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Abstract
Community-driven development programs rest on the principle of development aid through active community participation. Their demand-driven and bottom-up nature of decision making is expected to promote pro-social behaviors. This paper studies the impact of one such program in rural Morocco on social capital. We use behavioral experiments in the field to measure social capital among households living in communes with and without the policy intervention. Using a regression discontinuity framework, we find that community-driven development has a positive but weak impact on public goods contribution. This public responsibility increases with treatment intensity as proxied by the amount of total project spending. While the program has no effect on altruism, evidence seems to suggest that it reduces interpersonal trust. These mixed results signal that social capital responds rather slowly, if at all, to a shift from a centralized to a more localized decision-making process.

Keywords
Community-driven Development, Social Capital, Field Experiments

JEL classification
C93, D03, I38, O12, O22

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1 Introduction

This paper investigates the impact of a community-driven development (henceforth CDD) program in Morocco on social capital as measured by field experiments. CDD programs rely on the participation of communities to design and carry out development projects. The idea behind such programs is that communities know their own interests best, so by giving them the ability to decide on how to allocate development aid, programs may achieve better results (Mansuri and Rao, 2013). This involvement of communities is in turn expected to affect social capital. For instance, it has been theorized that CDD lowers the costs associated with collective action by promoting communities' organizing capacity and strengthening people's civic responsibility (Casey, Glennerster, and Miguel, 2012). Furthermore, increased interaction among people in the community is seen as enhancing social networks and promoting pro-social norms and behaviors (Avdeenko and Gilligan, 2013). In the long term, it is hoped that gains in social capital might facilitate economic development or help sustain program impacts. As a result, adding this social dimension or bottom-up nature to development has become fashionable since the early 2000s. In 2012, the World Bank alone backed roughly 400 CDD projects in 94 countries with $30 billion (Wong, 2012).

In response to the proliferation of CDD programs, a number of studies have analyzed the effects of such bottom-up development policies on both economic and social capital. Regarding the former, evidence has been consistent and shown positive results. The result from a paralell economic impact evaluation in Morocco suggests that this particular CDD program has substantially increased household revenue. Regarding social capital, defined as an "instantiated informal norm that promotes co-operation between individuals" (Fukuyama, 2001), the evidence has been mixed (see reviews by Wong, 2012 and Mansuri and Rao, 2004).[1]

Our paper adds to the literature in four ways. First, we contribute to the small yet growing literature that uses lab experiments in the field to measure social capital. Two evaluations in Liberia (Fearon, Humphreys, and Weinstein, 2009) and Sudan (Avdeenko and Gilligan, 2013) used field experiments, and one in Sierra Leone (Casey, Glennerster, and Miguel, 2012, 2011) used structured community activities to gauge social capital, while the rest relied on survey information. In particular, we follow the method used by Avdeenko and Gilligan (2013) in

[1] To the best of our knowledge, eleven impact evaluations of CDD programs have looked at social capital: five present mixed results and six report no impacts. There is no or very weak evidence that CDD programs in Afghanistan, Indonesia, the Democratic Republic of the Congo, Nepal, Sierra Leone, and Sudan have any impact on trust and social relations. In Armenia, Liberia, and Zambia, CDD was found to bring communities together, but this impact was only apparent in some groups. There was an increase in the willingness to contribute to community projects but no impact on trust in the Philippines (Labonne, 2013). A program in urban Indonesia was shown to have a positive impact on participation in community-initiated activities, while lowering household contributions to community projects (Pradhan, Rao, and Rosemberg, 2010).

the impact evaluation of the aforementioned Sudanese CDD program. We ran experiments in 61 communes with 740 participants in treated and untreated areas, roughly two years after the completion of the program. In particular, we played the dictator game to capture altruism, the public goods game to measure the willingness to contribute to the community, and the investment game to gain insights into levels of trust. Evidence can thus be compared across countries and projects by keeping the methodology fixed.

Second, in light of the "Arab Spring," we provide evidence on the effectiveness of a "grass-roots democracy" program in the context of a stable and relatively well functioning constitutional monarchy in Northern Africa. Our evidence can be interpreted as *relative* to the status quo of a very centralized system in the process of gradual democratization and decentralization. Mansuri and Rao (2004) call for more evidence on the superiority of CDD compared to top-down approaches. In Africa, CDD programs are often transplanted into weak institutions (see aforementioned evidence from fragile states like Sudan, Sierra Leone and Liberia), that is to say, they are compared to little governance in the first place. In the Moroccan case, the CDD program was run and substantially financed by the Moroccan government, rather than by international actors as often happens when states are weak or fragile. Morocco's self-initiated shift to more "democratic principles" has been hailed as "a recipe for other countries in transition to follow, especially in terms of achieving a gradual change or reform without much bloodshed or instability(Tawil, 2013)."

Third, and related to the second contribution, we also explore how the CDD program was implemented in reality. By merging household and commune data with rich adminstrative records, we can investigate how CDD activities and actual disbursement patterns are aligned with the development priorities of the citizens and communities. Fourth, we add new evidence on the causal relationship between economic development, as well as communty participation, and social capital.[2] To this end, we are the first to use a regression discontinuity design to estimate the impact of local development on social capital. A number of studies have documented evidence of causality in the reverse direction, in that social capital may also influence economic prospects.[3]

In principle, the CDD program may affect social capital through three main channels: First, the program has increased household revenues, which could influence pro-social behaviors. Second, the community-driven approach has possibly led to an increase in the quantity and quality of interactions among communitiy members. Third, the program may affect people's

[2]Examples in this literature include Van Oorschot and Arts (2005) on Europe, and Miguel, Gertler, and Levine (2003) on Indonesia.

[3]See for instance Narayan and Pritchett (2000); Hjollund, Paldam, and Svendsen (2003); Helliwell and Putnam (1995); Keefer (2013); Knack and Keefer (1997).

perception toward authority. When deciding on how to invest the block grants, community leaders are required to organize extensive consulting sessions with the population, hence increasing the interaction between people and their leaders. These interactions may enhance or even undermine people's trust as well as civic responsibility.

In line with the evidence by Fearon, Humphreys, and Weinstein (2009), we show that CDD can stimulate the willingness to contribute to the public goods. At the same time, our evidence also resembles the non-results of Avdeenko and Gilligan (2013) as well as the aforementioned evidence based on surveys in that other impacts on social capital are relatively small and not consistent. In fact, there is evidence that the program has a dampening effect on inter-personal trust but no impact on altruism in the dictator game. In addition, although risk and time preferences could feed into social behaviors of individuals, we detect no change in the experimental measures of risk and time preferences.[4] Using adminstrative and survey data, we detect similar correlational patterns between CDD spending and these measures of social capital. We also find that the development priorities of citizens and the types of projects implemented in the CDD program are similar.

One explanation for these mixed results is the diverse nature and responsiveness of social capital. Indeed, it appears that there is a high willingness to contribute to community goods, but a low level of trust among rural households in Morocco. Put differently, individual and group level measures diverge. Furthermore, as social capital is linked with people's intrinsic values, it may respond slowly to the participatory activities that the program set up.

This paper is structured as followed. Section 2 provides background information on the CDD program and social capital in Morocco. Section 3 explains how the data were collected and summarizes the descriptive statistics. Section 4 outlines the empirical model used in this paper. The results and robustness checks are described in section 5. Section 6 discusses our results in the context of the program and section 7 concludes.

2 Background on the INDH and Social Capital in Morocco

The CDD program investigated in this paper is one of the four components within Morocco's National Human Development Initiative (or Initiative Nationale pour le Développement Humain - INDH). The INDH was launched by King Mohamed VI on 18 May, 2005. The objective

[4] Our findings indicate that rural households in Morocco are generally quite risk averse and patient.

was to improve the country's poor socio-economic record. It was also a response to international criticism of the country's overall disappointing performance in human development. In 2007 Morocco ranked 127th in the human development index. Only four countries scored worse in the Arab world. The initiative aims to carry out public investments in disadvantaged areas that are in line with the needs of the local population. The three specific goals are (1) "to eradicate social deficits through health and education projects, the provision of electricity and water, and the creation of cultural, sports and religious infrastructures, especially for the younger generation; (2) to promote stable income generating activities whilst finding a creative solution for the informal sector; and (3) to assist vulnerable persons to enable them to preserve their dignity and to avoid them sliding into crime and social isolation associated with vulnerability" (King, 2005). Between 2006 and 2010, the INDH invested 14 billion Moroccan Dirhams (henceforth MAD), or approximately $1.7 billion, in about 700 local participatory plans, financing more than 22,000 activities that reached 5.2 million beneficiaries (WB, 2012). It has four components:

1. *Rural or CDD component*: targets 348 rural communes with poverty rates over 30% (based on the 2004 poverty map of Morocco) and 55 communes with poverty rates between 22% (the national average) and 30% and which were nominated by provincial human development committees;

2. *Urban component*: targets 250 urban shanty towns and old town centers (medinas) where "social exclusion" is high;

3. *Vulnerability component*: provides support to government agencies or non-governmental organizations (NGOs) that work with the most vulnerable populations;

4. *Cross-cutting component:* grants Provincial Competitive Fund (PCF) to enable provincial governments to fully participate in the INDH program.

This paper focuses on the first (rural) component, which takes on a CDD approach. Within this component, it looks only at communes whose poverty rates vary around the 30% threshold. However we also investigate the linkage and inherent trade-offs between components since any rural commune, regardless of its poverty rate, may also be eligible for the vulnerability and cross-cutting components. In the rural (or CDD) component, each eligible rural commune received a block grant to finance their needed activities. In addition to the funding from the INDH, communes also contributed around 30% of the total cost of the projects. In the vulnerability and cross-cutting components, project funding was granted on a competitive basis. This is different from the CDD approach in the rural component where projects were

identified and prioritized through a participatory planning process that included all social groups.

As part of the rural component, a sophisticated administrative infrastructure was set up with the objective to facilitate participatory planning and implementation, though with close monitoring by the King. Nationally, the program was coordinated by a central unit at the Ministry of the Interior. At the provincial level, Provincial Human Development Committees (CPDH) chaired by governors were set up to validate the proposals of local committees and facilitate alignment with government programs. The Social Action Divisions (DAS) at the provincial branch of the Ministry of the Interior provided support and supervision. At the communal level, Local Human Development Committees (CLDH) were established to select, monitor and evaluate projects. All local committees were supposed to be chaired by heads of commune councils. They were composed of 1/3 elected members of the commune council, 1/3 local government officials, and 1/3 civil society. In practice, this was not always respected and there was a low representation of women and youth. In each commune, a "facilitation and social mobilization team" (EAC/Q) was set up, comprising largely of local government staff and some volunteers from associations and communal personnel, to support the CLDH in facilitating the involvement of local civil society and citizens into the participatory process. By the end of 2006, all committees were established and activities were selected and funded (WB, 2012). Funded activities feature small-scale infrastructure and services (e.g. local roads, schools, and health clinics), social activities (e.g. sports, culture, youth centers), local capacity building (e.g. administrative training and facility upgrade), and income generation (e.g. artisanal cooperatives, market space). Activities were carried out mostly by local authorities, at the commune or provincial levels, or by associations, and were completed by the end of 2010.

The CDD approach of the rural component is novel in a country accustomed to top-down policymaking and high levels of centralization. The decentralization process started in the early 2000s but has been slow and based on weak democratic institutions, especially at the local level. Power still tends to reside with regional walis and provincial governors appointed by the king rather than elected officials (BTI, 2012). This top-down tradition probably posed some constraints on the participatory process of the CDD component. Indeed, the fact that local authorities held 2/3 of the seats in the CLDH means that public officials maintained high control of the project selection process. It is also unclear how participation happened in practice. The 2009 audit report revealed that only 1/3 of the CLDHs held the minimum number of yearly meetings.[5]

[5]INDH (2010): p.24, cited in Morgandi (2010)

At the same time, the INDH was implemented in the context of relatively low political and social participation in Morocco. People have little trust in politicians and political parties since there is a tendency for politicians to switch parties and join the governing (often pro-monarchy) parties. According to the 2006 Arab Barometer survey, 54.4% of Moroccans reported to have "no trust at all" in political parties. Socially, very few Moroccans participate in associations. The same survey showed that membership in "voluntary associations" was at 13%, below the Arab average of around 17% (BTI, 2012). According to the World Values Survey in 2005-2007, fewer than 5% reported being an active member in any voluntary organization (religious, professional, and political), with the exception of recreational organizations, in which 9% of Moroccans reported being members. Similarly, a survey conducted by Bossert, Cakir, Bowser, and Mitchell (2003), which interviewed individuals in 1,198 households in eight communities that were purposefully selected to be low-income, marginalized areas, revealed that only 12% indicated that someone in their household was a member of a group or association. Even among those who participated, most (46%) were in cultural groups or societies for festivals. The level of contribution of money or time to these organizations was also low. This literature matches with what was found in the household panel survey conducted in 2008 and 2011 in 194 rural communes for the impact evaluation of the INDH, in which few people reported participating in any collective activities.

In terms of social capital, there appears to be strong cohesion in some dimensions but weak solidarity in others. For example, trust is low among Moroccans. According to the 2006 Arab Barometer survey, 78.5 % agreed that one "must be very careful in dealing with people" and this number was 85.3% in the World Values Survey in 2005-2007 (BTI, 2012). The World Values Survey also indicated that only 13% believed that most people can be trusted, as compared to 21% world average. 37% trusted completely people they know personally and this percentage dropped to 1.3% for people whom they met for the first time. The small-scale survey by Bossert, Cakir, Bowser, and Mitchell (2003) confirmed this by showing that 53% of the respondents said "one can never be too prudent" when dealing with general people in the community. Most respondents (92%) felt that they had less than 10 "true" friends and that only one or two people could be counted on to help in a short-term financial need (54%). Trust among neighbors was higher, but mainly to take care of children and less about lending money. Interestingly, people with a higher income tended to have more trust.

On the other hand, people seemed to care about community affairs. According to the same survey by Bossert, Cakir, Bowser, and Mitchell (2003), among the few cooperatives that people participated in, most were set up for general community benefit more than personal income. These organizations also tended to have a democratic selection of leaders (71%) and collective decisionmaking (53%). A majority of people (70%), when asked hypothetically,

were also willing to give time and money to community projects and most (81%) judged that it was probable that the community could find collective solutions to problems. Collaboration was also higher among those with more income and education.

3 Data

Since social capital is a multi-faceted concept, there is no clear consensus regarding its definition. This paper uses the well-known definition by Putnam (1995), which refers to social capital as "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit." The multi-dimensionality of social capital also means that its measurement requires an incorporation of different aspects, levels and units of analysis (Woolcock and Narayan, 2000).[6]

This paper uses experimental rather than self-reported, survey-based measures of social capital. Self-reporting has been criticized to be biased in the CDD context (Wong, 2012; Mansuri and Rao, 2013). The resulting imprecision may explain the mixed evidence on CDD and social capital in the first place (Avdeenko and Gilligan, 2013). Unlike the membership in clubs, dimensions of social capital such as trust, altruism, and civic responsibility are abstract concepts. Interviewees may not perceive and express these accurately, in particular in retrospect. In addition, they may feel obliged or be primed to over-report, say, trust in their community members. And such over-reporting may be aggravated during surveys aimed to evaluate the impact of a CDD program itself.

Conversely, experiments mimic actual social interactions among people within a community to gauge the level of social capital by observing the extent to which individuals are influenced by and behave due to shared norms. The games are played with small amounts of

[6]Putnam (1995) captured social capital by tracking membership in civil society groups (cultural, religious, and professional) in America. Taking a more complex approach, Helliwell and Putnam (1995) measured social capital through a composite of three indicators: (1) civic community (newspaper readership, availability of sports and cultural associations, turnout in a referendum, and the incidence of preference voting); (2) institutional performance (a composite measure of the comparative performance of regional governments); and (3) citizen satisfaction with government services. One of the most comprehensive efforts to measure social capital is the World Values Survey. The survey interviews people across the world to assess the dynamics of perceptions and values. Notably, its questions on people's trust of others and their participation in voluntary associations are often used as proxy for social capital in cross-country research (Inglehart, 1997). Building on existing literature and questionnaires, Deepa Narayan developed a comprehensive Global Social Capital Survey. This approach captures an array of indicators that range from group membership to generalized norms (trust), as well as to volunteerism. The author claimed that these dimensions of social capital are largely stable and consistent across different contexts (Narayan and Cassidy, 2001). Finally, the World Bank promoted its Social Capital Assessment Tool (SOCAT) and the Social Capital Integrated Questionnaire (SOCAP IQ) to measure social capital at both the household and community levels.

money in order to incentivize people to behave in line with their preferences. The shared norms can affect the decision to collaborate and reciprocate even when the monetary return from deflecting or free riding is larger (Berg, Dickhaut, and McCabe, 1995; Ledyard, 1995; Schechter, 2007). These experiments have been fielded to investigate decision making in different types of programs, ranging from micro-finance (Karlan, 2005) to conditional cash transfer (Attanasio, Pellerano, and Reyes, 2009) to CDD (Avdeenko and Gilligan, 2013), as well as the impact of civil war on social capital (Gilligan, Pasquale, and Sami, 2010). This method, however, captures social capital at the individual level rather than in its structural, cultural and institutional role within communities.

We collected behavioral data during focus groups with household heads in 61 communes (31 treated and 30 untreated communes). We selected the communes with poverty rates closest to the eligibility threshold of 30%, ranging from 28 to 31%. In each commune, we invited 15 household heads from the sample of a household panel survey conducted in 2008 and 2011 for the economic impact evaluation of the INDH. The data collection ran from October to December 2012, two years after the completion of the program. We were able to reach 740 participants, achieving a show-up rate of 81%. Basic characteristics of the players are presented in Table 1. On average, there were 12-13 players in each commune, 90% of which were heads of households. The average age of the players was 53; and 90% of participants were males and 35% literate.

The experiments consist of five games to measure risk, time preferences, altruism, trust, and the willingness to contribute to public goods, respectively. The session procedures, as well as the public goods, trust, and discount game protocols, were adopted from Gilligan, Pasquale, and Sami (2010) in Nepal and Avdeenko and Gilligan (2013) in Sudan. Similar protocols were used by Michael Gilligan (New York University) in Burkina Faso (also in French). These experiments were originally promoted by Karlan (2005). The trust game is based on Berg, Dickhaut, and McCabe (1995) and the public goods game follows Barrett (2005). The risk game is similar to Charness and Gneezy (2010) and builds on earlier work by Gneezy and Potters (1997).

The games were run in the same sequence and fashion across communes. Before each game, the rules were first explained by a facilitator in a group session. Then participants were individually called to the game station where the surveyor briefly re-explained the game and tested the understanding of the participants before they made their choices in private. Participants were not supposed to discuss their choices with each other before or after the game. Participants were handed their total payouts only at the end of the entire session. Each session lasted about three hours. The average total payout was 72 MAD, or roughly

120% of the daily wage a male would receive for his primary economic activity in these communes. The results of the games are summarized in Table 1.

In order to measure risk aversion, we gave each participant 10 MAD. They then had the opportunity to invest a portion of this money in a risky option and to keep the remainder with certainty. The flip of a coin by the participant decided if the investment was tripled or lost. For example, if a participant invested 4 MAD, he or she could keep 6 MAD for sure. In the case of heads, the investment was lost and the participant was left with 6 MAD. With tails, the 4 MAD were tripled, adding to the safe amount of 6 MAD, and the final pay out was 18 MAD (6 + 3 x 4). A risk neutral or loving individual would invest the entire 10 MAD into the risky option. On average, people invested 3.65 MAD in the risky option, which suggests that risk aversion was relatively high in rural Morocco.

To measure patience, we asked participants to decide between receiving 10 MAD today or increasingly larger amounts in three days time (11,12,13,14, and 15 MAD). A person that always prefers the 10 MAD is coded as impatient, while a person that is willing to wait for three days to receive 11 MAD rather than 10 MAD today is patient. In the middle ground, some people switch as the amount increases. Participants were very patient. On average they were willing to receive 12 MAD in 3 days rather than 10 MAD today.

Altruism was captured through a dictator game that featured three independent scenarios. In the first scenario, the participant was given 5 MAD and could chose to donate any amount to an anonymous poor family in the same commune. In the second scenario, another 5 MAD was given, from which the participant could decide the amount to send to an anonymous poor family in a neighboring commune. In the last scenario, the donation could be made to development projects in the commune. The average participant gave 2.29 MAD out of the 5 MAD to the poor family in the same commune, 1.8 to the poor family in a neighboring commune, and 1.59 to the commune. In the main analysis, we sum the three donations into one indicator for altruism. The average sum is 5.68 MAD.

We used an investment game to measure the level of trust and trustworthiness between two people in a commune. Participants were randomly and anonymously paired. They were also randomly assigned to be senders or receivers. Both types were then endowed with 10 MAD and the game was played in two rounds. In the first round, the sender could choose the amount to send. This amount was then tripled and given to the receiver. In the second round, the receiver decided how much to return to the sender. In this simple investment game, the amount sent proxies trust in, whereas the amount returned captures trustworthiness (conditional on the amount received) of people in the commune. Aligned

with the literature on social capital in Morocco, trust was quite low. On average people sent 3.93 MAD and returned 7.02 MAD.

The final activity measures the willingness of people to contribute to public goods in their commune. People were given the choice to contribute or free ride and the decision was anonymous. For each person that contributed, every individual in the group received 2 MAD. Those who decided to free ride received 12 MAD on top of the amount they received from people who contributed. The final payout for each individual depends on the number of people contributing to public goods. For example, if 10 out of 15 people decided to contribute to the group and the rest decided to free ride, then each of the five free-riders would receive 32 MAD (10 x 2+12), while contributors received merely 20 MAD (10 x 2). A large majority of people (67%) contributed. This indicates that the willingness to help and contribute to the community was high.

Table 1 also presents the differences in means between people in treated and untreated communes. There does not seem to be any statistically significant difference in the experimental behaviors. For instance, 69% and 65% of participants contributed to the public goods game in CDD and untreated communes, respectively. The difference in means is 4% with a p-value of 25%. The differences in the level of trust, risk taking, and impatience are tiny. The levels of altruism and trustworthiness tend to be slightly higher in treated communes with p-values of 10% and 12%, respectively. In terms of the participant characteristics, the sample is balanced across literacy, gender, and household size. Nevertheless, there is a significant difference in the average age that amounts to three years. There are small differences (but not significant) between treated and untreated communes in terms of population size, the number of poor people, and schooling and road access. It should be noted, however, that these simple descriptive differences need to be further investigated to take into account the distance from the cut-off and other confounding factors. To this end, we present our identification strategy in the next section.

4 Identification strategy

In order to estimate the causal effects of CDD on social capital, we adopt a regression discontinuity design (henceforth RDD). It is based on the eligibility criterion of the rural component of the INDH program. Communes could participate in the program if their poverty rates in 2004 (the forcing variable x) were equal or higher than 30% (the cut-off c). In other words, treatment status is 1 if $x \geq c$ and 0 otherwise.

To verify compliance with the program eligibility rule, we plot the amount of total project spending under the rural component, as well as the other two components, for each commune as a function of poverty rates in Figure 1. The black squares denote spending in the rural component of the INDH, which was allocated only to communes with poverty rates of 30% and more.[7] The white squares denote spending in the other two components of the program that all rural communes, regardless of their poverty rates, are eligible for (the vulnerability and cross-cutting components). The take-up appears to be universal and there is no major cross-over between the treated and control communes. While there is a sharp jump in the rural component of the INDH, spending under the remaining components appears unsystematically scattered around the cut-off. Note that there are seven communes left of the cut-off with non-zero spending under the rural component. However, these small deviations are virtually zero, so we include these deviating communes. In any case excluding them leads to qualitatively similar results given the small amount of funding allocated to them. This is therefore a sharp RDD set-up.

According to Imbens and Lemieux (2007), the sharp RDD estimates the jump in conditional means of the outcome variable Y in the vicinity of the cut-off point:

$$\tau = \lim_{x \downarrow c} E[Y(1)|X = x] - \lim_{x \uparrow c} E[Y(0)|X = x] \tag{1}$$

We estimate this difference non-parametrically using the full sample or a series of smaller windows around the cut-off. In particular, we select the optimal bandwidth that minimizes the mean squared error based on Imbens and Kalyanaraman (2012). The local non-parametric method also ensures that communes with poverty rates (the identifying value) farther away from the cut-off receive less weight. This local approach minimizes the differences in observable and unobservable characteristics between the treated and control groups. But it is difficult to extrapolate the estimates to the overall causal effect of the program on the entire population of communes. Finally, we also provide parametric RDD estimates based on polynomials up to the order of five. We allow the coefficients on the polynomial to vary left and right of the cut-off. Concerning inference, we always provide unclustered and clustered standard errors. The latter account for the correlation of errors within communes (i.e. we cluster on the forcing variable).[8]

We conducted some tests on the internal validity of RDD in the INDH context. There is no

[7] There are also 55 communes with poverty rates between 22 and 30% which benefited from the rural component but they are not in our sample.

[8] We estimated the optimal bandwidth and RDD in R using a package by Matthieu Stigler. The package is a work in progress and available upon request. Alternatively, the RDD package by Drew Dimmery is readily available on the CRAN servers.

evidence that communes manipulated their poverty rates. The poverty rates of all Moroccan communes were established in 2004, which is well before the start of the INDH. As can be seen in Figure 3, there does not seem to be sorting around the forcing variable based on the test proposed by McCrary (2008). In fact, the distribution is relatively smooth around the 30% cut-off. Another indication of the internal validity of our strategy is the balance of co-variates around the cut-off. At the commune level, there are no significant differences in means of predetermined indicators (population size, the number of poor people, the road indicator, and schooling rate) from the 2004 poverty map (Table 1). We detect no jumps in these variables using the non-parametric RDD (Table 10). In the same table, we also verify balance in commune characteristics based on geographical and climate data[9] and find no significant differences in terms of remoteness (altitude and the length of national roads) or agricultural conditions (proxied by average temperatures and rainfall from 1950-2000).

At the individual level, we estimate the program's impact on the likelihood of showing up to the experimental session and predetermined characteristics using the non-parametric RDD (Table 11). Since the program should not affect the latter, we should see no impact on sex, age, literacy, and the marital status of participants. However, we cannot rule out that the CDD component changed the likelihood of a person showing up to the experimental session, or the kind of household member that showed up. The CDD component could make people more obliged to participate in community affairs, including our focus groups. Conversely, the CDD component may have increased employment and therefore people had less time to attend our focus groups. We detect no systematic impact on the likelihood of a household showing up and the number of players by communes. Likewise, there is no link with the player being a household head or male. However, there seem to be differences in age and literacy between CDD and non-CDD communes. This can be problematic in that age and literacy are correlated with experimental behaviors. Therefore, in our estimates, we also explore the stability of results by controlling for these variables.

5 Results

Before moving to the RDD results, we examine visually our six behavioral variables averaged at the commune level as a function of the poverty rate in Figure 2. There appear to be jumps in public goods contribution, altruism, trust, and risk taking, but no clear jumps in terms of trustworthiness and impatience. It is also important to point out that the slopes associated with the poverty rates tend to be relatively flat.

[9] Climate data were taken from WorldClim: http://www.worldclim.org/current.

In the full-fledged RDD model, we find evidence that the CDD component has affected social capital. However, the impacts are relatively small and vary across different types of social behaviors. The main results from the non-parametric RDD at the optimal bandwidth (Imbens and Kalyanaraman, 2012) are presented in Table 2. While CDD seems to have promoted the willingness to contribute to public goods, it has had a dampening effect on trust. In other words, social capital at the group level has benefited, whereas inter-personal social capital has decreased. This matches with the literature on social capital in Morocco and our survey data, which indicate that trust is low but community responsibility is high. Conversely, we detect no impact on altruism. One reason may be that altruism is an intrinsic value of individuals and is unlikely to respond quickly to changes. Likewise, CDD does not seem to have changed time or risk preferences, which are more fundamental parameters of individual decision making, as well as intrinsic drivers of social capital. The magnitude of these effects are qualitatively similar when we aggregate social behaviors at the commune level in Table 3. However most estimates are no longer statistically significant given the relatively small sample size.

In what follows, we look more closely at the economic and statistical significance, as well as the robustness, of the non-parametric RDD results game by game. In particular, we consider the inclusion of co-variates, the sensitivity to bandwidth choice, and placebo cut-offs.

5.1 Public goods contribution

We first examine the robustness of the impact on public goods contribution in terms of co-variate inclusion. Table 12 in the robustness appendix presents the non-parametric RDD results at the optimal bandwidth as suggested by Imbens and Kalyanaraman (2012), with and without controls. Column 1 is the main result without controls. With both clustered and unclustered standard errors, the local treatment effect is significant and amounts to 19%. This effect is moderate in size given that the average level of contribution is well above 60% among the control group. The RDD estimate goes in the same direction, but is of larger magnitude and more precisely estimated than the simple difference in means between treated and untreated communes. In column 2, we control for a host of individual and commune characteristics including the participant's age, sex, literacy, along with the commune means of these variables, as well as the number of players in the group session, commune population, number of poor people, a road indicator, and schooling rate. The descriptive statistics of these variables are summarized in Table 1. In column 3, we include nine region dummies. Co-variates are added in linearly, reducing residual variance and heterogeneity. In both cases, the estimates remain relatively stable in size and significance.

To examine the sensitivity of our estimates to the selection of bandwidths, we plot the local average treatment effect at different bandwidths (the top-left panel of Figure 4). The direction of the estimated effect remains unchanged but the size is sensitive to the choice of bandwidth. The clustered confidence intervals are overly tight at small bandwidths, because the number of clusters is small. The opposite is true for the unclustered confidence bands. They are wider at small bandwidths and tighter as the sample size and number of clusters increase. We propose to use the more conservative (wider) confidence bands. While the effect is not detected in the full sample, it is reassuring that the sign is consistent and the impact is significant around the optimal bandwidth choice. The size of the effect decreases and the estimates become more inefficient with the increase in bandwidth size.

The full bandwidth result is comparable in size and insignificance to the OLS estimate with the polynomial of order 1, which also uses the full sample. Table 13 presents OLS and Logit results introducing various orders of polynomial using the full sample. We allow the coefficients on the polynomials to be different on the left and right sides of the cut-off. The coefficient estimates are positive and increasing in size with higher order polynomials but the effect is only significant with the polynomial order of 5. In addition, the size of the effect appears unreasonably high and the order of 5 is on the extreme end. It is not surprising that non-parametric and parametric estimates are different given their very different approaches. In our context, the non-parametric approach in the optimal window yields more efficient and stable estimates.

Finally, we re-estimate the main result using placebo cut-offs. We run the non-parametric RDD separately on the treated and untreated communes and set the placebo cut-offs at the respective sample medians of the forcing variable, that is, the poverty rate (Table 14). Columns 1 and 2 correspond to models without controls. We then introduce controls to models 3 and 4, and region dummies to models 5 and 6. Unlike the estimates at the actual cut-off, the placebo estimates are negative. Using clustered standard errors, they are insignificant with no controls or with region dummies, but significant with individual and commune controls included. This can be misleading. To do this in a more systematic and transparent manner, we also do the same exercise for all possible placebo cut-offs. The left hand panels of Figure 5 present the results for the unconditional RDD as well as RDD with controls and region-fixed effects. Confidence bands are unclustered since in some cases the number of groups is very small. The placebo estimates vary widely and are significant in some cases. One explanation for these placebo patterns is that some sampled windows around the placebo cut-offs are tight and the RDD may therefore be vulnerable to picking up estimates that are nothing else but noise. In general, there is no systematic pattern in these placebo regressions. Unlike our main result, the placebo regressions are highly sensitive to the inclusion of

co-variates, both in magnitude and significance. In other words, the apparent heterogeneity in the outcome variable is likely to explain some of the significant placebo tests, but not the impact at the real cut-off.

5.2 Trust and trustworthiness

The CDD component led to a small decrease in trust as suggested by the non-parametric RDD results in Table 15 of the robustness appendix. The reduction in the amount sent in the trust game amounts to 1.28 MAD in the model with optimal bandwidth and no controls (column 1). This is 13% of the amount that participants had at their disposal and 1/3 of the average amount people were willing to send. The coefficient shrinks, but remains significant, once controls and region dummies are introduced in columns 2 and 3, respectively. The effect is smaller in size and efficiency in the full sample but across all bandwidths, the effect remains significant (the top-right panel of Figure 4). Furthermore, the parametric OLS and Poisson models with higher order polynomials also yield negative and significant results, except for the first order polynomial (Table 16). The magnitudes of the impacts, however, differ, with only the second order polynomial in the OLS model yielding a result of comparable size (1.47 MAD).

Reduced trust is reciprocated with a decrease in trustworthiness. The impact on trustworthiness is negative in the non-parametric with and without controls, except for when we condition on the amount sent in the non-parametric RDD model (Table 17). This sign reversal suggests that CDD affected trustworthiness mainly through the reduction of trust in the first place. Unfortunately, it is hard to estimate such indirect impacts precisely, given the relatively small sample. The non-parametric estimates are generally insignificant. However, as seen in the middle-left panel in Figure 4, the impact is significant if using smaller bandwidths. The results for trustworthiness in the OLS and Poisson models are significant with polynomials of orders higher than one (Table 18).

To check the robustness of these results, we perform some placebo tests similar to those for the public goods game (Table 14). In the case of trust, the estimates tend to be insignificant at the median placebo cut-off. Only the left placebo in the model with controls and the right placebo in the model with region dummies are significant. Similar patterns emerge in the case of trustworthiness, with only the right placebo in the unconditional estimate and the right placebo in the model with region dummies are significant. Figure 6 shows the placebo results along different cut-offs left and right of the forcing variable. They are largely insignificant and reveal no apparent pattern.

5.3 Deep values: altruism, and risk and time preferences

We do not find an impact on altruism as measured by the sum of donations in the three dictator games. Similar results hold for the three donations seperately. The results remain insignificant across different specifications in the non-parametric and parametric estimates (Tables 19 and 20). This non-impact is also obtained along different bandwidths as indicated in Figure 4. While the median placebos happen to be significant, flipping from negative on the left to positive on the right (Table 14), the placebos across all possible cut-offs are mostly insignificant and vary widely in size and sign (Figure 5).

Similarly, risk and time preferences have not changed in response to the CDD component. The impacts on risk taking in the lottery activity and patience in the discount game are small and insignificant. Non-parametric results are presented in Table 21. We detect some significant but still small impact for the risk activity confined in the range of very small bandwidths. However, these are obtained neither at the optimal bandwidth nor in the full sample. The impact on impatience is always insignificant across bandwidths (Figure 4). The OLS and parametric RDD results are also generally insignificant across orders of polynomials (Table 22). Also the placebos at the median (Table 14) and across different cut-offs tend to be insignificant (Figure 7).

6 Discussion

Our results, which indicate weak (and mixed) impacts of CDD on social capital, are aligned with other impact evaluations of CDD programs as described above as well as with the literature on CDD. There has been criticism that there is no evidence of gains *relative* to "standard" top-down alternatives (Mansuri and Rao, 2004). There can be many explanations for the mixed empirical evidence on the social impacts of CDD. One is that such programs sound good in theory but turn out to be top-down in practice. In particular, the lack of information and experience may limit the capacity of people to be involved in complex decision making. Likewise, bringing about changes in power structures and institutions takes time. Due to its very nature, the participatory process takes longer than top-down approaches, even more so if capacity has to be built in the first place. With high pressure to disburse funding and achieve results, such steps may be glossed over in favor of more direct routes to implement projects. Mansuri and Rao (2013) cautioned that many conditions need to be met for these programs to increase citizen participation. Without some sort of affirmative action, disadvantaged groups may be sidelined in the participatory process,

worsening existing inequalities. Furthermore, unless there are incentives for people to reach out beyond their existing social circles, bonding social cohesion (networks within groups) may increase but bridging social capital (networks across groups) may not. To ensure that participatory activities actually happen, rigorous monitoring and capacity building is needed. In the case of the INDH, as described above, the civic culture is weak in rural Morocco and the participatory process may not have been enforced in all communes.

Another problem is that local elites may absorb most of the economic benefits, which can leave social capital unchanged or even lowered. Critics of CDD, as well as of similar "participatory" approaches, argue that they are not community-driven or community-based at all. Local elites or opportunistic development entrepreneurs can hijack resources. As a result, funds never reach their intended recipients (Platteau and Gaspart, 2003). The extent of "elite capture" may depend on the tradition of local leadership. Based on anecdotal evidence from Sub-Saharan Africa, Platteau and Abraham (2002) argued that rural African communities are often led by strong dictatorial leaders. Such leaders often dominate the participation process in a manner that directly benefits them, in particular when the flow of information is poor. A qualitative evaluation by IFAD of five CDD programs in Africa showed that some programs have managed to build a "pluralistic governance setting" and enhance partnerships within the community. However, this depends on the institutional setting and the political leadership (Pantanali, 2005).

One way to check the extent to which the CDD process was subject to "elite capture" is to examine whether the implemented projects were more aligned with the priorities of local elites or of the people, because if the deliberate decisionmaking process actually took place, project selection should reflect the community preferences. The development priorities of the people, based on different sources, are summarized in Table 4. There does not seem to be much difference between CDD and non-CDD communes. The order of priorities may differ depending on the respondents and the time of the survey but people generally identified their needs to be in transport, water and sanitation, eduction, health, and income generation (e.g. building of market places, youth employment, etc.). Transport, water and sanitation, and education were also the three domains that received large shares of INDH funding in the CDD component (22%, 25%, and 9%, respectively). Nevertheless, health and income generation activities received much less funding (5% and 3%, respectively), while much of the funding went to agricultural, social, and cultural infrastructure, despite their low priority in community needs. The distribution of project spending and INDH funding across all sectors is displayed in Table 5. This shows that there is some, but not full, representation of people's preferences in project choices. In the future, we plan to investigate the priorities of the local leaders and this will shed more light on the importance of the elites' preferences

versus those of the people.

Another explanation for the mixed results may relate to the heterogeneity of treatment across communes. Thus far, our analysis has focused on the estimation of a binary treatment effect, but not all implemented projects were equal in size or type. According to the administrative data of the INDH, on average, a CDD commune spent 12.6 million MAD ($1.5 million) on projects in the CDD (or rural) component and 3.1 million MAD on projects in the other two components (Table 6). Of these, the amounts of funding from the INDH program for each commune were 8.5 and 2.7 million MAD, respectively; and the rest came from other sources such as local government agencies, NGOs, or the communes themselves. Communes ineligible for the rural or CDD component spent on average 6.8 million MAD under the other two components, of which the INDH funding was 4.1 million MAD. Treated communes had more projects than control communes (43 compared with 13) and most of them were funded in the rural component. Conversely, project length is similar, with an average of 6 months. It should be noted that treated communes tended to spend less and receive less INDH funding in the other components.

To test if these differences are significant, we run an RDD using total project spending and INDH funding by commune as dependent variables (Table 7). In our sample, there is evidence that communes eligible for the CDD component spent significantly less on the other components, but the difference in terms of the money received from the INDH is not significant (columns 1 and 3). We also do the same analysis on the full population of communes that participated in the INDH (columns 2 and 4). At the optimal bandwidth, we again detect significant (and negative) differences in terms of project spending and the amount of funds coming from the INDH. As would be expected, differences are more precisely estimated in this larger sample but they are smaller in magnitude as we take into account communes far away from the cut-off. To sum up, at least in our sample, treated communes received similar amounts of INDH funding for the other components but substantially shifted activities (and money) to the CDD component.

The treatment intensity (in terms of total project spending and INDH funding) for the CDD component also does not seem to be correlated with exogeneous commune characteristics (Table 8). However, the total spending and INDH funding for the other two components appear to be significantly correlated with the poverty rate and population size. This means that communes with lower poverty rates (possibly non-CDD communes) as well as more populous communes tended to spend more and receive more INDH funding in the other components.

In a final step, we combine the administrative data on treatment intensity with our exper-

imental data. We can then investigate how this treatment intensity correlates with social capital in Table 9. In order to focus on treatment intensity rather than the treatment per se, we split the sample into treated and untreated communes. We find that spending on the CDD (rural) component is positively and significantly correlated with the likelihood of contributing to public goods. For each additional million MAD spent the likelihood goes up by 2.2 percentage points. The correlation is also significant with trustworthiness and altruism, and in the same direction as our RDD results on the binary treatment. Conversely, spending on the other components is uncorrelated with public goods contribution, trust, and altruism, both in treated and untreated communes. This underlines our results in demonstrating that social capital does not respond to non-CDD activities. The only exception is that trustworthiness is positively and significantly linked with spending in the other components in treated communes and negatively correlated in untreated communes. Although not reported here, we also divide the total spending into parts funded by the INDH program and parts funded by other sources and correlate them with the experimental behaviors. No systematic correlations appear. This suggests that the total amount of spending, *not* the source of funding, matters in the CDD component.

7 Conclusion

This paper estimates how local economic development and community participation affect social capital in the context of a rural CDD program in Morocco. The identification strategy based on a regression discontinuity design allows for isolation of the causal effect of the program. Our results indicate that the CDD program has improved public participation, in particular people's willingness to contribute to public goods in their communities, but from an already high sense of community responsibility. Further, there is a small and negative impact on trust that indirectly lowers trustworthiness. There are several hypotheses to explain this. One is that trust is low in rural Morocco to begin with, particularly when money is involved. Another possibility is that economic development makes people more cautious and critical, especially with their earnings. Finally, as households improve their welfare, they may become more independent, hence have to rely less on others. There is no significant impact on altruism, perhaps because this is a more inherent value that does not change in the short run. This research has also documented relatively high levels of patience and risk aversion in rural Morocco. These deeper preferences have remained unaffected by the social and economic development induced by the program. Social capital consists of fundamental personal and social values that take time to change. Our survey took place

only two years after the completion of the program so it may not yet capture the long-term change in these social behaviors.

Our results signal that the CDD approach may help enhance collective action, in line with the underlying principle of grassroots involvement in decentralized development. This is significant, given the Moroccan context where the centralized approach remains dominant. Before and in particular after the wake of the "Arab Spring", Morocco has gradually moved towards democratic reforms. These small steps may also explain the presence of positive, yet weak, impacts. The INDH program, with its demand-driven nature, is a first step towards decentralization in a country used to top-down policies. In the long term, this strengthened collective action could serve as an important building block for community development, as people begin to have a higher sense of ownership and responsibility toward the welfare of their community.

In this paper, we look only at average households. Local elites may respond differently to changes in the decisionmaking procedures. Finally, the causal chain between CDD and social cohesion depends on many channels, and it is important to identify which channel matters and in what context. Such an understanding would contribute to hypotheses about the causal mechanisms between CDD and social capital, as well as help figure out which aspects of the program should be enhanced in order for it to increase social capital. Further research is therefore needed to understand the robustness and dynamics underlying these results, especially how they eventually impact the sustainability of the program and the community's economic progress.

Tables

Table 1: Summary statistics

	Overall	Treated				Untreated				P-value
	Mean	N	Mean	Median	SD	N	Mean	Median	SD	Δ
Game behaviors										
Public good	0.67	358	0.69	1.00	-	371	0.65	1.00	-	*0.25*
Trust	3.93	175	3.91	5.00	2.35	175	3.94	5.00	2.62	*0.90*
Trustworthiness	7.02	193	7.42	10.00	5.08	195	6.62	5.00	5.16	*0.12*
Altruism	5.68	368	5.89	6.00	3.50	372	5.47	5.00	3.31	*0.10*
Risk taking	3.65	368	3.61	3.00	2.36	372	3.68	3.00	2.30	*0.69*
Patience	0.72	368	0.72	1.00	-	341	0.72	1.00	-	*0.90*
Participants										
Age	53.10	368	51.50	50.50	14.30	371	54.80	54.00	15.70	*0.00*
Male	0.90	368	0.90	1.00	-	372	0.89	1.00	-	*0.66*
Literacy	0.35	368	0.36	0.00	-	371	0.35	0.00	-	*0.81*
Household size	6.63	368	6.58	6.00	3.29	371	6.68	6.00	3.36	*0.68*
Poverty Map										
Poverty rate	29.74	31	30.41	30.34	0.27	30	29.05	29.02	0.62	0.00
Population size	8589.97	31	9197.74	9130.00	4236.46	30	7961.93	7512.00	4130.57	0.25
Poor people	2554.10	31	2797.16	2819.00	1287.01	30	2302.93	2188.50	1174.99	0.12
Road indicator	30.31	31	28.10	31.00	15.56	30	32.60	34.00	13.40	0.23
Schooling (in %)	35.28	31	34.84	35.00	5.54	30	35.73	36.50	4.96	0.51

Note: Patience is coded as the % of people who were willing to wait three days to receive any amount of money higher than 10 MAD today.

Table 2: The impact of CDD on experimental behaviors: baseline regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Public good	Trust	Trustworthiness	Altruism	Risk	Patience
Sample mean	*0.67*	*3.93*	*7.02*	*5.68*	*3.65*	*0.72*
CDD	0.190	-1.280	-1.830	0.162	-0.687	-0.026
SE	(0.079)*	(0.551)*	(1.100)	(0.498)	(0.442)	(0.078)
Clustered SE	(0.078)*	(0.410)*	(1.140)	(0.532)	(0.480)	(0.047)
Bandwidth	0.780	0.944	0.940	1.146	0.615	0.737
N	466	252	276	595	416	434

Note: Non-parametric RDD at the optimal bandwidth. No controls included. Standard errors clustered on the forcing variable (i.e. at the commune level). * significant at the 5% level.

Table 3: The impact of CDD on experimental behaviors: commune averages

	(1) Public good	(2) Trust	(3) Trustworthiness	(4) Altruism	(5) Risk	(6) Patience
Sample mean	*0.67*	*3.93*	*7.03*	*5.76*	*3.61*	*0.72*
CDD	0.141	-1.199+	-1.586	0.163	-0.427	-0.019
SE	(0.103)	(0.673)	(1.524)	(0.704)	(0.741)	(0.079)
Bandwidth	0.918	0.969	1.081	1.385	0.755	0.763
N	42	43	46	49	36	37

Note: Non-parametric RDD at the optimal bandwidth. No controls included. * significant at the 5%, + significant at 10% level.

Table 4: Development areas reported as top-3 priorities (in %)

	Individual		Household		Group		Commune	
	Treated	Untreated	Treated	Untreated	Treated	Untreated	Treated	Untreated
Transport	24.1	21.2	10.8	11.5	32.8	31	27	19
Water&sanitation	16.5	15.7			23.4	20.7	17	29
Health	25.5	26.4	11.9	16	31.3	31	2	8
Education	10.6	9.8	9.2	12	12.5	17.2	14	13
Income generation	6.1	8.1	20.1	19.1			19	14

Note: 740 individuals in 61 communes. Individual and group priorities are from the game survey in 2012; household and commune priorities are from the household and commune surveys in 2011.

Table 5: Total spending and INDH funding by project types (%)

	Treated				Untreated	
	CDD component		Other components		Other components	
	Spending	INDH funding	Spending	INDH funding	Spending	INDH funding
Agriculture	14.6	14.1	17.2	16.3	9.2	8.8
Income generation	3.1	3.1	5.0	5.4	7.0	6.7
Electrification	3.2	2.1	0.8	0.9	0.4	0.5
Water&sanitation	25.1	24.6	12.9	9.9	19.1	14.7
Education	8.3	9.1	12.5	15.2	14.5	18.0
Training	2.7	2.8	11.5	6.9	6.0	3.7
Health	5.7	5.7	9.6	12.1	5.9	6.2
Transports	21.0	22.2	8.0	8.0	10.1	10.2
Environment	0.5	0.6	1.6	1.3	1.4	1.1
Cultural&social	15.4	15.5	20.8	23.6	28.7	34.0
Housing	0.3	0.3	0.0	0.0	0.3	0.4

Table 6: Project summary statistics

	Overall	Treated				Untreated		Diff.
		CDD component		Other components		Other components		Other
	Mean	Mean	SD	Mean	SD	Mean	SD	P-value
Project spending	11.389	12.633	4.274	3.077	3.785	6.787	6.855	*0.01*
INDH funding	8.546	10.449	2.375	2.261	2.754	4.132	4.596	*0.06*
Nr. projects	28.3	35.5	16.4	7.2	6.5	12.7	9.3	*0.01*
Project length	6.10	5.97	2.77	5.75	2.55	5.61	2.33	*0.90*

Note: Project spending and INDH funding are in millions of MAD; project length is in months.

Table 7: Impact of CDD on project size and funding in other components

	(1)	(2)	(3)	(4)
(in mil. MAD)	Project spending		INDH funding	
CDD	-4.487	-1.467	-1.904	-1.144
SE	(1.915)*	(0.833)	(1.278)	(0.456)*
Clustered SE	(2.568)	(0.534)*	(1.527)	(0.291)*
Bandwidth	1.237	14.357	1.145	13.554
N	51	866	49	815
Sample	Games	All	Games	All

Note: Non-parametric RDD estimates at optimal bandwidth. No controls included. Standard errors clustered at the province level. * significant at the 5% level.

Table 8: Commune determinants of treatment intensity

	(1)	(2)	(3)	(4)
(in mil. MAD)	Project spending		INDH funding	
Component	CDD	Other	CDD	Other
Poverty rate	-0.715	-1.463*	0.944	-2.397*
	(5.663)	(0.561)	(3.305)	(0.823)
Pop. size (in 1000s)	0.305	0.346*	0.138	0.487*
	(0.409)	(0.124)	(0.238)	(0.182)
Road indicator	-0.037	-0.025	0.030	-0.046
	(0.106)	(0.036)	(0.062)	(0.053)
Schooling (in %)	-0.029	-0.006	-0.101	0.021
	(0.333)	(0.111)	(0.194)	(0.162)
Altitude	0.004	-0.002	0.003	-0.004
	(0.005)	(0.002)	(0.003)	(0.002)
Temperature	0.096	-0.035	0.036	-0.078
	(0.132)	(0.039)	(0.077)	(0.057)
Rainfall	0.009	-0.002)	0.004	-0.003
	(0.016)	(0.004)	(0.009)	(0.005)
N	31	61	31	61

Note: * significant at the 5% level.

Table 9: Exploring treatment heterogeneity

	(1) Public goods	(2) Trust	(3) Trustworthy	(4) Altruism	(5) Risk taking	(6) Patience
Treated						
CDD component	0.022*	-0.029	-0.114*	0.108	-0.077	-0.007
(in mil MAD)	(0.007)	(0.036)	(0.035)	(0.059)	(0.040)	(0.006)
Other components	-0.005	0.019	0.083	0.089	0.107*	0.017
(in mil MAD)	(0.008)	(0.033)	(0.044)	(0.058)	(0.046)	(0.010)
Poverty rate	-0.020	-0.749	-0.986	-0.625	-2.510*	0.024
	(0.108)	(0.536)	(1.087)	(0.886)	(0.592)	(0.093)
N	358	175	193	368	368	368
Untreated						
Other components	-0.005	0.026	-0.112*	0.034	-0.026	-0.002
(in mil MAD)	(0.007)	(0.036)	(0.036)	(0.028)	(0.016)	(0.005)
Poverty rate	0.057	-0.894*	0.778*	0.328	-0.301	-0.112*
	(0.068)	(0.287)	(0.302)	(0.433)	(0.246)	(0.038)
N	370	174	195	371	371	340

Note: Controls include commune population, road and school indicators, # players, male, age, literacy (individual and commune means) as well as region dummies. The trustworthiness model also includes the amount sent. Standard errors are clustered at the commune level. * significant at the 5% level.

Figures

Figure 1: Project spending by commune and component

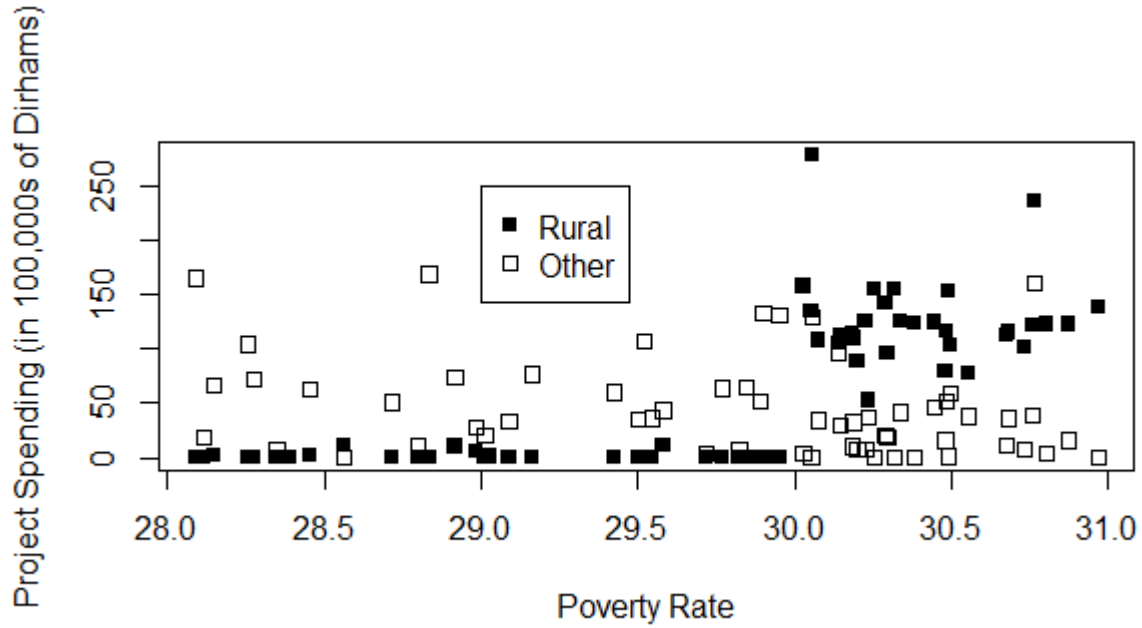
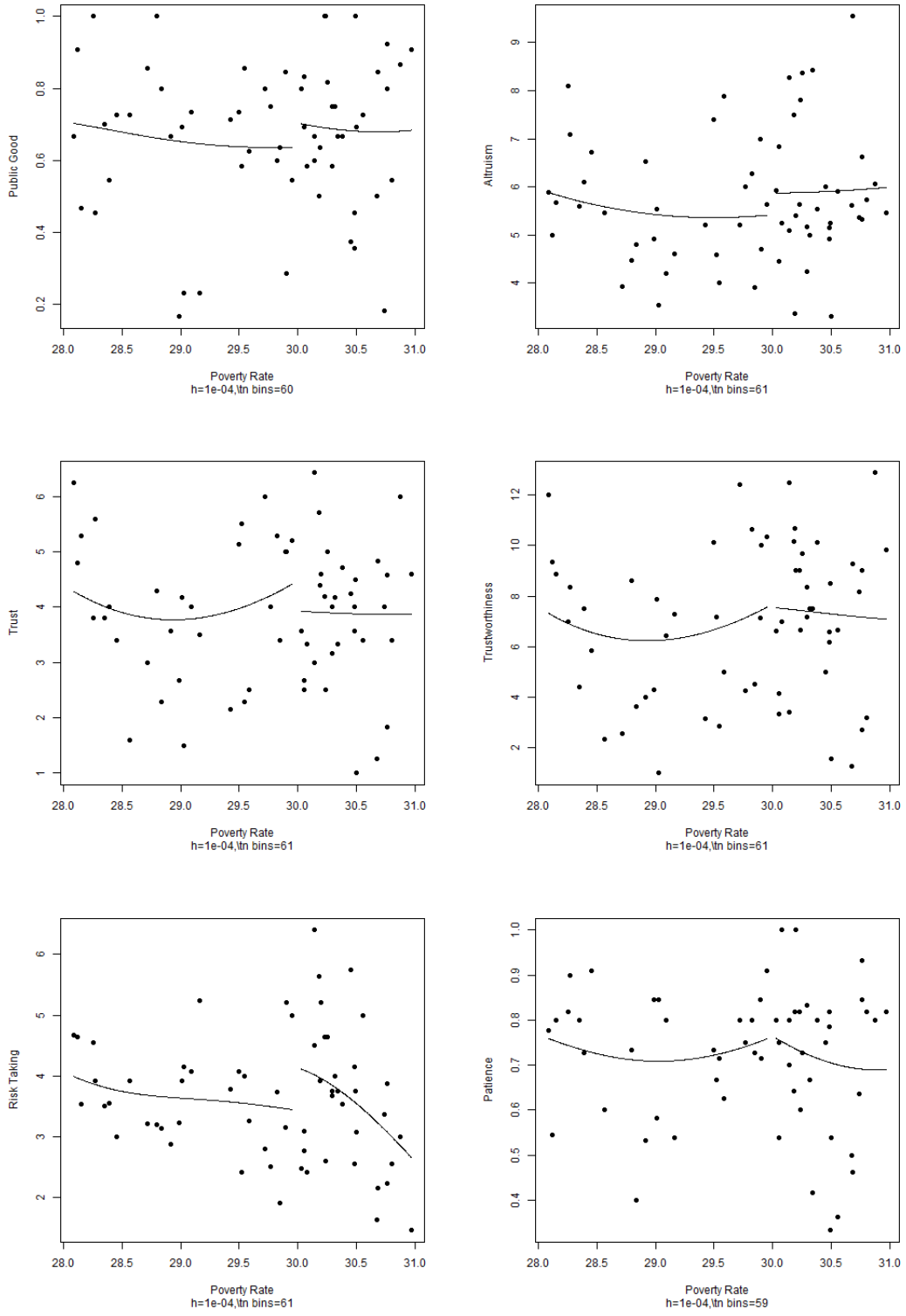


Figure 2: Visual inspection of the discontinuities



Note: Since there is a lot of heterogeneity across communes for each of the outcomes, it is hard to pick out any discontinuities. To facilitate this we added local smooths.

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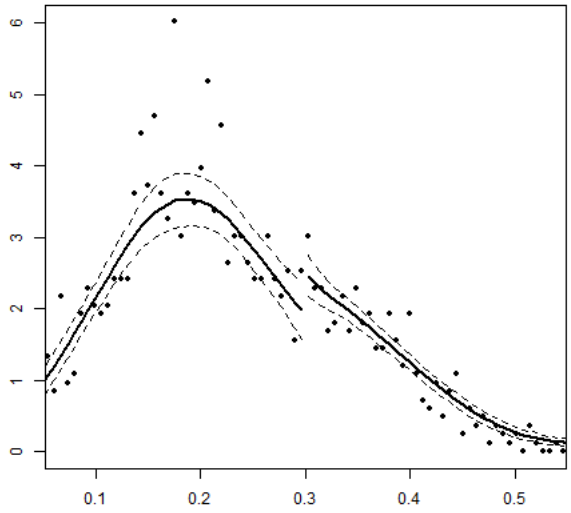
Appendix

Internal validity tests

Figure 3: Test of manipulation around the discontinuity following McCrary (2008)



Note: Kernel density of the poverty rate across all Moroccan communes. With a p-value of 16% we fail to reject the null hypothesis of no sorting around the 30% eligibility threshold.

Table 10: Test for discontinuities in exogenous commune characteristics: non-parametric RDD

	(1)	(2)	(3)	(4)
	Poverty map (2004)			
	Population size	Poor people	Schooling (in %)	Road indicator
CDD	-1829.690	-468.524	-3.296	-0.981
SE	(2790.054)	(839.573)	(4.512)	(0.950)
Bandwidth	1.443	1.445	1.293	1.151
N	53	53	52	49
	Geographical data			
	Mean temperature	Rainfall (in mm)	Altitude	Ntl. road (in logs)
CDD	-1.388	-329.056	-410.923	0.013
SE	(3.679)	(244.555)	(636.619)	(0.226)
Bandwidth	1.025	0.842	1.115	0.861
N	48	42	49	42

Note: Unconditional estimates, no co-variates included. Standard errors are below estimates in brackets.

Table 11: Test for discontinuities in attendance to game sessions and exogenous individual characteristics: non-parametric RDD

	(1)	(2)	(3)	(4)	(5)	(6)
	Show-up	Nr. players	Sex	Head	Age	Literacy
CDD	-0.043	0.167	-0.027	0.011	-9.988	0.152
SE	(0.062)	(1.406)	(0.049)	(0.036)	(2.546)*	(0.063)*
Clustered SE	(0.057)	-	(0.037)	(0.062)	(1.922)*	(0.060)*
Bandwidth	0.904	0.809	0.601	1.484	0.808	1.459
N	683	41 communes	416	650	487	650

Note: Unconditional estimates, no co-variates included. Standard errors (clustered at the commune level) are below estimates in brackets. * significant at the 5% level.

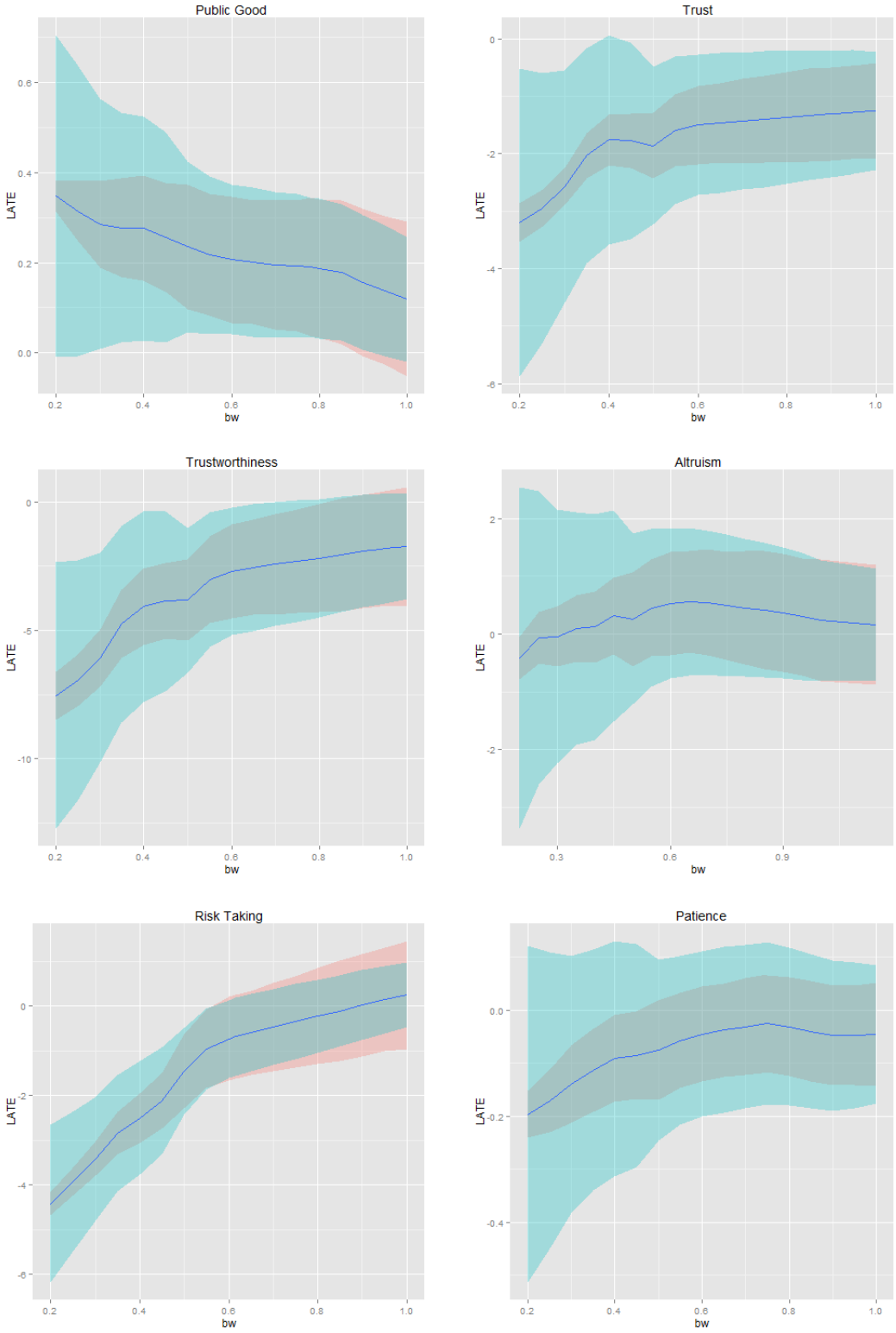
Robustness checks

Table 12: Non-parametric RDD - robustness to inclusion of controls: public goods contribution

Public goods	(1)	(2)	(3)
CDD	0.190	0.236	0.185
SE	(0.079)*	(0.101)*	(0.106)
Clustered SE	(0.078)*	(0.067)*	(0.093)*
Bandwidth	0.780	0.780	0.780
N	466	466	466
Controls	No	Yes	No
Region Dummies	No	No	Yes

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

Figure 4: Sensitivity of impact estimates to varying bandwidths



Note: Non-parametric local linear regression model with 95% confidence bands (standard errors in green and clustered standard errors at the commune level in red).

Table 13: CDD impact on public goods contribution: OLS and Logit RDD

Public goods	(1)	(2)	(3)	(4)	(5)
			OLS		
CDD	0.069	0.158	0.088	0.285	0.789
SE	(0.065)	(0.094)	(0.128)	(0.167)	(0.236)*
Clustered SE	(0.082)	(0.116)	(0.161)	(0.196)	(0.291)*
			Logit		
CDD	0.303	0.753	0.341	1.343	3.515
SE	(0.290)	(0.438)	(0.589)	(0.770)	(1.122)*
Clustered SE	(0.361)	(0.526)	(0.715)	(0.858)	(1.323)*
Order	1	2	3	4	5

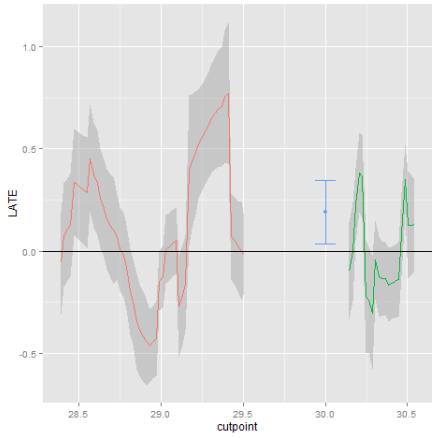
Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

Table 14: Placebo cut-offs at the median left and right of the actual cut-off

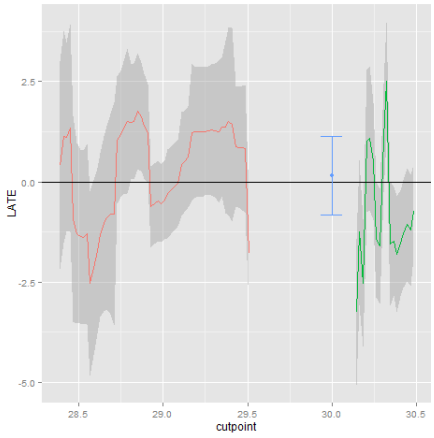
	(1)	(2)	(3)	(4)	(5)	(6)
Median placebo	Left	Right	Left	Right	Left	Right
Public good						
CDD	-0.222	-0.131	-0.407	-0.308	0.125	-0.054
SE	(0.082)*	(0.090)	(0.210)	(0.103)*	(0.112)	(0.098)
Clustered SE	(0.165)	(0.105)	(0.123)*	(0.088)*	(0.140)	(0.108)
Trust						
CDD	-0.810	0.409	-4.350	0.045	0.039	1.510
SE	(0.652)	(0.683)	(2.030)*	(1.344)	(0.946)	(0.914)
Clustered SE	(0.555)	(0.432)	(1.100)*	(0.428)	(0.343)	(0.347)*
Trustworthiness						
CDD	0.966	1.758	0.524	0.695	1.002	4.358
SE	(1.108)	(1.299)	(2.585)	(2.534)	(1.226)	(1.659)*
Clustered SE	(1.451)	(0.807)*	(2.325)	(0.557)	(1.153)	(0.294)*
Altruism						
CDD	-1.403	2.444	-2.016	0.831	-1.101	2.068
SE	(0.549)*	(0.768)*	(1.701)	(1.182)	(0.777)	(0.974)*
Clustered SE	(0.301)*	(0.654)*	(0.687)*	(0.631)	(0.245)*	(0.663)*
Risk taking						
CDD	1.240	0.165	0.557	0.214	0.766	0.337
SE	(0.363)*	(0.532)	(0.900)	(1.072)	(0.493)	(0.715)
Clustered SE	(0.375)*	(0.131)	(0.648)	(0.368)	(0.236)*	(0.178)
Patience						
CDD	0.153	-0.131	-0.113	-0.115	0.126	-0.061
SE	(0.087)	(0.094)	(0.307)	(0.125)	(0.122)	(0.115)
Clustered SE	(0.075)*	(0.121)	(0.077)	(0.114)	(0.054)*	(0.123)
Controls	No	No	Yes	Yes	No	No
Region dummies	No	No	No	No	Yes	Yes

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

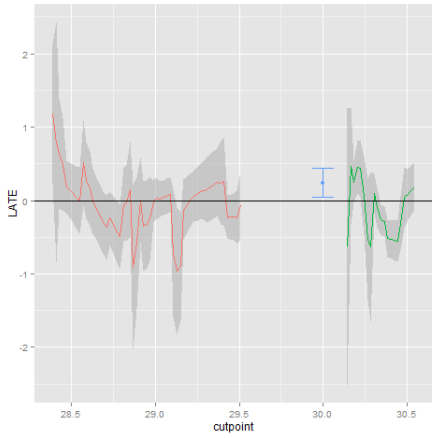
Figure 5: Placebo regressions: public goods and altruism



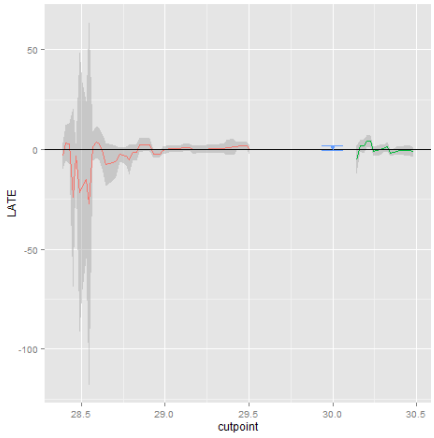
Public goods



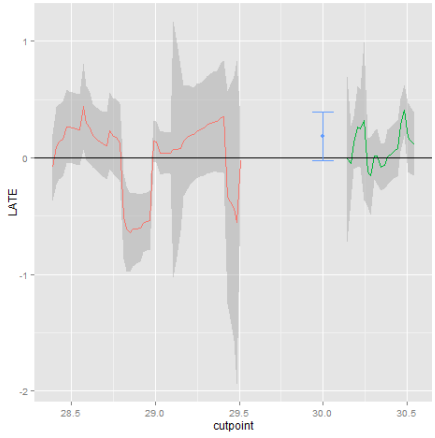
Altruism



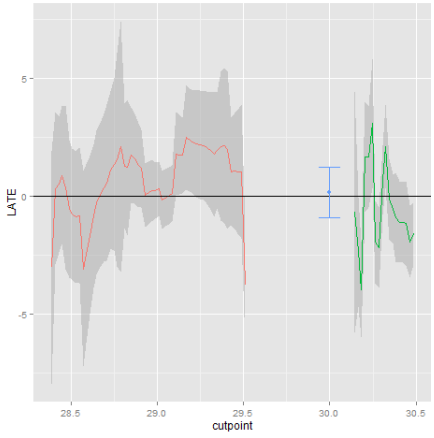
Public goods - with co-variates



Altruism - with co-variates



Public goods - with region dummies



Altruism - with region dummies

Note: Non-parametric local linear regression model with 95% confidence bands (unclustered standard errors).

Table 15: Non-parametric RDD - robustness to inclusion of controls: trust

Trust	(1)	(2)	(3)
CDD	-1.280	-0.884	-0.814
SE	(0.551)*	(0.680)	(0.621)
Clustered SE	(0.410)*	(0.376)*	(0.404)*
Bandwidth	0.944	0.944	0.944
N	252	252	252
Controls	No	Yes	No
Region dummies	No	No	Yes

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

Table 16: CDD impact on trust: OLS and Poisson RDD

Trust	(1)	(2)	(3)	(4)	(5)
			OLS		
CDD	-0.235	-1.469	-2.220	-3.536	-3.168
SE	(0.492)	(0.707)*	(0.959)*	(1.250)*	(1.785)
Clustered SE	(0.613)	(0.751)*	(0.733)*	(1.026)*	(1.477)*
			Poisson		
CDD	-0.060	-0.345	-0.541	-0.872	-0.803
SE	(0.099)	(0.139)*	(0.196)*	(0.264)*	(0.370)*
Clustered SE	(0.155)	(0.182)	(0.193)*	(0.276)*	(0.383)*
Order	1	2	3	4	5

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

Table 17: Non-parametric RDD - robustness to inclusion of controls: trustworthiness

Trustworthiness	(1)	(2)	(3)	(4)
CDD	-1.830	-1.090	-0.131	0.362
SE	(1.100)	(1.330)	(1.216)	(0.682)
Clustered SE	(1.140)	(1.050)	(1.185)	(0.644)
Bandwidth	0.940	0.940	0.940	0.940
N	276	276	276	276
Controls	No	Yes	No	Amount sent
Region dummies	No	No	Yes	No

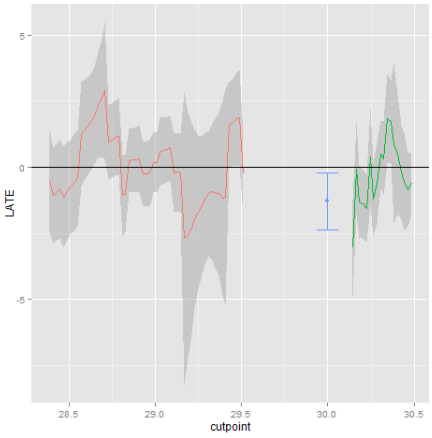
Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level.

Table 18: CDD impact on trustworthiness: OLS and Poisson RDD

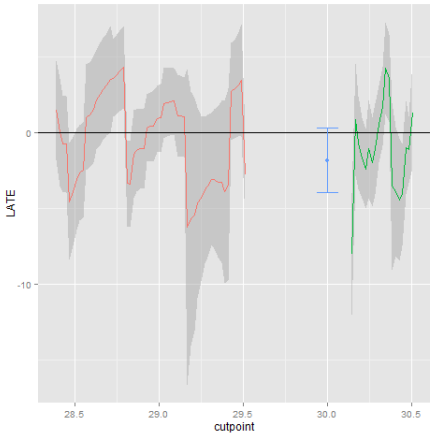
Trust	(1)	(2)	(3)	(4)	(5)
			OLS		
CDD	0.318	-2.282	-4.483	-7.850	-7.131
SE	(0.964)	(1.377)	(1.838)*	(2.389)*	(3.390)*
Clustered SE	(1.485)	(1.961)	(2.045)*	(2.638)*	(3.802)
			Poisson		
CDD	0.044	-0.314	-0.606	-1.080	-1.014
SE	(0.071)	(0.098)*	(0.140)*	(0.189)*	(0.261)*
Clustered SE	(0.210)	(0.249)	(0.290)*	(0.402)*	(0.549)
Order	1	2	3	4	5

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

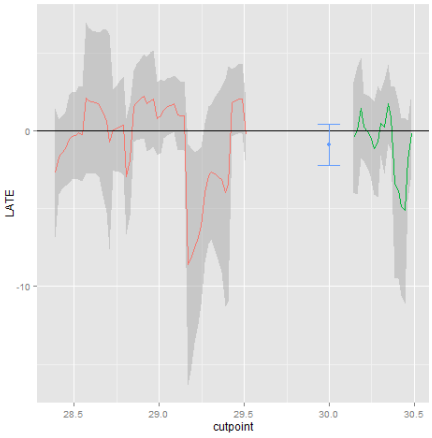
Figure 6: Placebo regressions: trust and trustworthiness



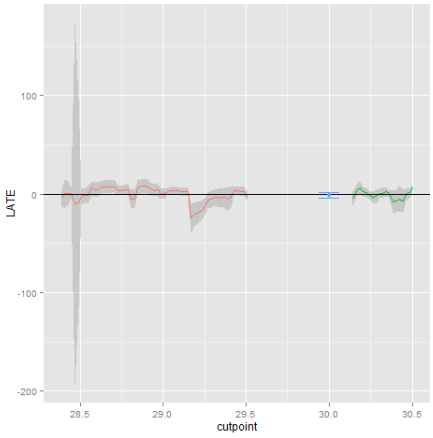
Trust



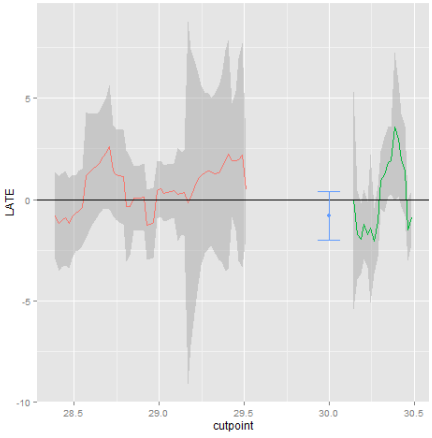
Trustworthiness



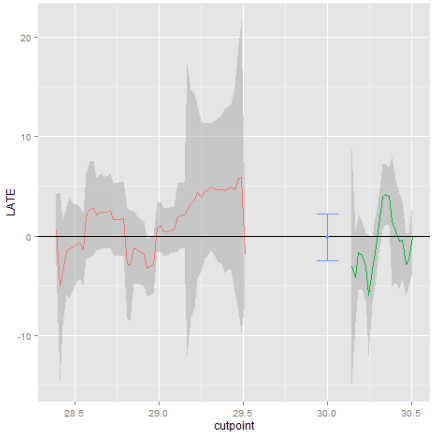
Trust - with co-variates



Trustworthiness - with co-variates



Trust - with region dummies



Trustworthiness - with region dummies

Note: Non-parametric local linear regression model with 95% confidence bands (unclustered standard errors).

Table 19: Non-parametric RDD - robustness to inclusion of controls: altruism

Altruism	(1)	(2)	(3)
CDD	0.162	0.836	0.164
SE	(0.498)	(0.610)	(0.544)
Clustered SE	(0.532)	(0.626)	(0.514)
Bandwidth	1.146	1.146	1.146
N	595	595	595
Controls	No	Yes	No
Region dummies	No	No	Yes

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level.

Table 20: CDD impact on altruism: OLS and Poisson RDD

Altruism	(1)	(2)	(3)	(4)	(5)
			OLS		
CDD	0.628	0.044	0.178	0.353	-1.328
SE	(0.464)	(0.680)	(0.929)	(1.208)	(1.713)
Clustered SE	(0.611)	(0.809)	(0.994)	(1.276)	(1.684)
			Poisson		
CDD	0.112	0.005	0.025	0.071	-0.220
SE	(0.057)*	(0.083)	(0.113)	(0.151)	(0.213)
Clustered SE	(0.108)	(0.139)	(0.170)	(0.230)	(0.292)
Order	1	2	3	4	5

Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level. * significant at the 5% level.

Table 21: Non-parametric RDD - robustness to inclusion of controls: risk taking and patience

	(1)	(3)	(4)
	Risk taking		
CDD	-0.687	-0.157	0.13
SE	(0.442)	(0.554)	(0.593)
Clustered SE	(0.48)	(0.391)	(0.384)
Bandwidth	0.615	0.615	0.615
N	416	416	416
	Patience		
CDD	-0.026	-0.057	0.092
SE	(0.078)	(0.099)	(0.100)
Clustered SE	(0.047)	(0.046)	(0.065)
Bandwidth	0.737	0.737	0.737
N	434	434	434
Controls	No	Yes	No
Region Dummies	No	No	Yes

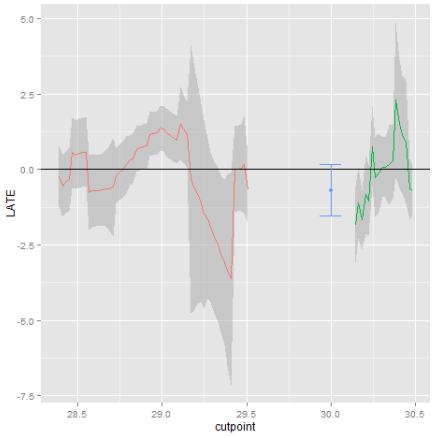
Note: Controls include individual and commune characteristics (see descriptive statistics in Table 1). Standard errors are clustered at the commune level.

Table 22: CDD impact on risk taking and patience: OLS and parametric RDD

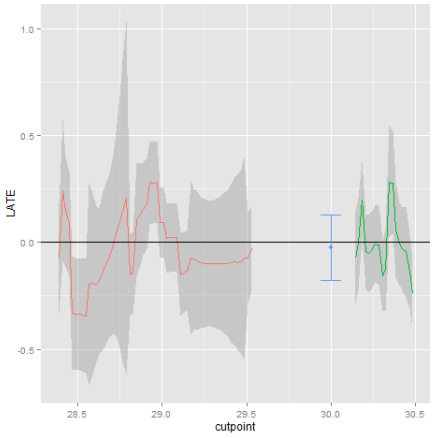
	(1)	(2)	(3)	(4)	(5)
Risk taking			OLS		
CDD	0.746	-0.438	-1.022	-3.122	-5.811
SE	(0.314)*	(0.457)	(0.621)	(0.803)*	(1.132)*
Clustered SE	(0.582)	(0.796)	(0.937)	(0.905)*	(1.065)*
Risk taking			Poisson		
CDD	0.203	-0.146	-0.289	-0.892	-1.600
SE	(0.070)*	(0.105)	(0.146)*	(0.194)*	(0.269)*
Clustered SE	(0.154)	(0.214)	(0.265)	(0.241)*	(0.272)*
Patience			OLS		
CDD	-0.002	0.031	-0.097	-0.181	-0.225
SE	(0.062)	(0.089)	(0.123)	(0.160)	(0.227)
Clustered SE	(0.057)	(0.090)	(0.113)	(0.145)	(0.161)
Patience			Logit		
CDD	-0.010	0.186	-0.603	-0.946	-1.365
SE	(0.310)	(0.490)	(0.675)	(0.848)	(1.293)
Clustered SE	(0.289)	(0.534)	(0.654)	(0.769)	(0.973)
Order	1	2	3	4	5

Note: Controls include individual and commune characteristics (see descriptive statistics in Table1). Standard errors are clustered at the commune level. * significant at the 5% level.

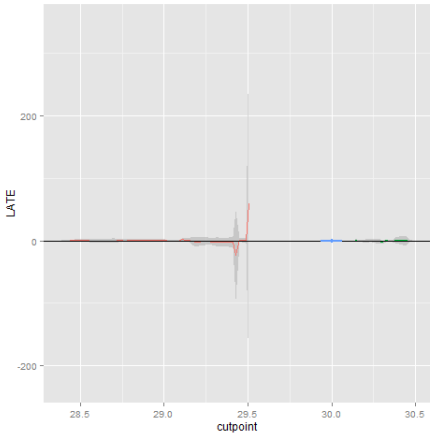
Figure 7: Placebo regressions: risk taking and patience



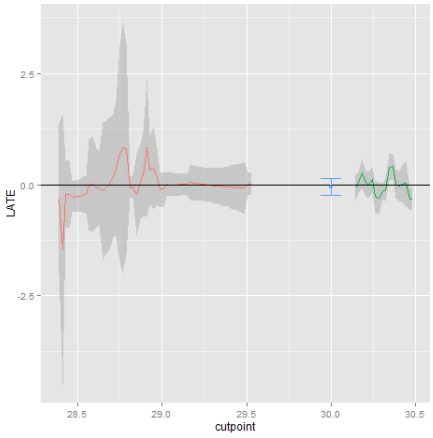
Risk taking



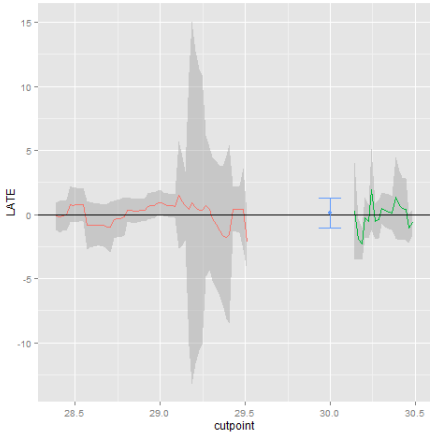
Patience



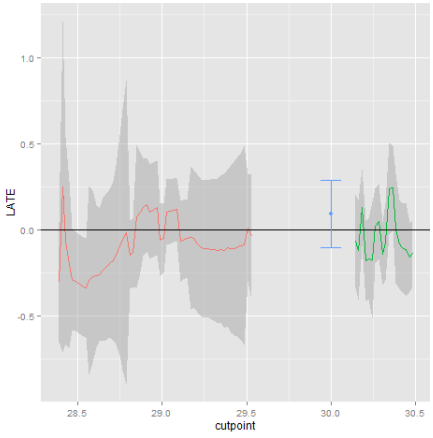
Risk taking - with co-variates



Patience - with co-variates



Risk taking - with region dummies



Patience - with region dummies

Note: Non-parametric local linear regression model with 95% confidence bands (unclustered standard errors).