual to a given intervention.

We addressed the first difficulty implementing a public good game in the communities where we wanted to measure social capital. Our main measure of social capital is based on the behaviour during this game, whose rewards, for the individuals in our sample, are salient. We started our analysis by comparing the level of cooperation in two similar neighbourhoods in 2007 when the CCT program we have been studying was operating only in one of them. We show that the level of cooperation we observe in the ‘treatment’ community is considerably higher than in the ‘control’ community. The two neighbourhoods, however, although similar in many dimensions, turn out to be significantly different in other observable variables. The result we obtained in terms of cooperation, however, is robust to controls for these observable differences. This still leaves the possibility that the observed differences in cooperation and pro-social behaviour are driven by subtle unobserved differences in the social fabric of the two communities. However, when in 2008, after the program had been expanded to the control community, we retake the measurements taken in 2007, we find no strong difference between the level of cooperation in the two neighbourhoods. This evidence provides strong corroboration to the hypothesis that the introduction of the CCT we have been studying did indeed increase social capital.

The other focus of the paper is on the way to measure social capital. While we implemented a VCM game and use observed individual behaviour in the game as our main measure, we also collect information on self reported behaviour in a number of dimensions that have been used in the literature as measures of social capital. We show that while these measures roughly correlate with our measure, they are also affected by measurement error which makes the identification of the impacts of CCTs on social capital harder to detect.

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Appendix A. Experimental Design and procedure

1. Experimental set up

The participants were invited to come to the local public high school. Upon arrival, the subjects were given an identification number randomly and seated in semi-circle in a classroom. As detailed below, the VCM game we use is played in two rounds. The subjects first play the game individually and privately, without having the possibility of communicating with other players. After the first round (but before its results are revealed), they are given the possibility of talking and discussing strategies for the second round. Finally the second round is played, again individually and privately, before the results of the first round are announced.

All recruited people were given US\$1.2 as part of their show-up fee in order to induce credibility and to subsidize the transportation cost from their homes or workplace to the school we assigned for the experiments stage. Once the session ended participants were paid their earnings based on the decisions in the experiments. On average each participant earned US\$9.6 (COL\$16866.46).

2. Experimental Design: the VCM¹³

Each player receives an endowment of one token that could be invested either in a private or a group account. The private decision is made simultaneously, and without discussion with anyone in the group. The earnings are calculated in the following way: if the player chooses to invest in the private account, the token is converted in \$5¹⁴ and will be given entirely to her. In addition each player receives, regardless of how she has invested her own her token, \$0.40 for each token invested in the group account by any other member in the group of 25 players. Therefore, her total earnings at the end of this round are (\$5) + (\$0.40 x Sum of Tokens invested by the group). If the player chooses to invest her token in the group account, she will receive 0.4 for each token invested in the group account by her and in the rest of the group. In this case her total earnings at the end of the round will be (\$0) + (\$0.40 x Sum of Tokens invested by the group). Each player makes her private decision by selecting a card which says if she is going to invest her money in the group account or to keep it for herself (i.e. private account). The experimenter then collects the “decisions cards,” totals them up, multiplies by \$0.40 the amount and credits the relevant amounts to each player. The relevant amounts, however, are only revealed and paid at the end of the session and after a second round of the same game.

In the first round, each player has to decide where to invest her token. The second round is a repetition of the first, except that the players are allowed to discuss for ten minutes before making simultaneously their private, anonymous decision. Communication is completely unstructured and during the discussion, the players can talk about whatever they wanted but they could not leave the room. No one, except the experimenter, knows for certain the other players' contributions in the first round.

The players do not even know their own payout in the first round when they discuss with the other players or when they play the second round. At the end of the session, however,

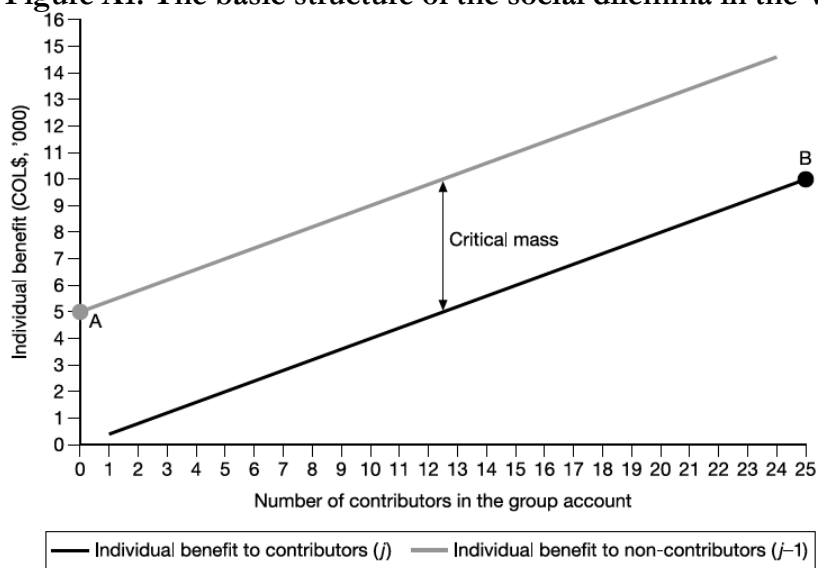
¹³ The experimental design of the VCM described here was developed by Juan Camilo Cárdenas, Maria Claudia Lopez, Natalia Candelo and Sandra Polanía-Reyes.

¹⁴ Units in thousands; thus, \$5 means COL\$5.000 (US\$ 2.86, according to the official exchange rate at that date TRM: 1US\$=COL\$1750 (Monthly mean average for July 2008. <http://www.banrep.gov.co>)).

the totals but not the individual strategies are announced. The players are paid in cash privately at the end of the session after taking a snack. The payoff resulting from both rounds are paid together with a show-up fee of \$2 to cover the transportation costs of each participant.

This experiment has been designed to set up a situation for 25 people where there is a social dilemma, illustrated in Figure 3. This figure shows the two possible individual outcomes (playing public or private) as a function of the number of individuals that contribute to the group account. Clearly, the dominant strategy for the $j-1$ player is to choose not to invest the token in the group account because each token contributed yields only \$0.40 to its contributor, no matter what the others do. Therefore, each player would want to “free ride” on the others the benefits of the group account and the Nash equilibrium is that everyone invests in the private account (point A). In this case, the group earnings would be \$25 (players) x \$5 (private account return) = \$125. The social optimal where the group would be best off is that everyone contributes (point B) and each token contributed yields \$10 (25 (players)*0.4 (group account return) to the others at no cost to them. In this case, the group earnings would be 25 (players) x \$10 (individual benefits of the group account) = \$250. Notice that it is necessary that at least 12 players contribute to the public account for a contributor to this account to earn the same as in the Nash equilibrium where everybody invests her token to the private account. When size of the group is smaller than 25 players, the critical mass would be more difficult to achieve.

Figure A1. The basic structure of the social dilemma in the VCM



Source: Attanasio, et al. (2009)

4. Post experimental data

In addition to our quantitative measure we also collect a survey from the participants to the game. In this survey, among other things, we ask questions that have been suggested as possible measures of social capital such as membership in organizations and trust. This survey yields some insights into the individual characteristics that could affect the decision of contribution (i.e. volunteerism, participation in community activities, leadership and attendance to their meetings) and gives also information to examine the external validity of our results.

The survey is completed by a module that aims at filling in a ‘networks map’ for each

session, asking the subjects questions about their relationship to other participants. In particular, in the networks questionnaire, we asked to each participant her relationship with each other player in the group (“how do you consider person Y?”) in three categories: relatives, friends and acquaintances. The network information allows us to measure the degree of connectivity among the players in each session¹⁵. We also asked if the player considered any other player as a leader in the group. It was possible to mention only one person. This variable provides us with information about the presence of leaders and is useful to determine their potential role in the game outcome.

The social networks’ structure determines the degree of social cohesion in a group and the ability to overcome the costs of collective action and obtain benefits related with cost of transaction, information, and risk management. In the VCM experiment, the structure affects the player’s willingness to communicate with others and the ability to do so in an effective and organized way to obtain the maximum social outcome. In addition, the structure of the social network can determine individual perception of group’s characteristics and network’s quality Cárdenas and Jaramillo (2007); if there is not even a social network (i.e. all participants are unknown to each other) the cost of effective communication could be higher.

¹⁵ We are aware that asking the subjects about their acquaintance’s trustworthiness would have given us a more accurate measure of social capital. There were two reasons we got only a measure for connectivity. First, we replicated the same experimental and survey design which was conducted in the FeA’s first and second follow-up evaluations in rural areas. Second, we were constrained by time logistics. However, we consider collecting a trustworthiness measure in future studies.

Appendix B. Coefficients on control variables

Table B1
Controls for the decision to contribute in the group account in the first round 2007

Dependent variable: 1 if player contributed to the group account in the first round

| Independent Variables | II | III | IV | | |
|---|---|---|-------------------|-------------------|--------------------|
| <i>Basic Controls - Participant's characteristics</i> | If the players has a couple | 0.072+ [0.035] | 0.077+ [0.036] | 0.071+ [0.034] | |
| | Level of Education (0 to 5) | 0.022+ [0.011] | 0.021+ [0.010] | 0.022+ [0.010] | |
| | Household size | 0.016+ [0.008] | 0.016+ [0.008] | 0.017+ [0.008] | |
| | Ground Floor (house) | -0.043 [0.031] | -0.039 [0.030] | -0.037 [0.030] | |
| | Number of Years living in the neighbourhood | 0.001 [0.002] | 0.001 [0.002] | 0.000 [0.002] | |
| | 1 if the player's home has water pipe access | 0.129* [0.031] | 0.117* [0.029] | 0.116* [0.026] | |
| | Sewage | -0.043 [0.036] | -0.046 [0.032] | -0.037 [0.031] | |
| | No Electricity | 0.117 [0.117] | 0.088 [0.118] | 0.129 [0.130] | |
| | 1 if the player is the Head of Household | 0.058 [0.056] | 0.068 [0.058] | 0.082 [0.060] | |
| | Age | 0.002 [0.002] | 0.002 [0.002] | 0.002 [0.002] | |
| | 1 if the player is Unemployed | 0.050 [0.077] | 0.075 [0.080] | 0.056 [0.078] | |
| | 1if the player has her Own Housing | -0.049 [0.044] | -0.058 [0.043] | -0.059 [0.044] | |
| | 1 if player belongs to the fifth quintile per capita income | -0.010 [0.034] | 0.001 [0.033] | 0.000 [0.032] | |
| | 1 if the player has a Phone | 0.068 [0.057] | 0.079 [0.057] | 0.073 [0.055] | |
| | Number of rooms in the house | -0.018 [0.018] | -0.016 [0.018] | -0.013 [0.018] | |
| | 1 if the player is Displaced (self-declared) | 0.035 [0.038] | 0.019 [0.033] | 0.009 [0.034] | |
| | How much the player is Player understood the instructions (1 nothing,, 4 Everything) | -0.018 [0.032] | -0.021 [0.029] | -0.017 [0.026] | |
| | 1 if the household receives other support from another institution | -0.053 [0.039] | -0.041 [0.036] | -0.029 [0.038] | |
| | <i>Session Characteristics</i> | Number of players in session | | -0.011 [0.010] | -0.028* [0.006] |
| | | 1 if there is at least one Man in the session | | 0.273* [0.088] | 0.253* [0.060] |
| Experimenter n°2 (female) | | | 0.020 [0.057] | -0.040 [0.040] | |
| Experimenter n°3 (male) | | | 0.080^ [0.048] | 0.090* [0.031] | |
| First Session in the Day | | | 0.096+ [0.043] | 0.097+ [0.040] | |
| Behavior in the 1st round of the last two sessions ^a | | | 0.402 [0.273] | 0.273+ [0.122] | |
| <i>Session composition</i> | Percentage of participants with less than secondary complete | | | 0.564* [0.118] | |
| | Std Dev of level of education whitin the session - mean of level of education in the neighbourhood in that year | | | 0.415* [0.133] | |
| Observations | 656 | 656 | 656 | | |

Marginal Probit for I-IV. Marginal effects reported. Robust standard errors, clustered by session.

^ significant at 10%;+ significant at 5%; * significant at 1%. a It is calculated as the Mean of previous 2 Sessions' Deviation from the average contribution in the neighbourhood.

Table B2
Controls for the decision to contribute in the group account in the first round 2008 and 2007

| | | <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | |
|--|--|--|---------|---------|
| Independent Variables | | II | III | IV |
| <i>Basic Controls - Participant's characteristics</i> | 1 if the player is a woman | 0.120+ | 0.155* | 0.157* |
| | | [0.056] | [0.033] | [0.031] |
| | If the players has a couple | -0.012 | -0.002 | -0.001 |
| | | [0.038] | [0.038] | [0.037] |
| | Level of Education (0 to 5) | 0.003 | -0.001 | 0.002 |
| | | [0.010] | [0.009] | [0.009] |
| | Household size | 0.016* | 0.016+ | 0.016+ |
| | | [0.006] | [0.006] | [0.006] |
| | Ground Floor (house) | -0.045^ | -0.041^ | -0.039 |
| | | [0.026] | [0.024] | [0.024] |
| | Number of Years living in the neighborhood | 0.001 | 0.001 | 0.001 |
| | | [0.001] | [0.001] | [0.001] |
| | 1 if the player's home has water pipe access | 0.044 | 0.034 | 0.043 |
| | | [0.038] | [0.034] | [0.034] |
| | Sewage | -0.051^ | -0.043 | -0.036 |
| | | [0.029] | [0.027] | [0.026] |
| | No Electricity | 0.137* | 0.087 | 0.111 |
| | | [0.077] | [0.079] | [0.080] |
| | 1 if the player is the Head of Household | 0.009 | 0.008 | 0.010 |
| | | [0.041] | [0.041] | [0.042] |
| Age | 0.005* | 0.005* | 0.005* | |
| | [0.001] | [0.001] | [0.001] | |
| 1 if the player is Unemployed | -0.042 | -0.028 | -0.029 | |
| | [0.054] | [0.057] | [0.056] | |
| 1if the player has her Own Housing | -0.032 | -0.034 | -0.034 | |
| | [0.028] | [0.026] | [0.026] | |
| | 0.045 | 0.050 | 0.054 | |
| | [0.033] | [0.033] | [0.033] | |
| 1 if the player has a Phone | 0.017 | 0.021 | 0.017 | |
| | [0.039] | [0.040] | [0.039] | |
| Number of rooms in the house | -0.019 | -0.017 | -0.017 | |
| | [0.014] | [0.014] | [0.015] | |
| 1 if the player is Displaced (self-declared) | 0.023 | 0.009 | 0.009 | |
| | [0.033] | [0.033] | [0.033] | |
| How much the player is Player understood the instructions (1 nothing,, 4 Everything) | -0.040+ | -0.035^ | -0.035^ | |
| | [0.020] | [0.020] | [0.020] | |
| 1 if the household receives other support from another institution | -0.054* | -0.046 | -0.042 | |
| | [0.032] | [0.030] | [0.030] | |
| Number of players in session | | -0.040* | -0.052* | |
| | | [0.011] | [0.010] | |
| 1 if there is at least one Man in the session | | 0.154+ | 0.190* | |
| | | [0.063] | [0.062] | |
| <i>Session Characteristics</i> | Experimenter n°2 (female) in 2007 | | -0.035 | -0.080 |
| | | | [0.072] | [0.061] |
| | Experimenter n°3 (male) in 2007 | | 0.095 | 0.112+ |
| | | | [0.063] | [0.049] |
| | Experimenter n°2 (female) in 2008 | | 0.151* | 0.128 |
| | | [0.083] | [0.085] | |
| First Session in the Day | | 0.171* | 0.176* | |
| | | [0.058] | [0.051] | |
| Behavior in the 1st round of the last two sessions ^a | | 0.199 | 0.242 | |
| | | [0.232] | [0.195] | |
| <i>Session composition</i> | Percentage of participants with less than secondary complete | | | 0.478+ |
| | | | | [0.188] |
| | Std Dev of level of education in in the session - mean of level of education in the neighbourhood in that year | | | 0.213 |
| | | | | [0.151] |
| Observations | | 1,282 | 1,282 | 1,282 |

Marginal Probit for I-IV. Marginal effects reported. Robust standard errors, clustered by session.
^ significant at 10%;+ significant at 5%; * significant at 1%. a It is calculated as the Mean of previous 2 Sessions' Deviation from the average contribution in the neighbourhood.

Table B3
Role of the Leaders (First Round)

| <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | | |
|--|--------------------|--------------------|--------------------|
| Independent Variables | IX | X | XI |
| Dummy <i>Ciénaga</i> | -0.010 [0.078] | -0.014 [0.072] | -0.018 [0.077] |
| Dummy 2007 | 0.146+ [0.059] | 0.066 [0.073] | 0.159* [0.059] |
| Program impact | 0.197* [0.064] | 0.097 [0.112] | 0.193* [0.064] |
| 1 if the participant is a ML | -0.064^ [0.038] | -0.083+ [0.036] | |
| Number of ML in the session | | 0.027+ [0.013] | |
| 1 if the participant is considered a Leader | | | -0.067* [0.025] |
| <i>Basic Controls - Participant's characteristics</i> | Yes | Yes | Yes |
| <i>Session Characteristics</i> | Yes | Yes | Yes |
| <i>Session composition (information within session)</i> | Yes | Yes | Yes |
| Observations | 1,282 | 1,282 | 1,282 |

Marginal effects reported. Robust standard errors, clustered by session.

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

Table B4
Role of the Leaders: Controls for the decision to contribute in the group account in the first round
2008 and 2007

| <i>Dependent variable: 1 if player contributed to the group account in the first round</i> | | | |
|---|---------|---------|---------|
| Independent Variables | IX | X | XI |
| 1 if the player is a woman | 0.158* | 0.157* | 0.153* |
| | [0.030] | [0.030] | [0.033] |
| If the players has a couple | 0.004 | 0.002 | -0.005 |
| | [0.037] | [0.037] | [0.038] |
| Level of Education (0 to 5) | 0.004 | 0.004 | 0.006 |
| | [0.010] | [0.010] | [0.010] |
| Household size | 0.016+ | 0.017* | 0.015+ |
| | [0.006] | [0.007] | [0.006] |
| Ground Floor (house) | -0.040^ | -0.039^ | -0.039 |
| | [0.024] | [0.024] | [0.024] |
| Number of Years living in the neighborhood | 0.001 | 0.001 | 0.001 |
| | [0.001] | [0.001] | [0.001] |
| 1 if the player's home has water pipe access | 0.043 | 0.045 | 0.038 |
| | [0.033] | [0.033] | [0.034] |
| Sewage | -0.035 | -0.035 | -0.033 |
| | [0.026] | [0.026] | [0.026] |
| No Electricity | 0.109 | 0.120 | 0.106 |
| | [0.080] | [0.080] | [0.080] |
| 1 if the player is the Head of Household | 0.014 | 0.012 | 0.006 |
| | [0.042] | [0.042] | [0.042] |
| Age | 0.005* | 0.005* | 0.005* |
| | [0.001] | [0.001] | [0.001] |
| 1 if the player is Unemployed | -0.027 | -0.022 | -0.028 |
| | [0.056] | [0.057] | [0.056] |
| 1if the player has her Own Housing | -0.032 | -0.035 | -0.032 |
| | [0.026] | [0.026] | [0.027] |
| 1 if player belongs to the fifth quintile per capita income | 0.057* | 0.056* | 0.056 |
| | [0.034] | [0.033] | [0.034] |
| 1 if the player has a Phone | 0.015 | 0.017 | 0.019 |
| | [0.039] | [0.040] | [0.041] |
| Number of rooms in the house | -0.018 | -0.019 | -0.015 |
| | [0.015] | [0.015] | [0.015] |
| 1 if the player is Displaced (self-declared) | 0.010 | 0.011 | 0.014 |
| | [0.033] | [0.033] | [0.034] |
| How much the player is Player understood the instructions (1 nothing,, 4 Everything) | -0.035* | -0.033 | -0.035* |
| | [0.020] | [0.020] | [0.020] |
| 1 if the household receives other support from another institution | -0.041 | -0.039 | -0.039 |
| | [0.030] | [0.030] | [0.030] |
| Number of players in session | -0.052* | -0.048* | -0.052* |
| | [0.010] | [0.012] | [0.010] |
| 1 if there is at least one Man in the session | 0.190* | 0.190* | 0.189* |
| | [0.063] | [0.059] | [0.063] |
| Experimenter n°2 (female) in 2007 | -0.080 | -0.080 | -0.085 |
| | [0.060] | [0.058] | [0.057] |
| Experimenter n°3 (male) in 2007 | 0.108+ | 0.155+ | 0.112+ |
| | [0.049] | [0.077] | [0.050] |
| Experimenter n°2 (female) in 2008 | 0.124 | 0.160* | 0.134 |
| | [0.086] | [0.087] | [0.085] |
| First Session in the Day | 0.177* | 0.175* | 0.181* |
| | [0.051] | [0.049] | [0.051] |
| Behavior in the 1st round of the last two sessions ^a | 0.252 | 0.157 | 0.252 |
| | [0.195] | [0.195] | [0.193] |
| Percentage of participants with less than secondary complete | 0.482+ | 0.488* | 0.494* |
| | [0.190] | [0.176] | [0.186] |
| Std Dev of level of education in in the session - mean of level of education in the neighborhood in that year | 0.213 | 0.210 | 0.207 |
| | [0.152] | [0.151] | [0.153] |
| Observations | 1,282 | 1,282 | 1,282 |

Marginal effects reported. Robust standard errors, clustered by session.
^ significant at 10%;+ significant at 5%; * significant at 1%.

Appendix C. Descriptive Statistics.

| Variable | Base line | | | | | Follow-up | | | | | |
|--|-------------|------|------|-------|-----|-----------|------|------|-------|-----|-----|
| | mean | sd | max | min | N | mean | sd | max | min | N | |
| <i>Basic Controls - Participant's characteristics</i> | | | | | | | | | | | |
| Decision to contribute | 0.20 | 0.40 | 1 | 0 | 676 | 0.29 | 0.46 | 1 | 0 | 619 | |
| 1 if the player is a woman | 0.99 | 0.10 | 1 | 0 | 676 | 0.98 | 0.13 | 1 | 0 | 619 | |
| If the players has a couple | 0.70 | 0.46 | 1 | 0 | 676 | 0.72 | 0.45 | 1 | 0 | 619 | |
| Level of Education (0 to 5) | 2.78 | 1.27 | 5 | 0 | 676 | 2.72 | 1.33 | 5 | 0 | 619 | |
| Household size | 5.72 | 2.11 | 15 | 2 | 676 | 5.70 | 2.02 | 15 | 2 | 619 | |
| Ground Floor (house) | 0.33 | 0.47 | 1 | 0 | 676 | 0.28 | 0.45 | 1 | 0 | 619 | |
| Number of Years living in the neighborhood | 18.38 | 9.42 | 50 | 1 | 676 | 18.72 | 9.93 | 57 | 0 | 619 | |
| 1 if the player's home has water pipe access | 0.86 | 0.35 | 1 | 0 | 676 | 0.88 | 0.33 | 1 | 0 | 619 | |
| Sewage | 0.39 | 0.49 | 1 | 0 | 676 | 0.48 | 0.50 | 1 | 0 | 619 | |
| No Electricity | 0.04 | 0.19 | 1 | 0 | 676 | 0.03 | 0.17 | 1 | 0 | 619 | |
| 1 if the player is the Head of Household | 0.26 | 0.44 | 1 | 0 | 676 | 0.34 | 0.47 | 1 | 0 | 619 | |
| Age | 35.83 | 9.94 | 75 | 18 | 674 | 36.20 | 9.64 | 71 | 16 | 619 | |
| 1 if the player is Unemployed | 0.07 | 0.25 | 1 | 0 | 676 | 0.05 | 0.21 | 1 | 0 | 619 | |
| 1if the player has her Own Housing | 0.71 | 0.45 | 1 | 0 | 676 | 0.60 | 0.49 | 1 | 0 | 619 | |
| 1 if player belongs to the fifth quintile per capita income | 0.20 | 0.40 | 1 | 0 | 676 | 0.18 | 0.38 | 1 | 0 | 619 | |
| 1 if the player has a Phone | 0.18 | 0.38 | 1 | 0 | 676 | 0.16 | 0.37 | 1 | 0 | 619 | |
| Number of rooms in the house | 2.28 | 1.05 | 6 | 1 | 675 | 2.31 | 1.08 | 6 | 0 | 619 | |
| 1 if the player is Displaced (self-declared) | 0.14 | 0.34 | 1 | 0 | 669 | 0.14 | 0.34 | 1 | 0 | 619 | |
| How much the player is Player understood the instructions | 3.64 | 0.67 | 4 | 1 | 675 | 3.58 | 0.69 | 4 | 1 | 619 | |
| 1 if the household receives support from another institution | 0.13 | 0.34 | 1 | 0 | 674 | 0.10 | 0.29 | 1 | 0 | 619 | |
| <i>Session Characteristics</i> | | | | | | | | | | | |
| Number of players in session | 24.26 | 1.43 | 28 | 21 | 676 | 24.78 | 0.68 | 25 | 22 | 619 | |
| 1 if there is at least one Man in the session | 0.14 | 0.35 | 1 | 0 | 676 | 0.36 | 0.48 | 1 | 0 | 619 | |
| Experimenter n°2 (female) in 2007 | 0.17 | 0.38 | 1 | 0 | 676 | 0.00 | 0.00 | 0 | 0 | 619 | |
| Experimenter n°3 (male) in 2007 | 0.33 | 0.47 | 1 | 0 | 676 | 0.00 | 0.00 | 0 | 0 | 619 | |
| Experimenter n°2 (female) in 2008 | 0.00 | 0.00 | 0 | 0 | 676 | 0.64 | 0.48 | 1 | 0 | 619 | |
| First Session in the Day | 0.15 | 0.36 | 1 | 0 | 676 | 0.36 | 0.48 | 1 | 0 | 619 | |
| Behavior in the 1st round of the last two sessions | 0.01 | 0.07 | 0.18 | -0.17 | 676 | 0.08 | 0.12 | 0.39 | -0.11 | 619 | |
| Percentage of participants with less than secondary complete | 0.60 | 0.13 | 0.84 | 0.3 | 676 | 0.71 | 0.10 | 0.92 | 0.52 | 619 | |
| <i>Social Capital measures</i> | | | | | | | | | | | |
| Membership in at least one organization | 0.39 | 0.49 | 1 | 0 | 676 | 0.27 | 0.45 | 1 | 0 | 619 | |
| Participation in neighbourhood decisions | 0.54 | 0.50 | 1 | 0 | 676 | 0.40 | 0.49 | 1 | 0 | 619 | |
| Participation in the neighbourhood meetings | 0.62 | 0.49 | 1 | 0 | 660 | 0.48 | 0.50 | 1 | 0 | 619 | |
| Vote Local Elections (2003 and 2007) | 0.52 | 0.50 | 1 | 0 | 676 | 0.72 | 0.45 | 1 | 0 | 619 | |
| Vote Presidential Elections (2006) | 0.67 | 0.47 | 1 | 0 | 676 | 0.78 | 0.41 | 1 | 0 | 619 | |
| Trust | Most people | 0.06 | 0.24 | 1 | 0 | 672 | 0.07 | 0.25 | 1 | 0 | 619 |
| | Few people | 0.59 | 0.49 | 1 | 0 | 672 | 0.60 | 0.49 | 1 | 0 | 619 |
| | None | 0.30 | 0.46 | 1 | 0 | 672 | 0.30 | 0.46 | 1 | 0 | 619 |
| Perception within the community | Cooperation | 0.25 | 0.43 | 1 | 0 | 665 | 0.32 | 0.47 | 1 | 0 | 619 |
| | Reciprocity | 0.23 | 0.42 | 1 | 0 | 665 | 0.13 | 0.34 | 1 | 0 | 619 |
| | Selfishness | 0.46 | 0.50 | 1 | 0 | 665 | 0.51 | 0.50 | 1 | 0 | 619 |
| Average number of friends of participants | 1.04 | 2.21 | 17 | 0 | 676 | 1.39 | 1.75 | 11 | 0 | 619 | |
| Average friendship density | 0.04 | 0.04 | 0.17 | 0 | 676 | 0.10 | 0.04 | 0.25 | 0.05 | 619 | |
| Average connections density | 0.38 | 0.14 | 0.69 | 0.18 | 676 | 0.13 | 0.05 | 0.33 | 0.08 | 619 | |
| Average number of connections | 8.91 | 7.75 | 27 | 0 | 676 | 1.95 | 2.05 | 13 | 0 | 619 | |
| Percentage of players identified as leader in the session | 0.33 | 0.47 | 1 | 0 | 676 | 0.18 | 0.38 | 1 | 0 | 619 | |
| Percentage of ML in the session | 0.08 | 0.28 | 1 | 0 | 676 | 0.05 | 0.23 | 1 | 0 | 619 | |
| Percentage of players identified as trustworthy in the session | 1.00 | 0.00 | 1 | 1 | 676 | 0.70 | 0.46 | 1 | 0 | 619 | |
| Sum of ML in the session | 2.05 | 2.45 | 7 | 0 | 676 | 1.35 | 1.22 | 6 | 0 | 619 | |