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# Peace and Goodwill? Using an Experimental Game to Analyse the *Desarrollo y Paz* initiative in Colombia

IFS Working Paper W09/20

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# Peace and Goodwill? Using an Experimental Game to Analyse the *Desarrollo y Paz* initiative in Colombia

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## Abstract:

Several decades of conflict, rebellion and unrest severely weakened civil society in parts of Colombia. *Desarrollo y Paz* is the umbrella term used to describe the set of locally-led initiatives that aim at addressing this problem through initiatives to promote sustainable economic development and community cohesion and action.

In this paper we analyse the findings from a series of ‘public good’ games that were conducted between November 2005 and February 2007 in 104 municipalities in rural and urban Colombia with mainly poor participants. The data covers municipalities both with (‘treatment’) and without (‘control’) a PRDP in place, and within the ‘treatment’ municipalities, both beneficiaries and non beneficiaries of the PRDP initiative. The data for ‘control’ municipalities was collected as part of the evaluation of *Familias en Accion* (FeA), Colombia’s conditional cash transfer programme.

The game is structured as a typical free-rider problem with the act of contributing to the ‘public good’ (a collective money pot) being always dominated by non-contribution. We interpret contribution as an act consistent with a high degree of social capital.

Potentially endogenous selection into the programme makes identifying programme effects difficult but we find strong and suggestive evidence that exposure to PRDPs improve social capital and that this extends beyond direct beneficiaries of the programme. In particular, the duration of programme operation and the proportion of programme beneficiaries in a game session increase contribution to the public good, suggesting that in order to have a major impact the programme must be sufficiently ‘intensive’.

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**Keywords:** Social Capital, Conflict, Experimental Games, Public Goods, Evaluation Methods.

**JEL classification:** C93, I38, D74, H41

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## Section 1: Introduction

Several decades of conflict, rebellion and unrest have severely weakened civil society in Colombia. The legacy of past and ongoing violence has led to a weakened economy (Cardenas, 2002; Echeverry et al., 2001; Riascos & Vargas, 2004), and citizens that may have difficulty interacting with and trusting those outside their immediate social group, and engaging with local and national government agencies and organisations. *Desarrollo y Paz* is the umbrella term used to describe the set of locally-led initiatives that aim at addressing these problems through programmes to promote sustainable economic development and community cohesion and action. Ultimately, the *Programas Regionales de Desarrollo y Paz* (PRDPs) aim to foster an increase in social capital, to encourage the formation of social networks across social divides and to therefore increase the degree of trust between individuals. When individuals can trust each other, contracting can be less costly and fewer resources devoted to enforcement, thereby aiding economic development. Similarly, a community linked through trust and collective organisations is likely to be able to envisage and implement better strategies to manage and resolve potential conflict, leading to a fall in violence levels.

But how can one measure the impact of a programme designed to improve this ‘social capital’? One could attempt to measure a final output, economic activity or human rights violations, for instance. However, this is difficult both for reasons of data collection (particularly at the sub-regional level), and because improvements in behaviours associated with social capital may be considered an end unto themselves (for instance, by making future conflict less likely). With this in mind, a significant literature focuses on analysing measures of civic engagement (e.g. voting behaviour, group membership) (see Helliwell & Putnam, 1995 and Putnam, 2000, for instance) and survey responses designed to elicit trust and trust-worthiness (see Grootaert & Van Bastelaer, 2001, for instance). However, economists and psychologists have increasingly made use of experimental methods; specially designed games, often with real payoffs, that allow the researcher to analyse the determinants of cooperative (or indeed, uncooperative) behaviour (Barr & Genicot, 2007; Fearon et al., 2009; Karlan, 2005; Mosley & Verschoor, 2005).

In this paper we analyse the findings from a series of ‘public good’ games that were conducted in 104 rural and urban municipalities in Colombia between November 2005 and February 2007, with most participants being poor. The data covers municipalities both with (‘treatment’) and without (‘control’) a PRDP in place, and within the ‘treatment’ municipalities, both beneficiaries and non beneficiaries of the PRDP initiative. The data for ‘control’ municipalities was collected as part of the evaluation of *Familias en Accion* (FeA), Colombia’s conditional cash transfer programme.

The game is structured as a typical free-rider problem with the act of contributing to the ‘public good’ (a collective money pot) being always dominated by non-contribution. The game is played twice, with a short group discussion between participants taking place between the first and second round. We take the act of contribution to the collective money-pot as our measure of social capital – a willingness to forgo a private return for the social good, and to coordinate with other players to contribute and act in a reciprocal manner despite the incentive not to.

The rest of this paper proceeds as follows. Section 2 details the PRDPs and the data. Section 3 describes in more detail the public goods game and provides some basic descriptive statistics for game-play. Section 4 provides an analysis of the effect of the PRDPs on collective action, firstly using a comparison between beneficiaries and non-beneficiaries in areas where the programme was running, and then by comparing with ‘control’ municipalities. Finally, Section 5 offers our conclusions.

## **Section 2: *Desarrollo y Paz* and the Survey Data**

### ***2.1 The Setting. Civil Conflict in Colombia***

Colombia has been affected by a complex civil conflict in recent decades. The drivers of the conflict have evolved with time, from the historical rivalry between opposing parties, through the confrontation between the state and left wing revolutionary groups, to the fight for the control over natural resources and the profits of the coca industry. Kidnapping, selective assassinations and internal displacement are amongst the most evident consequences of this endless stream of violence. Murder rate stands at 37 over 100.000, the 10th highest in the world, and U.N. sources report at least 1.8 million Colombians internally displaced by the conflict (UNHCR, 2006).<sup>1</sup> The human rights of social leaders, as well as common people in vulnerable communities, are systematically violated.<sup>2</sup>

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<sup>1</sup> According to the Committee on Human Rights and Displacement (CODHES), a nongovernmental organization monitoring displacement, the number of the number of internally displaced people since 1985 is 2.8 million, and the first half of 2008 marked the highest rate of displacement in Colombia in 23 years, with more than 270,000 people displaced in six months.

<sup>2</sup> Human Rights Watch reports that 41 unionists were killed in 2008 (Source: *Escuela Nacional Sindical*). Nearly two dozen candidates were assassinated prior to last regional and local elections in 2007 (source UNHCR).

In contrast to a typical ethnic conflict setting, where the whole of society itself is sharply divided along ethnic lines, the Colombian conflict is driven by a groups of ‘outsiders’ fighting between themselves for power and threatening the vast majority of the population, which is passively affected by its consequences. The scene of the recent conflict has been dominated by two main illegal factions: the Guerrilla(s) and the paramilitaries. Both are complex organizations that, despite the relatively small number of members, have managed to control vast parts of the territory, infiltrate society and engage in several illegal activities, exploiting the weakness of public institutions.

In recent years these traditional groups have disintegrated into smaller factions and the state have regained control over large parts of the country. However, extreme violence is still concentrated in several areas, especially isolated rural districts. In these ‘clusters’ the threat of violence and weakness of the state are corrosive for social capital. And indeed there is a strong association between the presence of illegal groups and violence levels, local political instability, inequality and poor social outcomes at the local level (Sanchez et al., 2003).

Household living in conflict zones suffer repeated losses of physical, human and social capital, leading to a condition of assets depletion which is extremely hard to recover from, as the state fails to provide essential public goods, and the traditional mechanisms of mutual support are jeopardized by the violence (Engel & Ibañez, 2007; Ibañez & Moya, 2009; McIlwaine & Moser, 2000).

Traditionally, the Government has tackled the conflict with an approach based on security operations and military confrontation. In this context, the PRDPs represent an aim to at building peace ‘from the bottom up’, as it is described in the next section.

## ***2.2 The initiative. Desarrollo y Paz***

*Desarrollo y Paz* is the umbrella term used to describe a set of projects run at the regional and local level with the aim of fostering the accumulation of social capital amongst those Colombians worst affected by civil conflict. It consists of networks of grassroots organizations that were formed in some of the poorest and most violent regions of Colombia under the auspices of key civil society stakeholders (labour unions, the church, private foundations, etc.) in an attempt to re-establish peace and promote development.

Based on a community driven approach, the PRDPs claim that peace is a multidimensional and a multilevel concept.<sup>3</sup> It cannot be achieved by military means alone, but is rather the result of a cohesive society with functioning and inclusive institutions, the potential for collective engagement, and the prospect of development which benefits more than an elite. By attacking the socioeconomic and cultural conditions which cause and perpetuate the conflict locally, the PRDPs hope to reshape social and economic patterns along the principles of equity, solidarity and inclusiveness. Indeed they claim that peace can *only* be sustainable if it is constructed ‘from the bottom up’. By strengthening the social fabric and promoting democratic participation, PRDPs expect to empower communities so that they become masters and actors of their own development. Newly empowered communities may, for example, have the capacity and confidence to engage with illegal groups, and may demand the protection of human life and rights. This would weaken the hold of the illegal groups over the political, social and economic life of afflicted areas.

The *Desarrollo y Paz* initiative started in the early 90s in Magdalena Medio, but has rapidly expanded in many other regions of the country. Since then, the PRDPs have gained sufficient credibility to engage with local and national governments and major international donors.<sup>4</sup> 6 PRDPs in the regions of Magdalena Medio, Maciso Colombiano, Norte de Santander, Oriente Antioqueno, Montes de Maria and Meta<sup>5</sup> have been supported by the World Bank and the European Commission, with a total estimated investment of more than \$180 million.<sup>6</sup>

These resources are managed and executed at the regional level where the PRDPs act as an umbrella fund, supporting a very heterogeneous set of initiatives in the communities that pertain to 3 main axis of action:

- a) Productive Development;
- b) Institutional Development and Governance, and;
- c) Human Rights and ‘Culture of Peace’.

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<sup>3</sup> For a theoretical discussion on the concept of peace and its relevance to PRDPs’ philosophy of intervention see Galtung (1996) and Lederach (2007).

<sup>4</sup> Although they are not governmental programmes, they are endorsed in the National Development Plan and the Presidential Secretary for Social Affairs of the Colombian Government (*Acción Social*) coordinates their funding.

<sup>5</sup> Additional to these 6, there are other 18 PRDPs in Colombia. All of them are confederated in the Red Prodepaz ([www.redprodepaz.org.co](http://www.redprodepaz.org.co)).

<sup>6</sup> The support from the World Bank consisted in two Learning and Innovation Grants (LIL1 and LIL2) from 1998 to 2003 and the *Paz y Desarrollo* Loan from 2004-2008. The European Commission supports the PRDPs through *Laboratorios de Paz I, II and III*, its main international cooperation strategy in Colombia, covering 2002-2010 period.

Under the first category fall several types of micro-enterprise projects, especially in the agriculture sector. They are nearly always producer cooperatives, and often involve collective land ownership. Most projects combine a strategy for commercial production of a leading cash-crop (e.g. palm oil, coffee, cocoa, raspberry, cattle, etc.) with a focus on food security and sustainable environmental management.

In the domain of Institutional Development and Governance, the PRPDs promote community health and education initiatives as well as water and sanitation projects. They also support several initiatives in the domain of active citizenship, by building up and strengthening social networks for civic participation, promoting engagement in participative planning and budgeting exercise and encouraging transparency and accountability in public decision making.

Finally, projects in the third axis of Culture of Peace range from the promotion of non-violence and mediation for the resolution of disagreement, to the setting up of *Espacios Humanitarios* (spaces for civil resistance, early alert system and institutional coordination for the management of humanitarian crisis), to the support of community radio and initiatives for the preservation of local traditions and identity. The latter is seen as a stabilising ‘buffer’, that will provide a sense of community and ‘belonging’ that makes violence less likely and forms the foundation of collective action.

All these projects are promoted, formulated and executed by grassroots organizations in a participatory way. Through the projects, local communities are able to express their own views and set their priorities (*‘la vida que queremos’*) and beneficiaries are normally members of the grassroots organizations.

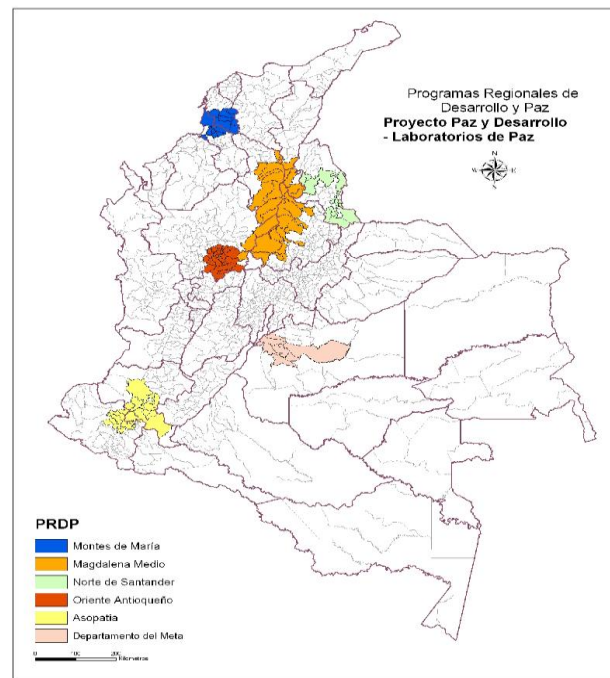
The Government estimates that in the 6 mentioned regions (118 municipalities), the PRDPs fund 1363 projects, working with approximately 800 grassroots organizations and reaching some estimated 180,000 beneficiaries.<sup>7</sup>

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<sup>7</sup> Source: Sistema de Seguimiento de los Programas Paz y Desarrollo y Laboratorios de Paz, Acción Social, Gobierno de Colombia.



Figure 1: Coverage of the PRDPs



Despite the diversity of projects, the consistent principle of the PRDPs is the primacy of building positive social networks and community organisational capacity. They consider all projects as an opportunity to (re)establish bonds of trust amongst people. By rebuilding social networks (amongst grassroots organizations, amongst women, youths, between people and the public institutions, etc.) they aim to promote new community level leaderships and new ‘institutions’. Finally they hope that this community wide process will make collective action possible again.

Our approach to evaluating the programme’s effectiveness is based on a specific measure of social capital that fits this theory of change: the ability to engage in collective action and contribute to local public goods.

### 2.3 Data

In an effort to evaluate the effectiveness of the PRDPs, a survey and a set of experimental games were undertaken in winter 2006. The evaluation was led by the *Departamento Nacional de Planeación* (DNP) in Colombia, with funding from the European Commission and the World Bank.<sup>8</sup> The survey covered a sample of 37 municipalities in 5

<sup>8</sup>The design of the evaluation and data collection were undertaken by the Consortium SEI-Econometría-IFS. The evaluation plan includes 2 rounds of data collection and a mixed qualitative-quantitative methods approach. The main results of the first phase of the evaluation are presented in a comprehensive policy

regions<sup>9</sup>, and included both direct beneficiaries of the programme, and non-beneficiaries living in the same municipalities. The PRDP programme was operating in all municipalities at the time of the survey ('treatment' municipalities). Beneficiaries were selected from the lists of individuals having participated in at least one projects funded by the PRDPs. They are normally members of grassroots organizations. Non beneficiaries were selected for being members of other grassroots organizations that didn't participate in the PRDP initiative. This was done to try to account for endogenous selection into the organisations that have participated in the PRDP initiative. Comparability of grassroots organizations was ensured on a number of respects.

At the time of data collection, the PRDP initiative had already been running for several years. The average length of exposure to the programme amongst sampled beneficiaries is 18 months, but there is a great deal variability, both within and across municipalities. In fact PRDPs coverage has expanded substantially over time, both within areas where the programme has been traditionally operating, and due to roll-outs in new regions and additional municipalities.

In addition to the information collected in 'treatment' municipalities, we also use another dataset containing information on a further 70 municipalities where the programme was not in place ('control' municipalities). The 'control' municipalities were surveyed and had games administered in order to evaluate another programme called *Familias en Accion* (FeA).<sup>10</sup> Whilst FeA may have acted upon social capital, it was primarily designed to increase families' investments in their children's human capital (education and health) through conditional cash transfers. This information was collected in winter 2005, one year before the PRDP data collection.<sup>11</sup>

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report (DNP, 2009). A second phase of the study is currently undergoing, coordinated by the DNP. This new work draws extensively on the conceptual framework, analysis and results of the policy report.

<sup>9</sup> The region of Meta was excluded from the analysis, as at the time of the data collection, the PRDP had not started financing projects yet.

<sup>10</sup> See Attanasio et al. (2006) for a full description of the programme and the results of its main evaluation.

<sup>11</sup> We use the information of the second follow-up of the main FeA evaluation. It comprises FeA Treatment and FeA control Locations. In the case of three municipalities where the PRDP is operational, we have information from both the PRDP survey, and the FeA survey. We are unable to use the latter because we are unable to identify the beneficiaries of the PRDPs from the FeA survey.

*Table 1: Structure of the Data*

	Control	Treatment	
	Locations	Locations	Total
Number of municipalities	67	37	104
Number of game sessions	67	45	112
Number of participants	2242	1618	3860
Number of PRDP beneficiaries	-	700 <sup>12</sup>	700 <sup>12</sup>
Number of non PRDP beneficiaries	2242	818 <sup>12</sup>	3060 <sup>12</sup>

Table 1, above, shows the structure of the survey data. There are three main groups of participants: a) individuals in ‘treatment’ locations who are directly involved with the PRDPs, b) individuals in ‘treatment’ locations who are not directly involved with the program and have not participated in any project, c) individuals in ‘control’ municipalities where the programme does not operate.<sup>12</sup> We will exploit this variation in treatment status across and within municipalities when trying to assess the effect of the PRDPs on social capital formation.

Both PRDP and FeA evaluation data include information from a public good experimental game that was conducted in the field to elicit behavioural information on social capital. The games were played in group sessions, as a part of half-day workshops conducted in the community. Full details of the game design are provided in the next section.

A survey was applied to all game participants, containing a detailed set of demographic and socio-economic information at the individual and household level. In the case of the PRDP dataset, the survey covers a number of potential outcomes of the programme relating to poverty, violence, social capital, conflict management and the relationship with public institutions. We are also able to merge this information with additional municipality level data, including indicators of violence, institutional and economic development.

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<sup>12</sup>When we compare treatment and control participants within treatment locations we restrict our analysis to 1518 observations. For the other 100 participants we don’t have reliable information on whether they were directly involved with PRDPs.

After the game, information on social network was also gathered. All participants were asked whether they were acquainted with, friends with, or related to every other participant in their game session. From this we constructed a measure of the proportion of other participants each knew (by type of relationship) and indicators of whether they knew anyone at all.

Because of the significant time demands of this particular data collection methodology, one may be concerned with non-random no response as some potential participants may refuse to take part in the games. For this reason a mechanism of sample replacement was put in place and there is no reason to believe that non response differentially affects ‘treatment’ and ‘control’ locations, or beneficiaries and non beneficiaries.

When the games were conducted for the FeA evaluation it was not envisioned that the data would be used as ‘control’ municipalities for the evaluation of the PRDPs, and hence these municipalities and individuals were not chosen to be comparable to the PRDP ones (but instead to be representative of those potentially entitled to FeA). A possible concern is that, because of the way the PRDPs target municipalities, our ‘treatment’ and ‘control’ locations may differ in a number of municipality characteristics, particularly violence levels and institutional efficiency. For this reason we used propensity score matching<sup>13</sup> to match ‘treatment’ and ‘control’ localities using (pre-programme<sup>14</sup>) municipality level characteristics in 2002. The municipalities on the common support shall be used for our main analysis when we compare across ‘treatment’ and ‘control’ municipalities.

Figure 2, summarises the distribution of propensity scores. 2 ‘control’ localities are dropped due to missing information, and 21 are dropped due to being off the common support, whilst 15 ‘treatment’ localities are also dropped. 2,249 game participants are on the common support, or 58% of the original sample.

*Figure 2: Propensity Scores and Common Support*

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<sup>13</sup> We used a kernel matching technique on a comprehensive set of municipality variables. The function of participations includes all the municipality characteristics reported in Table 2 and 3. Full details of the first and second step of the matching process are available on demand from the authors.

<sup>14</sup> In four out of five treatment regions.

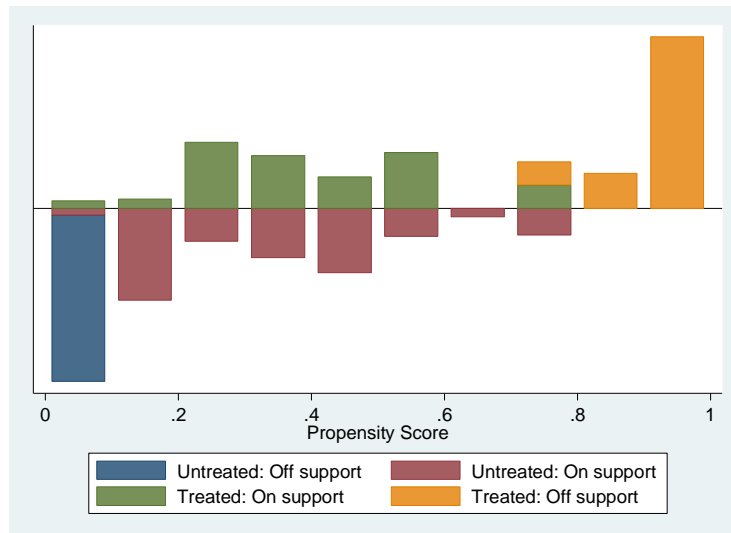


Table 2, provides descriptive statistics for key household and municipality level variables by ‘treatment’ and ‘control’ areas, for both the full sample and the matched sample. It shows that:

- Before matching, ‘treatment’ municipalities have significantly larger populations, and, on average, higher altitude than ‘control’ municipalities. As expected, murder rates are somewhat higher, whilst, the number of secondary school students is also significantly greater.
- After matching and dropping those off the common support, there are no significant differences between ‘treatment’ and ‘control’ areas in terms of municipality level variables; that is our matching procedure is successful in balancing the ‘treatment’ and ‘control’ samples in terms of observable variables on the common support.
- Both before and after matching, there are significant differences in the individual and household characteristics between ‘treatment’ and ‘control’ areas. In particular, participants in ‘treatment’ areas are less likely to be females, are generally more educated and have greater access to household amenities, particularly, landline phones and piped gas. These differences can be mainly attributed to the targeting criteria of FeA and PRDP. While only poor women that pass a socioeconomic means test are eligible to FeA, the selection criteria of PRDP projects are defined on a case by case basis.<sup>15</sup>
- Despite these differences, both ‘treatment’ and ‘control’ municipalities and participants are quite poor, with this being the case for the latter group in particular.
- Participants seem to have more friends in the game sessions in ‘treatment’ locations. Indeed this may reflect an effect of the PRDP, rather than a pre-programme

<sup>15</sup> In order to maximize the comparability of our samples in control and treatment locations we also performed an alternative matching including individual and household characteristics. Our main results don’t change.

difference. Alternatively, this could be due to differences in the sampling methods across 'treatment' and 'control' locations.

Table 2: Individual, Household, Municipality and Other Summary Statistics. Across Locations.

	Control Locations	Treatment Locations		Matched Control Locations	Matched Treatment Locations
<b>Individual/Household Characteristics</b>					
Female	0.841	0.537***		0.837	0.525***
Age (years)	41.607	40.788		41.569	42.004
Urban	0.581	0.557		0.615	0.528
Water by pipe	0.664	0.724		0.644	0.705
Sewage system	0.301	0.503***		0.31	0.446*
Rubbish collection	0.355	0.477**		0.366	0.413
Gas by pipe	0.097	0.498***		0.101	0.525***
Landline phones	0.083	0.247***		0.081	0.234***
Less than primary education	0.45	0.308***		0.445	0.307***
Full primary education	0.137	0.201***		0.135	0.204***
Some secondary education	0.143	0.16		0.151	0.156
Full secondary or more	0.053	0.243***		0.054	0.225***
<b>Municipality Characteristics (in 2002)</b>					
Altitude	824.582	1265.539***		1018.624	1066.776
Municipality development index	35.189	36.952		34.486	34.745
Coca crops coverage	8.887	60.645*		14.091	6.978
Murder rate (per 1000 inh.)	0.604	0.941*		0.658	0.705
Total Population	27163.16	89856.188***		32414.22	34009.59
Proportion Urban	0.508	0.545		0.523	0.508
Outgoing displaced population (per 1000 inh.)	15.944	30.005		21.641	20.249
Voting rate (local elections)	0.524	0.487		0.518	0.529
Voting rate (presidential elections)	0.864	0.768*		0.822	0.817
Voting majority (local election)	0.414	0.406		0.419	0.432
Per capita public expenditure	0.312	0.308		0.307	0.311
Per capita public investment	0.249	0.246		0.243	0.255
Primary school students (per 1000 inh.)	161.417	149.262*		156.883	158.223
Secondary school students (per 1000 inh.)	85.538	257.616**		87.301	76.060
Judiciary processes started (per 1000 inh.)	13	17.483		13.771	13.116
Judiciary processes terminated (per 1000 inh.)	12.954	18.210*		14.856	14.595
<b>Social Connections</b>					
Proportion of Acquaintances in the session	0.156	0.127		0.149	0.139
Proportion of Friends in the session	0.062	0.078**		0.058	0.075*
Proportion of Family Members in the session	0.009	0.011		0.009	0.014

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level.

In Table 3 we further analyze the comparability of our groups by looking at ‘treatment’ and ‘control’ participants within ‘treatment’ areas. We also compare PRDP beneficiaries with different durations of treatment exposure, measured in the number of months a beneficiary has participated in the PRDP initiative, as we distinguish beneficiaries who fall below and above the median length of exposure.

Overall beneficiaries and non beneficiaries in ‘treatment’ locations seem comparable on most respects, both in terms of individual, household level and municipality characteristics. The same is true for beneficiaries with different degrees of exposure to the PRDP. However there are some differences, the main ones being that:

- Beneficiaries are more likely to live in rural areas and self report as internally displaced by the civil conflict.
- Beneficiaries that have been participating in the PRDP for a longer time are more educated, slightly wealthier and have better access to public services in their houses.
- While beneficiaries and non-beneficiaries have no significant differences in the size of their social networks (amongst game participants), amongst beneficiaries, those that participated in the process for a longer time have on average more friends in the session. This may be a reflection of new networks that have been built through continued interaction in the PRDP activities.

It should be noted that some of these differences may relate to impacts of the PRDP programme. For instance, if the programme were to improve social capital, individuals may exploit this to increase their income or to lobby local government for better services.



Table 3: Individual, Household, Municipality and Other Summary Statistics. Within Treatment Locations.

	Treatment Locations			
	Non Beneficiaries	Beneficiaries	Below Median Exposure	Above Median Exposure
<b>Individual/Household Characteristics</b>				
Female	0.555	0.529	0.53	0.528
Age (years)	41.164	39.766	38.49	41.964***
Urban	0.616	0.507**	0.483	0.552
Water by pipe	0.73	0.716	0.725	0.704
Sewage system	0.527	0.486	0.468	0.52
Rubbish recollection	0.505	0.454	0.438	0.484
Gas by pipe	0.517	0.493	0.497	0.484
Phone (landline)	0.28	0.224*	0.19	0.288**
Less than primary	0.319	0.296	0.311	0.272
Full primary	0.192	0.21	0.239	0.160***
Some secondary	0.164	0.166	0.157	0.176
Full secondary +	0.244	0.247	0.224	0.288
Female head of the household	0.225	0.2	0.179	0.24
Family members younger than 18	1.366	1.591**	1.584	1.6
Displaced (self declared)	0.225	0.321**	0.336	0.3
Months living in the neighbourhood	243.999	235.609	231.757	240.71
Owens house	0.685	0.653	0.635	0.68
Number of rooms	2.875	2.944	2.906	3.012
Top distribution assets	0.142	0.119	0.096	0.160*
Other support	0.26	0.3	0.3	0.304
Laboratorios de Paz	-	0.417	0.403	0.444
<b>Municipality Characteristics (in 2002)</b>				
Altitude	1275.844	1270.33	1336.304	1152.924
Municipality development index	37.24	37.265	36.994	37.7
Coca crops extension	53.064	68.5	48.928	104.124
Murder rate (1000 inhabitants)	0.961	0.94	0.982	0.866
<b>Social Connections</b>				
Proportion of Acquaintances in the session	0.13	0.123	0.123	0.124
Proportion of Friends in the session	0.082	0.071	0.067	0.079*
Proportion of Family Members in the session	0.011	0.012	0.012	0.011

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level.

### Section 3: The Public Goods Game

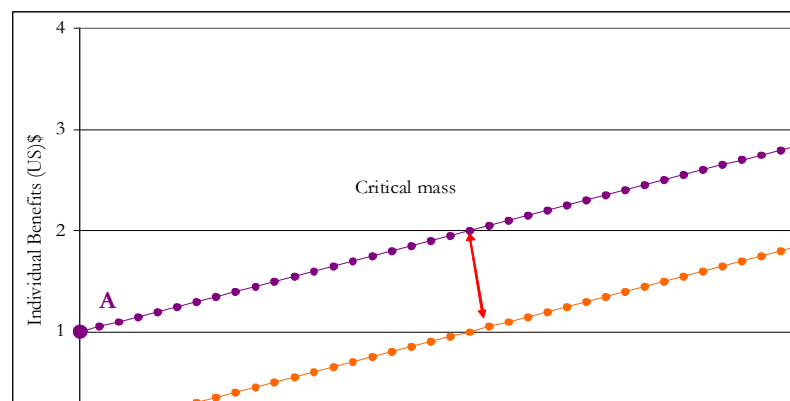
The public goods game has been designed to elicit information regarding the degree of social-mindedness that participants display. We use a discrete version of the Volunteer Contribution Mechanism, pioneered by Marwell & Ames (1979), and extensively piloted in field experiments in Colombia (Cardenas, 2003). Initially, players are given a token and are provided with two options, either:

- ‘Invest’ it in a ‘private pot’ and at the end receive 2000 pesos (about \$1), and in addition receive 100 pesos (about 5 cents) for everyone who contributes to the ‘public pot’ within their game session, or;
- ‘Invest’ it in the public pot in which case they forgo any private return and receive only 100 pesos for everyone contributing to the ‘public pot’.

Decisions are made privately and are kept confidential from the rest of the group, limiting the potential for social pressure and the enforcement of sanctions. Exactly the same design, guidelines, training protocol and training material were used in for the PRDP and the FeA evaluation, which ensures that the experimental results are fully comparable from a procedural point of view.

The structure of the incentives implies that the dominant strategy of this game is for every player to not contribute to the public pot; the payoff is always higher under this strategy irrespective of what the other players do. However, provided that there are at least 21 participants in the session, the social optimum is for all to invest in the public pot, as if all contribute each will receive at least 2100 versus 2000 if none contributes (Figure 3).

*Figure 3: Public Goods Game Incentives*



We interpret contributions to the public good as a measure of social capital because it involves forgoing a private return in order to increase the social return. This cooperative behaviour could be based on an altruistic set of preferences, or could demonstrate a belief (trust) that others are likely to cooperate and a commitment to act in a reciprocal manner. An alternative interpretation, is that contribution to the public good instead reflects a lack of understanding of the private incentives of the game (and vice versa). If this were the case we might expect less educated people to be more likely to contribute, something we shall test.

In the second round of the game, participants are given the opportunity to communicate for 10 minutes, before taking the same decision again. Although not actively encouraged to interact, participants are expected to discuss how the game should be played in the second round. This could be used to exert ‘social pressure’ to contribute to the public good and coordinate on a more socially efficient outcome. The result of the first round of the game is not known when discussions take place, and decisions remain confidential in the final round. Hence the social pressure must act through ‘intrinsic’ channels (e.g. feelings of obligation, duty or guilt) for the majority of participants.<sup>16</sup> Communication may also modify the expectation of other players’ game strategy, pushing ‘conditional cooperators’ towards either the social optimum or the Nash equilibrium (Fischbacher et al., 2001; Gächter & Thöni, 2005).

In Table 4 we report a set of summary statistics of the game sessions that were undertaken in ‘treatment’ and ‘control’ municipalities. Two features are worth noting. First, although the reward structure was originally designed for the game to be played in groups of 40 people, there is some variability in the number of participants per session. This will have to be accounted for in the analysis.<sup>17</sup> Second, in ‘treatment’ localities there is variation across sessions in the percentage of participants who were directly involved with the programme. We will come back to this later.

Table 5 shows the proportion contributing in each round and by the type of municipality and beneficiary status. The experimental literature has extensively documented that, typically, the Nash equilibrium is not observed, either in the lab or in the field. Groups of

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<sup>16</sup> Except, perhaps for the small number of participants with close friends / family members also playing who may be able to tell if they are lying (e.g. through observing subsequent behaviour and spending.)

<sup>17</sup> In every case sessions had less than 20 participants, the structure of incentives was redefined in such a way that the social optimum would offset the Nash equilibrium if more than 10 players contributed to the public pot.

individuals seem to be able to internalize at least in part the externality built in the game. Contribution rates are remarkably high in ‘treatment’ locations.<sup>18</sup>

*Table 4: Session Summary Statistics*

	Control Locations	Treatment Locations	Total
Number of game sessions	67	45	112
Average session size	33.46	35.96	34.46
Minimum session size	11	21	11
Maximum session size	40	40	40
Average proportion of women in session	0.88	0.54	0.74
Average proportion of beneficiaries in session	0	0.45	0.18
Min proportion of beneficiaries in session	0	0.24	0
Max proportion of beneficiaries in session	0	0.67	0.67

*Table 5: Contribution to the Public Good*

Group	First Round	Second Round
<b>Treatment Locations (A)</b>	63.5%	74.4%
<b>Beneficiaries (E)</b>	62.1%	73.3%
<b>Non Beneficiaries (F)</b>	64.3%	74.7%
<b>Control Locations (B)</b>	37.0%	44.8%
<b>Matched Treatment Locations (C)</b>	61.3%	73.8%
<b>Matched Control Locations (D)</b>	36.7%	42.4%
<b>Difference A- B</b>	26.5 (4.0)	29.6 (4.7)
<b>Difference C-D</b>	24.6 (4.8)	31.4 (6.1)
<b>Difference E-F</b>	-2.2 (3.9)	-1.4 (4.4)

Notes: Standard errors in parenthesis. All inferences are performed computing standard errors that are clustered at the game session level.

<sup>18</sup> Many of VCM reported in the literature afford the possibility of investing a fraction of the initial endowment, while our game forces a 0/1 choice, making the explanation much simpler. In the literature average contributions to the public good are in a range of forty to sixty percent of the group optimum. For a detail survey of these results see Camerer & Fehr (2003), Ledyard (1995), Croson (2007) and Cardenas & Carpenter (2008).

In the first instance, comparison between the ‘treatment’ and ‘control’ areas would suggest that PRDPs are associated with greater ‘social capital’. Furthermore, the very small differences between beneficiaries and non-beneficiaries in the ‘treatment’ areas would suggest that this operates at the level of the municipality rather than the individual, possibly because the effect of the PRDP spills over to affect even individuals that are not directly involved with the programme. In order to validate this hypothesis we need to look more closely at the data and attempt to rule out other alternative explanations: differences between ‘treatment’ and ‘control’ areas, or errors in interpreting contribution as social capital. We do this in the next section.

## **Section 4: An Analysis of *Desarrollo y Paz***

### **4.1 Empirical Methodology**

In this section, we analyse the determinants of contribution to the public good and use a series of regressions to assess the impact of the PRDPs upon our measure of ‘social capital’. This is more difficult than it sounds both because of the potential for the programme to act at different levels (the individual, the household, a specific social group or the municipality) and potential endogenous selection into the programme (again at both the individual and municipality level). Here we discuss our attempts to tackle these issues. It should be noted at the outset that the methodology we use to identify the programme’s impacts is obviously affected by the institutional setting and the available data. Alternative methodologies such as difference in difference were not available to us because of the lack of individual pre-programme data. Furthermore, there is no obvious candidate for an ‘instrumental variable’. This means that the results only hold conditional on the untestable identification assumptions we make. However, to pre-empt our results, we believe they should be seen as persuasive and strongly indicative of a positive effect of the programme on social capital.

Initially we confine our analysis to those municipalities where the PRDPs are active (the ‘treatment’ locations) and look at the differences in behaviour between beneficiaries and non-beneficiaries, controlling for a set of observable characteristics. This is the appropriate comparison to make if the programme operates at the level of the individual beneficiary. However, if the programme affects not only those directly participating in it, but improves the levels of social capital in the whole municipality, this method of assessing the impact may understate the impact because those ‘non-beneficiaries’ used as the control group actually receive (at least some) treatment too. Hence, we then compare areas where a PRDP is active to areas where it is not (the ‘control’ locations), again

controlling for a set of observable differences in (municipality and individual) characteristics.

In order to interpret the results of these first specifications causally, identification relies upon any unobserved heterogeneity being orthogonal with respect to whether an individual is a direct beneficiary of the programme and whether they live in a ‘treatment’ area. In order to avoid our conclusions depending fully on this strong assumption we then move on to several complementary models.

It is plausible that the effect of the programme increases with the length of time someone has participated in the programme: this is the duration effect. As mentioned above, our sample presents some variability in the length of exposure to the PRDPs amongst beneficiaries, both across and within ‘treatment’ municipalities. We evaluate the PRDP initiative by comparing the contributions to the public good of beneficiaries with only brief participation in the programme with those who have participated for longer. Of course, this pre-supposes that, if the programme has a positive impact on social capital, this grows over time. Whilst the length of time an individual/a municipality has been exposed to the PRDP may be endogenous (perhaps those most in need of the programme were enrolled or self selected into the programme first), it seems plausible that the selection bias is smaller than when comparing beneficiaries and non-beneficiaries, as here we restrict our analysis to beneficiaries only.<sup>19</sup>

One of the potential contributions of our study is to investigate the existence of local spill-over effects in social capital formation. Our approach to this issue is twofold. First, we study whether non-beneficiaries in ‘treatment’ locations show different patterns of contribution to the public good if they have heard about the PRDP initiative. Here we assume that individuals with more information about the programme are also more likely to be exposed to its contamination effects, if there is any. Of course, knowledge of the PRDPs and game behaviour may be simultaneously influenced by some other unobserved factor (for instance access to social networks), therefore causality is difficult to address.

Second, we investigate the presence of spill-overs by calculating the proportion of beneficiaries in every game session and including this as a regressor. Whilst it is possible for social capital to be a pure public good (i.e. the inclusion of one individual in the programme increases everyone’s social capital in the municipality) it seems more likely that spill-overs are incomplete and increase as a greater proportion of people participate

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<sup>19</sup> We have already shown (Table 3) that, at least on the basis of observables, beneficiaries are rather homogeneous amongst themselves.

in the programme: this is the ‘critical mass’ effect (Moresi and Salop, 2003). This effect may operate at the population level (where the programme has a greater impact the higher the fraction of population participating in a particular area), or at the ‘specific group level’ (where the fraction of beneficiaries in a particular context, e.g. a game session, is the driving force). We have found that the proportion of beneficiaries in the game session is unrelated to the proportion in the population at large and can therefore distinguish between these two effects.<sup>20</sup>

We exploit the variability in the proportion of beneficiaries that participated in each game session in ‘treatment’ areas. If this variability is random, the results of this model are potentially key to the investigation of the impact of different programme ‘intensity’ at the game session level.

An important concern in this work is the potential endogeneity of certain potential explanatory variables. These include those variables relating to trust, civic engagement, levels of unrest, migration and economic development. On the one hand, the PRPDs were implemented in poor, violent and fragile communities, but the programmes may have subsequently improved these outcomes. Hence, including such variables will tend to downwardly bias estimates of programme effect. On the other hand, if these variables are exogenous, but differ between ‘treatment’ and ‘control’ groups, *excluding* them will lead to biased estimates of the programme effect. We overcome this problem using a number of steps. First, we base our models on a set of municipality level variables that represent pre-programme information for 4 PRDPs out of 5 (the exception being Magdalena Medio). Second, we restrict the main set of household level socioeconomic controls to structural variables that we can confidently argue can not be directly affected by the Programme. Third, for a remaining set of controls, including those that are potentially endogenous, all analyses are conducted twice: once including these variables, and then excluding them.

We also include in our models a set of game session level controls. They cover session characteristics that may directly affect individual behaviour in the first and second round: the size of the session, group composition in terms of age, sex and education, players’ heterogeneity along the same criteria, and different measures of social connectivity in the group.

Despite the comprehensive investigation we conduct, some readers may be unpersuaded by our ‘identification strategy’. We would argue that at a minimum, the results should be seen as persuasive and consistent with the causal effect that we suggest *is likely to be*

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<sup>20</sup> Note, however, that the data on the fraction of the population of treatment municipalities participating has significant measurement error.

occurring. We believe that in the absence of a difference-in-difference setting or a suitable instrument, it would be unwise to simply dismiss the results obtained here, imperfect as the evaluation strategy is. A number of robustness checks are carried out and results all point towards the same direction.

## 4.2 Investigating Individual and Municipality PRDP Effects

### 4.2.1 Using Non Beneficiaries as Controls

Table 6 shows the results from the regression of contribution to the public good in the first round on individual and household characteristics *within* treated municipalities surveyed as part of the main PRDP evaluation. The first column (Specification I) includes only those control variables relating to individual, household and municipality level characteristics, the second column (Specification II) also includes variables that capture characteristics of the game session, whilst other potentially endogenous variables are added in the third column (Specification III). We only report the coefficients on the main variables; the complete set of results is shown in Table A1 in the Appendix.<sup>21</sup>

The first point to note is that in all specifications beneficiaries of the PRDPs are no more likely to contribute to the public good than non beneficiaries and, indeed, the effect is negative in sign (although very small in magnitude). Players with some education are more likely to contribute than those with no education, and the average level of education amongst game participants in the session also has a positive and significant coefficient. These results go somewhat to counteracting the worry that contribution reflects a misunderstanding of individual incentives rather than pro-social behaviour. Perhaps surprisingly, the number of players in the game does not have a significant impact on game play, nor does the proportion of acquaintances or friends. The presence of a greater number of family members reduces the probability of contributing to the public good.

Table A1 in the Appendix shows additional variables, some of which do have a significant impact on contribution, namely: the older one is the greater the likelihood of contribution to the public good, those with access to water by pipe (which may proxy deprivation level) are more likely to contribute, members of households with more children are more cooperative and internally displaced people are generally less. Municipality level variables have no significant nor strong effects on players' behaviour in

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<sup>21</sup> The set of control variables at the individual, household and session level is larger for the models that only involve data from treatment municipalities, as the PRDP dataset is richer.



the game. In terms of the potentially endogenous regressors, those with higher levels of income are possibly more likely to cooperate and those who state a general belief in the trustworthiness of others are also more likely to contribute to the public good. Whilst inclusion of game session-level variables and likely endogenous regressors changes the coefficients slightly, the qualitative findings are unaffected.

Table 7 shows the results of the same analysis for the second round of the game. Here we include as an additional regressor behaviour in the first round so that coefficients measure the effect of a variable on second round behaviour, conditional on its impact in the first round.<sup>22</sup> Again there is no impact of participating in the PRDP initiative on individual decisions to contribute to the public good. Controlling for first round behaviour, both education and social connection variables also have very little power in explaining behaviour in the game. Of the other variables (Table A2), females are significantly more likely to contribute in the second round, and higher proportion of women in the game session is also found to increase the probability of contribution in the second round. This suggests that women may be better able to encourage contribution during the between-round discussion and that they are more susceptible to the social/moral pressure brought to bear. The murder rate in the municipality is also found to increase the likelihood of contribution in the second round. Potentially endogenous variables like income or standard measures of trust don't show any additional explanatory role.

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<sup>22</sup> Given that we control for first round behaviour, one should not interpret the coefficient on PRDP as the total effect of participation in a PRDP on second round decisions. For instance, in a situation where communication between rounds has no effects at all, and every player sticks to the strategy of the first round, the first round decision would be the only relevant determinant of second round behaviour, and all other coefficients would be zero (including that on the PRDP indicator). Instead, the coefficient on PRDP in the second round should be interpreted as the 'additional' impact of the programme on behaviour in the second round, conditional on its impact in the first round. The total effect can be calculated as the effect in the first round multiplied by the correlation between first and second round behaviours, plus the net effect measured here. During our work we have used an additional set of specifications where we avoid controlling for first round behaviour. The results are overall largely consistent with those shown in the main text and are available from the authors on request.

Table 6 – First Round Contributions (PRDP Municipalities Only)

Variable	Specification I	Specification II	Specification III
Treatment	-0.004 (0.037)	-0.003 (0.037)	-0.012 (0.036)
Some Primary	0.112* (0.064)	0.131** (0.061)	0.136** (0.060)
Complete Primary	0.096 (0.068)	0.113* (0.065)	0.114* (0.066)
Some Secondary	0.122** (0.060)	0.114** (0.058)	0.114** (0.057)
Full Secondary	0.170*** (0.066)	0.167** (0.065)	0.147** (0.067)
Session Size		-0.005 (0.005)	-0.006 (0.004)
Prop. Family		-0.717 (0.478)	-0.774* (0.462)
Prop. Acquaint			0.035 (0.167)
Prop. Friend			0.027 (0.201)
N	1485	1485	1485

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

Table 7 – 2nd Round Contributions (PRDP Municipalities Only)

Variable	Specification I	Specification II	Specification III
Treatment	0.030 (0.043)	0.023 (0.046)	0.022 (0.046)
First Round Behaviour	0.296*** (0.039)	0.293*** (0.037)	0.293*** (0.037)
Some Primary	-0.011 (0.043)	-0.004 (0.040)	-0.004 (0.039)
Complete Primary	0.044 (0.041)	0.043 (0.040)	0.043 (0.040)
Some Secondary	0.023 (0.051)	0.026 (0.048)	0.027 (0.048)
Full Secondary	-0.016 (0.058)	-0.010 (0.057)	-0.010 (0.058)
Session Size		0.002 (0.006)	0.002 (0.006)
Prop. Family		-0.091 (0.402)	-0.124 (0.410)
Prop. Acquaint			-0.022 (0.192)
Prop. Friend			-0.042 (0.257)
N	1485	1485	1485

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

#### 4.2.2 Using *Familias en Accion* Sample as Controls

If the PRDPs have wider impacts beyond that on direct programme beneficiaries, using non-beneficiaries from municipalities where the programme is active as controls would not be an appropriate evaluation strategy. The programme may operate at the level of the municipality due to spillovers between friends and acquaintances, for instance. Indeed, the idea of the program is to improve the social environment of the municipalities where it operates. If these effects are important, one should compare the behaviour in ‘treated’ communities to that of individuals from other municipalities where the programme is not active. The FeA sample allows this municipality level analysis to take place.

In Section 2.3 we showed that whilst the composition of the ‘control’ areas differs somewhat (in particular, PRDP areas tend to have better infrastructure – e.g. water, sewage, telephone systems– than FeA areas, and players sampled from PRDP areas are less likely to be women and are more educated, on average), it does not differ in

important ways in terms of the observed characteristics that matter for contribution choice. Particularly when we impose common support, municipality observable characteristics are sufficiently similar to combine the two samples and to use FeA municipalities as a control. However, it is important to remember that unobserved characteristics may differ significantly between areas. We present further results in the next sub-section designed to assuage worries that it is simply these unobserved differences driving our results.

Table 8 shows results of this comparison across municipalities for the first round. Our models include a set of individual, household, municipality and session composition level variables that are common across the two surveys. We present separately results depending on whether or not we impose common support.

The coefficient on the dummy variable indicating that a participant lives in a ‘treatment’ area is fairly large and significant in all tested specifications; in particular, the effect is robust to imposing common support and to the inclusion (and exclusion) of session-level regressors. According to our most conservative estimate, *ceteris paribus*, the PRDP contributes to an increase in the probability to contribute to the public good in ‘treatment’ areas of 15 percentage points.

Of the other variables, the same continue to be significant: age, where older participants are more likely to contribute; the variable recording access to piped water; and session size. As in results presented in Table 6 the probability of contribution is still highest for those with the highest levels of education, again soothing worries about the interpretation of contribution as ‘social capital’ rather than an inability to understand game incentives. This positive influence of education operates in two ways. On the one hand more educated individuals are more cooperative in the game, on the other hand players are more inclined to contribute to the public investment pot when the other game participants also show higher education levels.

Table 8: Comparing Treatment with Control Areas, Round 1

Variable	Specification I	Specification II	Specification I (common support)	Specification II (common support)
Treatment Muni	0.256*** (0.059)	0.150* (0.083)	0.221*** (0.071)	0.184* (0.102)
Some Primary	0.061* (0.031)	0.061* (0.031)	0.037 (0.036)	0.034 (0.037)
Complete Primary	0.038 (0.038)	0.033 (0.037)	-0.006 (0.043)	-0.016 (0.043)
Some Secondary	0.087** (0.035)	0.068** (0.034)	0.030 (0.042)	0.013 (0.042)
Full Secondary+	0.116*** (0.041)	0.088** (0.040)	0.074 (0.051)	0.062 (0.053)
Session Size		0.006* (0.004)		0.006 (0.005)
Prop. Family		-0.038 (0.463)		-0.377 (0.411)
N	3674	3670	2170	2166

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

The analysis of second-round behaviour in Table 9 confirms that those who contributed in the first round are very much more likely to contribute in the second round. However, even after controlling for first round behaviour, participants living in PRDP ‘treatment’ areas are still significantly more likely to contribute to the public good than those living in ‘control’ areas. The magnitude of this effect is economically important, as according to our most conservative specification we estimate a positive effect on the probability to contribute to the public good of 29 percentage points.

Education is no longer a significant determinant of the likeliness of contribution whilst the number of players in the game is: more players leads to more contribution, possibly because the social optimum more starkly Pareto dominates the Nash equilibrium. The results are robust to the inclusion of potentially endogenous controls.

Table 9: Comparing Treatment with Control Areas, Round 2

Variable	Specification I	Specification II	Specification I (common support)	Specification II (common support)
Treatment Muni	0.332*** (0.065)	0.305*** (0.099)	0.313*** (0.075)	0.288*** (0.110)
First Round Behaviour	0.391*** (0.032)	0.381*** (0.029)	0.454*** (0.043)	0.449*** (0.039)
Some Primary	-0.032 (0.031)	-0.025 (0.031)	0.019 (0.038)	0.020 (0.039)
Complete Primary	0.003 (0.035)	0.007 (0.034)	0.058 (0.041)	0.043 (0.044)
Some Secondary	-0.009 (0.039)	-0.015 (0.036)	0.032 (0.046)	0.011 (0.044)
Full Secondary+	-0.022 (0.045)	-0.031 (0.043)	-0.008 (0.053)	-0.010 (0.050)
Session Size		0.014*** (0.004)		0.016*** (0.005)
Prop. Family		0.080 (0.419)		0.656 (0.455)
N	3674	3670	2170	2166

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

### 4.3 Additional Analysis of the PRDPs

Section 4.2 has two clear findings, although there are concerns regarding endogeneity and selection:

1. Direct beneficiaries are no more likely to contribute to the public good than non-beneficiaries living in treatment municipalities.
2. Individuals living in treatment municipalities are much more likely to contribute than those living in control municipalities.

The latter finding would suggest the PRDPs have large spill-over effects, increasing the degree of social capital for the entire community, but this could be driven purely by endogenous selection of municipalities into the programme. Even taken at face value, the results suggest little about the way the programme affects social capital. In this section we use variation in programme duration and intensity to conduct further analysis that

sheds some light on the way the programme is likely to operate and that should assuage worries regarding the endogeneity of treatment status.

### 4.3.1 Length of Programme Participation

Section 4.2.1 would show that contribution to the public good is no greater for direct beneficiaries of the PRDP programmes than non-beneficiaries living in treatment municipalities. This failure to find a positive effect of participation in PRDP may be due to spill over effects on non-beneficiaries, as discussed in Section 4.1 and 4.2.2, or because of endogenous selection into the programme. For instance, those targeted by programme administrators may have been those worst affected by civil unrest and breakdown and may have had lower initial levels of social capital. The methodology of Section 4.2.1 attributes these pre-programme differences to the programme itself, negatively biasing results.<sup>23</sup>

Here we make use of the fact that there is variation both across individuals and municipalities in the length of time participants have benefitted from a PRDP project. This performs two roles. First, and most obviously, it allows us to test if the impact of the programme changes as time of exposure increases. Second, conditional on this, and provided we are willing to assume that length of exposure to the programme is orthogonal with respect to unobserved characteristics, we can use this to supplement our views of the overall programme impact.

Table 10, below, shows that those participating in the programme for 15 or more months are more likely to contribute to the public pot than those participating for 6 or fewer months. When we use dummies for at least 7, 10 and 14 months of exposure, a similar result emerges. However after controlling for composition effects and potentially endogenous regressors, the size of the effect decreases and it is no longer significant.<sup>24</sup>

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<sup>23</sup> It is not necessarily the case that the bias *must* be negative, however. If individuals endogenously select in to the programme (rather than the programme selecting them), one would expect individuals with greater civic engagement and greater levels of social capital to sign up (leading to an upward bias in results).

<sup>24</sup> When individual exposure time is included as a regressor in a linear fashion, we find a positive but statistically insignificant effect.

Table 10 – Effect of Individual Exposure – First Round (PRDP Beneficiaries Only)

Variable	Specification I	Specification II	Specification III
7-14 Months Treatment	0.045 (0.048)	0.010 (0.047)	0.019 (0.047)
> 14 Months Treatment	0.085** (0.043)	0.064 (0.042)	0.060 (0.042)
Some Primary	0.163 (0.101)	0.150 (0.100)	0.173* (0.103)
Complete Primary	0.123 (0.113)	0.134 (0.112)	0.139 (0.114)
Some Secondary	0.107 (0.110)	0.070 (0.109)	0.087 (0.109)
Full Secondary+	0.213** (0.105)	0.183* (0.104)	0.152 (0.109)
Session Size		0.004 (0.006)	0.003 (0.006)
Prop. Family		-1.672*** (0.435)	-1.646*** (0.468)
Prop. Acquaint			-0.111 (0.245)
Prop. Friend			0.246 (0.308)
N	684	684	684

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

In order to fully avoid potential biases arising from the self-selection of individual beneficiaries into the programme we also calculate the *maximum* exposure to PRDPs in every municipality. This gives us an estimate of the time since the PRDP initiative started in a given location. We find positive and significant impacts of this municipality level indicator of exposure on beneficiaries' contribution to the public good, but not on non beneficiaries' (Table 11).

Together, these results indicate a positive impact of participation in the PRDPs that increases over time. They suggest that the process triggered by the PRDPs requires time to generate effects on social capital, as it involves complex changes in attitudes. Also, the analysis of maximum exposure in treated municipalities suggests that the effects propagate beyond direct beneficiaries, as participants may start gaining from the intervention even before they start participating in a project themselves.



Looking to the second round, there is no additional impact of the duration of exposure to the programme on contributions.

*Table 11 – Effect of Municipality Exposure – First Round (PRDP Beneficiaries Only)*

Variable	Specification I	Specification II	Specification III
Months of Exposure (Municipality Max)	0.003** (0.001)	0.002* (0.001)	0.002* (0.001)
Months of Exposure (Individual)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
Some Primary	0.178* (0.097)	0.157 (0.101)	0.183* (0.103)
Complete Primary	0.132 (0.111)	0.135 (0.114)	0.144 (0.115)
Some Secondary	0.119 (0.106)	0.076 (0.109)	0.097 (0.108)
Full Secondary+	0.222** (0.104)	0.184* (0.105)	0.157 (0.109)
Session Size		0.005 (0.005)	0.004 (0.005)
Prop. Family		-1.456*** (0.460)	-1.391*** (0.493)
Prop. Acquaint			-0.210 (0.241)
Prop. Friend			0.220 (0.315)
N	684	684	684

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

#### 4.3.2 Effect of Programme Awareness

As part of the survey accompanying the games, all participants in treated areas (both beneficiaries and non beneficiaries) were asked whether they had heard of the PRDP initiative and whether they knew any of its activities or projects. Not surprisingly almost

all the beneficiaries knew the programme,<sup>25</sup> whereas approximately 60% of non beneficiaries were aware of it.

In this section we investigate whether knowledge of the PRDP initiative affects game behaviour in order to explore how the programme impacts non-beneficiaries in ‘treatment’ areas. Table 12 shows the estimates of the effect of having heard of the PRDP initiative on the contribution to the public good. The specification used is the same as in Section 4.2.1, except that we now include a dummy for both treatment status and PRDP knowledge status.

*Table 12 – First Round Contributions (PRDP Municipalities Only)*

Variable	Specification I	Specification II	Specification III
Treatment	-0.040 (0.037)	-0.043 (0.037)	-0.052 (0.036)
Knows the PRPD	0.089** (0.035)	0.102*** (0.035)	0.105*** (0.034)
Some Primary	0.108* (0.064)	0.125** (0.061)	0.130** (0.060)
Complete Primary	0.089 (0.070)	0.104 (0.068)	0.102 (0.069)
Some Secondary	0.111* (0.060)	0.104* (0.059)	0.102* (0.058)
Full Secondary+	0.161** (0.066)	0.155** (0.066)	0.136** (0.068)
Session Size		-0.006 (0.004)	-0.007* (0.004)
Prop. Family		-0.965** (0.471)	-1.031** (0.458)
Prop. Acquaint			0.084 (0.176)
Prop. Friend			-0.037 (0.202)
N	1472	1472	1472

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

The results suggest that knowledge of the PRDP initiative has a positive and significant effect on the contribution to the public good in the first round of the game, but not in the second. When looking at non-beneficiaries only, we estimate that having heard of

<sup>25</sup> Only 1 percent of the sample of beneficiaries do not know the programme. This is possibly due to the fact that the PRDP initiative might be known locally with different names.

the PRDP is associated with an increase in the probability to invest in the public pot of between 8 and 9 percentage points.

Interpreting this result is not straightforward. It seems reasonable to presume that non beneficiaries who know the programme have stronger ties with PRDP beneficiaries, and are therefore more likely to reflect any contamination effect that propagates from the programme through existing social networks. One interpretation is that their greater propensity to contribute is an evidence of the existence of spill-over effects in social capital formation. However their wider social networks (and better institutional connections) may be correlated with a set of innate social preferences and characteristics that directly explain their behaviour in the game.

Whilst the evidence presented in this section does not demonstrate causality, it is in line with our hypothesis that there are spillovers at the municipality level, and that these may act through channels of formal and informal social networks.

#### **4.3.3 Using the proportion of beneficiaries as a regressor**

In order to further investigate the nature of the impact of PRDP on public goods contributions as measured in the experimental game, we now present a series of regressions that include the proportion of beneficiaries in the game session (for ‘treatment’ areas only). This will allow investigation of how the programme works in increasing ‘social capital’ as measured by the public goods game assessing: (a) whether it is purely a municipality level phenomenon; (b) whether it depends upon the number of beneficiaries in the municipality, or; (c) whether it depends upon the number of beneficiaries in a specific context (e.g. the game session). It also offers a method of overcoming the potential endogenous selection of areas into the PRDP initiative.

It was originally planned that in ‘treatment’ areas 50% of game participants in each session would be PRDP beneficiaries. Whilst on average an almost equal split was achieved, there is significant variation in the proportion of beneficiaries across ‘treatment’ municipalities (see Table 4). We have already argued that this variation is not correlated with the real variation in municipality programme coverage over the total population. This unplanned variation has turned out to be fortuitous allowing an additional method with which one can attempt to identify the mechanisms of social capital formation. In particular, if the proportion of beneficiaries in the game is found to be a significant determinant of behaviour, we have support for hypothesis (c), above.

As Table 13 and 14 show, for both the first and the second round of the game, the coefficient on the proportion of beneficiaries is quite large and significant, even when one includes session-level characteristics and potentially endogenous regressors. Other variables have coefficients similar to those in Tables 6 and 7 for the first and second rounds respectively.

*Table 13: Including the Proportion of Beneficiaries (Round 1)*

Variable	Specification I	Specification II	Specification III
Beneficiary	-0.013 (0.036)	-0.006 (0.037)	-0.014 (0.036)
Beneficiary Proportion	0.484*** (0.177)	0.550*** (0.147)	0.546*** (0.154)
Some Primary	0.111* (0.062)	0.130** (0.061)	0.135** (0.060)
Complete Primary	0.092 (0.068)	0.112* (0.067)	0.111* (0.067)
Some Secondary	0.105* (0.061)	0.098 (0.060)	0.097 (0.060)
Full Secondary+	0.166** (0.066)	0.161** (0.066)	0.141** (0.068)
Session Size		-0.008* (0.004)	-0.008* (0.004)
Prop. Family		-0.802* (0.447)	-0.865** (0.435)
Prop. Acquaint			0.067 (0.168)
Prop. Friend			-0.063 (0.211)
N	1485	1485	1485

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

Table 14: Including the Proportion of Beneficiaries (Round 2)

Variable	Specification I	Specification II	Specification III
Beneficiary	0.022 (0.043)	0.019 (0.046)	0.018 (0.046)
Beneficiary Proportion	0.346* (0.200)	0.365* (0.189)	0.386** (0.180)
First Round Behaviour	0.289*** (0.038)	0.287*** (0.037)	0.288*** (0.037)
Complete Primary	-0.012 (0.043)	-0.005 (0.040)	-0.006 (0.039)
Some Secondary	0.043 (0.040)	0.041 (0.040)	0.040 (0.040)
Full Secondary+	0.013 (0.050)	0.014 (0.048)	0.014 (0.049)
Session Size		-0.000 (0.005)	-0.001 (0.006)
Prop. Family		-0.151 (0.419)	-0.191 (0.427)
Prop. Acquaint			-0.000 (0.185)
Prop. Friend			-0.109 (0.253)
N	1485	1485	1485

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

The estimates indicate that increasing the proportion of beneficiaries in the game session from 40 to 60 % of the total number of players determines a rise in contribution to the public good of about 9.1 percentage points in the first round and 6.2 percentage points in the second.<sup>26</sup> This suggests that the proportion of beneficiaries has a remarkably significant and positive impact on probability of contribution to the public pot in both the first and second rounds of the game.<sup>27</sup>

Why might the proportion of beneficiaries in the game session matter for behaviour? There are several possibilities. One possibility is that those sessions where the proportion

<sup>26</sup> Holding all other variables fixed at their mean value.

<sup>27</sup> As a robustness check of this result we split the sample up into sub-samples along three different dimensions (education, sex and family income) into eight subgroups. For each two rounds of game 12 out of 12 regressions have positive coefficients on the variable recording proportion of beneficiaries (even if insignificant at standard levels of significance due to the smaller sample sizes). Breaking down the results also shows that the proportion of beneficiaries does not have a uniform impact across the sample.

of beneficiaries is higher are likely to have a greater degree of social connectedness, which may make people more likely to contribute to the game. In fact, PRDP beneficiaries may know each other in a given municipality.<sup>28</sup> This would go in favour of the idea that the PRDPs are producing some sort of bonding social capital (Narayan, 1999).

We reject this hypothesis on the ground of additional evidence. In Specification III we include the proportion of friends and acquaintances in the session as explanatory variables of individual game decisions. This doesn't change our estimates substantially. Furthermore, we find that the degree of connectedness of a session, measured by the overall density of social connections amongst all players, doesn't explain contribution rates.<sup>29</sup>

Finally, if it is stronger social bonds that drive the result, the impact of beneficiary proportion should be greater for beneficiaries than for non beneficiaries. We interact treatment status and the proportion of beneficiaries to further examine this case. We don't find any significant effect of the interacted term in Round 1. However, in Round 2 we find that the effect of the interaction is opposite to what we would expect: the proportion of beneficiaries matters mainly for the contribution of non-beneficiaries (Table 15).

*Table 15: Including the Proportion of Beneficiaries (Round 2)*

Variable	Specification I	Specification II	Specification III
Beneficiary	0.248* (0.129)	0.265** (0.124)	0.272** (0.124)
Beneficiary Proportion	0.584** (0.264)	0.634** (0.256)	0.664*** (0.251)
Proportion * Beneficiary	-0.518* (0.314)	-0.564* (0.301)	-0.582* (0.302)
First Round Behaviour	0.290*** (0.038)	0.287*** (0.036)	0.288*** (0.037)
Some Primary	-0.016 (0.043)	-0.009 (0.040)	-0.010 (0.039)

<sup>28</sup> One might hypothesise that this related to greater ability to exert social/moral pressure within the context of the conversation taking place during game-play. However, as this effect is observed in the first round too, this cannot be the entire explanation.

<sup>29</sup> Additional estimations show that the proportion of game participants having heard of the PRDP has even a more positive effect on the contribution to the public good in the first round than the proportion of beneficiaries itself. If there is any, an eventual connectivity effect would therefore operate through more extended social networks than those bonding only actual beneficiaries amongst themselves.

Complete Primary	0.037 (0.040)	0.035 (0.040)	0.034 (0.040)
Some Secondary	0.004 (0.050)	0.003 (0.048)	0.003 (0.048)
Full Secondary+	-0.028 (0.057)	-0.026 (0.057)	-0.026 (0.058)
Session Size		-0.001 (0.005)	-0.001 (0.006)
Prop. Family		-0.168 (0.397)	-0.208 (0.404)
Prop. Acquaint			-0.014 (0.183)
Prop. Friend			-0.110 (0.270)
N	1485	1485	1485

Notes: Indicators of significance: \* - 10% level, \*\* - 5% level, \*\*\* - 1% level. All inferences are performed computing standard errors that are clustered at the game session level. Marginal Probit specification.

This leads to a second line of interpretation of the link between proportion of beneficiaries and players' behaviour in the game. The key mechanism could be through reputation and expected behaviour. If beneficiaries are perceived to be more likely to contribute to the public pot, or alternatively better able to detect and punish non-contributors, the rate of contribution may rise as the proportion of beneficiaries in the game session rises.

This interpretation is consistent with the theory that for some people cooperation is conditional on interacting with a groups of socially minded people who are also likely to co-operate (Fischbacher et al., 2001; Gächter & Thöni, 2005; Burlando & Guala 2005). Indeed, for this reputation effect to work treatment status must be known or recognisable to other game participants (Brosig, 2002), as may in fact be facilitated by communication in Round 2.

Tables 6 and 7 showed that beneficiaries were no more likely to contribute to the public good than non-beneficiaries, indicating that any reputation of being more likely to contribute is not borne out in actual behaviour. One might expect the beneficiaries to have better information about other beneficiaries and to anticipate this. Hence, the proportion of beneficiaries would have no (or less) impact on their behaviour than non-beneficiaries. As shown in table 14, we find evidence for this.

We are not able to test the channels of programme operation more robustly here. Whichever interpretation is valid (and it is possible that it is neither), the results of this section are supportive of our argument that programmes like the PRDPs need to reach a ‘critical mass’ of treatment to enable social capital formation. In the specific setting represented by the public good game sessions, significant improvements to social outcomes require a significant proportion of participants to have been subject to treatment. Together with the impact of the duration of exposure to the programme (Section 4.3.1), this suggests that the intensity of the programme is of key importance.

Figures 4 and 5 give a graphical representation of this phenomenon. The bivariate relationship between proportion of beneficiaries and individual decision to cooperate suggests that, particularly in Round 2, social capital accumulation is not a fully linear process. Rather there seems to be an enabling threshold: a critical level of treatment ‘mass’ that should be hit in order to activate social cooperation modalities in the group.

*Figure 4: Critical Mass (Round 1)*

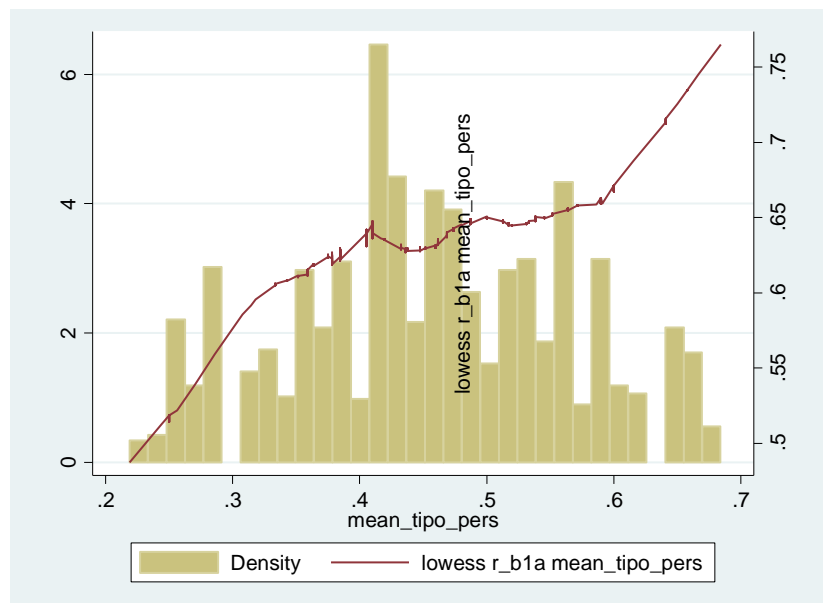
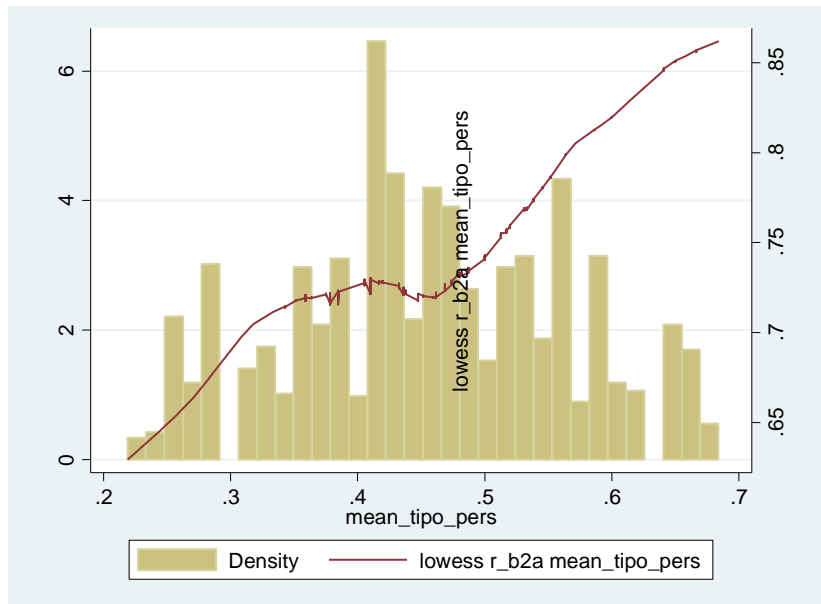




Figure 5: Critical Mass (Round 2)



#### 4.5 Summary

Section 4.2 shows the following:

- Controlling for observed characteristics, PRDP beneficiaries are no more likely to contribute to the public good than non-beneficiaries who live in ‘treatment’ areas.
- Interpretation of contribution as a ‘lack of understanding’ finds little support: higher levels of education are not associated with less contribution (and indeed are associated with greater probability of contribution in the first round).
- The finding of no effect when comparing beneficiaries with non-beneficiaries may relate to selection into the programme based on unobservables.
- Controlling for observed characteristics, those living in ‘treatment’ areas are significantly more likely to contribute to the public good than non-beneficiaries in both rounds of the game
- In the second round this holds even after controlling for first round behaviour suggesting that communication is more effective in treatment municipalities.

Section 4.3 shows the following:

- Those beneficiaries of the programme who have been exposed for longer have a higher rate of contribution to the public good than those who have been exposed for only a short time only. Similarly, in those municipalities where the PRDPs have a longer trajectory of work beneficiaries are more likely to contribute.

- Knowledge of the programme significantly increases contribution to the public good, particularly in the first round of the game.
- A higher proportion of beneficiaries increases contribution to the public good in both the first and second round (conditional on first round behaviour).
- This appears to relate to expected reciprocity and reputation.
- Taken together these results suggest that the programme impact increases with time and that a significant degree of coverage is important in realising its benefits.

## Section 5: Conclusions

Developing social capital as a precursor to reduced conflict and improved economic vitality is a key priority for Colombia. This paper analyses the impact of one initiative targeted at this problem, *Desarrollo y Paz*, through a game that mimics a public goods provision problem. This work suggests that the programme may have a positive impact on social capital, at least as measured by the behaviour in a public good game. Moreover, this effect seems to go beyond those directly participating in the programme. In both the first and second rounds of our public good game, there is a significant positive coefficient on the dummy variable indicating residence in an area where PRDP is in operation whilst the dummy variable indicating individual beneficiary status is insignificant.

Obviously, these results are conditional on the specific assumptions and methodology that we have used in the analysis. In particular, we assume that, conditional on the observable variables we consider in the analysis, our ‘treatment’ and ‘control’ groups are comparable and their behaviour in the public good game is not affected by unobservable variables that differ systematically between the two groups.

In order to further investigate the channel through which this effect acts and to partly overcome concerns about endogenous selection in to the programme, three additional specifications are implemented. These models add the duration of exposure, knowledge of the programme, and the proportion of programme beneficiaries in the game session as explanatory variables. The most striking result is that the presence of more programme beneficiaries in a game session encourages contributions from others in the session; this could be because participants are trusted to reciprocate, or they are felt better able to punish non-contribution, or in second round, larger groups of participants are better able to exert moral/social pressure during discussions. In terms of policy implications, this implies that programme participation needs to be relatively high – the positive effects do not fully ‘trickle down’ from a few participants but rely upon a critical mass in terms of

coverage to have maximum effect on social outcomes. Furthermore, the impact of programme duration suggests that it takes time for the full impact of participation in the PRDPs to be felt.

Our results come to support a growing body of evidence on the effectiveness of participatory community based initiatives in conflict settings. For instance, Fearon et al. (2009) study the effect of a community driven reconstruction programme on social cohesion in the context of the civil war in Liberia. They show results from a random field experiment where they use a similar version of the public good game to elicit information on social capital. Their findings and methodology are similar to what we present in this work.

As has been made clear throughout, the identification strategy used in this paper is not perfect, although we believe it does respond well to the data limitations. Future work on evaluating such policies would benefit from randomised allocation of areas into treatment and control groups, and pre-programme experiments that could be used as baseline results for a difference-in-differences approach.

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## APPENDIX

### Table A1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PRDP Individual Level Effect (Treatment Locations)						Effect of Knowing the PRDP (Treatment Locations)					
	Round 1			Round 2			Round 1			Round 2		
Female	-0.024 (0.031)	-0.023 (0.032)	-0.011 (0.033)	0.061* (0.031)	0.062** (0.030)	0.064** (0.030)	-0.020 (0.031)	-0.019 (0.032)	-0.007 (0.032)	0.061* (0.031)	0.061* (0.031)	0.062** (0.031)
Age (years)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Urban	0.037 (0.060)	-0.029 (0.058)	-0.016 (0.058)	0.006 (0.043)	-0.004 (0.041)	-0.002 (0.041)	0.037 (0.059)	-0.028 (0.057)	-0.015 (0.057)	0.009 (0.044)	0.009 (0.044)	-0.002 (0.041)
Water by pipe	0.079** (0.040)	0.067* (0.037)	0.069* (0.038)	0.015 (0.039)	0.019 (0.038)	0.021 (0.039)	0.071* (0.040)	0.060* (0.036)	0.063* (0.037)	0.017 (0.039)	0.017 (0.039)	0.020 (0.038)
Sewage system	-0.032 (0.048)	-0.026 (0.048)	-0.030 (0.049)	0.018 (0.038)	0.019 (0.041)	0.019 (0.040)	-0.033 (0.048)	-0.027 (0.049)	-0.031 (0.050)	0.015 (0.039)	0.015 (0.039)	0.016 (0.041)
Rubbish recollection	-0.067 (0.059)	-0.030 (0.060)	-0.034 (0.058)	-0.024 (0.045)	-0.006 (0.044)	-0.005 (0.044)	-0.063 (0.059)	-0.026 (0.059)	-0.031 (0.059)	-0.026 (0.045)	-0.026 (0.045)	-0.008 (0.044)
Gas by pipe	-0.039 (0.036)	-0.019 (0.036)	-0.022 (0.035)	-0.022 (0.031)	-0.031 (0.029)	-0.031 (0.030)	-0.036 (0.035)	-0.016 (0.035)	-0.019 (0.035)	-0.024 (0.031)	-0.024 (0.031)	-0.032 (0.029)
Phone (landline)	0.007 (0.035)	-0.010 (0.036)	-0.017 (0.036)	0.039 (0.035)	0.016 (0.037)	0.016 (0.036)	0.005 (0.035)	-0.013 (0.036)	-0.019 (0.036)	0.039 (0.036)	0.039 (0.036)	0.015 (0.037)
Less than primary	0.112* (0.064)	0.131** (0.061)	0.136** (0.060)	-0.011 (0.043)	-0.004 (0.040)	-0.004 (0.039)	0.108* (0.064)	0.125** (0.061)	0.130** (0.060)	-0.004 (0.042)	-0.004 (0.042)	0.001 (0.040)
Full primary	0.096 (0.068)	0.113* (0.065)	0.114* (0.066)	0.044 (0.041)	0.043 (0.040)	0.043 (0.040)	0.089 (0.070)	0.104 (0.068)	0.102 (0.069)	0.050 (0.041)	0.050 (0.041)	0.047 (0.041)
Some secondary	0.122** (0.060)	0.114** (0.058)	0.114** (0.057)	0.023 (0.051)	0.026 (0.048)	0.027 (0.048)	0.111* (0.060)	0.104* (0.059)	0.102* (0.058)	0.028 (0.050)	0.028 (0.050)	0.028 (0.048)
Full secondary +	0.170*** (0.066)	0.167** (0.065)	0.147** (0.067)	-0.016 (0.058)	-0.010 (0.057)	-0.010 (0.058)	0.161** (0.066)	0.155** (0.066)	0.136** (0.068)	-0.011 (0.058)	-0.011 (0.058)	-0.009 (0.057)
Female head of the household	-0.036 (0.033)	-0.037 (0.029)	-0.033 (0.029)	0.004 (0.028)	0.005 (0.028)	0.006 (0.029)	-0.040 (0.034)	-0.041 (0.030)	-0.036 (0.030)	0.004 (0.028)	0.004 (0.028)	0.005 (0.028)
Family members younger than 18	0.018** (0.008)	0.020** (0.009)	0.021** (0.009)	-0.008 (0.007)	-0.008 (0.008)	-0.008 (0.008)	0.018** (0.009)	0.020** (0.009)	0.021** (0.009)	-0.007 (0.007)	-0.007 (0.007)	-0.008 (0.008)
Displaced (self declared)	-0.082** (0.039)	-0.091** (0.040)	-0.087** (0.041)	-0.025 (0.032)	-0.026 (0.033)	-0.024 (0.033)	-0.086** (0.039)	-0.094** (0.041)	-0.089** (0.042)	-0.026 (0.032)	-0.026 (0.032)	-0.027 (0.033)

Months living in the neighborhood	-0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Owns house	-0.004	-0.002	-0.000	-0.029	-0.021	-0.021	-0.000	0.001	0.004	-0.026	-0.026	-0.018
	(0.028)	(0.028)	(0.028)	(0.030)	(0.030)	(0.030)	(0.029)	(0.028)	(0.029)	(0.031)	(0.031)	(0.031)
Number of rooms	0.010	0.012	0.008	0.006	0.007	0.008	0.009	0.011	0.008	0.007	0.007	0.008
	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Top distribution assets	0.001	0.004	-0.025	0.018	0.018	0.020	-0.008	-0.004	-0.033	0.017	0.017	0.018
	(0.043)	(0.042)	(0.049)	(0.047)	(0.047)	(0.048)	(0.045)	(0.044)	(0.050)	(0.047)	(0.047)	(0.047)
Laboratorios de Paz	-0.020	-0.033	-0.039	-0.087	-0.084	-0.085	-0.017	-0.029	-0.037	-0.089	-0.089	-0.083
	(0.050)	(0.052)	(0.053)	(0.062)	(0.068)	(0.069)	(0.050)	(0.052)	(0.052)	(0.062)	(0.062)	(0.067)
Other support	0.050	0.050	0.050	0.036	0.035	0.035	0.047	0.045	0.045	0.033	0.033	0.033
	(0.038)	(0.036)	(0.035)	(0.023)	(0.023)	(0.023)	(0.038)	(0.036)	(0.035)	(0.023)	(0.023)	(0.023)
Altitude	-0.000	-0.000	-0.000	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.000	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality development index	0.002	-0.003	-0.003	-0.000	0.000	0.000	0.003	-0.003	-0.002	-0.000	-0.000	0.000
	(0.003)	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Coca crops extension	0.000	-0.000	-0.000	0.000	0.000*	0.000*	0.000	-0.000	-0.000	0.000	0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Murder rate (per 1000 inh.)	0.018	-0.001	-0.002	0.045**	0.048**	0.048**	0.021	-0.000	-0.002	0.045**	0.045**	0.048**
	(0.017)	(0.023)	(0.022)	(0.018)	(0.020)	(0.020)	(0.016)	(0.021)	(0.021)	(0.018)	(0.018)	(0.020)
Region Maciso Colombiano	0.070	0.038	0.046	0.087	0.160**	0.155**	0.081	0.047	0.057	0.085	0.085	0.158**
	(0.069)	(0.084)	(0.082)	(0.075)	(0.071)	(0.076)	(0.066)	(0.078)	(0.076)	(0.076)	(0.076)	(0.071)
Region Magdalena Medio	-0.154**	-0.215**	-0.212**	0.038	0.040	0.042	-0.156**	-0.219***	-0.214**	0.038	0.038	0.042
	(0.078)	(0.088)	(0.090)	(0.068)	(0.066)	(0.065)	(0.077)	(0.084)	(0.086)	(0.068)	(0.068)	(0.066)
Region Montes de Maria	-0.028	-0.203	-0.213	0.020	0.157*	0.158*	-0.015	-0.217	-0.228	0.014	0.014	0.146
	(0.121)	(0.168)	(0.166)	(0.087)	(0.089)	(0.086)	(0.116)	(0.155)	(0.152)	(0.087)	(0.087)	(0.092)
Region Norte de Santander	-0.089	-0.083	-0.079	0.140***	0.202***	0.197***	-0.078	-0.068	-0.063	0.139***	0.139***	0.203***
	(0.064)	(0.082)	(0.081)	(0.050)	(0.043)	(0.045)	(0.062)	(0.077)	(0.076)	(0.050)	(0.050)	(0.042)
Session Size		-0.005	-0.006		0.002	0.002		-0.006	-0.007*			0.001
		(0.005)	(0.004)		(0.006)	(0.006)		(0.004)	(0.004)			(0.006)
Proportion of Women in the Session		-0.051	-0.074		0.417**	0.416**		-0.028	-0.054			0.421**
		(0.162)	(0.161)		(0.182)	(0.180)		(0.151)	(0.150)			(0.179)
Average Age in the Session		0.003	0.003		-0.001	-0.001		0.001	-0.000			-0.001
		(0.009)	(0.008)		(0.009)	(0.009)		(0.008)	(0.008)			(0.009)
S.D. of Age in the Session		-0.014	-0.013		0.001	0.002		-0.014	-0.013			-0.000
		(0.011)	(0.011)		(0.013)	(0.014)		(0.010)	(0.010)			(0.013)

Average Education in the Session	0.183***	0.173**	0.149*	0.147*	0.170***	0.158**	0.151*
	(0.070)	(0.072)	(0.083)	(0.083)	(0.064)	(0.066)	(0.081)
S.D. of Education in the Session	0.034	0.027	0.150	0.141	0.064	0.061	0.154
	(0.135)	(0.140)	(0.124)	(0.126)	(0.125)	(0.130)	(0.123)
Average Months living in the neighb. in the Session	0.000	0.000	-0.000	-0.000	0.001	0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
S.D. of Months living in the neighb. in the Session	-0.001	-0.001	0.001	0.001	-0.001	-0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
Proportion of Urban Households in the Session	0.145	0.177	-0.266	-0.267	0.131	0.167	-0.260
	(0.127)	(0.128)	(0.179)	(0.169)	(0.119)	(0.120)	(0.178)
Proportion of Displaced households in the Session	0.351	0.334	0.026	0.014	0.409**	0.395*	0.053
	(0.222)	(0.222)	(0.226)	(0.227)	(0.202)	(0.202)	(0.225)
Proportion of Family Members in the Session	-0.717	-0.774*	-0.091	-0.124	-0.965**	-1.031**	-0.154
	(0.478)	(0.462)	(0.402)	(0.410)	(0.471)	(0.458)	(0.402)
Household Income		0.000		-0.000		0.000	
		(0.000)		(0.000)		(0.000)	
Household Income Squared		-0.000		0.000		-0.000	
		(0.000)		(0.000)		(0.000)	
Believes people are helpful in the community		0.037		0.009		0.039	
		(0.038)		(0.028)		(0.037)	
Believes people are reciprocal in the community		-0.029		0.026		-0.028	
		(0.042)		(0.031)		(0.041)	
Trusts the majority of people in the community		0.072*		0.029		0.076*	
		(0.040)		(0.047)		(0.040)	
Trusts few people in the community		0.039		0.015		0.042	
		(0.033)		(0.047)		(0.032)	
Proportion of Acquaintances in the Session		0.035		-0.022		0.084	
		(0.167)		(0.192)		(0.176)	
Proportion of Friends in the Session		0.027		-0.042		-0.037	
		(0.201)		(0.257)		(0.202)	
Decision in the First Round			0.296***	0.293***	0.293***		0.296***
			(0.039)	(0.037)	(0.037)		(0.039)
Treated Household	-0.004	-0.003	-0.012	0.030	0.023	0.022	-0.040
	(0.037)	(0.037)	(0.036)	(0.043)	(0.046)	(0.046)	(0.037)
Knows PRDP							0.089**
							(0.035)
							0.102***
							(0.035)
							0.105***
							(0.034)
Observations	1485	1485	1485	1485	1485	1485	1472
	1485	1485	1485	1485	1485	1485	1472
	1485	1485	1485	1485	1485	1485	1472
	1485	1485	1485	1485	1485	1485	1472
	1485	1485	1485	1485	1485	1485	1472
	1485	1485	1485	1485	1485	1485	1472

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table A2.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PRDP Municipality Level Effect						PRDP Municipality Level Effect (Matched Municipalities)					
	Round 1			Round 2			Round 1			Round 2		
Female	-0.024 (0.022)	-0.027 (0.021)	-0.027 (0.020)	0.040 (0.028)	0.033 (0.025)	0.032 (0.025)	-0.047 (0.030)	-0.049* (0.027)	-0.052* (0.027)	0.048 (0.033)	0.046 (0.031)	0.044 (0.031)
Age (years)	0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.002** (0.001)	0.003** (0.001)	0.002** (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Urban	-0.009 (0.036)	-0.025 (0.034)	-0.026 (0.034)	0.033 (0.045)	0.029 (0.044)	0.031 (0.044)	0.008 (0.045)	0.000 (0.043)	0.001 (0.041)	0.048 (0.060)	0.049 (0.058)	0.054 (0.057)
Water by pipe	0.086** (0.035)	0.078** (0.034)	0.077** (0.034)	-0.001 (0.039)	-0.005 (0.038)	-0.003 (0.038)	0.024 (0.036)	0.034 (0.035)	0.033 (0.034)	0.029 (0.048)	0.029 (0.048)	0.031 (0.047)
Sewage system	-0.044 (0.035)	-0.035 (0.032)	-0.035 (0.032)	0.002 (0.036)	0.013 (0.035)	0.013 (0.034)	-0.063 (0.043)	-0.054 (0.042)	-0.051 (0.041)	0.031 (0.045)	0.043 (0.046)	0.049 (0.044)
Rubbish recollection	-0.036 (0.037)	-0.023 (0.037)	-0.023 (0.037)	-0.074* (0.044)	-0.066 (0.040)	-0.059 (0.040)	-0.023 (0.047)	-0.009 (0.048)	-0.008 (0.048)	-0.150*** (0.054)	-0.123** (0.049)	-0.120** (0.047)
Gas by pipe	-0.029 (0.034)	-0.048 (0.033)	-0.047 (0.033)	0.043 (0.034)	0.022 (0.033)	0.024 (0.033)	-0.002 (0.045)	-0.048 (0.043)	-0.045 (0.043)	0.065 (0.049)	-0.041 (0.050)	-0.035 (0.046)
Phone (landline)	0.018 (0.034)	0.014 (0.036)	0.014 (0.034)	0.054* (0.031)	0.061* (0.033)	0.069** (0.032)	0.053 (0.043)	0.046 (0.044)	0.048 (0.043)	0.098** (0.045)	0.087* (0.046)	0.099** (0.047)
Less than primary	0.061* (0.031)	0.061* (0.031)	0.062** (0.031)	-0.032 (0.031)	-0.025 (0.031)	-0.022 (0.030)	0.037 (0.036)	0.034 (0.037)	0.038 (0.037)	0.019 (0.038)	0.020 (0.039)	0.028 (0.039)
Full primary	0.038 (0.038)	0.033 (0.037)	0.035 (0.038)	0.003 (0.035)	0.007 (0.034)	0.012 (0.034)	-0.006 (0.043)	-0.016 (0.043)	-0.007 (0.044)	0.058 (0.041)	0.043 (0.044)	0.061 (0.043)
Some secondary	0.087** (0.035)	0.068** (0.034)	0.069** (0.034)	-0.009 (0.039)	-0.015 (0.036)	-0.005 (0.036)	0.030 (0.042)	0.013 (0.042)	0.019 (0.044)	0.032 (0.046)	0.011 (0.044)	0.035 (0.045)
Full secondary +	0.116*** (0.041)	0.088** (0.040)	0.084** (0.041)	-0.022 (0.045)	-0.031 (0.043)	-0.015 (0.045)	0.074 (0.051)	0.062 (0.053)	0.053 (0.054)	-0.008 (0.053)	-0.010 (0.050)	0.006 (0.054)
Altitude	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Municipality development index	-0.002 (0.002)	-0.004 (0.003)	-0.004 (0.003)	-0.001 (0.002)	-0.001 (0.003)	-0.001 (0.003)	-0.003 (0.003)	-0.004 (0.004)	-0.003 (0.004)	-0.002 (0.004)	-0.001 (0.005)	-0.002 (0.004)
Coca crops extension	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)
Murder rate (per 1000 inh.)	0.025	0.035	0.034	0.027	0.038	0.039	0.034	0.037	0.029	0.052	0.056	0.052

FeA Treatment Municipality	(0.020)	(0.021)	(0.021)	(0.024)	(0.026)	(0.026)	(0.057)	(0.056)	(0.057)	(0.062)	(0.054)	(0.054)
	0.004	-0.027	-0.032	0.147*	0.094	0.094	0.001	-0.041	-0.054	0.112	0.018	0.011
Missing Values: Sewage system	(0.072)	(0.065)	(0.065)	(0.076)	(0.076)	(0.077)	(0.082)	(0.078)	(0.077)	(0.100)	(0.097)	(0.096)
	-0.174	-0.185	-0.170	0.115	0.143	0.164	-0.097	-0.095	-0.061	0.041	0.019	0.064
Missing Values: Rubbish recollection	(0.262)	(0.272)	(0.277)	(0.261)	(0.239)	(0.225)	(0.300)	(0.320)	(0.319)	(0.209)	(0.221)	(0.201)
	-0.065	-0.026	-0.015	0.034	0.082	0.048	-0.179	-0.142	-0.126	0.033	0.114	0.068
Session size	(0.248)	(0.250)	(0.250)	(0.272)	(0.231)	(0.236)	(0.263)	(0.269)	(0.273)	(0.293)	(0.240)	(0.242)
		0.006*	0.006*		0.014***	0.012***		0.006	0.006		0.016***	0.015***
Proportion of Women in the Session		(0.004)	(0.004)		(0.004)	(0.004)		(0.005)	(0.004)		(0.005)	(0.005)
		-0.048	-0.053		-0.108	-0.099		-0.060	-0.098		-0.028	-0.029
Average Age in the Session		(0.149)	(0.148)		(0.208)	(0.208)		(0.173)	(0.164)		(0.227)	(0.222)
		0.001	0.001		-0.019**	-0.019**		-0.005	-0.007		-0.021	-0.023*
S.D. of Age in the Session		(0.009)	(0.009)		(0.009)	(0.009)		(0.011)	(0.011)		(0.013)	(0.013)
		-0.022	-0.021		-0.019	-0.018		-0.026	-0.021		-0.034*	-0.030*
Average Education in the Session		(0.014)	(0.014)		(0.014)	(0.014)		(0.016)	(0.016)		(0.019)	(0.018)
		0.171**	0.172**		-0.035	-0.026		0.076	0.079		0.097	0.117
Proportion of Family Members in the Session		(0.078)	(0.077)		(0.079)	(0.078)		(0.098)	(0.094)		(0.106)	(0.098)
		-0.038	-0.055		0.080	0.095		-0.377	-0.327		0.656	0.747*
Household Income		(0.463)	(0.447)		(0.419)	(0.404)		(0.411)	(0.375)		(0.455)	(0.426)
			0.000			-0.000*			-0.000			-0.000*
Household Income Squared			(0.000)			(0.000)			(0.000)			(0.000)
			-0.000			0.000			0.000			0.000
Proportion of Acquaintances in the Session			(0.000)			(0.000)			(0.000)			(0.000)
			-0.075			-0.170			-0.273*			-0.406**
Proportion of Friends in the Session			(0.149)			(0.121)			(0.166)			(0.191)
			0.312			-0.095			0.738***			0.410
Decision in the First Round			(0.203)			(0.253)			(0.282)			(0.303)
					0.391***	0.381***					0.454***	0.449***
					(0.032)	(0.029)					(0.043)	(0.039)
Treated Location	0.256***	0.150*	0.135*	0.332***	0.305***	0.300***	0.221***	0.184*	0.141	0.313***	0.288***	0.263**
	(0.059)	(0.083)	(0.082)	(0.065)	(0.099)	(0.100)	(0.071)	(0.102)	(0.098)	(0.075)	(0.110)	(0.104)
Observations	3674	3670	3670	3674	3670	3670	2170	2166	2166	2170	2166	2166

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A3.**

	Individual Exposure Effect (Treatment Households)						Municipality Exposure Effect (Treatment Households)					
	Round 1		Round 2		Round 1		Round 2		Round 1		Round 2	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Female	-0.012 (0.050)	0.008 (0.052)	0.019 (0.053)	0.079** (0.038)	0.079** (0.037)	0.079** (0.035)	-0.010 (0.051)	0.005 (0.052)	0.016 (0.054)	0.079** (0.039)	0.080** (0.038)	0.078** (0.036)
Age (years)	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.004 (0.002)	0.003 (0.002)	0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Urban	0.047 (0.068)	-0.016 (0.066)	0.014 (0.066)	0.051 (0.061)	0.036 (0.054)	0.030 (0.055)	0.054 (0.068)	-0.007 (0.067)	0.026 (0.067)	0.048 (0.059)	0.033 (0.053)	0.027 (0.055)
Water by pipe	0.112* (0.064)	0.099 (0.062)	0.093 (0.063)	0.007 (0.050)	0.010 (0.048)	0.017 (0.049)	0.109* (0.062)	0.100 (0.061)	0.094 (0.062)	0.009 (0.048)	0.012 (0.047)	0.020 (0.049)
Sewage system	-0.051 (0.070)	-0.014 (0.072)	-0.026 (0.073)	-0.046 (0.059)	-0.033 (0.058)	-0.033 (0.056)	-0.066 (0.069)	-0.024 (0.073)	-0.036 (0.074)	-0.036 (0.057)	-0.024 (0.056)	-0.024 (0.054)
Rubbish recollection	-0.014 (0.072)	0.016 (0.072)	0.017 (0.071)	-0.086 (0.067)	-0.088 (0.064)	-0.086 (0.063)	-0.010 (0.071)	0.014 (0.072)	0.012 (0.070)	-0.091 (0.065)	-0.089 (0.063)	-0.086 (0.062)
Gas by pipe	-0.076 (0.049)	-0.048 (0.046)	-0.047 (0.046)	-0.021 (0.041)	-0.037 (0.039)	-0.030 (0.037)	-0.073 (0.047)	-0.047 (0.045)	-0.046 (0.046)	-0.024 (0.040)	-0.038 (0.040)	-0.029 (0.037)
Phone (landline)	-0.008 (0.046)	-0.030 (0.049)	-0.045 (0.052)	0.072 (0.051)	0.063 (0.048)	0.068 (0.049)	-0.005 (0.042)	-0.021 (0.049)	-0.034 (0.052)	0.075 (0.050)	0.059 (0.048)	0.066 (0.050)
Less than primary	0.163 (0.101)	0.150 (0.100)	0.173* (0.103)	-0.051 (0.070)	-0.059 (0.066)	-0.067 (0.066)	0.178* (0.097)	0.157 (0.101)	0.183* (0.103)	-0.064 (0.076)	-0.073 (0.072)	-0.084 (0.072)
Full primary	0.123 (0.113)	0.134 (0.112)	0.139 (0.114)	0.040 (0.071)	0.033 (0.068)	0.024 (0.071)	0.132 (0.111)	0.135 (0.114)	0.144 (0.115)	0.031 (0.076)	0.021 (0.073)	0.008 (0.076)
Some secondary	0.107 (0.110)	0.070 (0.109)	0.087 (0.109)	-0.046 (0.095)	-0.056 (0.094)	-0.066 (0.096)	0.119 (0.106)	0.076 (0.109)	0.097 (0.108)	-0.057 (0.098)	-0.071 (0.097)	-0.082 (0.098)
Full secondary +	0.213** (0.105)	0.183* (0.104)	0.152 (0.109)	-0.069 (0.094)	-0.083 (0.090)	-0.081 (0.091)	0.222** (0.104)	0.184* (0.105)	0.157 (0.109)	-0.079 (0.097)	-0.093 (0.093)	-0.098 (0.093)
Female head of the household	-0.029 (0.053)	-0.030 (0.048)	-0.017 (0.052)	0.032 (0.044)	0.031 (0.045)	0.033 (0.044)	-0.020 (0.050)	-0.023 (0.048)	-0.007 (0.052)	0.030 (0.044)	0.028 (0.047)	0.029 (0.045)
Family members younger than 18	0.006 (0.009)	0.016* (0.008)	0.015* (0.008)	-0.015 (0.010)	-0.018 (0.012)	-0.017 (0.011)	0.004 (0.009)	0.012 (0.008)	0.012 (0.008)	-0.013 (0.010)	-0.016 (0.011)	-0.015 (0.010)
Displaced (self declared)	-0.118* (0.061)	-0.151** (0.066)	-0.151** (0.066)	-0.015 (0.045)	-0.031 (0.053)	-0.025 (0.052)	-0.125** (0.059)	-0.156** (0.066)	-0.157** (0.066)	-0.015 (0.045)	-0.034 (0.053)	-0.027 (0.052)
Months living in the neighborhood	-0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Owns house	0.025	0.036	0.043	-0.012	-0.003	-0.011	0.022	0.027	0.034	-0.007	0.007	-0.000
	(0.042)	(0.039)	(0.038)	(0.037)	(0.036)	(0.035)	(0.043)	(0.039)	(0.038)	(0.037)	(0.038)	(0.036)
Number of rooms	0.000	-0.001	-0.005	0.014	0.016	0.018	-0.004	-0.003	-0.007	0.016	0.017	0.019
	(0.015)	(0.017)	(0.017)	(0.014)	(0.014)	(0.014)	(0.016)	(0.017)	(0.017)	(0.014)	(0.014)	(0.014)
Top distribution assets	0.054	0.080	0.026	0.042	0.040	0.053	0.072	0.088	0.032	0.035	0.034	0.046
	(0.059)	(0.057)	(0.067)	(0.051)	(0.048)	(0.047)	(0.059)	(0.057)	(0.068)	(0.052)	(0.050)	(0.048)
Laboratorios de Paz	-0.053	-0.092*	-0.098*	-0.070	-0.080	-0.074	-0.049	-0.095*	-0.104*	-0.072	-0.077	-0.072
	(0.051)	(0.052)	(0.054)	(0.065)	(0.068)	(0.066)	(0.050)	(0.052)	(0.054)	(0.065)	(0.070)	(0.068)
Other support	0.063	0.060	0.060	0.045	0.044	0.048	0.057	0.058	0.057	0.053	0.053	0.057
	(0.049)	(0.050)	(0.050)	(0.033)	(0.036)	(0.035)	(0.049)	(0.049)	(0.049)	(0.033)	(0.036)	(0.035)
Altitude	-0.000	-0.000*	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality development index	-0.002	-0.010**	-0.010**	-0.000	0.000	-0.001	-0.003	-0.010***	-0.011***	0.001	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)
Coca crops extension	-0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Murder rate (per 1000 inh.)	0.021	0.034	0.028	0.061***	0.067***	0.064***	0.035**	0.043*	0.037*	0.053**	0.057**	0.054**
	(0.020)	(0.025)	(0.025)	(0.022)	(0.026)	(0.025)	(0.016)	(0.023)	(0.022)	(0.024)	(0.025)	(0.024)
Region Maciso Colombiano	0.045	-0.121	-0.103	0.110	0.195***	0.186***	0.024	-0.125	-0.110	0.119	0.199***	0.192***
	(0.079)	(0.085)	(0.085)	(0.081)	(0.070)	(0.071)	(0.070)	(0.082)	(0.085)	(0.078)	(0.067)	(0.067)
Region Magdalena Medio	-0.131	-0.234**	-0.219*	0.155**	0.193***	0.202***	-0.201*	-0.273**	-0.261**	0.190***	0.226***	0.235***
	(0.108)	(0.115)	(0.120)	(0.079)	(0.070)	(0.068)	(0.110)	(0.117)	(0.122)	(0.073)	(0.069)	(0.068)
Region Montes de Maria	-0.092	-0.267	-0.295*	0.128	0.204**	0.192**	-0.010	-0.195	-0.198	0.097	0.173*	0.152
	(0.146)	(0.167)	(0.163)	(0.093)	(0.084)	(0.087)	(0.129)	(0.164)	(0.160)	(0.100)	(0.089)	(0.096)
Region Norte de Santander	-0.108	-0.168**	-0.170**	0.224***	0.266***	0.262***	-0.128*	-0.189***	-0.195**	0.226***	0.272***	0.269***
	(0.086)	(0.074)	(0.079)	(0.049)	(0.045)	(0.043)	(0.072)	(0.073)	(0.080)	(0.048)	(0.043)	(0.041)
Session size		0.004	0.003		-0.002	-0.003		0.005	0.004		-0.003	-0.004
		(0.006)	(0.006)		(0.006)	(0.006)		(0.005)	(0.005)		(0.006)	(0.006)
Proportion of Women in the Session		0.082	0.032		0.237	0.231		0.001	-0.052		0.300	0.289
		(0.197)	(0.201)		(0.204)	(0.198)		(0.203)	(0.199)		(0.212)	(0.205)
Average Age in the Session		0.012	0.015		0.007	0.009		0.011	0.013		0.007	0.009
		(0.012)	(0.012)		(0.013)	(0.012)		(0.011)	(0.011)		(0.014)	(0.012)
S.D. of Age in the Session		-0.029**	-0.029**		-0.009	-0.009		-0.024*	-0.022		-0.012	-0.014
		(0.011)	(0.012)		(0.017)	(0.018)		(0.013)	(0.014)		(0.017)	(0.018)
Average Education in the Session		0.254***	0.240***		0.141	0.153		0.233***	0.222***		0.155	0.165

S.D. of Education in the Session	(0.087)	(0.091)	(0.108)	(0.102)	(0.084)	(0.084)	(0.114)	(0.108)
	0.176	0.159	-0.035	-0.086	0.116	0.076	0.011	-0.028
	(0.174)	(0.177)	(0.166)	(0.159)	(0.156)	(0.155)	(0.168)	(0.161)
Average Months living in the neighb. in the Session	0.002**	0.002**	-0.001	-0.001	0.001*	0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
S.D. of Months living in the neighb. in the Session	-0.003***	-0.003***	0.001	0.001	-0.003***	-0.003***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Proportion of Urban Households in the Session	0.003	0.042	-0.302	-0.332	-0.038	-0.013	-0.298	-0.319
	(0.165)	(0.176)	(0.220)	(0.212)	(0.185)	(0.198)	(0.207)	(0.198)
Proportion of Displaced households in the Session	0.489*	0.496*	-0.040	0.004	0.434*	0.431*	0.031	0.081
	(0.257)	(0.263)	(0.293)	(0.268)	(0.240)	(0.244)	(0.276)	(0.256)
Proportion of Family Members in the Session	-1.672***	-1.646***	0.714	0.692	-1.456***	-1.391***	0.545	0.511
	(0.435)	(0.468)	(0.449)	(0.453)	(0.460)	(0.493)	(0.406)	(0.410)
Household Income		0.000		-0.000**		0.000		-0.000**
		(0.000)		(0.000)		(0.000)		(0.000)
Household Income Squared		-0.000		0.000*		-0.000		0.000*
		(0.000)		(0.000)		(0.000)		(0.000)
Believes people are helpful in the community		0.033		-0.078**		0.041		-0.084**
		(0.059)		(0.034)		(0.058)		(0.035)
Believes people are reciprocal in the community		0.011		0.019		0.011		0.011
		(0.061)		(0.049)		(0.062)		(0.050)
Trusts the majority of people in the community		0.105		0.079		0.100		0.088
		(0.069)		(0.062)		(0.071)		(0.061)
Trusts few people in the community		0.060		0.018		0.067		0.019
		(0.060)		(0.059)		(0.060)		(0.057)
Proportion of Acquaintances in the Session		-0.111		-0.251		-0.210		-0.161
		(0.245)		(0.259)		(0.241)		(0.260)
Proportion of Friends in the Session		0.246		-0.161		0.220		-0.152
		(0.308)		(0.438)		(0.315)		(0.421)
Decision in the First Round			0.305***	0.312***	0.317***		0.314***	0.318***
			(0.053)	(0.056)	(0.055)		(0.055)	(0.057)
Treated Household								
Exposure (7-14 months)	0.045	0.010	0.019	-0.047	-0.058	-0.062		
	(0.048)	(0.047)	(0.047)	(0.047)	(0.043)	(0.046)		
Exposure (>14 months)	0.085**	0.064	0.060	-0.014	-0.032	-0.023		

Months of Exposure (Municipality Max)	(0.043)	(0.042)	(0.042)	(0.048)	(0.043)	(0.044)	0.003**	0.002*	0.002*	-0.001	-0.001	-0.001
							(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Months of Exposure (Individual)							0.001	0.000	0.000	-0.001	-0.001	-0.001
							(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	684	684	684	684	684	684	684	684	684	684	684	684

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A4.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PRDP Proportion Effect						PRDP Proportion Effect (interacted)					
	Round 1			Round 2			Round 1			Round 2		
Female	-0.021 (0.031)	-0.021 (0.032)	-0.009 (0.033)	0.063** (0.031)	0.063** (0.031)	0.065** (0.030)	-0.021 (0.031)	-0.022 (0.032)	-0.010 (0.033)	0.060* (0.032)	0.061* (0.032)	0.062** (0.030)
Age (years)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Urban	0.028 (0.057)	-0.032 (0.057)	-0.018 (0.058)	-0.001 (0.043)	-0.008 (0.041)	-0.005 (0.042)	0.029 (0.056)	-0.031 (0.057)	-0.016 (0.058)	0.003 (0.043)	-0.002 (0.041)	0.001 (0.041)
Water by pipe	0.072* (0.037)	0.063* (0.036)	0.067* (0.037)	0.009 (0.037)	0.016 (0.038)	0.019 (0.039)	0.071* (0.038)	0.061* (0.036)	0.066* (0.037)	0.002 (0.037)	0.009 (0.038)	0.012 (0.039)
Sewage system	-0.028 (0.049)	-0.029 (0.049)	-0.033 (0.049)	0.018 (0.038)	0.015 (0.040)	0.015 (0.040)	-0.028 (0.050)	-0.029 (0.049)	-0.033 (0.050)	0.017 (0.038)	0.014 (0.041)	0.015 (0.041)
Rubbish recollection	-0.059 (0.057)	-0.024 (0.059)	-0.029 (0.058)	-0.019 (0.046)	-0.002 (0.044)	-0.001 (0.044)	-0.059 (0.057)	-0.024 (0.059)	-0.030 (0.058)	-0.020 (0.045)	-0.002 (0.043)	-0.001 (0.043)
Gas by pipe	-0.040 (0.035)	-0.021 (0.036)	-0.025 (0.036)	-0.023 (0.030)	-0.033 (0.030)	-0.032 (0.030)	-0.040 (0.035)	-0.020 (0.036)	-0.024 (0.036)	-0.021 (0.031)	-0.030 (0.031)	-0.030 (0.031)
Phone (landline)	0.007 (0.036)	-0.005 (0.038)	-0.014 (0.037)	0.040 (0.035)	0.020 (0.036)	0.018 (0.036)	0.006 (0.036)	-0.005 (0.037)	-0.015 (0.037)	0.038 (0.035)	0.017 (0.036)	0.016 (0.036)
Less than primary	0.111* (0.062)	0.130** (0.061)	0.135** (0.060)	-0.012 (0.043)	-0.005 (0.040)	-0.006 (0.039)	0.110* (0.062)	0.130** (0.061)	0.134** (0.060)	-0.016 (0.043)	-0.009 (0.040)	-0.010 (0.039)
Full primary	0.092 (0.068)	0.112* (0.067)	0.111* (0.067)	0.043 (0.040)	0.041 (0.040)	0.040 (0.040)	0.091 (0.068)	0.111* (0.067)	0.110 (0.067)	0.037 (0.040)	0.035 (0.040)	0.034 (0.040)
Some secondary	0.105* (0.061)	0.098 (0.060)	0.097 (0.060)	0.013 (0.050)	0.014 (0.048)	0.014 (0.049)	0.104* (0.061)	0.096 (0.060)	0.095 (0.060)	0.004 (0.050)	0.003 (0.048)	0.003 (0.048)
Full secondary +	0.166** (0.066)	0.161** (0.066)	0.141** (0.068)	-0.019 (0.058)	-0.016 (0.058)	-0.016 (0.059)	0.165** (0.065)	0.159** (0.065)	0.139** (0.067)	-0.028 (0.057)	-0.026 (0.057)	-0.026 (0.058)
Female head of the household	-0.048 (0.033)	-0.051* (0.031)	-0.046 (0.031)	-0.003 (0.029)	-0.003 (0.029)	-0.002 (0.029)	-0.048 (0.033)	-0.050 (0.031)	-0.045 (0.031)	0.002 (0.029)	0.003 (0.028)	0.004 (0.029)
Family members younger than 18	0.018** (0.009)	0.020** (0.009)	0.020** (0.009)	-0.007 (0.007)	-0.008 (0.008)	-0.009 (0.008)	0.018** (0.009)	0.020** (0.009)	0.020** (0.009)	-0.007 (0.007)	-0.008 (0.008)	-0.009 (0.008)
Displaced (self declared)	-0.083**	-0.090**	-0.086**	-0.025	-0.024	-0.022	-0.083**	-0.090**	-0.086**	-0.027	-0.026	-0.025

Months living in the neighborhood	(0.038)	(0.040)	(0.041)	(0.031)	(0.033)	(0.033)	(0.038)	(0.040)	(0.041)	(0.031)	(0.033)	(0.032)
	-0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Owns house	-0.006	-0.008	-0.005	-0.031	-0.025	-0.025	-0.006	-0.008	-0.005	-0.031	-0.025	-0.026
	(0.028)	(0.028)	(0.029)	(0.031)	(0.030)	(0.029)	(0.028)	(0.028)	(0.029)	(0.030)	(0.029)	(0.028)
Number of rooms	0.007	0.010	0.007	0.005	0.007	0.007	0.007	0.010	0.007	0.004	0.006	0.006
	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
Top distribution assets	0.000	0.001	-0.027	0.017	0.015	0.019	0.001	0.001	-0.027	0.019	0.016	0.020
	(0.043)	(0.043)	(0.049)	(0.046)	(0.047)	(0.048)	(0.043)	(0.043)	(0.049)	(0.046)	(0.047)	(0.048)
Laboratorios de Paz	-0.008	-0.024	-0.032	-0.078	-0.076	-0.078	-0.009	-0.026	-0.034	-0.085	-0.084	-0.087
	(0.049)	(0.052)	(0.052)	(0.063)	(0.067)	(0.068)	(0.050)	(0.053)	(0.053)	(0.062)	(0.067)	(0.068)
Other support	0.048	0.050	0.051	0.034	0.036	0.036	0.048	0.049	0.050	0.033	0.035	0.035
	(0.038)	(0.036)	(0.035)	(0.023)	(0.023)	(0.023)	(0.038)	(0.036)	(0.035)	(0.023)	(0.023)	(0.023)
Altitude	-0.000	-0.000	-0.000	-0.000**	-0.000***	-0.000***	-0.000	-0.000	-0.000	-0.000**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipality development index	0.002	-0.002	-0.002	-0.000	0.001	0.001	0.002	-0.002	-0.002	-0.001	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Coca crops extension	0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Murder rate (per 1000 inh.)	0.027*	0.003	0.001	0.052***	0.050**	0.050**	0.027*	0.003	0.001	0.052***	0.050**	0.050**
	(0.015)	(0.021)	(0.021)	(0.017)	(0.020)	(0.020)	(0.015)	(0.021)	(0.021)	(0.018)	(0.020)	(0.020)
Region Maciso Colombiano	0.131**	0.096	0.102	0.124*	0.188***	0.185***	0.130**	0.094	0.100	0.120*	0.185***	0.181***
	(0.063)	(0.078)	(0.077)	(0.070)	(0.062)	(0.065)	(0.064)	(0.078)	(0.077)	(0.072)	(0.063)	(0.066)
Region Magdalena Medio	-0.105	-0.176*	-0.172*	0.072	0.066	0.069	-0.105	-0.176*	-0.172*	0.074	0.067	0.070
	(0.089)	(0.097)	(0.099)	(0.067)	(0.064)	(0.064)	(0.089)	(0.097)	(0.099)	(0.068)	(0.066)	(0.065)
Region Montes de Maria	0.029	-0.220	-0.229*	0.056	0.149*	0.150*	0.027	-0.224	-0.232*	0.044	0.136	0.138
	(0.108)	(0.139)	(0.139)	(0.082)	(0.086)	(0.084)	(0.108)	(0.139)	(0.140)	(0.085)	(0.090)	(0.088)
Region Norte de Santander	-0.070	-0.104	-0.103	0.150***	0.196***	0.190***	-0.069	-0.104	-0.103	0.151***	0.197***	0.190***
	(0.067)	(0.080)	(0.079)	(0.047)	(0.043)	(0.046)	(0.067)	(0.080)	(0.079)	(0.048)	(0.043)	(0.046)
Session size		-0.008*	-0.008*		-0.000	-0.001		-0.008*	-0.008*		-0.001	-0.001
		(0.004)	(0.004)		(0.005)	(0.006)		(0.004)	(0.004)		(0.005)	(0.006)
Proportion of Women in the Session		-0.150	-0.172		0.351**	0.347**		-0.152	-0.173		0.339*	0.336*
		(0.162)	(0.162)		(0.175)	(0.173)		(0.163)	(0.163)		(0.175)	(0.173)
Average Age in the Session		-0.003	-0.004		-0.005	-0.005		-0.003	-0.004		-0.006	-0.006
		(0.008)	(0.008)		(0.010)	(0.009)		(0.008)	(0.008)		(0.010)	(0.009)
S.D. of Age in the Session		-0.015	-0.014		-0.000	-0.000		-0.014	-0.014		-0.000	0.000



Average Education in the Session	(0.009)	(0.009)	(0.013)	(0.013)	(0.009)	(0.009)	(0.013)	(0.013)
	0.085	0.077	0.088	0.082	0.086	0.077	0.088	0.082
S.D. of Education in the Session	(0.063)	(0.064)	(0.083)	(0.083)	(0.063)	(0.064)	(0.083)	(0.084)
	0.099	0.091	0.191	0.186	0.100	0.091	0.198	0.190
Average Months living in the neighb. in the Session	(0.129)	(0.134)	(0.124)	(0.124)	(0.129)	(0.135)	(0.124)	(0.124)
	0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
S.D. of Months living in the neighb. in the Session	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	-0.001*	-0.001	0.001	0.001	-0.001*	-0.001	0.001	0.001
Proportion of Urban Households in the Session	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
	0.175	0.207*	-0.252	-0.252	0.172	0.204*	-0.262	-0.264*
Proportion of Displaced households in the Session	(0.116)	(0.114)	(0.160)	(0.154)	(0.118)	(0.116)	(0.161)	(0.154)
	0.369**	0.355*	0.045	0.036	0.369**	0.354*	0.053	0.040
Proportion of Family Members in the Session	(0.186)	(0.186)	(0.216)	(0.218)	(0.186)	(0.187)	(0.213)	(0.214)
	-0.802*	-0.865**	-0.151	-0.191	-0.805*	-0.868**	-0.168	-0.208
Household Income	(0.447)	(0.435)	(0.419)	(0.427)	(0.448)	(0.437)	(0.397)	(0.404)
		0.000		-0.000		0.000		-0.000
Household Income Squared		(0.000)		(0.000)		(0.000)		(0.000)
		-0.000		0.000		-0.000		0.000
Believes people are helpful in the community		(0.000)		(0.000)		(0.000)		(0.000)
		0.038		0.009		0.039		0.013
Believes people are reciprocal in the community		(0.038)		(0.028)		(0.038)		(0.028)
		-0.018		0.033		-0.017		0.037
Trusts the majority of people in the community		(0.042)		(0.031)		(0.042)		(0.032)
		0.068*		0.025		0.068*		0.024
Trusts few people in the community		(0.041)		(0.047)		(0.041)		(0.048)
		0.028		0.006		0.028		0.007
Proportion of Acquaintances in the Session		(0.032)		(0.046)		(0.032)		(0.047)
		0.067		-0.000		0.064		-0.014
Proportion of Friends in the Session		(0.168)		(0.185)		(0.168)		(0.183)
		-0.063		-0.109		-0.061		-0.110
Decision in the First Round		(0.211)		(0.253)		(0.213)		(0.270)
			0.289***	0.287***	0.288***		0.290***	0.287***
Treated Household	-0.013	-0.006	-0.014	(0.038)	(0.037)	(0.037)	(0.038)	(0.036)
	(0.036)	(0.037)	(0.036)	0.022	0.019	0.018	0.248*	0.265**
Proportion of Treated in the Session	0.484***	0.550***	0.546***	(0.043)	(0.046)	(0.046)	(0.129)	(0.124)
				0.346*	0.365*	0.386**	0.584**	0.634**
							0.605***	0.664***

Interacted (proportion * treated)	(0.177)	(0.147)	(0.154)	(0.200)	(0.189)	(0.180)	(0.214)	(0.223)	(0.223)	(0.264)	(0.256)	(0.251)
							-0.082	-0.143	-0.132	-0.518*	-0.564*	-0.582*
							(0.316)	(0.328)	(0.330)	(0.314)	(0.301)	(0.302)
Observations	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1