FOR THE GREATER GOOD:

PRIVATE CONTRIBUTIONS TO PUBLIC GOODS IN RURAL GHANA[†]

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Abstract

This paper presents the results of a field experiment measuring the willingness of individuals in rural Ghana to donate to local public projects. Individuals were invited five times during 2009 to contribute to a public good for their community. The experiment tested two techniques commonly used to encourage charitable contributions: a matching grant, and a provision point mechanism. The results offer the first empirical evidence on the effectiveness of these mechanisms in a developing country setting, and the first comparison of the mechanisms in a field experiment. While both mechanisms increased donations, the provision point mechanism had a considerably larger effect. Intriguingly, increasing the ratio of the matching grant only increased men's donations. I use household survey data to examine what characteristics explain individual contribution decisions. I find that the most trusted members of the community donated more, and that new migrants were more generous in donating than other residents.

Keywords: public goods; provision point mechanism; field experiment; social networks.

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1. Introduction

This study is concerned with the process of community fundraising for local infrastructure projects. Evaluative studies have found that infrastructure is better targeted, lasts longer and works better if community members are required to contribute to its cost (Jimenez and Paqueo, 1996; Kleemeier, 2000). There are a number of arguments in favor of seeking financial contributions from community members. First, community members should be willing to pay something for facilities that they use and value. Provided private contributions approximately reflect individuals' true social valuations, a community fund-raising initiative serves as an ex-ante test of the community's demand for the proposed infrastructure.[1] Second, making a financial contribution to infrastructure encourages community members to become involved in other aspects of the project, and supports maintenance of the facility once built.[2] Third, funds raised from community contributions augment those provided by central government and donors, increasing the number of projects which can be completed with a given government or external donor budget. Community contributions thus reinforce the objectives of decentralized public goods provision, promoting local ownership and improving the targeting and mobilization of resources.

This paper examines the factors affecting the willingness of individuals to contribute to

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[1] The notion of seeking community opinion on which projects to pursue is referred to in the literature as *preference targeting*. Evidence on its effectiveness is scarce. In a study of Jamaican Social Funds, Rao and Ibáñez (2005) find that better-networked and elite members of the community tended to dominate the choice of projects, though in the long run there were high degrees of satisfaction with the projects among all community members.

[2] For instance, in her study of piped water schemes in Malawi, Kleemeier (2000) concludes that the infrastructure might have lasted longer had community members been charged user fees to fund maintenance.

local public goods. The results come from a field experiment conducted in four rural communities in southern Ghana during 2009. Survey participants were visited five times during the year, given a small cash endowment and invited to donate to a community infrastructure project.

If individuals contribute towards the cost of local infrastructure, it would be ideal to elicit contributions in a way that captures their valuation of the project. Projects that are not sufficiently valued by the community might thereby be reconsidered or redesigned. However, because of the free-rider problem, private contributions will likely understate private demand. In the experiment, two mechanisms designed to alleviate the free-rider problem were tested: the matching grant, and the provision point mechanism (PPM). The ratio of the matching grant was varied randomly across participants and rounds, while the PPM was introduced for all participants in the last two rounds of the experiment.

The participants in the experiment concurrently took part in a comprehensive household survey, which collected detailed data on individual and household characteristics and the in-sample social network. Pairing these data with the experimental results, I explore the characteristics associated with larger donations. This allows me to test in depth various hypotheses about private contributions to public goods. For instance, previous studies have identified social capital as crucial to the success of community-driven development projects (Isham and Käkhönen, 2002). In smaller and more ethnically concentrated communities, individuals have greater economic interdependence and therefore may be more susceptible to social sanction. This should make them more willing to contribute to public goods (Fehr and Gächter, 2000). Empirical evidence from Kenya (Miguel and Gugerty, 2005) and from Ghana (Akramov and Asante, 2009) suggests that the quality of public goods is poorer in places with

greater ethnic diversity. With a sample of four communities I cannot draw conclusions about the effects of ethnic heterogeneity or population size on aggregate behavior. However, using a unique dataset on the social networks of the study communities I focus on how social attitudes, position in the social network, ethnicity and social status affect individual behavior.

This study makes a number of novel contributions. To my knowledge it is the first field experiment to assess the public goods contributions behavior of individuals in a developing country, and the first to test the matching grant and provision point mechanism in this context. An interesting result hitherto unseen in the literature is that the response of donations to the ratio of the matching grant is significant only for men. Furthermore, this is the first study that compares the relative effectiveness two incentive mechanisms. I also provide the first experimental evidence on how individual characteristics affect public goods contributions, an important factor in understanding the relationship between status, the social network and development in rural communities. The results of this study have implications for the design of effective development policy, and for our overall understanding of economic behavior.

The paper is structured as follows. In Section 2, I describe the existing literature on the matching grant and provision point mechanism. In Section 3, I describe the sampling procedure used to select participants, and the household survey in which they took part. Section 4 presents the design of the public goods experiment, and the choice of the public project in each community. In Section 5, I discuss the qualitative results of the experiment. I then look more closely at the results using econometric models in Section 6. Section 7 presents a discussion of the policy implications stemming from my findings, and Section 8 offers concluding remarks.

4

2. Incentive mechanisms in theory and practice

It is well known that public goods provision is hampered by the free-rider problem. Where individuals bear the cost of funding public projects through individual voluntary contributions (commonly referred to as the voluntary contributions mechanism, or VCM), individuals' donations typically fall short of their true private valuation of the project (Bagnoli et al., 1992; Fischbacher et al., 2001). Various mechanisms have been proposed in which the Nash equilibrium is for individuals to reveal their true private valuations (Clarke, 1971; Groves and Ledyard, 1977; Smith, 1979). But these mechanisms are too complex to be employed in most real-world applications. Accordingly, a number of second-best mechanisms have been tested experimentally in the laboratory and in the field.[3] The two mechanisms I test in this paper are the matching grant and the provision point mechanism.

A matching grant is a promise made by some authority or individual to match private contributions in some fixed proportion. For instance, a philanthropic benefactor might pledge to match others' contributions, or the government might offer an income tax deduction for donations to registered charities. Matching grants should in theory boost contributions relative to the VCM, since they effectively reduce the 'price' of a given contribution to a public good. Laboratory experiments have confirmed this hypothesis (Eckel and Grossman, 2003; Baker et al., 2009). Evidence from field experiments, however, suggests that the effect of the match ratio is not large. Rondeau and List (2008) found that the matching donation did not have a positive effect at all. In a study by Meier (2007), a matching grant boosted contributions initially, but its subsequent removal actually caused contributions to fall. Using data from a fund-raising campaign in the U.S., Karlan and List (2007) found that a match offer boosted response rates and

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[3] There are many such mechanisms, the discussion of which is beyond the scope of this paper. List (2007) provides a recent summary of the experimental evidence on the effectiveness of these mechanisms.

the average amount donated, but changing the match ratio had little effect on the amount donated. In other words, to the extent that the match ratio has any effect at all, the price elasticity of donations appears to decay rapidly as the match offer increases.

The provision point mechanism (PPM) consists of a fund-raising target and a money-back guarantee. To fund a public project, the planner first announces a fund-raising target to the community and then invites voluntary contributions. If the sum of these contributions falls short of the target, the project does not go ahead and all contributions are refunded. Otherwise, the project is implemented.[4] The PPM has been tested in the laboratory using an induced value framework, with varying results. Rondeau et al. (1999) found that the PPM elicited contributions equal to private valuations. In similar studies by Isaac et al. (1989), Bagnoli and McKee (1991) and Poe et al. (2002), contributions under the PPM were higher than under the VCM – and provision of the public good more likely – but the mechanism fell short of being fully demand revealing. Rondeau et al. (2005) compared the VCM with the PPM in the laboratory and in a small field experiment, and found that the PPM induced generally higher contributions. However, the main effect of the PPM was felt at the top of the distribution (increasing the largest donations). The PPM is well suited to the provision of lumpy goods, where the target is binding as the minimum amount of money for which the good can plausibly be delivered. It is also simple to explain and implement. However, there is only limited evidence on the effectiveness of the PPM in real-world applications. Rose et al. (2002) found that the PPM increased the rate of participation in a green energy program substantially above that of a treatment group.

There are various methods for dealing with contributions above the threshold. The nature of this rebate rule matters to the optimality of equilibria. Marks and Croson (1998) tested three

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[4] Early proofs of the efficacy of this mechanism were given by Palfrey and Rosenthal (1984) and Bagnoli and Lipman (1989).

such methods in the laboratory: a no-rebate policy, where excess donations are discarded; a proportional rebate, in which the excess funds are divided among the donors in proportion to their contributions; and a utilization policy, in which excess funds are spent on the public good. They found that average contributions were significantly higher under the utilization policy than under the no-rebate and proportional rebate policies. In this study I adopt the utilization policy.

This is to my knowledge the first field experiment to test the effectiveness of the matching grant and PPM in a developing country. Moreover, these two mechanisms are tested in such a way that I can assess not only their effectiveness relative to a simple voluntary contributions mechanism (VCM), but also relative to each other. Such a comparison has not hitherto been performed in the literature.

3.   Sample and household survey

The field experiments were conducted between March and December 2009 in conjunction with a year-long household survey in four communities in Akwapim South district, in the Eastern Region of Ghana. The survey was part of a three-wave panel, the first two waves having been conducted in 1997-98 (Udry and Goldstein, 1999) and 2004 (Vanderpuye-Orgle, 2008). All four communities are quite poor. During 2009, mean per capita consumption ranged from GH¢54.42 to GH¢75.58 per month across the four communities.[5] At the time of the experiment, all of the communities lacked some basic public services.[6] In informal discussions, community members stated that the poor state of public infrastructure in part reflects a lack of accountability of the providers and a lack of ownership of the projects by the local community. If community members were responsible for part of the cost of these projects, they might be more inclined to

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[5] During 2009, one Ghana cedi (GH¢) averaged about 69 US cents. Converting without PPP adjustment, this equates to mean per capita consumption between $1.24 and $1.72 per day.
[6] For further details, see Walker (2011).

report defects in the work and take responsibility for the maintenance of the facilities.

The sample for the survey and experiment consisted of approximately 70 households in each of the four communities. According to the initial listing in January 2009, the four communities had between 180 and 580 households, so that the sample covers between 12 and 40 percent of their total populations.[7] Around half of the surveyed households were part of the initial 1997-98 sample, and the rest were recruited in January 2009 using stratified random sampling.[8] In the original sample, and in the 2009 re-sampling, we selected only from the pool of households headed by a resident married couple. However, we retained households from the 1997-98 sample even if only one of the spouses remained. These 'single-headed households' account for between 7 and 15 of the sample households in each community. Thus around 150 individuals participated in the experiment in each of the four communities (Table 1).

The head and spouse(s) of each selected household were interviewed five times during 2009, once every two months.[9] The household survey covered a wide range of subjects, including personal income, farming and non-farm business activities, gifts, transfers and loans, and household consumption expenditure. In addition, we conducted a detailed survey of respondents' in-sample social networks. The social network survey was conducted in the first round. Each respondent was asked in turn about every other respondent in the sample from his or her community. We asked whether they knew the person, by name or personally, how often they saw them, whether they were related, how strong they perceived the friendship to be, whether they had given or received anything of value from the person, and whether they would trust the

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[7] Including children, the estimated populations were 706 in Oboadaka, 1,270 in Konkonuru, 1,768 in Darmang and 2,283 in Pokrom.

[8] New sample members were selected randomly from the subset of households in the community headed by a married couple. The sample was stratified by age of the head into three categories: 18-29, 30-64 and 65+, so that the shares of households whose head was in each of these age categories corresponded to the population shares. The stratification was designed to reinstate representativeness given that households with heads under 30 did not exist in 1997-98, and those with heads over 65 had suffered greater natural attrition.

[9] Some men in the sample had two or three wives, all of whom were included in the sample.

person to look after a valuable item for them. From these data I construct various measures of the respondent's bilateral social network, reflecting both each individual's responses about others in the sample, and the others' aggregated responses about the individual. Summary statistics of the variables used in this study are shown in the first column of Table 2.

4.   Experimental design

We conducted five rounds of the public goods experiment, each two weeks prior to the start of the household survey round. The first was conducted prior to the second round of the survey, and the fifth followed the final round of the survey.

Before the experiments began, we held an open meeting in each community. We did not provide details of the experiment, but explained that participants would be given money for their time in the survey, and would be invited to donate to a public good. Supposing the community could raise around GH¢1,000, what would they most like to spend that money on? We gave only a few guidelines: it had to be a self-contained public project, affordable with that amount of money. The community members suggested a number of projects, which were then categorized as feasible or infeasible depending on their cost. Those at the meeting then voted on which of the feasible projects to pursue.[10] The final choices were: renovation of primary school toilets in Konkonuru; construction of a maternity ward for an existing health clinic in Oboadaka; a second public toilet block in Pokrom; and renovation of the junior secondary school (JSS) in Darmang. We informed the community members that their choice could be changed later on, provided there was majority community support for the change.

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[10] A number of studies have considered the effect of voting itself as a contextual mechanism for enhancing contributions (for example, Messer et al. 2007; Olken 2010). In a study of four communities I could not test this claim, but considered voting the fairest way of establishing community consensus on a single project. This choice is supported by the results of Olken (2010).

The experiments were conducted by the survey enumerators.[11] Respondents were called on a given day to report to the local primary school, where they signed in and took a ticket with their individual ID number written on it. One by one, they were invited into a closed classroom to receive their endowment and make a donation if they wished. Participants received a randomized match offer (described below) and, in the last two rounds of the experiment, the PPM was implemented and described to all participants. Care was taken to keep the solicitations private, and the amounts each individual donated were not disclosed to any other community member or participant. Only an interviewer and a record keeper (who took a written note of the donation) were witness to the respondent's decision.[12]

Upon entering the room, the respondent was seated at a desk facing the interviewer and record keeper. The interviewer explained (in Twi, the local language, as most of the respondents did not speak English) that the respondent was to receive a small amount of money (endowment) for their time and co-operation in the previous round's survey.[13] Since most respondents were poor and often short of cash, the endowment was designed to 'even the playing field' of cash-on-hand across respondents, removing potentially contaminating differences in ability to contribute among respondents. The endowment varied by round. Respondents were each given GH¢1 in round 1; GH¢2 in rounds 2 and 3; GH¢4 in round 4; and GH¢6 in round 5. This variation was designed to permit estimation of the income elasticity of demand for donations, and to test whether the size of the endowment was a binding constraint on larger donations.

The interviewer then explained that the team was raising money for a public project, and

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[11] The enumerators were all Ghanaians, both male and female, and came from all over the country. None of them came from the study area or knew any of the respondents before the start of 2009.

[12] It was impossible in this context for donations to be anonymous to the researchers and still be individually matched and linked to individual characteristics. The key objective was to remove the effect of coercion on participants' donation decisions.

[13] The endowment was deliberately framed as payment for the survey to reduce any 'endowment effect' in the experiment. To this end, respondents were told during the survey rounds how much they would be paid for their interview, and given a small ticket to 'redeem' their payment.

briefly described the project chosen by that community. The respondent was invited to donate to the project, but was not compelled to. Any donation they made would be kept confidential, and their choice would not affect their ongoing participation in the survey.

The respondent was then invited to draw a token from a bag to determine the match ratio. There were five tokens in the bag, each a different color, representing match ratios of 0, ½, 1, 1½ and 2. We took great care to ensure the draw was blind and random. A table relating the colors to the match ratios was displayed on a sheet in front of the respondent. The interviewer explained what match ratio the respondent had drawn, and what that meant. For any match ratio m, we would add m times the respondent's donation to the total funds for the project. If the token representing zero was drawn, no matching grant would be given. The respondent was quizzed to check they understood the concept, then given their endowment in cash and invited to make a donation if desired. To encourage a finer gradation of donations, the first GH¢2 of the endowment was given in 20p coins and the remainder in GH¢1 notes.[14] Respondents were told they could ask for change, so that any donation was feasible. Once the respondent made their donation, the match was added. After checking that the respondent was satisfied with their choice, the interviewer put the total amount in a special box. Once the respondent had left the room, the match ratio and donation were recorded on a sheet against their name.

In the final two rounds, the procedure was modified slightly to include a provision point mechanism (PPM).[15] After mentioning the project, the interviewer pointed to a sheet in front of the respondent which showed the amount raised and a fund-raising target (including a graphical depiction of the proportion of funds raised). Based on donations from the first three rounds and the realistic minimum cost of the projects, we set targets of GH¢750 in three communities and

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[14] There are 100 pesewas (p) in a Ghana cedi.
[15] We continued to give respondents a matching grant, in exactly the same manner as before.

11

GH¢1,000 in Pokrom (which had at that point raised substantially more than the other three). The interviewer explained that the project could not go ahead unless the target was reached, and that if the target was not reached, all donations from the fourth and fifth rounds would be refunded. The funds raised in the first three rounds would be spent on maintenance of existing public buildings. Respondents were given a receipt for their donations in rounds 4 and 5, and told that they could use this receipt to reclaim their donation if the project did not go ahead. The rest of the experiment proceeded as in the first three rounds, except that at the end a receipt was given to the respondent for the amount donated.

Once all respondents present had been interviewed, the amount raised was counted and crosschecked against the total from the record sheets. The amount was announced to the assemblyman, who in turn informed the community members.[16] The progressive total amount raised was also announced at subsequent meetings with the respondents. Respondents who did not attend the experiment in a given round could claim their endowment in the next round in addition to that round's endowment; therefore, some respondents received larger endowments in later rounds.[17] Funds not claimed at the end of the fifth round were counted as full donations and added (without a matching grant) to the funds raised for the community. Those amounts are excluded from the analysis below.

5. Initial observations

All four communities reached their targets, though Konkonuru did so by only a small margin. Overall, only 5 percent of respondents did not donate (Table 3). The rate of non-contribution was much higher in Konkonuru, but declined as the endowment increased. In all

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[16] The assemblyman is the community's organizer and 'secretary'.
[17] About 10 percent of the sample received 'extra endowments' in this manner.

communities, non-contribution dropped off sharply in rounds 4 and 5 with the increase in endowments and the introduction of the provision point mechanism.

Even in Konkonuru, however, the rate of non-contribution was much lower than in similar studies in Western countries, where it is common for more than half of the sample to refuse to donate.[18] In part, this may have been due to the presence of the interviewers. Since Ghanaian social norms dictate that people should not refuse a request for money from a friend in need, they may have felt obliged to give something in response to a request from researchers. This was unavoidable given the experimental design, but should be borne in mind when interpreting the results. However, the experimental process remained the same throughout the year, and should not affect comparisons between individuals or across rounds.

Table 4 presents the mean donations in each round. It is apparent that some communities donated substantially more than others. In part this reflects different characteristics of the respondents (such as differences in wealth), which I will explore in the regression analysis. Even after taking those factors into account, however, there is a residual difference which reflects characteristics of the community and the projects. First, comments by some respondents in the interviews made it clear that the projects in Konkonuru and Darmang were less popular for a number of reasons. In Konkonuru (raising money for a school toilet), some respondents argued that the teachers locked the toilet even when it was working, and that their children therefore would not benefit from it. In both communities, some non-contributors argued that they would not benefit from the project since their children attended other schools. Second, there was a distinct difference in the degree of enthusiasm shown by the community leaders for the

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[18] For example, Karlan and List (2007) reported response rates of around 2 percent in their study, and List and Lucking-Reiley (2002) reported response rates of 3.4 to 8.4 percent. Both studies relied on mail-out solicitations, so there are clearly other explanations for these low figures (such as wrong addresses, absenteeism and the lack of face-to-face interaction). However, they illustrate how difficult it can be to solicit donations from individuals.

fundraising exercise. However, this appears to have affected attendance more than donations, since Darmang raised the least money despite having one of the most involved leaders.

The match ratio offered to participants was randomized across individuals and rounds. The right-hand columns of Table 2 provide verification that the randomization was balanced across individual and household characteristics. Looking at the distribution of donations (Figure 1), the match ratio appears to have had a slightly positive impact, but mainly by lifting donations at the top of the distribution.

Figure 2 presents the cumulative distribution function (CDF) of donations for each community. The CDFs show significant clustering of donations at points like 20p, 40p and GH¢1, perhaps reflecting people's reluctance to ask for change and donate their true valuation. It might also be a manifestation of 'coherent arbitrariness' due to uncertainty over the true valuation.[19] It is worth noting that the distribution of donations in rounds 2 and 3, in which we doubled the endowment to GH¢2, is very similar to the distribution for round 1. For the majority of individuals, therefore, doubling the endowment had no effect on the amount donated. The only visible difference is in the second-top decile of donors, whose donations rose from around 50p to around 80p. Only a handful of people gave more than GH¢1 in rounds 2 and 3, suggesting that the GH¢1 endowment in round 1 was not a significant constraint on donations.

The effect of the provision point mechanism (PPM) on donations in rounds 4 and 5 is readily apparent. Since the PPM provides prospective donors with a guarantee that their money will be kept only if the project is fully funded, it assuages potential concerns about free-riding, thereby encouraging those who are hesitant to donate. One would accordingly expect the PPM to increase contributions, lifting each person's donation towards their true private valuation of the

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[19] 'Coherent arbitrariness' describes the tendency of individuals to be influenced by arbitrary anchors in determining their willingness to pay for goods without a well-defined reference price (Ariely et al., 2003).

project. The size of contributions indeed rose in the last two rounds, both in absolute terms and in proportion to the endowment (Table 4). The increase was substantial and affected the entire distribution.

After including uncollected monies, all four communities passed their targets. We met with each community and, in consultation with experts from the Akwapim South District Assembly, costed each of the projects. The community that had chosen to build a public toilet (Pokrom) changed its choice of public good, because the money raised would only build a small toilet which was considered inadequate for the town's population. Instead, they voted to spend the money on a new kindergarten. Each community elected a committee to oversee the project work, and also volunteered resources like sand, water, stones and artisanal labor. All four of the projects were completed by late 2010.

6.   Econometric analysis

One strength of the experiment's design is the wealth of survey data available on each respondent, which facilitates analysis of how individual characteristics affect donations. We collected data on income, wealth and consumption five times during the year, giving a dynamic picture of the respondents' financial situation over the course of the experiment. In order to measure the effect of characteristics on contributions, I estimate a regression model of the amount donated by each respondent in each round.

The first objective of this analysis is to measure the impact of the matching grant and provision point mechanism (PPM) on donations. The theoretical literature on these mechanisms does not provide much guidance on specification. If the match ratio has an influence on donations by altering the price of contribution, the relationship between the match ratio and

donations may be nonlinear depending on the functional form of individual preferences for the public good. Furthermore, we might expect to see threshold effects in behavior when the match offer takes effect – namely, a discrete difference between the zero and non-zero match offers. I therefore specify the match ratio as a set of dummies for the five possible ratios.[20] The PPM was introduced in the last two rounds, therefore its impact can be observed by including a set of round effects. However, the round effects also pick up other seasonal effects and the variation in the endowment. I therefore control for seasonality in individual income by including log household wealth in the specification,[21] and estimate the effect of the endowment by looking at the marginal increase in donations among those individuals who were absent in a round and subsequently collected a larger endowment. By subtracting this from the round effect estimate, I derive an indirect measure of the impact of the PPM.

The second objective of the regression analysis is to measure the effect of individual characteristics on donations. In addition to log wealth, which is a household-level variable, I add controls for the respondent's age and sex. I also include a measure of trust, since individuals might be concerned about the likelihood of their donations being misappropriated by community leaders (or the survey team) and about the way the public good will be managed once built. To account for this, I use information from a survey module on social attitudes. The module obtained Likert scale responses measuring the respondent's agreement with five statements about trust in neighbors, government and officials. I tested each in the specification; the only one that was significant was 'I feel I could trust my neighbors to look after my house while I am away'. This was measured on a scale of 1 to 5, with 1 representing 'strongly agree' and 5 'strongly

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[20] A linear specification yielded results of similar magnitude and significance.
[21] I also tried log per capita consumption, which is a more effective indicator of seasonality; its coefficient was small and insignificant. In any case, wealth gives a better sense of an individual's means and therefore willingness to contribute. Using income was theoretically desirable, but the measure was too noisy to be significant.

disagree'. I include this variable as a set of four dummies called *social* (excluding 'strongly disagree').

The social networks survey collected detailed data on the nature of relationships between the respondent and every other sample member from their community. Below I present results using various measures of the size and quality of an individual's social network, including the number of sample members known by the respondent, the number of these the respondent trusts, the number of respondents who report knowing the individual, and the number of these who trust the individual. These variables are represented generically in the specification below by the variable *socnetwork*.

Because of the likelihood of individual heterogeneity in contributions over the five rounds, I estimate a model with individual-level fixed effects. For comparison, I also present estimates from OLS and random effects specifications. However, a Hausman test rejected the hypothesis that the random effects specification is analogous to the fixed effects specification, therefore the random effects results (and, by extension, the OLS results) are inconsistent. In order to obtain consistent estimates of the key time-invariant characteristics of respondents that are washed out by the fixed effects estimator, I estimate the fixed effects model in two stages. First, I estimate the model:

$$donation_{it} = \alpha + \sum_{j=2}^{5} \beta_j ratio_{it}^j + \gamma \cdot extracash_{it} + \varphi \cdot logwealth_{it} + \sum_{m=2}^{5} \rho_t^m + v_i + \varepsilon_{it} \qquad (1)$$

The dependent variable is individual *i*'s donation in Ghana cedis in round *t*. The variable *ratio* represents a set of four dummies for the match ratio offered (0.5, 1, 1.5 or 2), excluding zero. The variable *extracash* is the additional endowment given to those respondents not collecting money in previous rounds; the remainder is captured by the round fixed effect. Household wealth in the month just prior to the round is captured by *logwealth*, specified in logs because the

variable is approximately lognormal across the population. This measure varies across rounds, capturing seasonal effects and economic shocks to individuals during the year that might affect donations. The ρ_t^m are round controls, ν_i are individual fixed effects, and ε_{it} is a white noise disturbance.[22]

I then regress the estimated fixed effects, $\hat{\nu}_i$, on the time-invariant characteristics in an auxiliary OLS regression:

$$\hat{\nu}_i = \delta_1 age_i + \delta_2 male_i + \delta_3 socnetwork_i + \sum_{k=2}^{5} \theta_k social_i^k + c_{k(i)} + \vartheta_{it} \qquad (2)$$

The respondent's *age* is measured in years, and *male* takes the value one if the respondent is male, zero otherwise. As described above, *socnetwork* is a measure of the individual's social network and trustworthiness, and *social* captures the respondent's degree of trust in her community in general. A set of community fixed effects, $c_{k(i)}$, is also included. The error term ϑ_{it} is assumed to be well behaved and uncorrelated across observations or time.[23]

The fixed-effect estimates for Equation 1 are presented in Table 6a, and the estimates for Equation 2 are presented in Table 6b. The latter results are presented with robust standard errors to control for heteroskedasticity. I also present OLS and random-effects estimates for comparison; for these models, all of the variables in (1) and (2) are estimated simultaneously in a single regression. Individual wealth and consumption were not available in the survey data, so I use household wealth.[24]

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[22] Since *extracash* is zero for all individuals in round 1, I omit the round 1 fixed effect.

[23] Since the estimates come from a panel dataset, a potential concern is that unobserved community-level disturbances might induce correlation between the ϑ_{it}, biasing the coefficient estimates (Moulton, 1990; Wooldridge, 2003). However, given the dataset has only four clusters and five rounds, corrections for clustering cannot be used and might even make matters worse.

[24] Household wealth includes stocks of food, farm output, livestock, business assets, goods for sale, durables, net balances owed by others, bank balances, and the value of jewelry and investments. It does not include the value of land or buildings.

6.1 Match ratio and endowment

The coefficients relating to match ratios of 1, 1.5 and 2 are all statistically significant at the 5 percent level, adding around 6-10p to donations relative to the no-match case. This effect compares to a mean donation of 37.6p in round 1 and 69.5p over all five rounds, thus it is quite significant in economic terms. The implied price elasticity of donations is -0.26, therefore inelastic, and not substantially different from the elasticity of -0.38 implied by the results of Karlan and List (2007).[25,26] However, in Karlan and List's study the response rate was very low, thus there was a large difference between the mean overall donation and the mean donation by existing contributors. In contrast, in this experiment there was a small difference between the two due to very high rates of participation. The implied price elasticity for *existing* contributors in Karlan and List's study was effectively zero.[27] Similar to the results found by Karlan and List, increasing the match ratio has a diminishing effect on donations beyond about 1.5.

Receiving additional endowment money (from previous rounds) raises donations by around 16p per additional cedi, which is substantially lower than the overall mean donation. It is difficult to infer what donations would have been had the endowment been zero. However, one can use the additional endowment variable to construct an estimate of the income elasticity of donations with respect to the endowment. The mean estimate across all communities and rounds is 0.53, implying that increases in the endowment induce roughly a one-to-two proportional increase in the donation. This is about 10 times larger than the elasticity of donations with respect to wealth, suggesting that the propensity to give out of cash-in-hand is much higher than

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[25] In order to calculate this elasticity, I re-estimated the model with *ratio* included as a linear term. The coefficient estimate was 0.059 (standard error 0.014).

[26] This figure is not drawn from Karlan and List's paper, but rather from my calculations based on their reported results and summary statistics. The two estimates are not perfectly comparable, since the elasticity from Karlan and List's study is a single elasticity at the mean donation, while the elasticity for my results is the mean of the individual elasticity estimates.

[27] Specifically, the coefficient estimate is 0.07, but it is not significantly different from zero.

the propensity to give out of overall wealth.

6.2 Provision point mechanism

The introduction of the PPM in round 4 had a dramatic positive effect on donations. The round coefficients jumped from between 0.06 and 0.01 in the second and third rounds respectively (relative to round 1) to 0.55 and 0.66 in rounds 4 and 5. It appears that the PPM was much more effective than the match ratio in eliciting contributions from community members. The increase in donations in rounds 4 and 5 cannot be explained solely by the increase in the endowment, which doubled from round 1 to 2 with little effect on donations. The estimated coefficient for *extracash* suggests that only part of the two Ghana cedi increase in the endowment going from round 3 to round 4 (roughly 32p) could have been due to the additional endowment, leaving a net increase in donations of about 23p attributable to the PPM. This estimate is supported by the CDFs in Figure 2; whereas there was almost no change in the distribution of donations over the first three rounds of the experiment, donations in the last two rounds are stochastically dominant and significantly larger across the distribution. Increasing the endowment by 50 percent from round 4 to round 5 had only a small positive impact on donations.

As a robustness check, and in order to better isolate the impact of the PPM itself, I re-estimated the model without round effects and individual characteristics, but including the full endowment (which varied across rounds and within rounds, for those who missed an earlier payment) and a dummy for the PPM rounds. I experimented with first-, second- and third-order polynomials for the endowment, and found a quadratic specification worked best. In addition to the fixed effects results, I report OLS and random effects estimates as well. The results are

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presented in Table 7. The introduction of the PPM leads to an increase of between 29p and 33p in contributions, roughly 50 percent of the mean overall contribution and almost 100 percent of the mean contribution in rounds 2 and 3. The effect of the PPM is about three times that of the matching grant with a ratio of 2.[28]

6.3   Gender

In Table 6, we see that men donated around 10p more than women even after controlling for other covariates. This may be in part because the model controls only for household-level wealth, while men tend to have greater command over household resources. To investigate whether there are other differences in behavior, I re-estimated the model separately for men and women. The results are reported in the second and third panels of Table 6. Most of the significant coefficients discussed above have similar magnitudes and significance. For instance, the PPM appears to have an identical effect on the donations of both genders. However, the match ratio has absolutely no impact on women's donations.[29]

It is not immediately clear what could explain this intriguing result. I investigated a number of explanations. First, since men tend to have substantially more education than women, perhaps women understood the match offer concept less well. However, if I interact the match ratio with education in a regression on women or men only, I obtain results of similar magnitude and significance for less-educated and more-educated men, and no significance for women even with high levels of education. Second, perhaps women feel more morally obliged to donate, and are therefore less price-responsive. However this seems unlikely, since women donated less on

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[28] As discussed earlier, the true effect of the match ratio may be greater than that estimated here if the act of offering a match is itself an incentive to contribute. All participants were aware that we were matching at least some contributions.

[29] I obtain results with very similar magnitude and significance if I simply interact the match ratio with gender in a pooled regression.

average than men at all match ratios. Third, women in the study area tend to have less control over household assets and less cash on hand than their husbands, so they are likely to have a higher marginal value of capital. While this could explain their lower donations overall, it is difficult to see how it explains their lack of responsiveness to the price incentive. Fourth, it is possible that spouses to some extent pre-arranged their donations beforehand, and that men felt freer to deviate from those arrangements given an enticing match offer. Indeed, the simple correlation between husband's and wife's donations is 0.77 (standard error 0.035).[30] This explanation is also very consistent with social norms in the communities studied, where men are primarily in control of household finances, pay for major family public goods like education, and make regular cash transfers to their wives to purchase specific items like food. Because of this, women may have felt reluctant to give more on the spot, and go home with less than previously expected. Finally, the difference may reflect culture-specific differences in the ways women and men think about the problem, or norms about donation in general. These latter two explanations seem most likely, but it is impossible to test them rigorously in this context. Nevertheless, the finding is interesting and merits further research.

6.4   Social networks and status

Table 6 shows that the greater an individual's reported trust of her neighbors (the variable *social*), the higher her contribution. This might reflect the degree of confidence about the way in which the public good would be built or managed by the community, and potentially also about whether the survey team would act as promised in spending the raised funds.

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[30] Of course, this is magnified by the varying endowments across rounds and different conditions in the four communities. Conditional on these factors (and the extra endowment), the correlation is still 0.45 (s.e. 0.043). Controlling for common characteristics between spouses would further reduce the unexplained correlation.

More significant is the share of individuals trusting the respondent (the variable *socnetwork*). The average individual in the top decile of this measure of 'trustworthiness' (trusted by 45 percent of those who know her) donated about 26p more than the average individual in the bottom decile (trusted by only 11 percent of those who know her). This is more than one third of the mean overall donation. What might explain this result? Table 8 reports coefficient estimates for a range of different social network measures, each included individually in an OLS estimation of Equation 2. Having a larger number of friends actually reduces donations, suggesting that it is not an individual's social network size that determines her donation.[31] Trust is clearly an important correlate of donations. While the respondent's trust for her friends is positively related to donations, the coefficient estimate is only a third as large as the coefficient on the number of friends who trust the respondent. Both the number of friends who trust the respondent, and the share, are significant at 5 percent. But since the number of friends varies a lot across individuals, is not normally distributed, and is not itself a predictor of donations, I elected to use the share of friends trusting the respondent in the other regressions in this paper.

Is trustworthiness related to higher status in the community? If trustworthy people tend to be leaders, they may feel obliged to donate more because of their position. Such individuals might also have expected to lead the management of the public goods project, or felt more responsible for its success. On the other hand, trustworthiness may capture unobservable characteristics such as generosity, which has already been recognized by the respondent's friends. To address these questions, I include a number of measures of status in the regression: dummy variables for holding a community or family office, coming from the local ethnic group,

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[31] This is true even if I use an intensity-weighted measure of friendship. While the number of people reporting knowing the individual is positively related to donations, this may partially capture an individual's prominence or reputation in the community.

having been fostered as a child, being a new migrant (defined as having lived in the community for five years or less), and the share of the individual's life spent in the community. If it is true that the effect of trustworthiness simply reflects the contributions behavior of higher-status individuals, one would expect office-bearers to contribute significantly more. Ethnicity is a significant theme in research on community-driven development, thus we might expect people from the local ethnic group (Akwapim) to have a greater say (and possibly stake) in public projects and thereby contribute more than new migrants. Previous research in these communities also suggests that individuals who were fostered (that is, lived a substantial part of their childhood with individuals other than their parents) are more likely to be socially isolated within the community (Vanderpuye-Orgle and Barrett, 2009) and therefore of lower status. These hypotheses are supported by simple regressions of trust on indicator variables of these three characteristics: office-bearers and Akwapim individuals are significantly more trusted, while new migrants and fostered individuals are significantly less trusted (as a share of those who know them). Both the number of individuals who know the respondent, and the number who trust the respondent, are higher the longer the respondent has lived in the community.[32]

Coefficient estimates for these status variables are reported in Table 9. Office-bearers donate significantly more, but including this variable in the regression does not detract from the magnitude or significance of the coefficient on trustworthiness. Those who were fostered as children (presumably therefore of lower status) did not contribute significantly less. Individuals from the local ethnic group actually donated around 6p less on average than others, while new migrants donated around 6p more. Another measure of migrant status, the share of life spent in the community, also suggests that newer arrivals are more willing to contribute.

These are counterintuitive results. Perhaps they reflect a desire among new migrants to

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[32] Results are available from the author on request.

build their new community, or to gain acceptance by other residents.[33] It is also possible that new migrants donate more because they have greater spending power; indeed, new migrants have higher per capita consumption on average. However, when I replace log wealth with log per capita consumption, the above results are unchanged. In conclusion, it appears that contributions to community-level public goods are strongly related to the social network, with more trusted individuals donating more. This does not appear to be due to status per se. The results from this analysis suggest that the relationship between ethnicity and community-level altruism is far from clear, and should be explored further in future work.

7.   Policy implications

This study has established that both the matching grant and PPM are effective in encouraging Ghanaians to donate to community-level public goods. These mechanisms could conceivably be incorporated into a fundraising program to augment centrally-allocated funds for infrastructure.

The PPM provides the added advantage of conditioning provision on a pre-determined level of community support. Under the PPM, unpopular projects that do not garner enough support to reach the fund-raising threshold would not go ahead, saving money and ensuring that scarce funds flow instead toward more desirable projects. However, the PPM requires fund-raisers to set a realistic target, which may be difficult if potential demand cannot be estimated ex ante. Setting too high a target and consequently aborting a project because the target is not reached could diminish goodwill within a community. One would also need to consider the administrative costs associated with recording donations and returning funds if the target is not

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[33] Around one quarter of respondents are first in their family to live in the community, reflecting quite high levels of geographic mobility.

met. In a developed country, a fund raiser could take credit card pledges and deduct the funds only if the target is met, but that is not feasible in poor rural communities.

The matching grant has a significant effect overall, but the lack of response by women is intriguing. This casts doubt on whether the explicit match offer is sufficiently effective to justify the cost of implementation. The matching grant could nevertheless be implemented indirectly if communities were required to contribute only a fraction – perhaps one-fifth – of the cost of the project. This would have the same effect as a match ratio of 4, reducing the effective price of donation but without needing to explain and co-ordinate the matching offer. The PPM threshold could also be varied depending on a community's standard of living, with poorer communities required to raise a smaller fraction of the full project cost.

The practice of raising additional funds for local development from community members has a number of advantages. First, these individuals are rarely subject to income tax and therefore shoulder a very small tax burden. Some form of voluntary co-payment seems justified for public projects that offer direct benefits to the local community. The additional funds raised would allow district assemblies to do more with existing funds, and reduce their reliance on central government disbursements and irregular NGO and donor initiatives. Requiring local community members to bear part of the project cost could also increase their sense of ownership of the project and encourage them to take responsibility for its care and maintenance.

Some caveats apply to this analysis. The field experiment was designed to measure individuals' willingness to contribute to a public project. The focus on individual behavior, and the particular requirements of an experimental setting, mean the design of the experiment is somewhat different from the process a district assembly might use to raise funds for a larger public project.

First, donations might have been lower had we not presented respondents with a cash endowment before soliciting contributions. Absent these endowments, more individuals may have refused to contribute because they were short of cash. They may also have been more inclined to contribute because of an 'endowment effect', feeling richer because of their endowment. We tried to offset this by framing the endowment as compensation for their participation in the household survey, and mentioning the payment again during survey interviews.

Second, the importance of status and social norms in these communities suggests that donations may have been significantly higher had the solicitations been public, subject to the influence of community leaders. Indeed, fundraising efforts in Ghanaian communities (such as church 'harvests') frequently raise amounts of money many times higher than those raised in this experiment. One important factor in such efforts is the involvement of outsiders connected to the community, such as family members overseas. If these sources were tapped, much more money could be raised.

Third, from our interactions with the respondents it was clear that contributions were strongly related to the popularity of the projects. We were limited by our budget and sample size to offering small projects. It is likely that contributions would have been much higher for more desirable and broadly beneficial projects like electrification and road building. However, it is unlikely that one could raise a similar proportion of the total cost for such a project from community donations.

Finally, the results of this study relate to only four communities in one district of Ghana. It is possible that behavior might be qualitatively different in other parts of the country, let alone in other countries. In order to implement this scheme as policy, a pilot study would be necessary to

evaluate its broader efficacy.

8.   Conclusions

This paper presented the results of an experiment designed to measure individuals'

willingness to contribute to a local public good. I identified factors that explain why some

individuals to give more than others, and tested two incentive mechanisms often used in

fundraising activities. The study makes a number of novel contributions to the literature. It offers

evidence on the actual public goods contributions of individuals in a real-world developing

country setting, relating to the financing of an actual public project. It presents the first evidence

on the effectiveness of the matching grant and PPM in a developing country, and the first

comparison of the relative strengths of the two mechanisms in the field.

I found that the provision point mechanism (PPM) had a significant impact on the size of

donations, while the matching grant had a smaller but also significant effect. That these

mechanisms are effective in boosting donations reinforces results from developed country field

and laboratory experiments. However, the finding that women did not respond to the match ratio

is an especially interesting and novel finding.

By relating the results of the experiment to a rich dataset on individual characteristics and

social networks, the study also identifies how contributions vary across the population. Older and

male respondents donated more, while household wealth had only a small effect on donations.

The strong effect of trustworthiness on donations is an interesting finding. Trusted members of

the community were more inclined to give, even after controlling for wealth. But somewhat

surprisingly, this result was not driven by status alone. These results are consistent with findings

from previous research that social cohesion within communities is conducive to the success of

community-led development projects. However, they also challenge the notion that elites in the community have the most to gain (or capture) from public projects, and the assumption that ethnic homogeneity implies greater participation and success in such endeavors. The answer appears to lie somewhere in between: minority ethnic groups are just as willing to contribute, but greater ethnic fractionalization can undermine the political process and thereby the success of locally managed public projects.

In conclusion, the broad willingness of individuals to contribute to community projects suggests policy makers may be able to use such contributions to augment funding for community projects. The results from the experiment indicate that the PPM in particular could be very effective in encouraging donations for such a program.

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Table 1: Sample size by community and respondent type

	Community				
	Darmang	Pokrom	Oboadaka	Konkonuru	Total
Husbands	70	67	69	68	274
Wives	77	71	73	68	289
Single males	4	3	1	4	12
Single females	7	5	6	11	29
Total	158	146	149	151	604

Table 2: Descriptive statistics and balance of randomization

Variable	Entire sample	By match ratio offered				
		0	0.5	1	1.5	2
Sex (male=1)	0.483	0.479	0.513	0.494	0.429	0.499
	(0.500)	(0.500)	(0.500)	(0.501)	(0.496)	(0.501)
Log household wealth	7.029	6.964	7.027	7.000	7.095	7.051
(GH¢)	(0.975)	(0.980)	(0.880)	(0.945)	(1.053)	(1.006)
Monthly per capita	96.91	94.96	101.12	93.74	96.15	98.17
expenditure (GH¢)	(68.75)	(60.06)	(74.26)	(59.38)	(72.02)	(75.00)
Household size	5.215	5.122	5.169	5.241	5.361	5.178
	(2.159)	(2.305)	(2.083)	(1.966)	(2.255)	(2.176)
Age (years)	42.93	41.10	43.91	43.57	43.24	42.74
	(13.37)	(12.70)	(13.44)	(13.14)	(13.89)	(13.51)
Could trust neighbor *	2.808	2.842	2.810	2.812	2.805	2.777
	(1.123)	(1.130)	(1.122)	(1.137)	(1.100)	(1.129)
Trusted by friends **	0.194	0.188	0.187	0.197	0.206	0.190
	(0.148)	(0.148)	(0.138)	(0.150)	(0.158)	(0.142)
Holds office	0.083	0.074	0.087	0.066	0.086	0.097
	(0.275)	(0.262)	(0.282)	(0.249)	(0.281)	(0.297)
Akwapim	0.811	0.834	0.803	0.810	0.802	0.809
	(0.391)	(0.372)	(0.398)	(0.393)	(0.399)	(0.394)
Fostered as child	0.601	0.624	0.578	0.624	0.605	0.576
	(0.490)	(0.485)	(0.494)	(0.485)	(0.489)	(0.495)
Lived in community less	0.081	0.075	0.076	0.075	0.096	0.082
than 5 years	(0.273)	(0.264)	(0.265)	(0.264)	(0.295)	(0.275)
Years lived in community	25.66	24.21	26.51	26.34	25.54	25.61
	(15.81)	(15.17)	(15.86)	(16.21)	(16.28)	(15.48)
Share of life spent in	0.588	0.584	0.594	0.587	0.582	0.594
community	(0.308)	(0.311)	(0.303)	(0.304)	(0.315)	(0.309)
Donation (GH¢)	0.693	0.633	0.654	0.657	0.760	0.751
	(0.598)	(0.542)	(0.527)	(0.536)	(0.677)	(0.670)
Total observations	2,060	386	421	399	415	439

Notes: Table reports means of individual characteristics based on the match ratio offered in each experimental session. Thus individuals are counted up to five times (once per round, with the match ratio varied across rounds). Sample standard deviations are reported in parentheses.

* Categorical variable with scores from 1 (strongly agree) to 5 (strongly disagree).

** Share of friends who report trusting the respondent.

Table 3: Non-contribution rates (percentage of participants who donated nothing)

Round	Community Darmang	Pokrom	Oboadaka	Konkonuru	Total
1	5.2	3.2	2.6	32.1	10.7
2	3.4	0	2.4	17.1	5.7
3	7.8	0	6.1	17.5	7.9
4	0	0	0	2.4	0.6
5	0	2.3	0	2.8	1.3
Total	3.2	1.1	2.3	13.5	5.1

Table 4: Mean donations by round and community (in Ghana cedis)

Round	Community Darmang	Pokrom	Oboadaka	Konkonuru	Total
1	.299	.528	.372	.345	.376
2	.347	.702	.367	.397	.453
3	.410	.654	.398	.335	.444
4	.761	1.097	1.447	.661	.978
5	1.064	1.179	1.454	.972	1.156
Total	.587	.852	.796	.563	.695

Table 6a: Regression models of amount donated (part 1)

	All individuals			Men			Women		
	Fixed effects	OLS	Random effects	Fixed effects	OLS	Random effects	Fixed effects	OLS	Random effects
Match ratio (0 omitted)									
0.5	0.026	0.021	0.024	0.065	0.064	0.067	-0.014	-0.021	-0.020
	(0.032)	(0.029)	(0.030)	(0.051)	(0.045)	(0.048)	(0.038)	(0.038)	(0.036)
1	0.060*	0.030	0.045	0.112**	0.052	0.082*	0.013	0.001	0.003
	(0.032)	(0.029)	(0.030)	(0.052)	(0.043)	(0.049)	(0.039)	(0.039)	(0.036)
1.5	0.084***	0.098***	0.095***	0.184***	0.194***	0.194***	0.008	0.009	0.008
	(0.032)	(0.032)	(0.030)	(0.054)	(0.052)	(0.050)	(0.037)	(0.039)	(0.034)
2	0.072**	0.108***	0.091***	0.133***	0.178***	0.157***	0.012	0.030	0.022
	(0.031)	(0.031)	(0.029)	(0.050)	(0.049)	(0.047)	(0.038)	(0.040)	(0.035)
Extra GH¢	0.156***	0.161***	0.164***	0.193***	0.194***	0.200***	0.115***	0.114***	0.114***
	(0.012)	(0.021)	(0.009)	(0.017)	(0.031)	(0.014)	(0.015)	(0.017)	(0.012)
Log household wealth	-0.021	0.030***	0.024*	-0.059	0.033*	0.016	0.012	0.021*	0.019
	(0.024)	(0.010)	(0.013)	(0.039)	(0.018)	(0.023)	(0.030)	(0.012)	(0.014)
Round (1 omitted)									
2	0.058**	0.046*	0.048*	0.037	0.033	0.030	0.074**	0.064**	0.067**
	(0.029)	(0.024)	(0.028)	(0.047)	(0.040)	(0.046)	(0.034)	(0.028)	(0.033)
3	0.013	-0.002	0.001	0.002	-0.013	-0.011	0.016	0.011	0.013
	(0.029)	(0.023)	(0.028)	(0.048)	(0.039)	(0.046)	(0.035)	(0.028)	(0.034)
4	0.551***	0.543***	0.542***	0.541***	0.533***	0.532***	0.556***	0.561***	0.558***
	(0.029)	(0.029)	(0.028)	(0.047)	(0.045)	(0.046)	(0.035)	(0.038)	(0.034)
5	0.659***	0.653***	0.653***	0.704***	0.698***	0.698***	0.614***	0.616***	0.615***
	(0.029)	(0.032)	(0.028)	(0.046)	(0.054)	(0.045)	(0.034)	(0.035)	(0.034)
Constant	0.484***	-0.193**	-0.162	0.745***	-0.186	-0.104	0.250	-0.068	-0.064
	(0.174)	(0.088)	(0.111)	(0.273)	(0.146)	(0.184)	(0.215)	(0.099)	(0.118)
N	2,060	2,060	2,060	995	995	995	1,065	1,065	1,065
Groups	510	--	510	253	--	253	257	--	257
R^2	0.370	0.449	0.449	0.364	0.445	0.443	0.393	0.470	0.469
Breusch-Pagan $\chi^2(1)$	832.43***	--	--	470.00***	--	--	184.81***	--	--
Hausman $\chi^2(10)$	--	19.71**	--	--	17.25*	--	--	5.53	--

Notes: Dependent variable is donation in GH¢. Random and fixed effects are at the individual level. Estimated standard errors in parentheses. Robust standard errors reported for OLS regression. *** indicates significance at the 1 percent level, ** at the 5 percent level and * at the 10 percent level.

Table 6b: Regression models of amount donated (part 2)

	All individuals			Men			Women		
	Fixed effects	OLS	Random effects	Fixed effects	OLS	Random effects	Fixed effects	OLS	Random effects
Age (years)	0.003***	0.002***	0.002**	0.003***	0.002*	0.002	0.002***	0.002**	0.002**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Male	0.094***	0.104***	0.100***	--	--	--	--	--	--
	(0.013)	(0.020)	(0.028)						
Could trust neighbor with valuable item ('Strongly disagree' omitted)									
Strongly agree	0.148***	0.158***	0.156**	0.155***	0.190**	0.183*	0.149***	0.148**	0.148*
	(0.035)	(0.057)	(0.069)	(0.056)	(0.092)	(0.111)	(0.041)	(0.069)	(0.077)
Agree	0.071***	0.068	0.067	0.090*	0.089	0.092	0.063**	0.061	0.061
	(0.027)	(0.046)	(0.058)	(0.046)	(0.075)	(0.092)	(0.030)	(0.054)	(0.065)
Neutral	0.022	0.012	0.025	0.027	0.024	0.040	0.022	0.017	0.026
	(0.027)	(0.047)	(0.062)	(0.046)	(0.078)	(0.100)	(0.030)	(0.054)	(0.070)
Disagree	0.040	0.038	0.040	0.055	0.063	0.066	0.042	0.039	0.045
	(0.027)	(0.047)	(0.060)	(0.045)	(0.075)	(0.094)	(0.031)	(0.055)	(0.068)
Share trusting respondent	0.434***	0.388***	0.476***	1.056***	0.85***	1.067***	0.184***	0.183*	0.192
	(0.086)	(0.114)	(0.153)	(0.219)	(0.281)	(0.316)	(0.059)	(0.097)	(0.143)
Community (Darmang omitted)									
Pokrom	0.175***	0.159***	0.149***	0.061	0.059	0.031	0.206***	0.203***	0.204***
	(0.024)	(0.034)	(0.049)	(0.057)	(0.072)	(0.093)	(0.024)	(0.037)	(0.050)
Oboadaka	0.154***	0.152***	0.140***	0.005	0.029	-0.005	0.208***	0.206***	0.205***
	(0.023)	(0.034)	(0.050)	(0.058)	(0.075)	(0.098)	(0.022)	(0.037)	(0.049)
Konkonuru	-0.161***	-0.135***	-0.160**	-0.364***	-0.282***	-0.351***	-0.084***	-0.081**	-0.085
	(0.027)	(0.039)	(0.062)	(0.065)	(0.089)	(0.121)	(0.024)	(0.040)	(0.060)
Constant	-0.357***	--	--	-0.377***	--	--	-0.264***	--	--
	(0.031)			(0.055)			(0.033)		
N	2,060	2,060	2,060	995	995	995	1,065	1,065	1,065
Groups	--	--	510	--	--	253	--	--	257
R^2	0.234	0.449	0.449	0.198	0.445	0.443	0.279	0.470	0.469

Notes: Estimated standard errors in parentheses. Robust standard errors reported for OLS regression. *** indicates significance at the 1 percent level, ** at the 5 percent level and * at the 10 percent level. Reported coefficients for OLS and random effects models estimated jointly with model in Table 6a.

Table 7: Alternative estimates of the PPM effect

	Fixed effects	OLS	Random effects
Match ratio (0 omitted)			
0.5	0.028	0.023	0.025
	(0.032)	(0.029)	(0.030)
1	0.066**	0.036	0.051*
	(0.033)	(0.029)	(0.030)
1.5	0.085***	0.100***	0.097***
	(0.032)	(0.033)	(0.030)
2	0.077**	0.112***	0.097***
	(0.032)	(0.032)	(0.030)
Endowment	0.058***	0.019	0.025
	(0.021)	(0.028)	(0.019)
Endowment squared	0.004**	0.007***	0.007***
	(0.002)	(0.003)	(0.001)
PPM (Rounds 4 & 5)	0.297***	0.343***	0.329***
	(0.041)	(0.046)	(0.040)
N	2,060	2,060	2,060
Groups	510	--	510
R^2	0.363	0.445	0.445

Notes: Dependent variable is donation in GH¢. Other regressors in Table 6 were included, but are omitted here for parsimony. Fixed and random effects are at the individual level. Robust standard errors reported for OLS. *** indicates significance at the 1 percent level, ** at the 5 percent level and * at the 10 percent level.

Table 8: Coefficient estimates for social network variables

| Variable	Coefficient (S.E.)
Number of sample members respondent knows	-0.001***
	(0.000)
Number of sample members who know respondent	0.000*
	(0.000)
Number of sample members respondent trusts	0.001***
	(0.000)
Number of sample members who trust respondent	0.003***
	(0.001)
Share of known sample members respondent trusts	0.062***
	(0.023)
Sample members who trust respondent, as share of those who know respondent	0.427***
	(0.086)

Notes: Each row reports the estimated coefficient on the respective social network variable when included individually in place of the variable *socnetwork* in Equation 2 (labeled "Share trusting respondent" in Table 6). The dependent variable is the estimated individual fixed effect from Equation 1. Other regressors in Table 6b were included, but are omitted here for parsimony. *** indicates significance at the 1 percent level, ** at the 5 percent level and * at the 10 percent level.

Table 9: Coefficient estimates for status variables

	(1)	(2)	(3)
Share trusting respondent	0.420***	0.433***	0.448***
	(0.085)	(0.087)	(0.089)
Status variables			
Holds community/family office	0.097***	0.099***	0.100***
	(0.033)	(0.033)	(0.033)
Member of Akwapim group	-0.061***	-0.060***	-0.055***
	(0.021)	(0.020)	(0.020)
Fostered as child	0.008	0.003	0.001
	(0.015)	(0.015)	(0.015)
New migrant ($\leq$ 5 years in community)	--	0.062**	--
		(0.026)	
Share of life spent in community	--	--	-0.060***
			(0.022)
N	2,008	2,008	2,003
Adjusted R^2	0.239	0.241	0.240

Notes: Dependent variable is the estimated individual fixed effect from Equation 1. Other regressors in Table 6b were included, but are omitted here for parsimony. Robust standard errors reported in parentheses. *** indicates significance at the 1 percent level, ** at the 5 percent level and * at the 10 percent level.

Figure 1: Effect of match ratio on donations
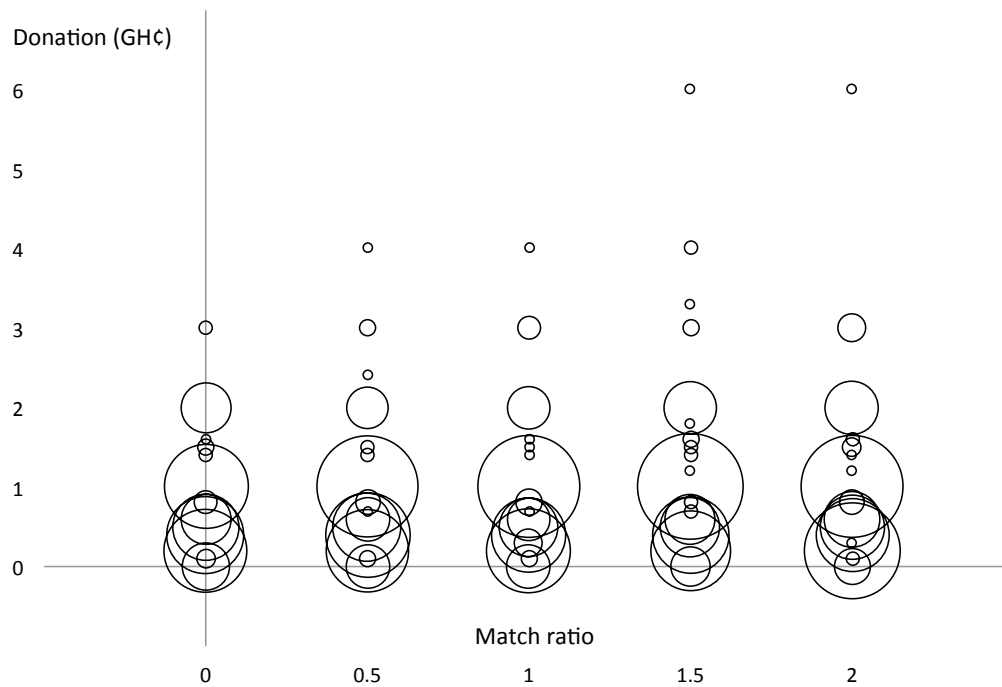
Note: Bubble area proportional to frequency.

Figure 2: Cumulative distribution of donations (all communities)