Social Preferences and the Willingness to Pay for Preventative Health Care: Evidence from Field Experiments

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Economics)
in the University of Michigan
2017

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ACKNOWLEDGEMENTS

In Michigan: I am very grateful to Dean Yang, for his advice, guidance and unfailing support for this research, even when my own resolve faltered. Many thanks to Achyuta Adhvaryu, Tanya Rosenblat and Manuela Angelucci for serving on my dissertation committee and providing me with invaluable feedback. Anne Fitzpatrick, I am deeply indebted to you for providing intellectual and emotional support from first year prelims, through IRB applications, to fieldwork and beyond. I am very grateful for my support group of fellow PhD students, particularly the denizens of and frequent visitors to Lorch 113. Special mention for my roommate, officemate, and bestmate Yeliz Kacamak.

In Washington DC: I would like to thank Ghazala Mansuri for many years of mentorship and support. Scott Dodds, you kept me sane through the worst of this. Freeha Fatima, thanks for letting me complain incessantly and believing in me constantly.

In Pakistan: I would like to thank the Research Consultants (RCons) team in Bahwalpur and Hyderabad, particularly Kashif Butt for spearheading the fieldwork and Irfan Ahmad for being ever willing to work around every constraint, and we faced many. I would like to thank Tahir Waqar and Nabeela Shahid in the National Rural Support Program (NRSP) for their invaluable assistance with implementation. I would also like to thank all the people who kept me sane in the homeland. Zahra

Moulvi, I was so fortunate to have you as a roommate. Hira Channa, Issam Ahmed, you made my time in Islamabad so much better. Huma Zafar, Amina Bajwa, you made my time in the World Bank basement so much better.

Funding for this research was provided by Phase I of the South Asian Food and Nutrition Initiative (SAFANSI), administered by the World Bank.

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ABSTRACT

Social Preferences and the Willingness to Pay for Preventative Health Care:
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Chair: Dean Yang

This dissertation explores behavioral incentives generated by individuals making choices in peer group settings in order to assess whether these incentives can be harnessed towards improving people's willingness to invest in undersubscribed preventative health care products. The first chapter uses a randomized field experiment to explore whether increasing the visibility of individual choices to peer groups impacts willingness to pay for water treatment products, by triggering the desire to engage in socially desirable behavior in public. The second chapter uses a randomized field experiment to analyze if sequential decision making in peer group settings exerts an impact on individual willingness to pay for first-movers owing to leadership effects, and compares outcomes between randomly appointed, self-selected and natural leaders. The third chapter compares altruistic product subsidies - which can be shared with other individuals - against individual subsidies in generating greater take

up of water treatment products, and assesses the likelihood of individuals selecting into altruistic subsidies if sorting out of these arrangements is allowed.

CHAPTER I

Buying Clean to be Seen? Image Motivation and the Willingness to Pay for Preventative Health Care Products

1.1 Abstract

Using data from a randomized field experiment in the setting of community groups in rural Pakistan, I investigate whether increasing the visibility of an individual's choices to their peer group affects their willingness to pay for water treatment products. I find evidence in favor of greater conformity with group behavior in public, with randomization into public bidding increasing the odds of individuals bidding closer to their expectations regarding the average group bid. The intersection of preferences for conformity with low expectations regarding the average willingness to pay for the product results in lower bids in public than private. However, bidders who express no expectations regarding group behavior have higher bids when randomized into public bidding, in line with status seeking in the absence of motives to conform. I find stronger conformity and status seeking patterns in villages with above median contamination levels. Priming bidders with the salience of health externalities and the negative spillovers from poor individual investment in preventative health care

results in higher bids in public. This is congruous with greater status seeking when the pro-social signaling value of individual behavior is increased, highlighting the importance of framing in eliciting socially desirable behavior.

1.2 Introduction

The current empirical literature on peer effects demonstrates that social networks can influence a diverse set of individual choices, ranging from saving (Duflo and Saez, 2002) to investment (Hong, Kubik and Stein, 2004) and technology adoption (Bandiera and Rasul, 2006; Conley and Udry, 2001). In particular, we have compelling evidence for peer networks facilitating the take up of a variety of health technologies such as deworming pills (Miguel and Kremer, 2004), insecticide treated bed nets (Dupas, 2014) and menstrual cups (Oster and Thronton, 2011). However, the role attributed to peer networks in this literature is limited to one of information diffusion and learning facilitation. Experiments from the lab and field on altruistic behavior and public good contributions demonstrate that social networks can also be powerful catalysts for socially desirable behavior by triggering image motivation, or the desire to seek approval from others. Yet, the presence or strength of these motivations in influencing decision making over health remains unexplored, in spite of the enduring problem of low spending on preventative health care and steep demand curves at positive prices.

This paper utilizes a large field experiment in rural Pakistan to test for the presence of image motivation in the willingness to purchase a preventative health care product - chlorine tablets for Point of Use (POU) drinking water treatment. Image motivation is the tendency of individual behavior to be affected by the perception of others, the impact of which is inherently tied to how visible individual behavior is to their social reference group (Ariely et al., 2009). I outline a basic model that incorporates

image motivation in an individual's utility function as arising from a desire for status seeking and conformity. Status seeking is achieved by differentiating yourself from the average group behavior and conformity is achieved by aligning yourself more closely with the group. The model demonstrates that for a person whose individual optimum lies below their expectation of the group average, conformity and status seeking coincide to drive their demand up towards the group average. However, for a person whose individual optimum lies above the group average, conformity pressures will lower their willingness to pay while status seeking will operate to increase it. The model therefore yields testable hypotheses on how visibility can affect willingness to pay for a product, which I proceed to apply in an empirical setting.

I engineer the sale of our POU chlorine tablets in the setting of pre-existing community groups in the sample villages and randomize whether an individual's maximum willingness to pay for the product is private or is revealed to their group, in order to assess whether economic behavior changes when image motivation is an added consideration in the decision process.

The setting for my experiment has the essential components of a population that is organized into community groups(COs) where the impacts of image motivation can be tested: the need for investment in drinking water treatment methods owing to widespread contamination of drinking water; and a drinking water treatment product that is unavailable in the local marketplace and can therefore be sold exclusively through the meetings of the community groups. The social groups utilized are endogenously formed and have a history of repeated interaction, which yields greater weight to social signaling than if these groups were randomly generated and had no history of association. The mechanism used for demand elicitation - the Becker DeGroot Marschack (BDM) auction- has been tested in a similar population of low numeracy and shown consistent results (Berry et al., 2015).

Randomization at the level of the individual ensures that the treatment effect is

driven only by changes in bidding environment from private to public and not other unobserved, correlated variables at the group level. The comparison of public and private bidders provides estimates of the impact of visibility of actions on behavior. Decisions are made simultaneously and without consultation to eliminate learning or sequential herding effects. In addition, all individuals are given a uniform information treatment prior to the randomization, in order to reduce variance in the level of knowledge among group members.

I collect individual beliefs regarding the average bid at the group level prior to randomization assignment. As such, my measure of conformity is with respect to the descriptive norm − what other individuals are doing − as opposed to the injunctive norm − what people ought to be doing. Therefore, my experiment speaks to the literature on the impact of beliefs regarding the descriptive norm and not the literature on injunctive norms. Moreover, my experiment is a one-shot game. Therefore, there is no updating of individual beliefs before the bidding is completed. Hence, unlike other experiments that provide information regarding the descriptive norm, I collect individual beliefs regarding the norm and assess how randomization affects individual behavior relative to these exogenously held beliefs.

I find that the overall treatment effect of making bids visible is zero and insignificant. Looking at result by beliefs regarding group behavior, I find that bidders who are bidding in public have significantly smaller disparity between their bid and their expectations regarding the average bid in the group, suggesting greater conformity in public. In addition, public bidding results in a significantly higher probability of bidders placing bids which are equal to their expectation of the average group bid. This effect is driven by the portion of the bidding distribution where bidders are bidding in excess of their expectations regarding the average group bid, and therefore manifests itself as a reduction in bids in public towards the expectation of group behavior. This effect is also heterogeneous across the distribution, deriving

primarily from bidders who are already bidding closer to their expectation regarding the group bid. On the other hand, bidders who have no beliefs regarding group behavior bid higher in public than private, which is consistent with pure status seeking behavior in the absence of conformity influences.

These results shed light on a feature of individual adoption behavior that may form one piece of the puzzle of low technology adoption equilibria persisting in developing country settings. Hence, as Ray (1998) points out, in the presence of complementarities in adoption and use of technologies, groups or societies can get stuck in low adoption traps if a critical mass of individuals fails to adopt. Social norms can create strong complementarities by encouraging conformity. Hence, where norms are poor, groups can get stuck in a low adoption equilibrium owing to the complementary incentives of exercising conformity with these poor norms, even though individual adoption may be preferred in the absence of such complementarities. This appears to be the case in our setting where private bidders are able to exercise higher willingness to pay than public bidders, since they are not subject to the demands of conformity to poor norms. This feature of individual behavior therefore highlights the importance of shaping and improving social norms in the technology adoption debate, since these norms may be crucial to the technology adoption equilibrium that evolves in societies characterized by strong adherence to social norms. Moreover, the fact of poor norms persisting in these societies may provide one piece of the puzzle regarding why these societies are stuck in low adoption equilibria with respect to beneficial health care technologies, given that the poor norms reinforce poor adoptions rates.

I find that social motivation effects are stronger when contamination rates are higher. Hence, both conformity and status seeking appear to be stronger motivators in high contamination environments relative to low contamination environments where the effects are muted and insignificant, suggesting that the role of social motivations is

mediated by the severity of the problem being addressed and therefore the value of the social signal generated from remedial action.

I also test for whether priming with information regarding health spillovers interacts with the impact of social motivation. I randomize some groups into receiving an additional information message which highlights the negative externalities attendant on the community from individual failure to adopt better health behaviors owing to the parasitic and infectious nature of gastrointestinal diseases. I find that the dampening effect of conformity on bidding behavior is reversed in public when bidders are randomized into the externalities treatment. Consequently, priming bidders on the externalities of their health behaviors results in bidders bidding higher in public than in private. This can be attributable to stronger status seeking behavior when the pro-social value of the signal is higher, which operates to counteract conformity influences which dominate when such priming of pro-social value is not done.

Given evidence in the psychology literature indicating differences between genders in their willingness and propensity to conform, I test whether men and women behave differently with respect to the treatment. I find that in mixed groups men are less likely to demonstrate conformity patterns than women, in line with expectations from existing work investigating gender differences in conformism. However, the evidence from all-male and all-female groups is less conclusive.

A third and simultaneous treatment arm tests the impact of allowing self-selection of bidding environment. This arm allows me to intuit the impact of sorting and self-selection on treatment effects, which is conceivably more representative of long run outcomes where experimental control is weakened. Here I find that over 60% of bidders would prefer to bid in private. Moreover, once self-selection is allowed, conformity trends disappear in public and standard image motivation results emerge of higher bids in public. Hence, the choice of mechanism appears to impact the type of social motivations that will evolve in equilibrium. However, the current design

does not allow me to make any claims as to whether the mechanism itself alters preferences over conformity and status seeking, or whether the results are driven by the sorting of conformists into private bidding and status seekers into public bidding.

This paper contributes to the growing literature on using behavioral incentives that appeal to social considerations and social norms to direct individual behavior in directions that conform with goals of public policy. Hence, social norms have been leveraged to increase individual voting (Gerber and Rogers, 2009), environmental conservation (Goldstein, Cialdini and Griskevicius, 2008), and electricity conservation (Allcott, 2011).

This paper is unique insofar as it is the first field experiment to investigate social norms and pro-social motivations in health settings and health care purchase decisions, in a literature derived primarily from applications to public goods and altruistic behavior. Insofar as health care expenditures in developing country settings have large spillovers, I test whether the same pro-social motivations that increase altruism and public good contributions in public can also be leveraged to increase the willingness to pay for preventative health care. As such, my research question bears closest resemblance to the application of social norms to conservation behavior and the emerging literature on conspicuous conservation (Griskevicius et al., 2010) where individuals bear higher costs or compromise on the quality of consumption choices in order to derive greater status from appearing more 'green'. I apply this concept to test whether people will be willing to pay more for health from a desire to seek status from their actions.

The existing literature on social influences affecting health-seeking behavior, while small, also shows weak treatment effects overall. Bronchetti et al. (2015) test whether peer endorsement of flu vaccination in college campuses results in an increase in vaccine take-up and find no effect on take up margin for a very large sample of over 9000 observations. They do, however, find evidence that peer endorsement increases

the likelihood of students opening emails that contain health information. However, their setting is one that may activate a sense of obligation to social norms but does not alter the visibility of follow through and therefore does not activate the social pressure channels I seek to investigate.

My work also shares similarities with the Guiteras et al. (2016), where messaging regarding shame and disgust at being seen consuming dirty water is exploited in an attempt to increase usage of POU chlorine and test willingness to pay for a community level chlorine dispenser. While they find little to no treatment effects, they attribute this to low levels of social cohesion in the sample communities, where people placed little regard on the behavior of others even though behaviors were visible. In addition, because their chlorine product was communal, the elicitation of clean demand estimates is further complicated by problems of group coordination and free-riding that may arise with shared commodities. My setting, on the other hand, uses endogenously formed peer groups which have a long history of repeated interaction where reputation concerns are more salient. My focus is also on the salience of visibility of actions to generating demand for an under subscribed behavior, owing to reputational concerns, and not on the role of messaging.

In addition, this paper relates to the literature on the use of groups motivators to improve incentives for individually beneficial behavior. Hence, studies on incentivizing under subscribed health behaviors such as exercising (Babcock et al., 2015) and cognitive exercises among the elderly to improve mental health (Schofield et al. 2015) find that group based incentives out perform individual incentives and people appear to value rewards to team members greater than rewards to themselves. This work provides additional evidence on another feature of social groups, image motivation derived from visibility of individual behavior, which can also be leveraged to influence individual behavior towards socially desirable outcomes. In doing so, it helps build a case for the use of groups as treatment units in public health settings where

externalities abound and there is consequently greater motivation to exercise other-regarding behavior when you also possess pro-social preferences and an opportunity to signal these preferences in public.

1.3 Current Literature

1.3.1 Image Motivation

The claim that people alter their behavior when under public scrutiny relies on the theory of preference signaling whereby if underlying preferences are unobservable, actions are used as signals for an individual's true preferences over socially desirable characteristics. As a result, visible actions confer status or prestige if they reflect society's definition of good behavior.

Literature indicates that people's behavior in public can reflect a desire to both stand out and to fit in. Bernheim (1994) models individual utility as deriving from intrinsic preferences as well as a desire for status, which is decreasing in deviation from the social norm. Such norm compliance or conformity has been attributed to information influence and normative influence. In the former case, people seek to resolve ambiguity and uncertainty most efficiently by using the decisional shortcut of registering what others are doing − the descriptive norm − and imitating the actions of the group (Cialdini, Reno and Kallgren, 1990). In the latter case, conformity is triggered by a desire to gain greater affiliation with the group, generate social approval and avoid sanction (Griskevicius et al., 2006).

The power of social norms to influence behavior has been investigated in a range of domains from littering to recycling, conservation and tax evasion. Chen et al. (2010) find that in an online community of movie reviewers when members are exposed to the descriptive contribution norm, below mean contributors increase their contributions

but above mean contributors decrease their level of contributions. Schultz et al. (2007) find a similar boomerang effect in electricity conservation where the revelation of average consumption statistics results in an increase in electricity consumption among below mean consumers. Social norm interventions targeting binge drinking among college students similarly find that interventions that reveal the prevalence of binge drinking tend to increase drinking among non-regular binge drinkers while reducing drinking among binge drinkers (Werch et al., 2000).

However, the costly signaling theory of pro-social behavior leans on the premise that when individuals have preferences over the beliefs of others regarding themselves, signaling yourself as a better type yields greater reward in social interactions - from being more desirable as a friend or partner, to eliciting greater trust and increasing the likelihood of being assigned to positions of power and authority (Griskevicius, 2010). As such, the greater the investment in costly signaling, the stronger the signal of not only pro-social preferences but also the resources to incur the cost of public welfare. In such a framework, the desire to stand out would dominate the desire to fit in, with economic choices being driven by status seeking over conformity.

This has been borne out in the domain of charitable contributions and contribution to public goods, where we find evidence of a more uniformly positive impact of image motivation. Ariely, Bracha and Meier (2009) show that people expend more effort for a pro-social cause when their actions are visible, in a lab setting. Andreoni and Petrie (2004) demonstrate that contributions to public goods are also increasing in the visibility of contributor decisions, and Hoffman et al. (1996) show that giving is smallest in dictator games which are double blind, so that dictator behavior is not known to anyone including the experimenter. Similarly, in a large field experiment on door-to-door fundraising, DellaVigna List and Malmendier (2012) find that social pressure is a stronger motivator for charitable giving than altruism, owing to significant numbers of givers opting out of the interaction with solicitors if provided

with a low-cost method for doing so. Moreover, social pressure has been shown to be effective in voter mobilization, with social pressure messaging which reveals the voting records of voters to everyone in their neighborhood increases voter turnout by 3-8% points, relative to the 0.5% increase effected by typical direct mail messaging that doesn't involve the use of social pressure. (Panagopoulos, 2010).

This motive of status signaling is evidently tapped into by charities when they publicly announce contributions (Ariely et al., 2009), blood donation agencies when they offer public awards (Karlan and McConnell, 2014), and firefighter organization when they offer vanity plates to volunteer (Carpenter and Myers, 2010). However, while there is sufficient evidence for the ability of status motives to draw individual behavior towards socially desirable outcomes, there are few attempts being made towards activating these motives as a policy instrument for improving individually sub-optimal behavior.

Also lacking is an analysis of how conformity to social norms can mediate signaling behavior in public, which creates non-linearities in individual response to costly signaling. Hence, conformity can drive behavior in an opposing direction to that predicted by simple status signaling. Zafar (2011) provides some evidence of this interaction when he finds that in a sequential decision making setting, while visibility of choices increases overall contributions in a charitable contributions game, receiving information on a lower contribution norm leads to a reduction in contributions, particularly in settings where participants are more likely to know one another. Consequently, I model individual choice in public arising from both a desire to conform and a desire to seek status.

1.3.2 Low spending on Preventative Health Care

Preventative health care is a domain of economic decision making that suffers from gross underinvestment by individuals, even when marginal benefits to increasing expenditures is very high from an individual and social perspective. This problem is particularly acute in the developing countries where the disease burden is incident at a significantly younger age and the infectious and parasitic nature of diseases produces large health externalities.

Drinking contaminated water is the leading cause of diarrheal and gastrointestinal diseases which claim the lives of 1.6 million children each year (Ahuja et al., 2010). In addition to their mortality impact, repeated episodes of diarrhea at a young age lead to stunting and wasting and lack of cognitive development which has severe implications for human capital accumulation and labor market returns. Moreover, repeated exposure to fecal pathogens can irreversibly affect the absorptive capacity of the intestinal tract of adults and children, even when there are no overt symptoms of morbidity. (Guiteras et al., 2016)

Diarrhea transmission occurs through the fecal-oral route, with the majority of infections spreading through feces-contaminated water. Given the unimproved nature of sanitation and drainage in developing countries, unsafe disposal of human waste exacerbates the potential for negative externalities from individual cases of infection. Consequently, the social benefits from providing greater protection against diarrheal diseases outstrips individual benefits.

Randomized controlled trials of Point of Use (POU) drinking water treatment indicate that with take-up rates on the order of 70 percent, POU treatment products can reduce childhood diarrhea by 20-40% (Kremer et al., 2011). However, even amongst populations with high knowledge regarding water borne disease transmission, the willingness to pay for POU water treatment products is low and demand

curves for the products are precipitously steep at positive prices. Hence, Kremer et al. (2011) find that despite 30% of their sample professing to prior experience with the POU water treatment product and 95% professing favorable views of the product, demand/utilization of the product falls from 80% to 10% when going from a full subsidy to a 50% subsidy, with no significant change in demand between a 50% subsidy and full price. The demand is also not higher amongst households with young children, who stand to benefit the most from water treatment.

Given the low cost of chlorine, POU water treatment using chlorine products is a highly cost-effective solution to diarrheal disease reduction. However, free provision of chlorine is not a sustainable solution in many settings. Therefore, we would like to assess the channels by which we can improve the willingness to pay for POU chlorine water treatment products. An appeal to image motivations is an aspect of demand for health care that remains, to date, unexplored. I extend the application of image motivation to the realm of decision making over health expenditures and test the impact of increasing the visibility of purchase decision making on willingness to pay for water treatment products in a peer group setting.

1.4 Behavioral Hypotheses

Consider a simple model where an individual's utility is additively separable in: (a) consumption of a status good, x; (b) consumption of all other goods/wealth, y; and (c) social approval, S.

$$U = u(x) + u(y) + \alpha_s * S$$

where α_s is the weight put on social utility. We model image motivation along the lines of Akerlof (1997) where social utility can be generated from a status seeking or a conformity. As per the status seeking model, an individual's utility is diminishing

in the distance they fall behind their reference group's consumption of the status good. The conformist model dictates that the individual minimize the social distance between themselves and others in their reference group.

Hence I define social approval, S, as:

$$S = S_0 + v[-\beta_c(x - \bar{x})^2 - \beta_s(\bar{x} - x)]$$

where β_c is the weight placed on conformity and β_s is the weight placed on status seeking; $\bar{x}$ is the average group behavior; v is a visibility parameter indicating how visible an individual's actions are to their reference group.

Assuming an interior optimum, I can solve for the optimal x^*:

$$u'(x^*) + \alpha_s v[-2\beta_c(x^* - \bar{x}) + \beta_s] = 0$$

which gives us the comparative statics:

$$\delta x/\delta v = \tfrac{\alpha_s}{u''(x^*)}[2\beta_c(x^* - \bar{x}) - \beta_s]$$

Hence, the impact of increasing visibility of actions is inextricably related to the direction and distance of an individual from the group average.

Status seeking motivations decrease utility when you fall below the group average and increase utility as positive distance from the group increases, i.e. you out perform the group. Utility from conformity, however, is derived from decreasing the distance between yourself and the average group member. Hence, for people whose individual optima lie below the group average, the direction of status seeking and conformity motivations both operate to increase bids in an equilibrium with greater visibility. However, for people whose individual optimum lies above the group average, the motivations derived from status seeking and conformity are at odds with one another. The desire to conform will drive such people to lower their optimum in

public, whereas the desire for status seeking will increase their desire to raise their optimal consumption of the status good.

In our setting, therefore, for people who are bidding below their expectations regarding average group behavior, we will be unable to disentangle the effects of status seeking from conformity. However, for bidders bidding above their expectation regarding the average group bid, an increase in bids in public can only be reconciled with stronger status seeking than conformity and a decrease in bids in public implies stronger conformity influences and weaker status seeking motivations.

These effects are moderated by the strength of conformity motivations, β_c, and the strength of status seeking motivations, β_c. Moreover, the overall impact of social motivations depends on the weight placed on social utility, α_s. Given that the theoretical and empirical foundation for status seeking is derived from the literature on pro-social behavior, we can hypothesize that an exogenous increase in how pro-social a behavior is deemed will result in a stronger impetus to derive status from engaging in the behavior (tantamount to an increase in β_s). Hence, for example, highlighting the salience of health spillovers will theoretically result in an increase in the perception of individual choice having pro-social implications, resulting in a higher propensity for individual's to incorporate status seeking motivations in their behavior. Similarly, we can expect the strength of social motivations (α_s) to also be mediated by the degree of contamination in the environment. Hence, in low contamination environments, the value of signaling by way of investment in water treatment technology may be smaller than in environments characterized by high levels of contamination where health seeking behaviors are viewed as more important.

We turn to empirical data to shed light on how these different motivations operate in our particular setting.

1.5 Empirical Framework

1.5.1 Local Context

The experiment is conducted in 69 villages drawn from 3 districts in rural Pakistan. I collaborate with a local NGO, the National Rural Support Program, which has coordinated community mobilization activities in these villages for the past several years. The study districts are subdivided into 4 Social Mobilization Teams (SMTs) - aggregations of spatially proximate villages employed by the NRSP to organize community mobilization activities.

Our study villages are ideal for studying the impact of image motivation in group settings since they were organized by the NRSP into endogenously formed community groups which have been conducting group meetings over the course of the past 6 years. Hence, they have a history of interaction in a group setting. In addition, the mobilization effort was undertaken as part of a prior field experiment that required for at least 60% of the village population to be organized into community groups. Hence, group composition is more generalizable to the ordinary village populace than if these groups had smaller coverage and therefore participation engendered stronger selection effects. Moreover, since the prior mobilization work had no direct relation with health care, any selection that may have taken place can be assumed as orthogonal to the health behaviors being studied.

Water testing conducted in 2013 on a sample of households in these villages revealed the presence of E coli at points of source (40% at the median across the full sample) and storage (80% at the median across the full sample). Household surveys indicated, however, that a mere 3% of respondents reported treating their water in any way to make it safer to drink. Boiling was the method by which most households treated their drinking water, owing to a lack of alternate water treatment technologies in the

rural marketplace.

1.5.2 Product Choice

The water treatment product introduced to these communities is chlorine tablets for Point of Use (POU) drinking water treatment. This choice was motivated by household survey data which indicates that the vast majority of household drinking water sources are individual or shared, with very few instances of community level water sources. Therefore, community level water treatment products that have shown great promise in recent literature (Kremer et al. 2011) are unsuitable for our field setting.

Chlorine products are also superior to filtration methods and boiling since they provide residual protection from recontamination which is important in rural environments with low levels of sanitation and overall hygiene and therefore high likelihood of recontamination post-treatment.

Aquatabs, our product of choice, are imported and distributed by a local supplier but they are currently unavailable in the rural marketplace. Therefore, our experimental setting also has the unique feature that we are the sole suppliers of the product being auctioned and therefore the only point of access to water treatment products for the vast majority of households who do not have access to large urban centers where competing products may be procured. Therefore, their purchasing decisions in the experimental setting are not influenced by access to close substitutes outside of the experimental environment.

1.5.3 Demand Elicitation mechanism

I utilize a Becker DeGroot Marschak (BDM) mechanism to elicit individual level willingness to pay for the product. This is a widely used mechanism for eliciting individual valuations over a good or experience, that has been tested by Berry et al. (2015) in a comparable field setting with a population having low numeracy, and shown results consistent with the standard Take it or Leave it offer method for demand estimation. In this mechanism, participants are told regarding the range of offer prices and asked what their maximum willingness to pay is, given the possible set of prices. The price is then determined randomly. If the price drawn is larger than the reservation price stated by the respondent, they are unable to purchase the product. Conversely, if the price drawn is lesser than the reservation price, the respondent has to purchase the product at the price that they drew. Therefore, the mechanism ensures that respondent's dominant strategy is to reveal their true maximum willingness to pay for the product. (Mazar et al. 2010)

The mechanism is incentive compatible for expected utility maximizers. However, it may depend on the price distribution amongst people who do not maximize expected utility. However, Mazar et al (2010) show that using a titration-based modified BDM procedure that elicits willingness to pay for the entire sequence of available prices nearly eliminates sensitivity to the price distribution. We therefore use a similar titration-based procedure where willingness to pay for each possible price draw is elicited.

1.5.4 Implementation

My experimental sample comprises 322 independent community groups. However, in order to ensure minimum meeting size, smaller groups were combined with spatially proximate groups to yield 219 meetings, varying in size from a minimum of 5 par-

ticipants to a maximum of 30 participants per meeting. The groups may be single gender (all-male or all-female) or of mixed gender composition.

Upon arrival to the meeting, participants are divided into one of the three treatment arms, by being assigned cards belonging to one of three colors which are visibly displayed on their person. However, the nature of randomization is not yet revealed. All participants participate in an information session that highlights the levels of water contamination found in their drinking water during tests conducted in 2013, possible sources of contamination and common water borne illnesses and their impacts. They are subsequently introduced to the auction product – Aquatabs – and provided with instructions on how to correctly use the product, and exercise safe storage of drinking water once it has been treated. Participants are then given a taste test of the product.

Next, the participants are trained in the BDM bidding mechanism. The enumerator describes the BDM procedure, placing emphasis on the dominant strategy being the revelation of true willingness to pay. It is also emphasized that increasing bids raises probability of being able to purchase the product while lowering bids lowers this probability, but that the final price paid is randomly determined. Respondents are told they can only bid once and cannot revise bids once the price has been drawn. They are also told that they must purchase the product if the price drawn is lower than their bid.

The enumerators use soap to conduct a practice round of the auction with a volunteer participant from the meeting. The practice auction using soap is implemented in full view of all participants to ensure their proper understanding.

The participants are then fielded a short survey which tests each individual for their understanding of the bidding mechanism and collects some basic information regarding prevalent practices regarding illness and water treatment. The respondents are

asked a battery of questions to test their comprehension of the bidding mechanism. The questions deal with the change in probability of winning the product if an individual bid is raised or lowered, respectively, and the outcome of a hypothetical bid and price draw. Each of these questions is asked twice, employing different numbers for bids/prices. If a respondent answers incorrectly the first time, the enumerator explains the bidding mechanism again and asks them the question again with a different set of prices/bids. If they still answer incorrectly, the correct answer is explained to them a second time and they are allowed to proceed but their incorrect response is recorded. This allows us to record which participants likely submitted bids with incomplete comprehension of the bidding mechanism.

Once the survey has been completed, participants are told regarding their treatment assignment. Once treatment assignment is revealed, silence is ensured in the meeting while bids are collected individually in a separate enclosure.

The range of possible prices for the product are set between Rs. 60 and Rs. 150, reflecting a 75% to 37.5% discount on the market price of the product (Rs. 240). The participant is asked whether they are willing to pay each possible price between Rs. 60 and Rs. 150 in Rs. 10 increments. If they are unwilling to purchase the product at Rs. 60, they are asked what minimum price between Rs. 0 and Rs. 60 they would be willing to pay. If they are willing to purchase the product at Rs. 150, they are additionally asked for the maximum they would be willing to pay between Rs. 150 and Rs. 240. The maximum willingness to pay, hence elicited, comprises the final bid of the participants.

1.5.5 Treatments

Public treatment: Participants assigned to the public arm are told that once all the bids have been collected, their bid will be announced to other members of their

meeting.

Private treatment: Participants assigned to the private arm are told that their bid will not be revealed to other members of their meeting.

Self-Selection treatment: Participants assigned to the self-selection arm are told that they have the choice of whether to keep their bids private or public. If they choose private their bids are not revealed at the end of the meeting, and vice versa.

The instructions regarding assignment to public vs. private treatment are revealed publicly during the meeting. The instructions to the self-selection arm are only revealed during direct interaction with the enumerator and not revealed to the general meeting participants. However, their decision regarding whether to bid privately or publicly can be backed out at the end of the meeting based on whether their bid is revealed or not.

I also introduce an overlaid randomization that varies whether bidders are primed regarding the negative health spillovers on friends and neighbors of a failure to invests in preventative health care at the individual level. By priming individuals on health externalities, we seek to increase how pro-social individual actions are perceived by highlighting that their benefits accrue not only to the individual but to the larger community as well. This externalities treatment is randomized at the village level to prevent information spillover between group within a village.

1.5.6 Randomization

I employ a between-subject design with randomization at the individual level, within meetings. For each day of the week, enumerators are provided with a randomization list by which to make the assignment, so that randomization is not systematic but still ensures balance of assignment as much as possible within each meeting.

(See Appendix Table A5 for sample randomization list). Hence, the order by which participants arrive at the meeting determines the treatment arm to which they are assigned but the order by which treatment arms are assigned is itself random by day of week. In addition, the assignment of groups (meetings) to the experiment was itself randomized from a larger sample space of 652 meetings. The randomization was stratified by SMT and gender composition of meeting.

Selection arises in show up to the meeting on the date of the study, since not all members of each community group participate on the day of the meeting. However, this does not affect the internal validity of the randomization.

Table A1 shows the summary statistics between the three randomization arms. There is balance across all the variables except for education, with bidders in the private arm having slightly lower education on average than in the public and opt arms. Consequently, I employ a small set of demographic controls in all our regression specifications to account for these differences between groups, and to improve the precision of our estimates.

In addition, looking at the unconditional distribution of bids in the data in Figure 1, we can see that there are strong shifts in the distribution by SMT. Therefore, I employ SMT fixed effects in the majority of our specifications to reduce noise in our estimates (unless otherwise noted). Finally, I cluster standard errors at the meeting level to account for correlated unobservable in our error term.

1.5.7 Norm Elicitation

Prior to the revelation of the randomization arms and the randomization assignment, participants are asked regarding their expectations of the average bid placed by other participants in the meeting. We use this measure as a proxy for the respondents' beliefs regarding the social norm governing the product. As such, our measure of

norms is a reflection of beliefs regarding the descriptive norm - what people are doing - as opposed to the injunctive norm - what people ought to be doing.

Since our norm elicitation precedes the revelation of randomization, it precludes any strategic considerations that may vary by treatment randomization. As demonsstrated in Figure 4, the distribution of expectations regarding the average bid in the group is invariant between the two treatment arms. In addition, Figure 3 demonstrates that the expectations regarding the average group bid are also fairly invariant across the bidding distribution, suggesting the presence of a somewhat stable norm across the sample, regardless of the actual bid placed.

In addition, a subsample of our respondents profess to having no expectation regarding the average bid in the group - our $NoNorm$ subsample. As shown in Table A1, this subgroup is roughly 20% of the total sample and is also uniformly distributed between treatment arms. Our randomization therefore ensures that there are no systematic differences between individuals with $NoNorm$ who are assigned to different treatment arms, and we can assess treatment effects on this subsample as well.

1.6 Results

1.6.1 Public vs. Private bidding (No self-selection):

Performing non-parametric rank-sum tests (MWW), we can compare bid distributions between different treatment arms. Comparing the subsample of bids falling in the public and private treatment arms only, we are unable to reject the null hypothesis of equality of distributions (z= -0.285, p= 0.7758).

Table 1.1 utilizes a regression framework to explore our findings. We estimate the following:

$$MWTP_{im} = \alpha + \beta_1 Public_{im} + X_{im} + fe + \epsilon_{im}$$

where $MWTP_{im}$ is the maximum willingness to pay of individual i in meeting m, as reflected in their BDM bid; $Public_{im}$ is an indicator for whether the individual was randomized into the public bidding arm; X_{im} is a vector of individual level controls including gender, age, household size, number children in household, and poverty score; fe is fixed effects, which vary by specification; and, ϵ_{im} is an error term which is clustered at the meeting level.

Looking at the overall effect of randomization into the public arm, relative to the private arm, I find small and statistically insignificant coefficients across all fixed effect specifications. While imprecisely estimated, the coefficients are very small relative to the mean value of the dependent variable. We can conclude, therefore, that the average treatment effect of making bidding behavior visible is negligible.

Since the simple linear regression specification only compares conditional means across the distribution, I employ a quantile regression in Table 1.2 to investigate how the treatment effects differ by their location on the distribution of bids. I discover that the tail end of the bid distribution is affected by the public treatment, with a very large positive coefficient on the public treatment arm for the tenth quantile which is statistically significant at the 10% level. The coefficient represents nearly 50% of the mean bid in this quantile, suggesting very strong treatment effects but on a very small portion of the bid distribution.

1.6.2 Treatment Effects by Beliefs Regarding Group Behavior: Conformity and Status Seeking

In order to evaluate the effects of conformity and status seeking on bidding behavior we must also incorporate the bidders' beliefs regarding the bidding distribution into

our empirical specification.

Figure 2 plots the distribution of the actual bids relative to the distribution of beliefs regarding the average group bid. Visual inspection suggests that the distribution of beliefs deviates from the distribution of actual bidding behavior. Using a Wilcoxon signed rank sum test, I confirm that there is a statistically significant difference in theses distributions, with the beliefs distribution having a lower rank overall. We can anticipate, therefore, that since expectations regarding bidding behavior are more pessimistic than the behavior itself, if conformists tendencies exist they will tend to bias bids downwards owing to poorer beliefs than actual behavior.

1.6.2.1 Conformity to Beliefs regarding Group Behavior

In order to investigate the effects of conformity by treatment assignment, I construct a variable that measures the difference between an individual's bid and their belief regarding the average group bid (BidNorm). DevNorm therefore measures how far bidders are willing to deviate from their perception of the descriptive norm.

$$DevNorm_{im} = MWTP_{im} - BidNorm_{im}.$$

Figure 5 plots the distribution of DevNorm by treatment arms of public and private bidders. We can see from this figure that while the distributions appear identical at the tails, the median of the public bids distribution is shifted towards the left of the median for the private bids distribution, and appears more centered around zero.

In Table 1.3 I test the difference in DevNorm by treatment assignment across the full sample.

$$DevNorm_{im} = \alpha + \beta_1 Public_{im} + X_{im} + fe + \epsilon_{im}$$

I find a negative but weak and statistically insignificant reduction in DevNorm when

bids are public. However, this specification only captures the treatment effect at the conditional mean. Consequently, in Table 1.4 I employ a simultaneous quantile regression to estimate the treatment effect for different deciles of the distribution of DevNorm.

As Table 1.4 reveals, there is a strong and statistically significant tendency to revise bids towards expectations regarding the average bid in the 30th, 40th and 50th quartiles when bids are made publicly, with effects persisting into the 60th quartile but with larger standard errors. All these quartiles coincide with positive deviations from the BidNorm and therefore indicate that for bidders bidding above their perception of the average group bid, public revelation drives their bids downwards in the direction of their belief regarding group behavior. As per the comparative statics of our model, since these bidders are bidding above their beliefs regarding the group average, their reduction in bids is consistent with a preference for conformity in public.

The treatment effect sizes in Table 1.4 range from 80% reduction in difference from the norm for bidders who were already close to the average, to 16% for bidders in the 60th percentile who are bidding farthest from their expectations regarding the average bid. Figure 5 provides a visual representation of our results by plotting the treatment effect coefficients from our specification in Table 1.4 by decile. We can observe a consistent trend in favor of conformity in the middle of the distribution. Hence, the tendency towards conformity is diminishing as the difference from average bid increases, with the largest effects being seen amongst people who are bidding more closely to their expectations regarding group behavior at the outset. This would appear intuitive since these bidders are already locating themselves in the vicinity of group behavior and visibility serves to make this motivation stronger.

In Table 1.5, I divide the sample into 3 groups: bidders who bid above their expectations regarding group behavior (Above Norm); bidders who bid at their expectation

of group behavior (At Norm); and bidders who bid below their expectation of group behavior (Below Norm). We present a simple tabulation of bidders with prior beliefs against treatment assignment to public bidding to see if treatment assignment shifts the distribution of bidders between the groups of 'Above Norm', 'At Norm' or 'Below Norm', which is a margin not clearly captured in our earlier specification. We find that the vast majority of bidders are bidding above their beliefs regarding average group behavior. However, assignment to public bidding results in a 5% reduction in bidders who are bidding above their expectations regarding group behavior, with bidders redistributing themselves on the norm or below it.

We examine this effect in a regression framework by employing a probit model to assess the impact that public revelation of bids has on the odds of bidding above the norm, with the inclusion of our controls and fixed effects. Table 1.6 shows our results. The negative coefficient on 'Public' indicates the randomization into public bidding results in a statistically significantly lower likelihood of bidding higher than your belief regarding the descriptive norm, in concordance with our results from Table 1.4. In addition, the likelihood of bidding at 'At Norm' increases significantly in public, with a smaller increase in the likelihood of bidding below the norm.

Together, these results provide strong evidence in favor of the presence of conformity in the randomized sample. Moreover, given that the conformity results are driven by bidders who are bidding above their expectations regarding the average bid, these results cannot be reconciled with a pure status seeking model which would lead the bidders to bid higher in public and therefore increase the difference between individual bids and the average bid.

However, it is also clear that the impact of conformity is not uniform across all bidders, and is concentrated amongst bidders who are already bidding in the vicinity of their beliefs regarding group behavior. Hence the utility from conformity cannot be rationalized into a simple squared loss function specification and recognizing in-

dividual differences in preferences for conformity − as captured by the β_c parameter in our model − is important. It is also important to note that existing literature on norm compliance finds that individuals exercise conformity to group norms when such norms are revealed to them even when their own actions are unobservable. Hence, our measure of conformity is a lower bound for the overall influence of conformity on individual behavior. Therefore, among high valuation bidders who are bidding well in excess of their beliefs regarding group behavior we cannot discount the possibility that even though conformity effects are not visible, this is owing to opposing status seeking effects and not as a result of weak or no conformity.

1.6.2.2 Status Seeking

Given that overall treatment effects were roughly zero, there must be some portion of the sample that is not revising their bids downwards in public. We assess bidding patterns for our excluded sub-sample: individuals who express no prior beliefs regarding group behavior in the bidding process and can plausibly be used to estimate what would occur in the absence of conformity effects. We estimate:

$$MWTP_{im} = \alpha + \beta_1 Public_{im} + \beta_2 NoNorm_{im} + \beta_3 Public * NoNorm_{im} + X_{im} + fe + \epsilon_{im}$$

where $NoNorm$ is an indicator for whether the bidder expressed no prior belief over the bidding behavior of his meeting group and therefore $\beta 3$ indicates the effect of visibility of bids on bidders who have no prior beliefs regarding average group behavior.

Table 1.7 shows the results of this specification. We find that bidders who express no beliefs regarding group behavior have lower bids overall, but significantly higher bids in public than in private. This result further supports our model's claims that in the absence of conformity effects, the effect of visibility on bidding should be unconditionally positive owing to a desire for status seeking. However, given that

bidders possessing no beliefs regarding group behavior have lower bids on average, this would suggest that the average effect of conformity is to drive higher bidding behavior overall, but to reduce positive deviations from the norm in public.

1.6.2.3 Norm Definition

While there is a large body of existing research in psychology that tests for the effects of norms on individual behavior, some in this tradition would argue that self-reported norms are problematic and that norm elicitation should be incentivized to remove all possibility of bias from misreporting.

Krupka and Weber (2013) suggest an incentive compatible mechanism for norm elicitation where the individual respondent is incentivized to provide a norm that is closest to the actual prevailing social norm. This method would theoretically provide greater external validity to the measurement of the social norm. However, Vesely (2015) tests the difference between norms elicited with and without incentivization and finds that the two methods are statistically equivalent and yield the same results.

My design is robust to these concerns insofar as our norm elicitation occurs before the revelation of the study randomization. In fact, the participants have no knowledge regarding the purpose of the study besides the sale of chlorine products at the point at which norms are elicited. The nature of randomization and the randomization assignment occur after the norm elicitation and therefore cannot bias our results in a manner which is consistent with the treatment assignment and would therefore compromise internal validity. This is moreover clear from Figure 4, which plots the distribution of norms between the two treatment arms and shows that they are identically distributed. Therefore, our results cannot be driven by any differences arising from the norm elicitation process which is internally valid.

Moreover, the process of incentivizing norm elicitation has been proposed for the

case of injunctive norms which inquire into the nature of what 'ought to be done' and not descriptive norms that are utilized here. We address this concern in greater detail in the robustness section.

1.6.3 Channels: Water Contamination Rates

During the information session bidders are also provided with rates of prevalence of source and storage water contamination at the village level. We can therefore analyze whether the degree of contamination in the environment mediates the behavioral responses of individuals to our experimental treatments. We should expect for this information to have an effect on individual behavior insofar as the degree to which social utility can be derived from individual behavior is crucially tied to whether society deems the action as favorable. Hence, in high contamination environments it is likely that individual actions bear larger social utility rewards than in a low contamination environment where individual preventative action is not deemed as crucial.

Given the very high level of correlation between contamination at source and storage (correlation coefficient of 0.73), and the smaller variance in degree of contamination at the level of storage, I utilize the level of contamination at source in my estimation strategy. I distinguish high contamination villages as having higher than median levels of contamination at source and analyze individual bidding behavior between the subsamples. In Appendix Table A6 we can see that high contamination villages do differ from low contamination villages, so defined, along other parameters namely number of household members, education level of the bidders and poverty rates. However, merely taking SMT level fixed effects renders these differences statistically insignificant and we therefore employ SMT level fixed effects in our analysis, as in our other specifications, to control for the effects of these stable underlying differences.

Table 1.8 (columns 1 & 2) revisits our base specification for the effect of high contamination environments on the level of bids in public relative to private at the conditional mean, and shows small and insignificant effects on overall bid levels. In columns 3 and 4, we analyze the treatment effect on deviation from beliefs regarding group behavior and find a large and statistically significant reduction of bids towards the group bid among bidders who belong to high contamination environments, with no such pattern in low contamination environment when estimated at the conditional mean. This reduction in bids towards the expectation of group behavior is nearly 40 percent of the mean difference between individual bids and beliefs regarding the group bid, suggesting strong conformity influences in high contamination environments.

In Table 1.9 we assess how these conformity influences vary across the distribution of bidders in high and low contamination environments. As the coefficients indicate, there are significant reductions in public bids relative to private bids throughout the distribution in high contamination villages, in line with conformity, whereas low contamination settings appear to no similar demonstration of conformity in public. This is verified by our probit specification with strong evidence in favor of higher bidding at the norm in high contamination environments and no parallel in low contamination environments.

Finally, we assess whether there are differences in status seeking in our subsample of bidders without beliefs regarding group behavior. Table 1.11 reveals that while the individual coefficients are imprecisely estimated, the impact of public bidding on bidders with no beliefs regarding group behavior is more positive in high contamination settings that in low contamination settings. However, the standard errors on these estimates are too large to be conclusive.

It would appear, therefore, that communities with higher levels of contamination have a stronger tendency to converge towards group equilibria and potentially a

stronger tendency to demonstrate status effects in the absence of conformity. Consequently, we can surmise that the strength of social motivations is mediated by the underlying demand environment, and people are less likely to exhibit social utility from conformity if the behavior is not deemed imperative. Conversely, the negative utility from being non-conformist in an environment where individual costs and benefits are more uniformly distributed is larger and therefore people are more likely to conform when contamination rates are uniformly higher than when they are low and therefore incident asymmetrically across the population. However, the impact of the demand environment on status signaling is not as clear cut, with imprecise coefficients owing to small sample sizes.

1.6.4 Channels: Salience of Externalities

An additional layer of randomization that I introduced at the village level involved the salience of externalities to the decision process. While the recognition of health externalities is fairly high across the sample (roughly 88% of the sample acknowledge that their actions affect health outcomes of others or that other's actions affect their health outcomes), in only half of the villages the information campaign included a section highlighting the importance of health externalities in the group meeting. Therefore, this arm allows us to investigate whether the priming bidders regarding health externalities has an impact on bidding behavior in public relative to private.

In order to prevent information spillover between groups and contamination of the randomization assignment, the randomization of externalities messaging was done at village level and not the group level. Appendix Table A7 shows that randomization at this level does not achieve balance between the treated and the untreated, with significant differences emerging in the two groups in the level of contamination in the environment and the gender mix of the bidders. I therefore control for these differences in my analysis to ensure that they are no driving my results, while ac-

knowledging that my identification at this level may not be completely robust to the effects of unknown covariates. I add linear controls to my regressions for contamination at source and storage and for the gender mix of the community group and take other steps to ensure robustness of my results as elaborated below. In addition, given that the visibility randomization is conducted at an individual level, comparing public and private bidders within villages exposed to the externalities treatment though compromising external validity is still internally valid.

Columns 1 and 2 of Table 1.12 evaluate our base specification of the impact of externalities messaging on the overall bid level. We can see that the coefficient on public bidding in villages with externalities messaging is positive but statistically insignificant when controls are added. However, a Wald test comparing the impact of public bidding on bidders with and without externalities messaging reveals a weakly statistically significant differences at the 10% level (F stat of 2.84, p value: 0.09). In columns 3 and 4 we analyze the impact of externalities messaging on conformity. The coefficients are imprecisely estimated but suggest departures between the two treatment types, after controlling for differences in contamination and gender mix.

In Table 1.13 we find that looking at the differences in bidding behavior across the bidding distribution, externalities do appear to be driving positive departures from the beliefs regarding group behavior while environments with no externalities messaging are demonstrating conformity by reducing the difference between public bids and beliefs regarding the average group bid. A Wald test finds significant differences between public bidding with and without externalities priming in 40th, 50th and 60th percentiles of the distribution. The differences in public and private bidding within villages with externalities priming show a similar pattern but are imprecisely measured and not statistically significantly disparate. While this specification contains linear controls for contamination at source and storage and gender mix of meeting group, I additionally control for whether the bidder lies in a high contamination

village and for the interaction of high contamination and public bidding and for the interaction of mixed gender groups and public bidding which are the two potential sources of confounding effects (table not shown). Figure 8 plots both the coefficients from the regression with and without the interacted controls and shows that the patterns are not being driven by contamination as the coefficients remain virtually stable in the villages with the externalities treatment and are positive for the vast range of the bidding distribution but with large standard errors.

Table 1.14 shows similarly that the tendency to bid above the norm is not weakened in villages with externalities messaging, as occurs in villages without. There is a significantly higher probability of bidding on the beliefs regarding the norm in externality villages but from our bidding distribution we can see that this is being driven by bidders in the lower portion of the distribution raising their bids in public as opposed to the conformity trend in the full sample of higher valuation bidders lowering their bids.

Combined, these results point to a lack of conformity amongst individuals who are exposed to the externalities priming message and vote in public. I argue that such priming effectively translates into an increase in the pro-social value of individual behavior, owing to the added consideration of health spillovers on the greater community. As a result, the relative contribution of status seeking to the image motivation equation rises, and bids are not driven down in public from conformity. The empirical evidence appears to bear out my theoretical stance and I find greater status seeking behavior as individuals increase the disparity between their bids and their expectations of average behavior in the group, leading to an overall increase in bids in public with externalities priming relative to without where the mean effect was (insignificantly) negative.

1.6.5 Heterogeneous Effects: By Gender & Gender Composition of Reference Group

Studies in psychology indicate that while there isn't complete consensus on gender differences in conformity, in all studies where men and women's responses to social influences diverge, it is women who systematically exhibit greater conformity than men. Furthermore, women are likely to conform more when they are aware that their opinions will be shared publicly (Eagly, Wood and Fishbaugh(1981) and Eagly and Chrvala (1986)). Santee and Jackson (1982) demonstrate that this arises from different evaluative processes between men and women, whereby women favor conformity over dissent as it relates to their self-identity.

There is significant heterogeneity in the gender composition of our meeting groups, with some groups being single gender and others having a mixed gender composition, which allows us to investigate whether there are different gender responses to our social motivators of conformity and status seeking. However, since group composition is endogenously determined, these results are illustrative but should not be interpreted as causal.

We look at the impact of public bidding on the disparity between individual bids and perceptions regarding the group average in Table 1.15. We find extremely large negative coefficients across most percentiles for all women groups, but they are imprecisely estimated owing to small sample size for this subgroup. On the other hand, the same coefficients among all male groups are considerably smaller except in the largest quantiles. Figure 9 plots these coefficients. Finally, separating the trends for men and women in mixed meetings, we find very small and insignificant coefficients for men in mixed meetings, but large and statistically significant negative coefficients across the majority of percentiles of the distribution for women (Figure 10). Consequently, we may conclude that women are more likely to bid closer to

their expectations of group behavior than men in public when in a mixed gender environment. Single gender environments yield more ambiguous results of both men and women demonstrating conformity over some range of the bidding distribution.

In addition, Table 1.16 indicates that women in all-female groups and women in mixed groups display a lower likelihood of bidding above the norm in public - a tendency that is nearly absent in all-male groups and weaker among males in mixed group settings. However, these coefficients are not precisely estimated. Finally, in Table 1.17, we find that men in all-male meetings who have no priors about group behavior are significantly likely to raise their bids in public, in line with status seeking in the absence of countervailing conformity motivations. Women in all female meetings do not show this effect, wheres as women and men in mixed meeting bid higher in public but the treatment response is more muted than for men in all-male meetings.

These patterns indicate that our data does support the literature indicating women exercise greater conformity than men and are more likely to bid closer to the descriptive norm when their actions are observable, though this result is derived from mixed gender settings and not from single gender settings where men also display conformity across some range of the bidding distribution. There is also evidence for men exercising greater status seeking in all-male environments from the sub-sample that has no prior beliefs over group behavior. However, these results are suggestive and not causally identified owing to endogenous group formation.

1.6.6 Public vs. Private bidding (Self-selection arm):

Our third treatment arm allows us to assess how social motivations operate when people are allowed to self-select their bidding environment. This is an important outcome insofar as it is the closest approximation of a unregulated equilibrium which

will conceivably emerge when product purchase does not occur in a controlled environment. Hence, when there are alternate channels by which to procure the product, as would be the case if this product was available in the local market place, we would likely see a self-selection equilibrium emerge in group setting.

The ability to self-select into private or public bidding reveals that there is an overall utility gain from bidding in private with 61% of the self-selection sample choosing to keep their bids private.

Table 1.18 parses out the impact of sorting on each arm – opting into private versus opting into public, in an extension of our base regression specification:

$$MWTP_{im} = \alpha + \beta_1 Public_{im} + \beta_2 Opt * Private_{im} + \beta_3 Opt * Public_{im} + X_{im} + fe + \epsilon_{im}$$

Here, we see clearly the impact of sorting on maximum willingness to pay as elicited by the BDM bid. While random assignment to public bidding doesn't result in a change in public bids relative to private bids overall, self-selection into private bidding results in a reduction in the level of private bids relative to randomly assigned private bids. Moreover, self-selection into public bidding results in a substantial increase in the level of public bids, relative to random assignment to public/private bids, such that the disparity of bids between public and private bidding with self-selection is large.

It is important to recognize that these results can emerge from a simple sorting of bidders with higher valuations into public bidding and lower valuations into private bidding. Or it may be the case that the choice mechanism itself affects bidders' underlying valuations. Our data does not allow up to make any predictions about which possibility is driving our results.

In Table 1.19, we apply our conformity specification to the self-selection sample and find that there is no evidence for conformity among the subset of the sample

that chooses to bid in public. Hence, while bidders randomized into public bidding are lowering their bids in public towards their conception of the social norm, those selecting into public bidding are raising their bids in public and deviating from the social norm across the majority of the deciles. Therefore, we argue that conformity influences diminish when self-selection is allowed. However, our design does not allow us to distinguish whether this occurs as a result of conformists sorting out of public or whether the same individuals tap into different motivations to order their behavior when the mechanism is altered or high valuation types are inclined to bid in public. However, it does reveal a potential mechanism for eliciting higher bids in public and therefore generating more positive beliefs regarding average group behavior, since self-selection into public bidding results in a higher average bid level in public.

1.6.7 Robustness

I test an arguably more exogenous definition of the descriptive norm in our data by using the median expectation regarding the average group bid at the village level as a measure of the social norm, as opposed to using the self-reported measure.

In Appendix Table A2 (Figure 12) I test our conformity specification using this alternate definition of the norm. The coefficients are attenuated owing to measurement error but show the same patterns in the 30-50th percentiles as the base specification with individual beliefs, lending credence to our earlier results. This specification reinforces our belief that the conformity results are being driven by a conception of the social norm and not some arbitrary or endogenously formed beliefs of the treatment group.

A bigger concern may be that since people's beliefs regarding group behavior were not exogenously manipulated, there may be endogeneity in who professes to having no priors over group behavior which will affect my ability to generalize the results from

the subsample of bidders professing to having no beliefs regarding group behavior. However, randomization yields balance between the treatment arms on expectations regarding the average bid as well as the proportion of bidders who professed to not knowing the norm. I would argue, therefore, that the characteristics of this subsample, which is of significant size at roughly 20% of the full sample, are also randomly distributed and do not vary systematically. I also regress the propensity to express no expectations regarding group behavior on a battery of variables that were employed for ensuring randomization balance (Appendix Table A4). I find no significant coefficients except for 'Age of group' which suggests that people who express no knowledge of group behavior are less likely to belong to groups who have had a longer history of association. However, independently I have found this feature of groups to bias against finding treatment effects from status motivation. Therefore, the shorter period of association among the 'No Norm' subsample would bias against finding treatment effects. (results not shown).

My alternate norm definition also allows me to corroborate the results for the subsample with no beliefs regarding the norm. In Appendix Table A3 (Figure 14) I assess how the bid of bidders in the $NoNorm$ subsample changes relative to the village level norm construct.

Since the mass of bidders with no expectations regarding the norm are bidding lower than the village level norm, the coefficients in quantiles 10-30 reflect movement towards the norm and can be consistent with both status seeking and conformity influences. However, the positive departure from the norm as indicated in quartiles 40-60 can only be reconciled with status seeking, and taken as a whole suggests a linear increase in bids for the vast majority of the sample in public which is consistent with status seeking behavior. Hence, while our results are not conclusive, it would appear that they are more supportive of status seeking than conformity, when people state an absence of beliefs regarding group behavior.

1.6.8 Discussion

My results indicate that while social motivation does influence willingness to pay for health products in social settings, the strength of these motivations is inherently tied to expectations regarding group behavior. Utility for status seekers is increasing in differentiating yourself from the average group behavior, but the demands of conformism operate in the reverse direction when expectations regarding group behavior are low. Given that the largest proportion of my sample has low expectations regarding the average bid, status seeking effects are dominated by a desire to conform in public, particularly in the portion of the bidding distribution where bids are already proximate to the beliefs regarding the group norm.

The fact that conformism would exhibit itself as a negative rebound in this situation may appear somewhat puzzling given that health expenditures in general have a positive norm associated with them and to lower willingness to pay in public appears counterintuitive. However, given that these social groups potentially form a platform for informal insurance, individual behavior is also subject to the incentives of income hiding. Hence, in settings characterized by high amounts of interpersonal transfers and income observability, agents are found to demonstrate a preference for hiding their wealth in order to avoid the demands of risk sharing (Beekman et al., 2015, Jakiela and Ozier, 2015). Our particular setting, by making public an individual's willingness to pay may also be providing information to their social insurance network on their ability to insure others against risk. Therefore, agents may be more averse to bidding higher in public and more amenable to conforming to a low bidding norm because they are less inclined to demonstrate their own wealth.

Status seeking only emerges neatly for the subsample that has no expectations regarding group behavior and is therefore unconstrained by conformity influences. Moreover, our externalities treatment suggests that status seeking is increasing in the

pro-social value of actions, with messaging regarding health externalities resulting in status seeking behavior where bids are higher in public and bidders differentiate themselves from their expectations regarding group behavior in a positive direction by placing higher bids in public. This suggests, therefore, that when health seeking behavior is not explicitly perceived as a 'social' behavior, individuals are more likely to appeal to social norm considerations and align themselves with average group behavior in public. However, when individual behavior is perceived as having social repercussion, people are more likely to engage in more socially desirable behavior and demonstrate higher willingness to pay in public since status seeking considerations are heightened.

I also find that when bidders can select their own bidding environment, the tendency towards conformity in public bidding disappear. Instead, public bidders throughout the bidding distribution demonstrate status seeking behavior, placing significantly higher bids than their expectations regarding the average bid in the group. On the other hand, bidders self-selecting into private bidding demonstrate lowering bidding on average and similar patterns of conformity as the randomized sample of public bidders. I argue, therefore, that self-selection draws bidders with a preference for conformity into private bidding allowing stronger status seeking patterns to emerge in the bidders who select into public bidding and seek to derive positive signals from their public behavior. However, this pattern can also emerge from higher valuation bidders selecting into public bidding while lower valuation bidders do not. While I cannot make any claims as to the mechanism that elicits such behavior, self-selection reveals itself as a potential method by which we can generate more positive beliefs regarding average group behavior by drawing out public bidders who have the highest average bids.

1.7 Conclusion

One of the three guiding pillars of the World Development Report 2015 is 'Thinking socially' - the recognition that individual decision making is framed by social norms, preferences, identities and networks. My work attempts to shed light on how these social preferences can affect individual investment in health care, and whether these social preferences can be applied towards the end of using community groups as treatment units for public health interventions.

My research highlights the importance of exploring and accounting for preexisting beliefs regarding social norms in any policy setting that involves the use of social motivation. Hence, if on average people have low expectations regarding the norm, and exhibit strong preferences for conformity, social preferences can work to the detriment of initiatives geared towards improving individual outcomes. Consequently, there is a strong need to assess the prevailing norm and to modify the norm as appropriate towards the goals of policy before using social preferences towards improving policy outcomes.

This finding resonates with Ray's (1998) theory of development traps arising from adoption complementarities which can yield multiple dynamic adoption equilibria, some in which adoption is high and other where adoption is low. In our particular setting, these complementarities are generated by conformity to the social norm governing willingness to invest in technology and hence where norms are poor, conformity to the norm reinforces poor adoption beliefs and yields a poor adoption equilibrium. It stands to reason that strong social norms governing willingness to pay would serve to reinforce a commensurately high adoption equilibrium, if such norm can be generated.

This suggests the need for research on the evolution of norms and the possibility

and effectiveness of policies for changing prevailing norms. Our self-selection arm points towards a mechanism that can contribute to the evolution of stronger positive norms because it encourages the display of status seeking behavior and privatizes behavior that would, in public, weaken the norm. On the other hand, it leads to an overall diminishment in the willingness to pay since more people seek private transactions than public and lower their willingness to pay when provided with the veil of privacy. Hence, policy makers should pay heed to the choice of mechanisms for eliciting behavior as much as the behavior itself.

Methodologically, we are able to exploit large sample size in a unique setting of pre-existing community groups and therefore provide more realistic estimates for peer effects than synthetically created peer groups with small sample sizes. We are able to randomize treatments within groups to allow us to tackle the reflection problem in group treatments. In addition the problem of correlated effects within groups would bias us against finding treatment effects. However, owing to constraints of our study setting, we are unable to randomize people's beliefs regarding the group norm, which would have allowed us more compelling evidence regarding conformity effects.

1.8 References

Ahuja, A., Kremer, M., & Zwane, A. P. (2010). Providing safe water: Evidence from randomized evaluations. Annu. Rev. Resour. Econ., 2(1), 237-256.

Akerlof, G. A. (1997). Social distance and social decisions. Econometrica: Journal of the Econometric Society, 1005-1027.

Andreoni, J., & Petrie, R. (2004). Public goods experiments without confidentiality: a glimpse into fund-raising. Journal of public Economics, 88(7), 1605-1623.

Ariely, D., Bracha, A., & Meier, S. (2009). Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. The American economic review, 99(1), 544-555.

Babcock, P., Bedard, K., Charness, G., Hartman, J., & Royer, H. (2015). Letting down the team? Social effects of team incentives. Journal of the European Economic Association, 13(5), 841-870.

Bandiera, O., & Rasul, I. (2006). Social networks and technology adoption in northern Mozambique. The Economic Journal, 116(514), 869-902.

Beekman, G., Gatto, M., & Nillesen, E. (2015). Family networks and income hiding: evidence from lab-in-the-field experiments in rural Liberia. Journal of African Economies, 24(3), 453-469.

Bernheim, B. D. (1994). A theory of conformity. Journal of political Economy, 841-877.

Berry, J., Fischer, G., & Guiteras, R. P. (2015). Eliciting and utilizing willingness to pay: evidence from field trials in Northern Ghana.

Bronchetti, E. T., Huffman, D. B., & Magenheim, E. (2015). Attention, intentions, and follow-through in preventive health behavior: Field experimental evidence on flu vaccination. Journal of Economic Behavior & Organization, 116, 270-291.

Carpenter, J., & Myers, C. K. (2010). Why volunteer? Evidence on the role of altruism, image, and incentives. Journal of Public Economics, 94(11), 911-920.

Conley, T., & Udry, C. (2001). Social learning through networks: The adoption of new agricultural technologies in Ghana. American Journal of Agricultural Economics, 83(3), 668-673.

DellaVigna, S., & John, A. List, and Ulrike Malmendier. 2012."Testing for altruism and social pressure in charitable giving.". Quarterly Journal of Economics, 127(1), 1-56.

Duflo, E., & Saez, E. (2002). Participation and investment decisions in a retirement plan: The influence of colleagues' choices. Journal of public Economics, 85(1), 121-148.

Dupas, P. (2011). Health behavior in developing countries. Annu. Rev. Econ., 3(1), 425-449.

Dupas, P. (2014). Short-run subsidies and long-run adoption of new health products: Evidence from a field experiment. Econometrica, 82(1), 197-228.

Dupas, P., & Robinsona, J. (2013). Why don't the poor save more? Evidence from health savings experiments. The American Economic Review, 103(4), 1138-1171.

Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: status, reputation, and conspicuous conservation. Journal of personality and social psychology, 98(3), 392.

Guiteras, R. P., Levine, D. I., Luby, S. P., Polley, T. H., Khatun-e-Jannat, K., & Unicomb, L. (2016). Disgust, Shame, and Soapy Water: Tests of Novel Interventions to Promote Safe Water and Hygiene. Journal of the Association of Environmental and Resource Economists, 3(2), 321-359.

Hoffman, E., McCabe, K., & Smith, V. L. (1996). Social distance and other-regarding behavior in dictator games. The American Economic Review, 86(3), 653-660.

Hong, H., Kubik, J. D., & Stein, J. C. (2004). Social interaction and stock-market participation. The journal of finance, 59(1), 137-163.

Jakiela, P., & Ozier, O. (2015). Does Africa need a rotten kin theorem? Experimental evidence from village economies. The Review of Economic Studies, rdv033.

Karlan, D., & McConnell, M. A. (2014). Hey look at me: The effect of giving circles on giving. Journal of Economic Behavior & Organization, 106, 402-412.

Kremer, M., Miguel, E., Mullainathan, S., Null, C., & Zwane, A. P. (2011). Social engineering: Evidence from a suite of take-up experiments in Kenya. Work. Pap., Univ. Calif., Berkeley.

Mazar, N., Koszegi, B., & Ariely, D. (2010). Price-sensitive preferences. SSRN Working Paper Series.

Miguel, E., & Kremer, M. (2004). Worms: identifying impacts on education and health in the presence of treatment externalities. Econometrica, 72(1), 159-217.

Oster, E., & Thornton, R. (2011). Menstruation, sanitary products, and school attendance: Evidence from a randomized evaluation. American Economic Journal: Applied Economics, 3(1), 91-100.

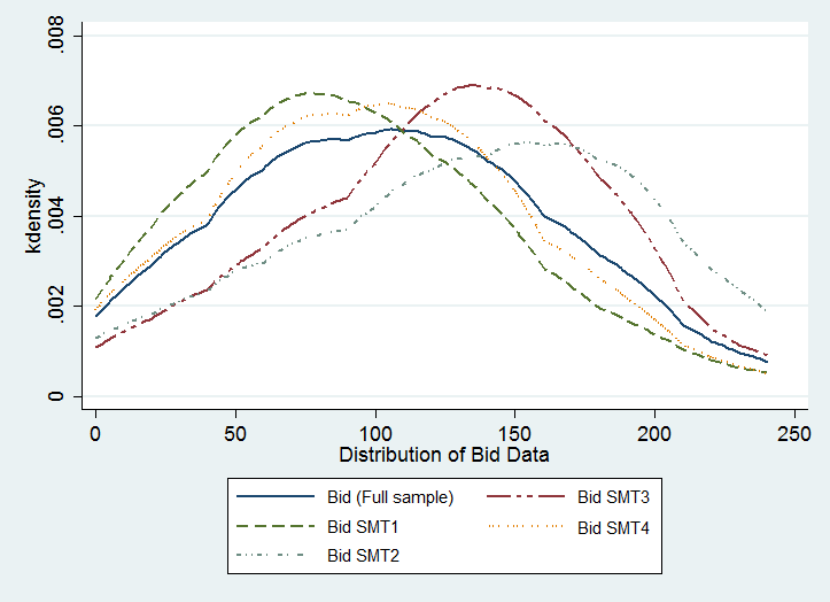
Panagopoulos, C. (2010). Affect, social pressure and prosocial motivation: Field experimental evidence of the mobilizing effects of pride, shame and publicizing voting behavior. Political Behavior, 32(3), 369-386.

Ray, D. (1998). Development economics. Princeton University Press

Schofield, H., Loewenstein, G., Kopsic, J., & Volpp, K. G. (2015). Comparing the effectiveness of individualistic, altruistic, and competitive incentives in motivating completion of mental exercises. Journal of health economics, 44, 286-299.

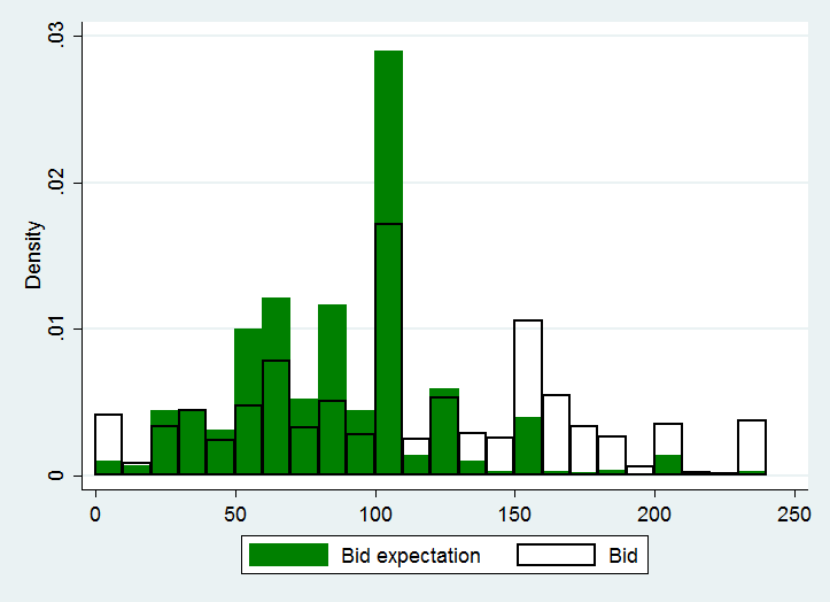
World Bank Group. (2015). World Development Report 2015 : Mind, Society, and Behavior. Washington, DC: World Bank. World Bank.
https://openknowledge.worldbank.org/handle/10986/20597

Figure 1.1: Distribution of Bid data



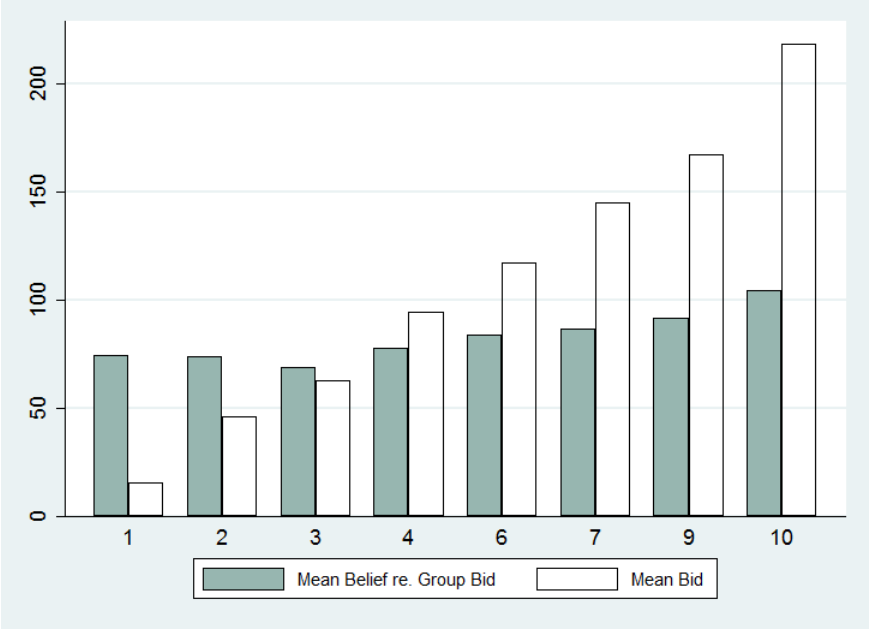
Note: SMT is sub-district administrative unit. Field teams were organized by SMT and I employ SMT level fixed effects in the regressions to improve estimate precision

Figure 1.2: Distribution of Bid data against Expectations regarding Average Bid



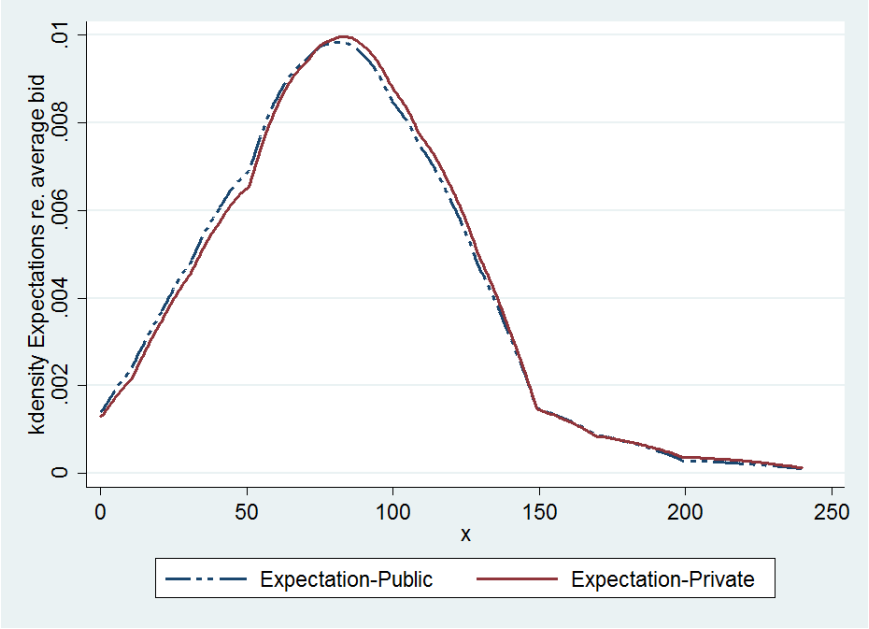
Note: This figure plots the distribution of actual bidding data against the distribution of beliefs regarding the average bid in the group. Ranksum tests reveal that the belief distribution is dominated in rank by the distribution of actual bids

Figure 1.3: Distribution of Bid data against Expectations regarding Average Bid



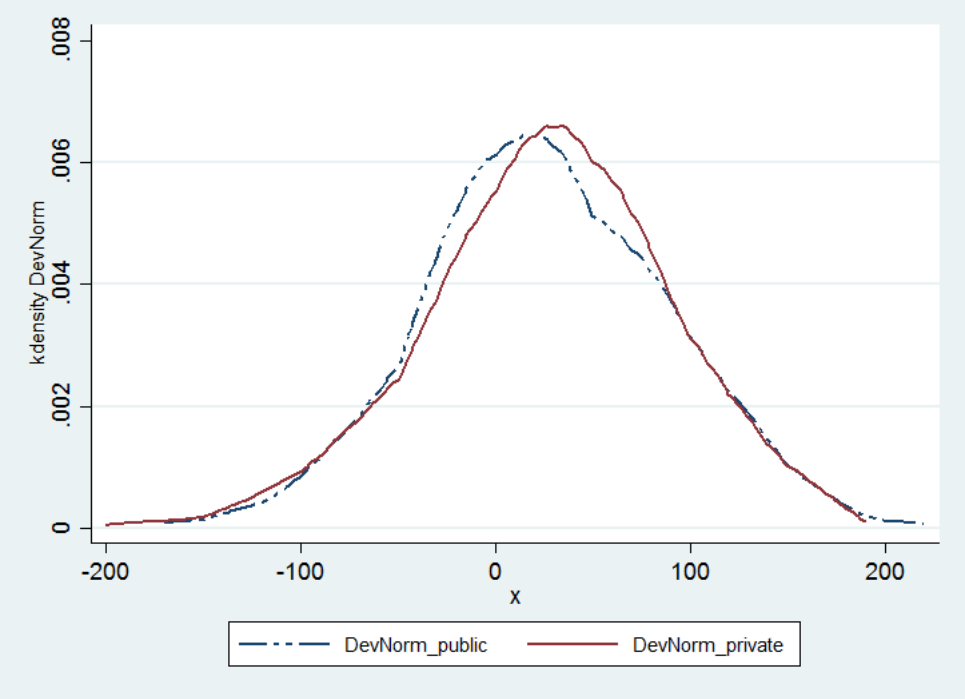
Note: This figure plots the belief regarding the average bid in the group for every decile of the bidding distribution. It reveals a stability of beliefs across different ranges of actual bidding behavior

Figure 1.4: Distribution of Expectations regarding Average Bid by Treatment Group



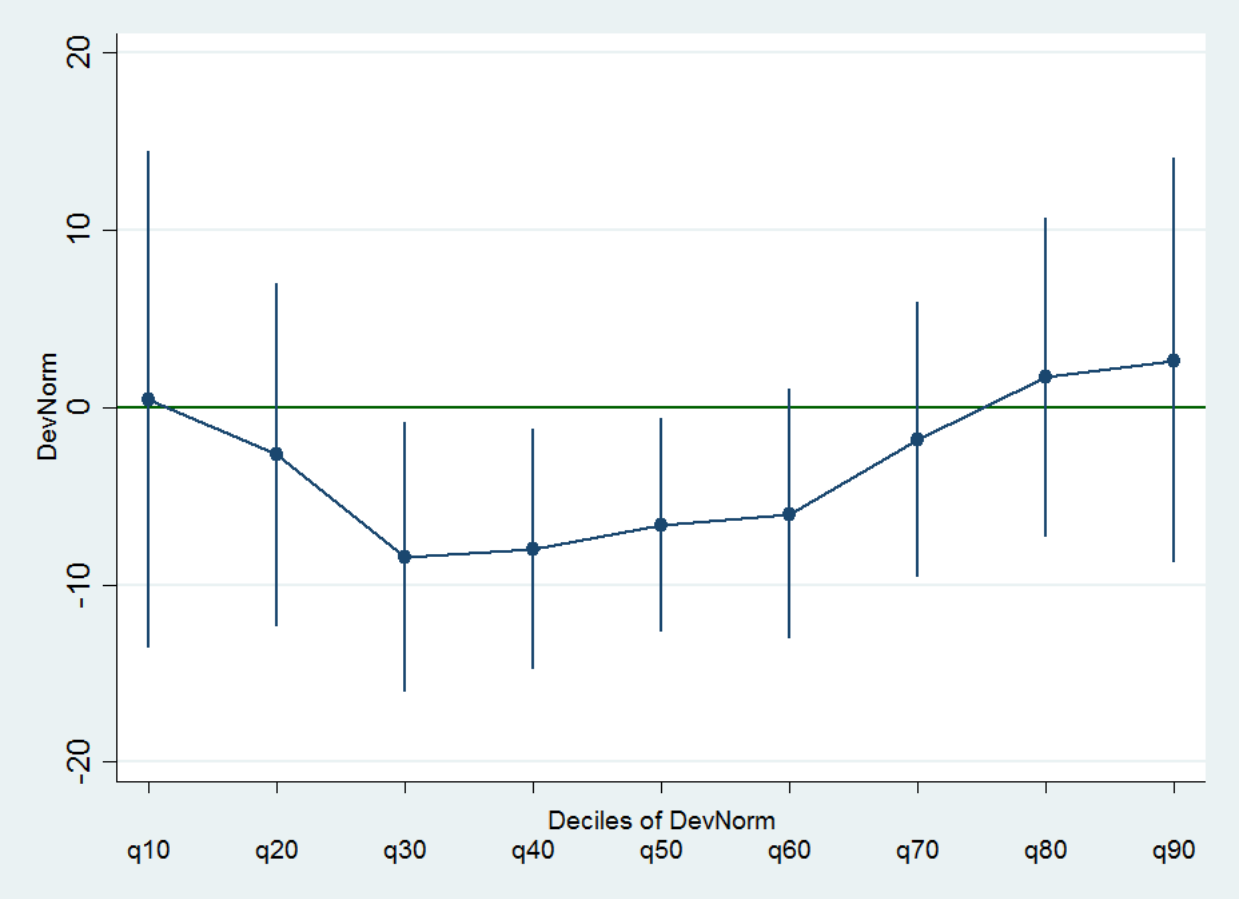
Note: This figure plots the distribution of belief regarding the average bid in the group by treatment arm, showing that beliefs are exogenous to treatment assignment

Figure 1.5: Distribution of DevNorm by Treatment Group



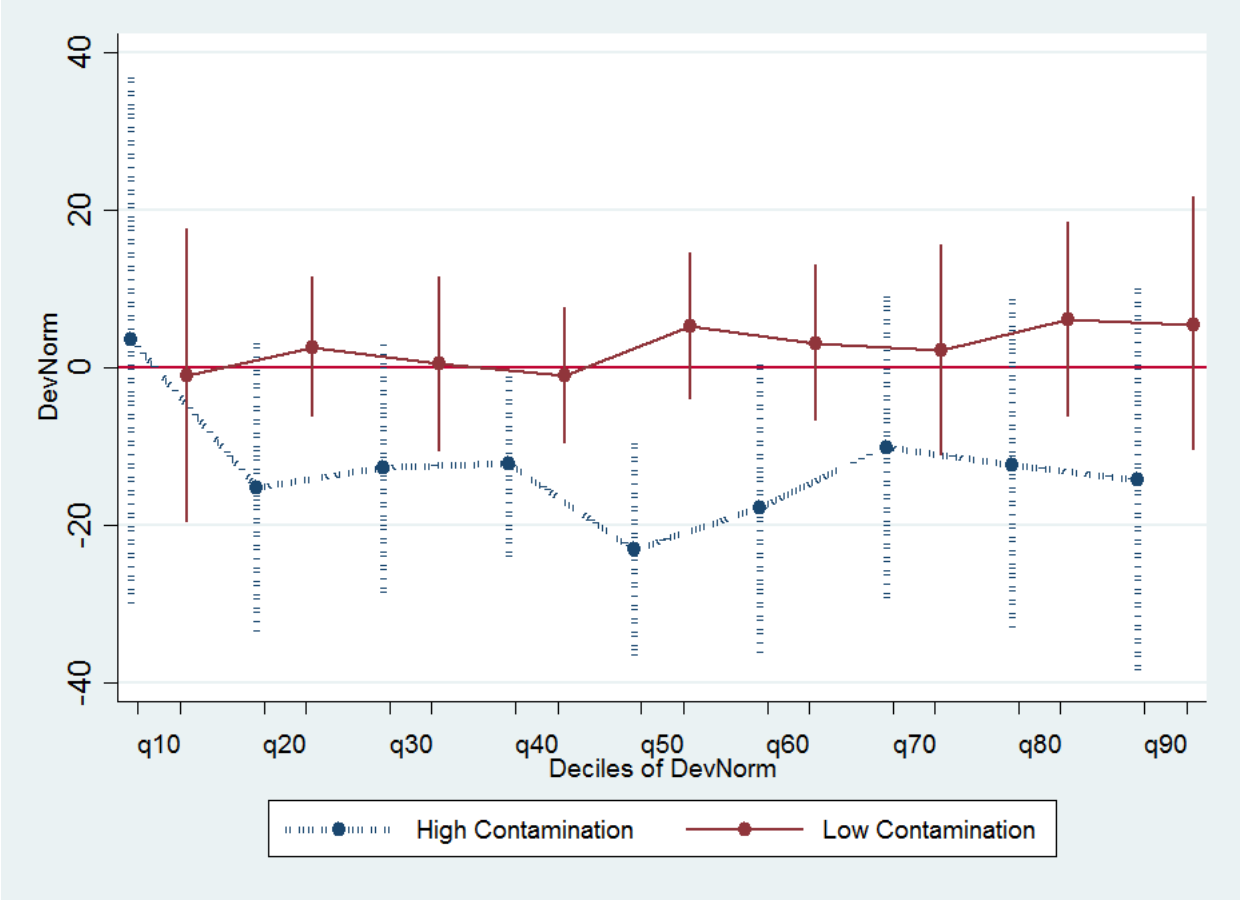
Note: This figure plots the distribution of DevNorm - the deviation of individual bid from belief re. average bid in group- by treatment arm, showing the shift in the public distribution left in the direction of decreasing deviation from the beliefs

Figure 1.6: Testing for Conformity: Full Sample



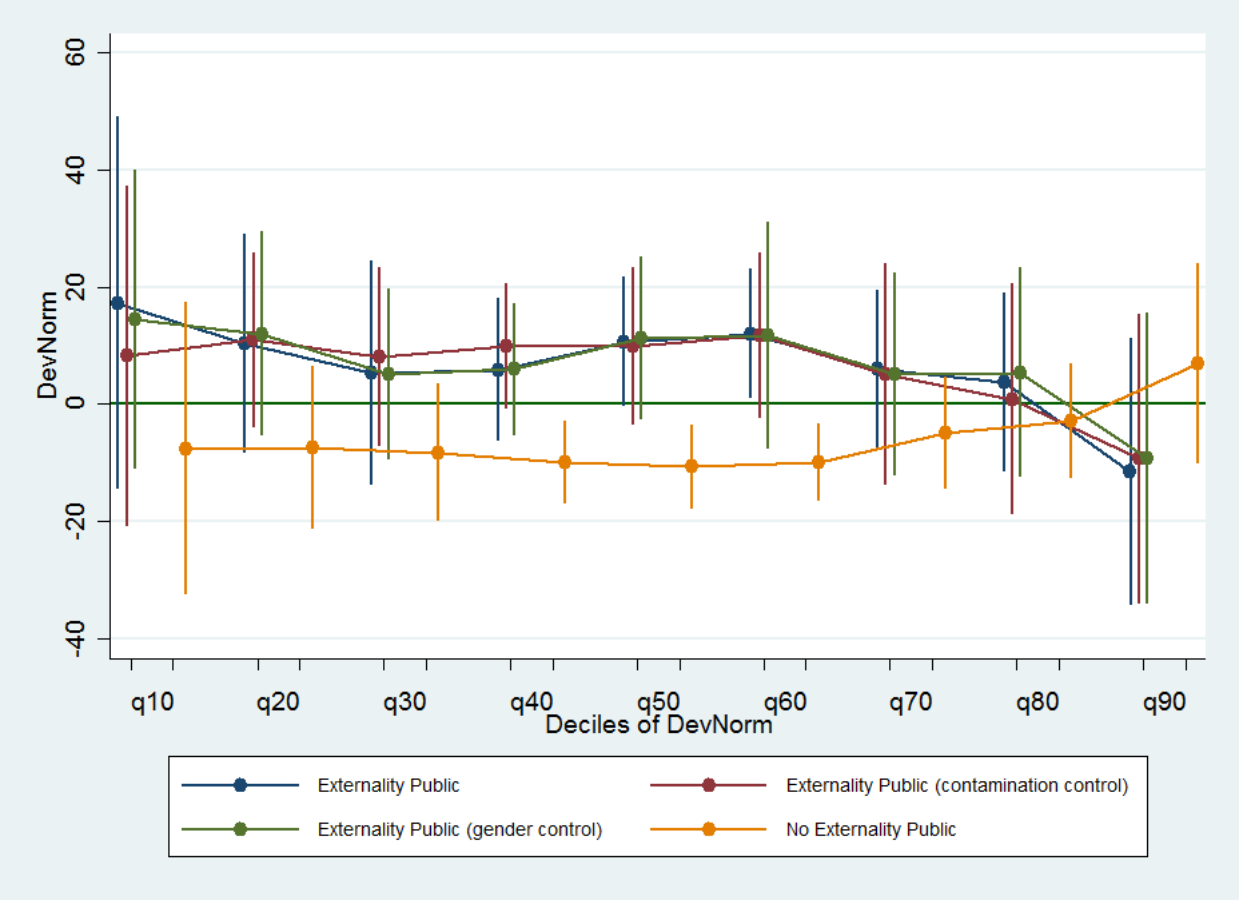
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group, showing the tendency to reduce deviation from beliefs regarding group behavior in public

Figure 1.7: Testing for Conformity: Contamination



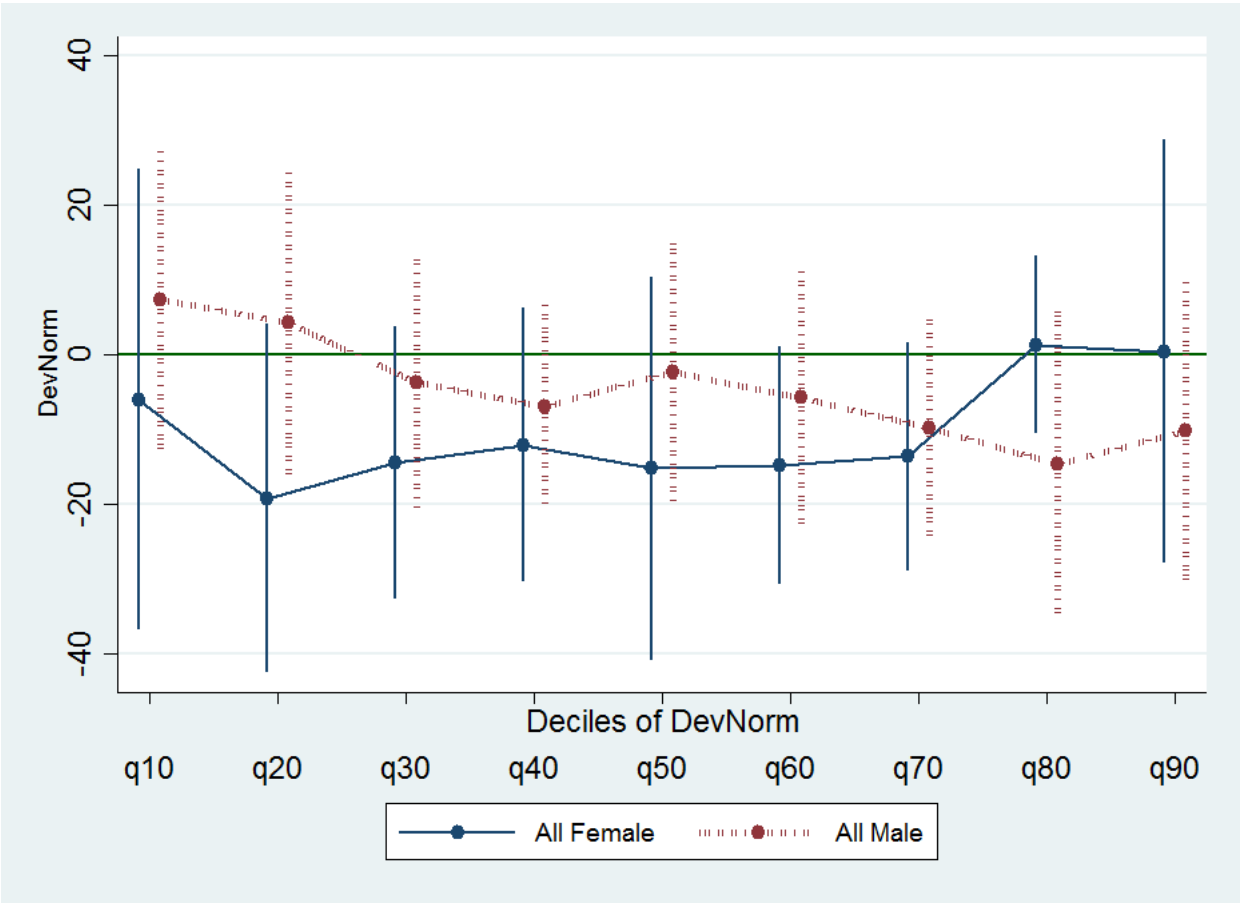
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group - for individuals in villages with above median contamination levels against individuals from median or below contamination

Figure 1.8: Testing for Conformity: Externalities



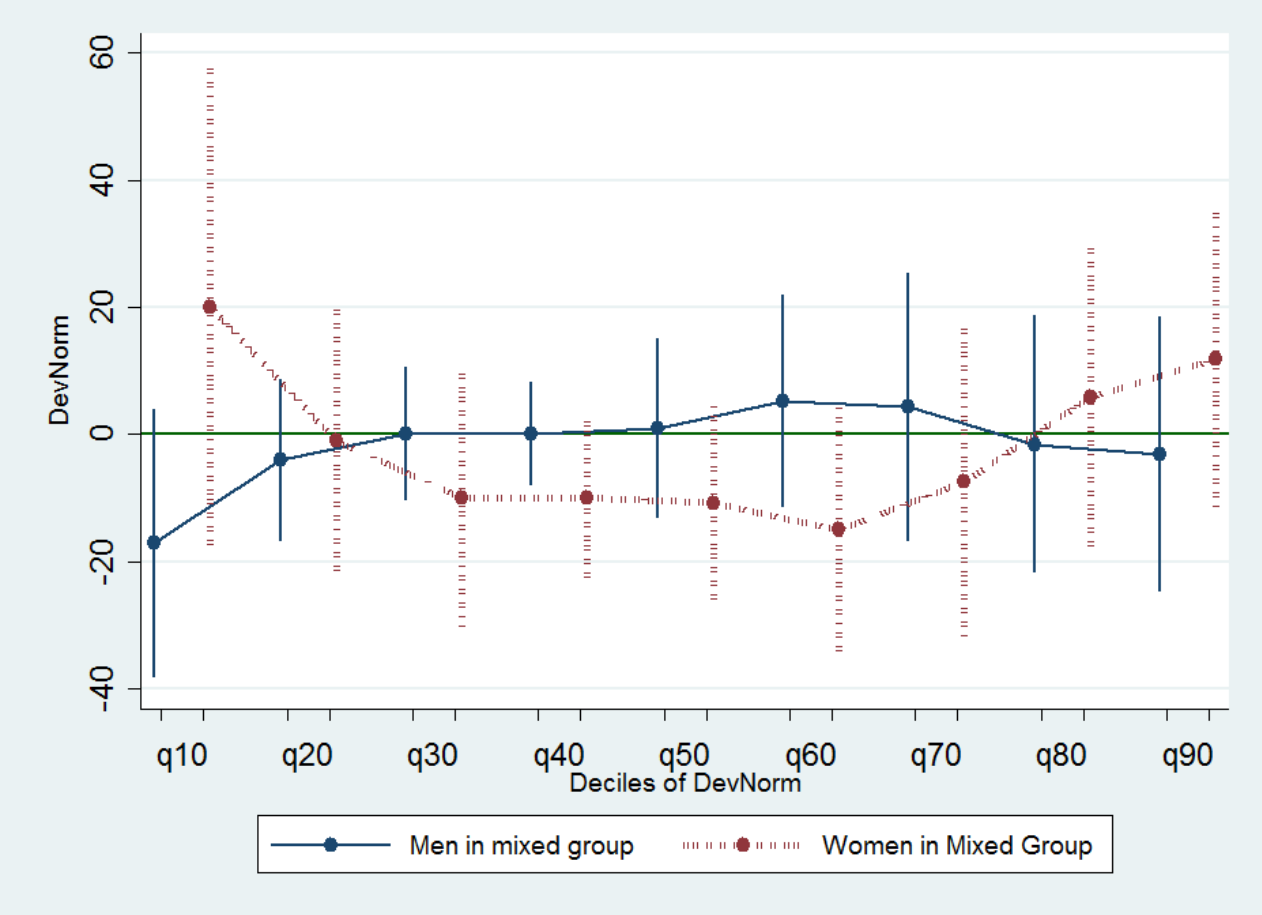
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group - for individuals drawn from villages with externalities priming against individuals without priming. The control specifications include controls for gender of meeting group and contamination interacted with treatment

Figure 1.9: Testing for Conformity: Gender



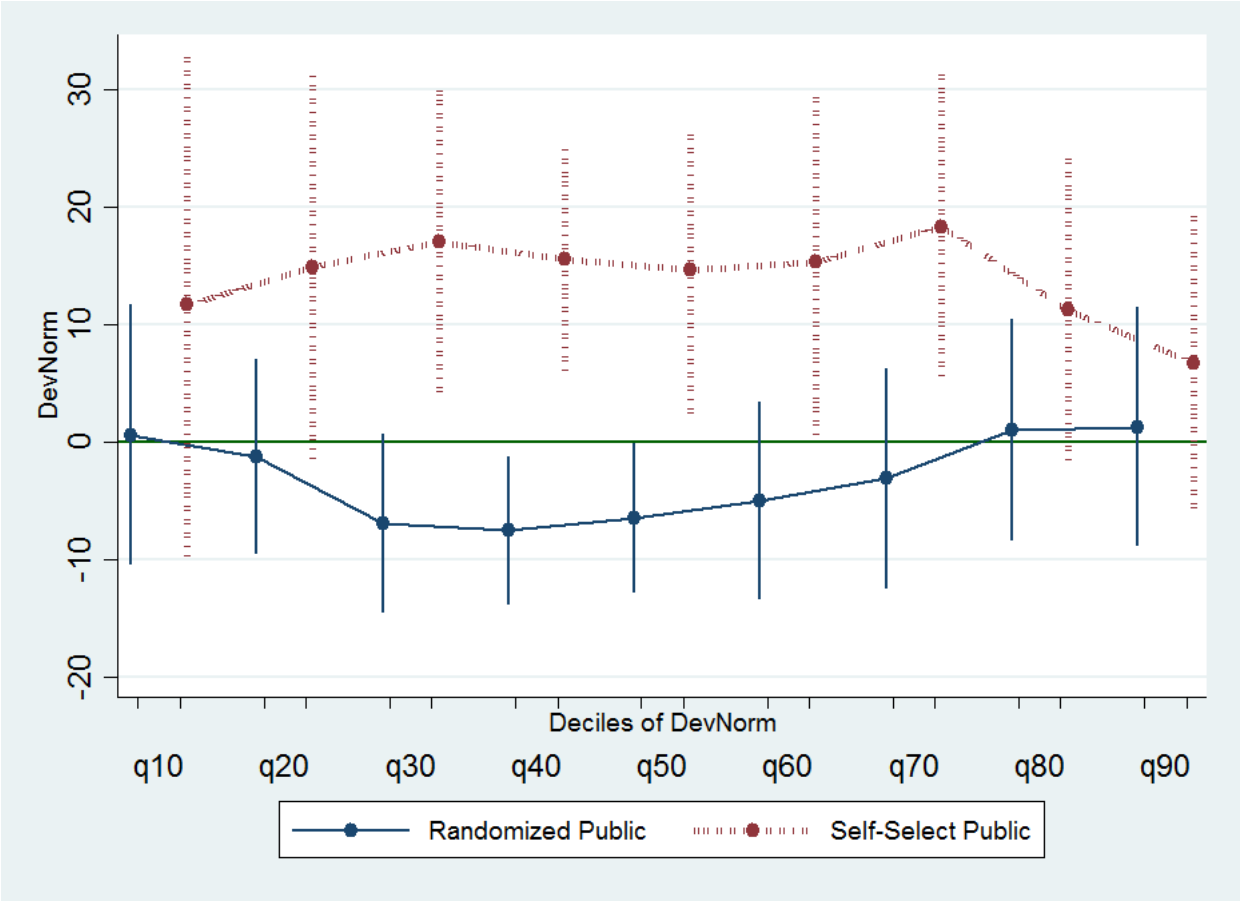
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group - for individuals drawn from all-female groups against individuals from all-male groups, showing that women adhere more closely to the full sample pattern of conformity but men also display some conformity at the higher end of the distribution (noisy estimates)

Figure 1.10: Testing for Conformity: Gender



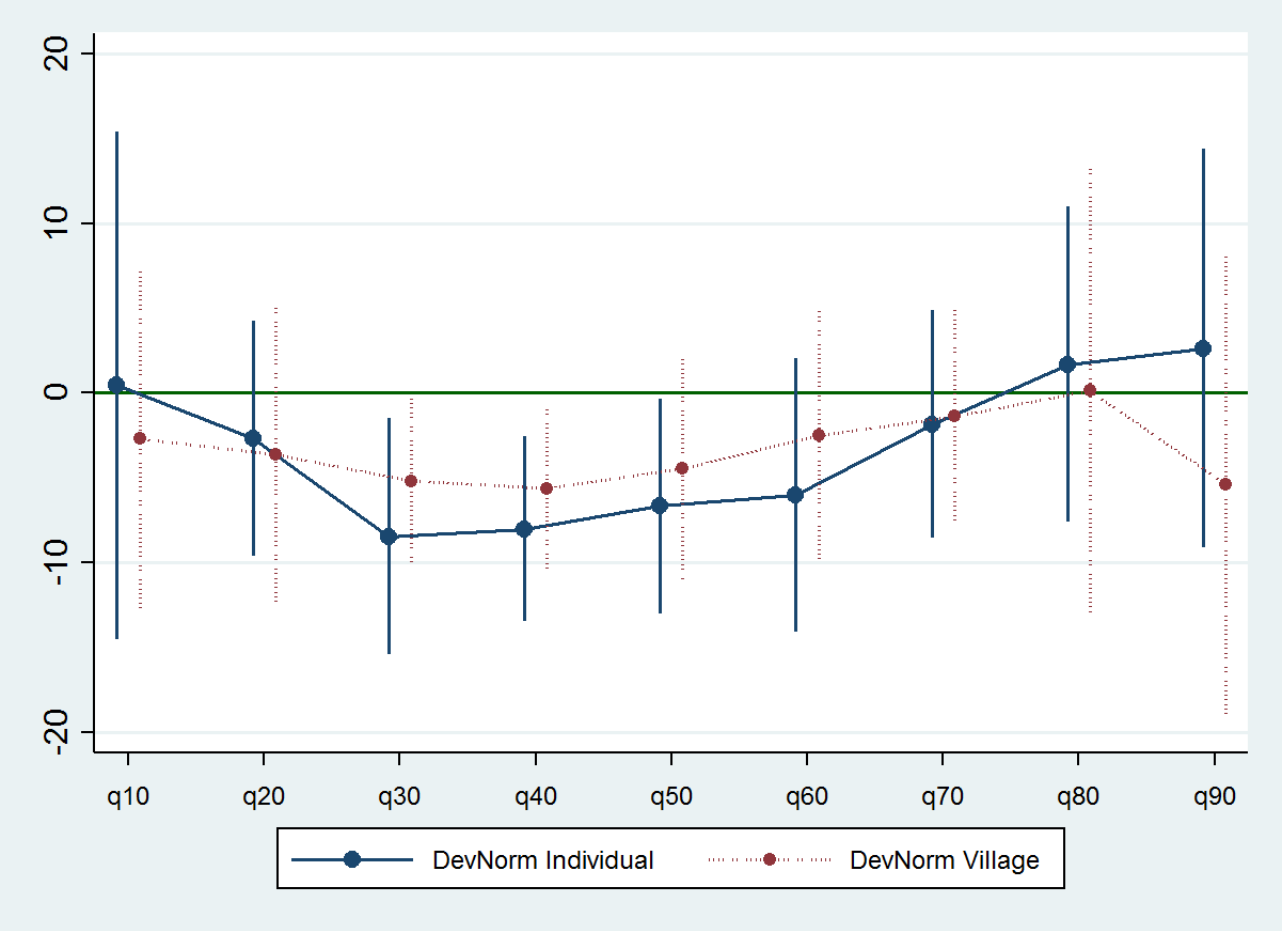
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group - for female against males, who are drawn from mixed groups showing that women in mixed groups demonstrate conformity while men do not

Figure 1.11: Testing for Conformity: Self Selection



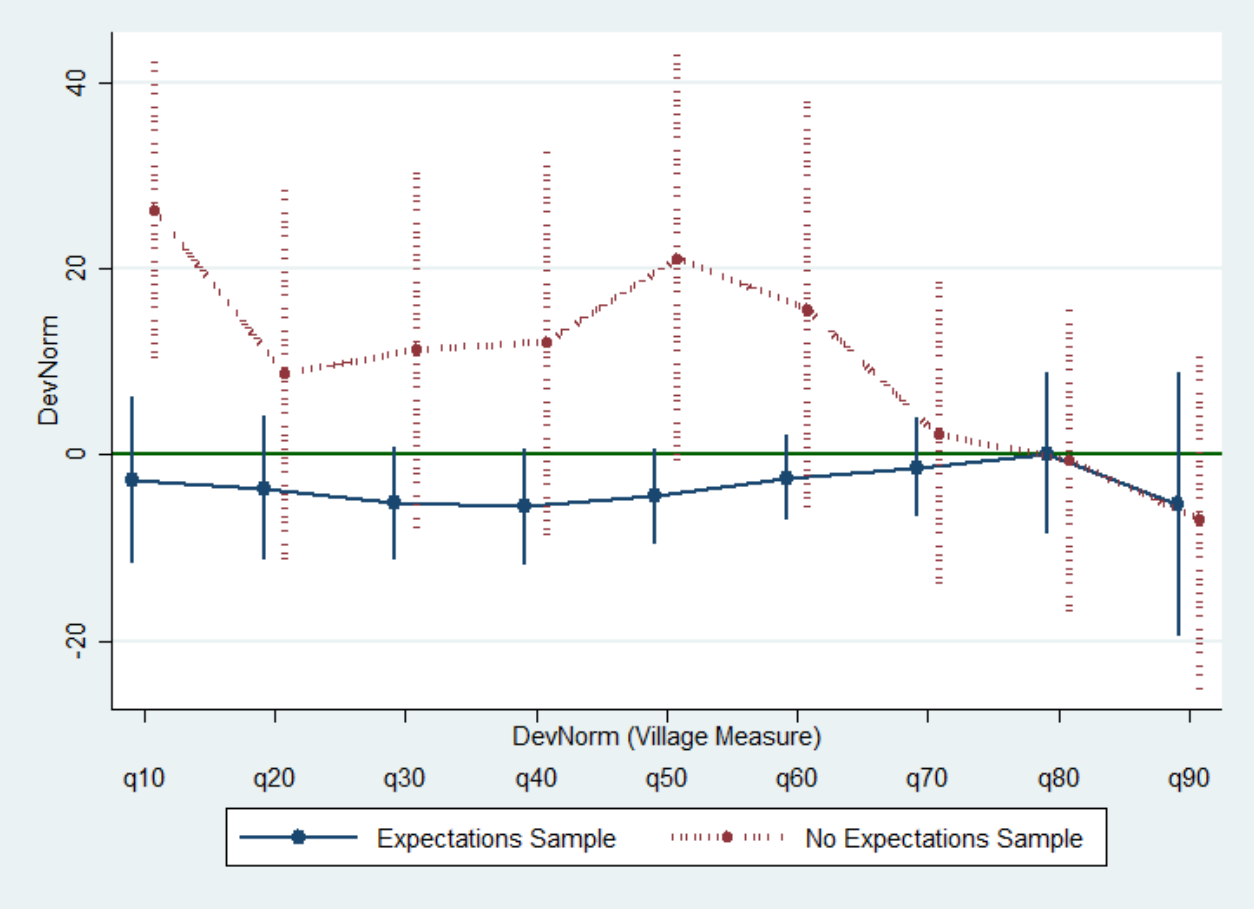
Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm - the deviation of individual bid from belief re. average bid in group - for randomized public bidders against self-select public bidders showing that self-select public bidders do not exercise conformity, instead exhibiting status seeking behavior that increases their deviation from
group behavior

Figure 1.12: Testing for Conformity: Robustness



Note: This figure plots the coefficients by decile of the treatment effect in public on DevNorm against the coefficients using the village level measure for DevNorm, showing that the patterns of conformity in bidding behavior are robust to our choice of belief measures

Figure 1.13: Testing for Status Seeking: Robustness



Note: This figure plots the coefficients by decile of the treatment effect in public on the NoNorm subsample relative to the village level measure for DevNorm, showing that this subsample shows a unique pattern of bidding relative to the village construct for beliefs which is more consistent with status seeking than conformity

Table 1.1: Public Bidding - ATE in Randomized Sample

	(1)	(2)	(3)
	Maximum Willingness to Pay		
Public Bid	0.585	0.193	-0.747
	(2.197)	(2.218)	(2.301)
_cons	106.6***	106.8***	96.85***
	(3.330)	(3.149)	(7.899)
N	1892	1892	1806
Mean Dependent Var (Pvt Bid)	106.6	106.6	106.2
Fixed effects	None	SMT	SMT
Controls	No	No	Yes

Note: The dependent variable is the individual's Maximum Willingness to Pay for the product, as elicited by their BDM bid.
Controls: Age, educ, poverty, gender, HH size, no. of children
Standard errors clustered at meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.2: Simultaneous Quantile Regression of Maximum Willingness to Pay

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Maximum Willingness to Pay								
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public bid	5.677**	1.709	-1.346	-2.477	-2.40e-14	2.37e-14	-3.643	-2.613	-2.471
	(2.641)	(3.497)	(2.211)	(3.634)	(0.770)	(0.805)	(3.667)	(4.959)	(4.055)
_cons	24.81**	56.91***	92.02***	109.1***	150.0***	150.0***	152.8***	167.9***	196.2***
	(11.54)	(13.68)	(8.212)	(9.420)	(8.348)	(4.099)	(10.43)	(11.03)	(8.842)
N	1806	1806	1806	1806	1806	1806	1806	1806	1806
MDepVar	27.08	56.64	75.94	95.62	114.6	114.6	134.7	155.9	177.5
FixedEffect	SMT								
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: Dependent variable is the individual bid (MWTP_im). Bootstrapped standard errors in parentheses. MDepVar reflects the mean bid in the private bidding arm
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.3: DevNorm - ATE in Randomized Sample

	(1)	(2)	(3)
	$DevNorm_{im} = MWTP_{im} - BidNorm_{im}$		
Public Bid	-0.578	-0.781	-2.078
	(2.789)	(2.804)	(2.915)
_cons	26.74***	26.85***	11.78
	(3.416)	(3.362)	(8.962)
N	1534	1534	1456
Mean Dependent Var (Private Bid)	26.74	26.74	26.90
Fixed effects	None	SMT	SMT
Controls	No	No	Yes

Note: The dependent variable is the deviation of individual bid from the individual's belief regarding the average bid in the group (DevNorm = MWTP - BidNorm)
Controls: Age, educ, poverty, gender, HH size, no. of children
Standard errors clustered at meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.4: Simultaneous Quantile Regression of Difference between Own Bid and Average Bid (DevNorm)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public bid	0.448	-2.688	-8.444**	-8.006**	-6.670**	-6.024	-1.827	1.690	2.639
	(7.891)	(3.744)	(3.770)	(3.184)	(3.276)	(4.245)	(4.841)	(3.873)	(5.924)
_cons	-63.79***	-21.98**	12.74	36.36**	39.49***	52.46***	60.26***	78.93***	97.42***
	(22.22)	(10.93)	(17.68)	(15.48)	(12.26)	(9.444)	(10.46)	(11.35)	(11.00)
N	1456	1456	1456	1456	1456	1456	1456	1456	1456
MDepVar	-82.23	-18.66	5.16	18.34	29.13	42.74	56.02	73.5	101.1
FixedEffect					SMT				
Controls					Age, education, poverty status, gender, household size and number of children				

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the individual's belief regarding the average group bid (BidNorm_im). Bootstrapped standard errors are in parentheses.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.5: Difference between Bid and Beliefs re. Average Bid

	Private	Public	Total
	%	%	%
Below Norm	24.5	25.9	25.2
At Norm	10.2	14	12.1
Above Norm	65.3	60.2	62.6
Total	100	100	100

Note: This table reflects the proportion of the sample that bids above, on or below their expectations re. the average bid, and differences in these proportions by treatment condition

Table 1.6: Probability of Bidding Higher than BidNorm

	(1) $Pr(MWTP > BidNorm)$	(2) $Pr(MWTP = BidNorm)$	(3) $Pr(MWTP < BidNorm)$
Public Bid	-0.155***	0.162**	0.0824***
	(0.0436)	(0.0677)	(0.0209)
_cons	0.162	-1.311***	-0.353***
	(0.114)	(0.200)	(0.0497)
N	1456	1456	1456
Mean Dep Var (Pvt)	0.648	0.104	0.248
Fixed Effects	SMT		
Controls	Age, educ, poverty, gender, hh size and num child		

Notes: The dependent variable is a binary variable indicating whether the bidder bid above their expectation regarding the average bid in the group, equal to the average or below it
Standard errors are clustered at the meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.7: No Conformity SubSample

	(1) Max WTP
Public Bid	-3.426
	(2.528)
No Norm	-11.92**
	(5.628)
Public*No Norm	14.00**
	(6.603)
_cons	99.21***
	(8.036)
N	1806
Mean Dep Var (Pvt)	109.1
Fixed Effects	SMT
Controls	Age, educ, poverty, gender, hh size and num child

Note: The dependent variable is the individual's Maximum Willingness to Pay for the product, as elicited by their BDM bid.
Standard errors are clustered at the meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.8: Channels: Contamination - ATE of Public Bidding

	(1)	(2)	(3)	(4)
	Max WTP		DevNorm	
Public Bid (Low Contamination)	2.441	0.594	3.514	2.551
	(3.078)	(3.263)	(3.649)	(3.906)
High Contamination	-10.77*	2.554	-8.750	1.604
	(6.345)	(6.855)	(7.017)	(7.750)
Public Bid * High Contamination	-4.942	-3.378	-10.82*	-11.41**
	(4.232)	(4.423)	(5.582)	(5.688)
_cons	110.8***	95.55***	30.22***	10.91
	(4.534)	(9.419)	(4.236)	(10.13)
N	1892	1806	1534	1456
Mean Dep Var (Private Bid)	106.6	106.3	26.74	26.90
Fixed effects	None	SMT	None	SMT
Controls	No	Yes	No	Yes

Note: The dependent variable in col 1 and 2 is the individual Maximum Willingness to Pay for the product, as elicited by their BDM bid. In col 3 and 4, the dependent is the deviation of individual bid from expectation regarding average group bid
Standard errors clustered at meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.9: Channels- Contamination and Conformity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	-1.034	2.582	0.450	-1.056	5.220	3.076	2.198	6.130	5.511
	(8.045)	(4.122)	(5.940)	(4.130)	(3.649)	(5.277)	(6.281)	(4.885)	(7.829)
High Cont.	-9.037	8.549	10.59*	8.250**	7.971	6.318	1.627	-0.177	-0.0757
	(10.37)	(8.199)	(5.575)	(3.506)	(4.916)	(5.559)	(5.375)	(9.301)	(10.17)
Pub*HighCont.	3.570	-15.29	-12.70*	-12.19**	-23.18***	-17.81**	-10.13	-12.37	-14.29
	(14.18)	(10.08)	(7.417)	(4.784)	(5.919)	(7.681)	(10.12)	(10.60)	(14.00)
_cons	-63.56***	-27.07***	0.990	26.26***	32.51***	51.41***	58.66***	78.48***	94.12***
	(20.19)	(10.45)	(12.26)	(9.576)	(7.007)	(7.622)	(8.823)	(10.42)	(13.16)
N					1456				
MeanDepVar	-48.84	-21.18	-1.822	14.61	23.64	37.13	53.47	71.43	99.75
Fixed Effects					SMT				
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid and the individual's belief regarding the average group bid (BidNorm_im). High contamination villages have source contamination greater than the median across the full sample. Bootstrapped standard errors in parenthesis.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.10: Contamination and Probability of Bidding Higher than BidNorm

	(1)	(2)	(3)	(4)
	Pr (MWTP > BidNorm)		Pr (MWTP = BidNorm)	
	High Cont	Low Cont	High Cont	Low Cont
Public Bid	-0.419***	0.0198	0.309***	0.0401
	(0.0345)	(0.0197)	(0.0921)	(0.0460)
_cons	-0.245	0.286*	-0.995***	-1.457***
	(0.218)	(0.158)	(0.199)	(0.213)
N	591	865	591	865
Mean Dep Var (Private Bid)	0.647	0.649	0.107	0.100
Fixed Effects			SMT	
Controls	Age, educ, poverty, gender, hh size and num child			

Notes: The dependent variable is a binary variable indicating whether the bidder bid above their expectation regarding the average bid in the group or on their expectation. Standard errors are clustered at the meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.11: Channels- Contamination and Status Seeking

	(1) Max WTP
Public Bid	-0.920 (3.662)
No Norm	-14.98** (7.418)
Public*No Norm	7.275 (9.406)
High Contamination	0.150 (7.410)
Public*High Contamintion	-6.243 (4.864)
No Norm*High Contamination	8.637 (11.44)
Public*No Norm*High Contamination	17.12 (12.53)
_cons	99.21*** (8.036)
N	1806
Mean Dep Var (Private Bid)	109.1
Fixed Effects	SMT
Controls	Age, educ, poverty, gender, hh size & # child

Note: The dependent variable is the individual's Maximum Willingness to Pay for the product as elicited by their BDM bid. Standard errors are clustered at meeting level $*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.12: ATE of Public Bidding by Externalities Priming

	(1)	(2)	(3)	(4)
	Max WTP		DevNorm	
Public Bid (No Externalities Priming)	-2.994	-4.371	-3.552	-5.258
	(2.758)	(2.961)	(3.803)	(4.070)
Externalities Priming	-0.922	-5.074	2.627	-1.132
	(6.615)	(6.285)	(6.784)	(6.617)
Public Bid * Externalities	7.304*	7.317	5.995	6.340
	(4.413)	(4.660)	(5.642)	(5.923)
_cons	107.0***	88.94***	25.52***	5.127
	(4.487)	(19.73)	(4.761)	(19.56)
N	1892	1806	1534	1456
Mean Dep Var (Private Bid)	106.6	106.3	26.74	26.90
Fixed effects	None	SMT	None	SMT
Controls	No	Yes	No	Yes

Note: The dependent variable in col 1 and 2 is the individual Maximum Willingness to Pay for the product, as elicited by their BDM bid. In col 3 and 4, the dependent is the deviation of individual bid from expectation regarding average group bid
Standard errors clustered at meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.13: Externalities and Conformity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	-7.574	-7.413	-8.264	-9.962***	-10.69**	-9.839*	-4.855	-2.846	6.900
	(7.198)	(7.958)	(5.189)	(3.291)	(4.590)	(5.265)	(5.537)	(7.635)	(8.786)
Externalities	-9.585	-5.310	-1.451	-3.117	-8.686**	-5.346	2.730	2.678	10.29
	(9.951)	(6.768)	(5.644)	(4.017)	(4.009)	(4.988)	(4.534)	(4.973)	(8.172)
Pub*Externality	17.30	10.35	5.283	5.912	10.69*	12.01	5.938	3.750	-11.57
	(10.75)	(10.10)	(7.581)	(5.015)	(5.940)	(7.619)	(8.264)	(8.717)	(10.25)
_cons	-44.78**	-28.83**	-2.747	15.02	42.30***	43.54***	45.71***	66.76***	86.49***
	(22.09)	(12.14)	(12.83)	(16.13)	(15.42)	(15.31)	(16.64)	(13.58)	(22.78)
N					1456				
MnDepVar-Pvt	-43.07	-15.7	3.86	18.81	30.82	44.39	57.92	76.16	99.03
Fixed Effects					SMT				
Controls	Age, educ, poverty, gender, hhold size, num child, source+storage contamination, group gender								

Notes: The dependent variable is the difference between the individual bid and the individual's belief regarding the average group bid (BidNorm_im). High contamination villages have source contamination greater than the median across the full sample. Bootstrapped standard errors in parenthesis.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.14: Externalities Priming and Probability of Bidding Higher than BidNorm

	(1)	(2)	(3)	(4)
	Pr (MWTP > BidNorm)		Pr (MWTP = BidNorm)	
	Externalities	No Externalities	Externalities	No Externalities
Public Bid	-0.0244	-0.281**	0.163**	0.177
	(0.0930)	(0.134)	(0.0662)	(0.121)
_cons	0.0288	-0.103	-2.144***	-1.222***
	(0.870)	(0.180)	(0.135)	(0.441)
N	691	765	691	767
Mean Dep Var (Private Bid)	0.637	0.657	0.103	0.103
Fixed Effects			SMT	
Controls	Age, educ, poverty, gender, hh size, num child, contamination, group gender			

Notes: The dependent variable is a binary variable on whether the bidder bid above their expectation regarding the average bid in the group or on their expectation. Standard errors are clustered at the meeting level. Externality villages are primed with a message on spillovers of individual health behavior. $*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.15: Gender and Conformity-I

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	DevNorm								
	A- All Female Group								
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	-5.988	-19.23	-14.47	-12.11	-15.22	-14.81*	-13.64*	1.339	0.448
	(22.24)	(11.81)	(10.23)	(9.731)	(10.94)	(8.067)	(7.723)	(6.046)	(17.92)
N	168	168	168	168	168	168	168	168	168
MeanDepVar(Pvt)	-42.71	-3.8	8.79	18.78	35.28	48.13	61.89	69.57	90.05
	B- All Male Group								
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	7.430	4.291	-3.697	-6.913	-2.297	-5.774	-9.756	-14.67	-10.20
	(12.71)	(10.35)	(10.04)	(8.293)	(6.760)	(8.788)	(9.189)	(10.46)	(10.34)
N	320	320	320	320	320	320	320	320	320
MeanDepVar (Pvt)	-62.22	-32.67	-10.7	5.413	20.06	39.33	56.69	81.33	104.95
Fixed Effects	SMT								
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the individual's belief re. the average group bid (BidNorm_im). Bootstrapped standard errors are in parentheses.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$
medskip

Table 1.16: Gender and Conformity-II

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm				
					B- Mixed Group				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	-17.13	-4.038	-8.02e-14	-1.40e-13	0.936	5.160	4.298	-1.585	-3.157
	(16.27)	(6.504)	(7.464)	(5.332)	(5.804)	(5.879)	(8.194)	(10.30)	(10.77)
Public* Female Bid	20.04	-1.025	-10.000	-10.000**	-10.78*	-15.06**	-7.513	5.862	11.78
	(18.91)	(10.49)	(10.59)	(4.994)	(6.275)	(7.596)	(10.49)	(12.03)	(13.46)
N	968	968	968	968	968	968	968	968	968
MeanDepVar (Pvt)	-34.65	-17.59	4.659	14.85	26.31	36.58	52.81	77.42	107
Fixed Effects					SMT				
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the individual's belief re. the average group bid (BidNorm_im). Bootstrapped standard errors are in parentheses.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$
medskip

Table 1.17: Probability of Bidding Higher than BidNorm- Gender

	(1)	(2)	
	Pr (MWTP > BidNorm)		
	All Female Group	All Male Group	Mixed Group
Public Bid	-0.248	-0.00435	-0.131
	(0.189)	(0.141)	(0.130)
Female Bid			0.0674
			(0.152)
Public * Female Bid			-0.127
			(0.157)
_cons	0.253	-0.0144	0.612**
	(0.634)	(0.362)	(0.243)
N	168	320	968
Mean Dep Var (Private Bid)	0.650	0.572	0.674
Fixed Effects	SMT		
Controls	Age, educ, poverty, gender, hh size and num child		

Notes: The dependent variable is a binary variable indicating whether the bidder bid above their expectation regarding the average bid in the group
Standard errors are clustered at the meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.18: No Conformity SubSample -Gender

	(1)	(2)	(3)
		Max WTP	
	All Female Group	All Male Group	Mixed Group
Public Bid	-5.814	0.323	-7.869
	(6.763)	(5.898)	(5.141)
No Norm	7.078	-7.747	-28.35**
	(13.17)	(13.13)	(11.99)
Public*No Norm	4.339	37.50**	10.96
	(14.00)	(15.78)	(15.00)
Female*Public*No Norm			0.158
			(18.45)
_cons	106.4***	101.6***	102.3***
	(17.46)	(16.68)	(10.05)
N	226	384	1196
Mean Dep Var (Private Bid)	103.5	101.7	112.6
Fixed Effects	SMT		
Controls	Age, educ, poverty, gender, hh size and num child		

Note: The dependent variable is the individual's Maximum Willingness to Pay for the product, as elicited by their BDM bid.
Standard errors are clustered at the meeting level
Some interactions suppressed for space consideration
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.19: Public Bidding - ATE on Randomized and Self Selection Sample

	(1)	(2)	(3)
	Maximum Willingness to Pay		
Public Bid	0.585	0.211	-0.853
	(2.197)	(2.212)	(2.295)
Self Selected Private Bid	-3.732	-5.777**	-5.488*
	(2.828)	(2.909)	(2.916)
Self Selected Public Bid	4.253	9.767**	9.300**
	(4.569)	(4.334)	(4.325)
_cons	106.6***	106.7***	96.01***
	(3.331)	(3.153)	(7.119)
N	2851	2851	2723
Mean Dep Var (Private Bid)	106.6	106.6	106.2
Fixed effects	None	SMT	SMT
Controls	No	No	Yes

Note: The dependent variable is the individual's Maximum Willingness to Pay for the product, as elicited by their BDM bid.
Standard errors clustered at meeting level
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table 1.20: Self Selection and Conformity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public Bid	0.609	-1.242	-6.995*	-7.556**	-6.474**	-5.025	-3.130	0.998	1.295
	(5.632)	(4.233)	(3.883)	(3.229)	(3.247)	(4.267)	(4.793)	(4.818)	(5.184)
SelfSlct*Pvt	0.0237	-6.123	-11.76***	-10.85***	-6.605***	-6.292**	-8.961**	-6.874	-2.049
	(7.696)	(5.326)	(3.766)	(2.504)	(2.550)	(3.150)	(3.614)	(5.099)	(5.198)
SelfSlct*Pub	11.64	14.91*	17.01**	15.54***	14.63**	15.31**	18.32***	11.23*	6.749
	(10.90)	(8.337)	(6.728)	(4.838)	(6.243)	(7.507)	(6.695)	(6.532)	(6.545)
_cons	-51.77***	-20.45**	7.914	24.96***	34.57***	52.70***	62.82***	82.12***	91.76***
	(11.06)	(9.974)	(7.786)	(8.366)	(7.599)	(6.159)	(8.310)	(10.12)	(10.61)
N	2195	2195	2195	2195	2195	2195	2195	2195	2195
MDepVar	-49.49	-19.12	2.58	15.91	28.58	42.72	55.58	73.26	102.5
FxedEffect					SMT				
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the individual's belief regarding the average group bid (BidNorm_im).
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

1.9 Appendices

Table A1: Balance Across Treatment Arms

	Private	Public	Self-select	p-value (joint)
Female	0.531	0.515	0.523	0.790
	(0.016)	(0.016)	(0.016)	
Education (years)	1.377	1.749	1.619	0.079
	(0.111)	(0.125)	(0.115)	
Number of Household Members	7.766	7.961	7.920	0.503
	(0.119)	(0.125)	(0.124)	
Number of children 0-2 years	0.586	0.637	0.587	0.341
	(0.026)	(0.030)	(0.028)	
Head of Household	0.725	0.713	0.713	0.773
	(0.015)	(0.014)	(0.015)	
Poverty Score	23.508	24.193	23.723	0.530
	(0.453)	(0.445)	(0.422)	
Leader	0.124	0.139	0.130	0.645
	(0.011)	(0.011)	(0.011)	
All Female meeting group	0.192	0.207	0.219	0.336
	(0.013)	(0.013)	(0.013)	
Mixed meeting group	0.474	0.460	0.438	0.299
	(0.016)	(0.016)	(0.016)	
Village level contamination rate	7.550	7.496	7.578	0.589
	(0.059)	(0.058)	(0.056)	
Number of meeting members	15.586	15.650	15.548	0.986
	(0.439)	(0.443)	(0.440)	
Expectation re. average group bid	82.973	81.508	80.760	0.484
	(1.360)	(1.306)	(1.260)	
No expectations re. group bid	0.199	0.197	0.199	0.989
	(0.013)	(0.013)	(0.013)	
Small Household (<= 5 members)	0.261	0.244	0.247	0.641
	(0.015)	(0.014)	(0.014)	

Table A2: Simultaneous Quantile Regression of Diff between Own Bid and Average Bid (DevNorm_Village)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	DevNorm_Village								
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public bid	-2.707	-3.608	-5.169**	-5.613**	-4.439	-2.513	-1.384	0.133	-5.365
	(4.762)	(4.059)	(2.515)	(2.718)	(3.316)	(2.835)	(3.310)	(4.210)	(5.236)
_cons	-58.19***	-14.18	13.19	25.16**	46.41***	56.95***	57.62***	70.21***	109.4***
	(10.24)	(13.13)	(11.34)	(9.998)	(8.667)	(6.780)	(10.93)	(12.78)	(16.79)
N	1456	1456	1456	1456	1456	1456	1456	1456	1456
MeanDepVar	-44.87	-15.97	3.129	16.41	29.43	40.49	51.78	71.63	99.31
Fixed Effect					SMT				
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the village level median of individual beliefs regarding the average group bid Median_v(BidNorm_im).
Bootstrapped standard errors are in parentheses.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table A3: Simultaneous Quantile Regression of Diff between Own Bid and Average Bid (DevNorm_Village)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					DevNorm_Village				
Quantile	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Public bid	26.22***	8.572	11.21	12.05	21.00**	15.61	2.085	-0.650	-7.008
	(9.978)	(7.367)	(9.467)	(10.15)	(8.270)	(11.24)	(10.73)	(8.842)	(7.089)
_cons	-46.17*	-34.31	-21.96	4.404	-1.563	24.25	60.52*	106.0***	113.6***
	(26.10)	(30.92)	(31.69)	(31.22)	(30.83)	(33.60)	(35.83)	(32.24)	(24.91)
N	350	350	350	350	350	350	350	350	350
MeanDepVar	-74.51	-39.59	-24.04	-4.2	6.87	26.38	50.4	69.78	93.62
Fixed Effects					SMT				
Controls	Age, education, poverty status, gender, household size and number of children								

Notes: The dependent variable is the difference between the individual bid (MWTP_im) and the village level median of individual beliefs regarding the average group bid Median_v(BidNorm_im).
Bootstrapped standard errors are in parentheses.
$*p < 0.10 * *p < 0.05 * * * p < 0.01$

Table A4: Individuals with No Beliefs

	No Norm
Female	0.0424
	(0.0444)
Education	0.00179
	(0.00264)
Number of HH members	-0.00227
	(0.00288)
Number of children 0-2 years	-0.00233
	(0.0133)
Poverty score	-0.00100
	(0.000801)
Leader	-0.0362
	(0.0257)
All male meeting group	0.0126
	(0.0628)
Mixed meeting group	-0.00992
	(0.0524)
Village contamination level	-0.0111
	(0.0122)
Small Household	-0.0121
	(0.0240)
Age of group	-0.0231*
	(0.0133)
Number of meeting members	0.000296
	(0.00145)
N	1966
F Effects	SMT
Standard errors clustered at meeting level	
$*p < 0.10 * *p < 0.05 * * * p < 0.01$	

Table A5: Sample Randomization

Monday	**Tuesday**	**Wednesday**
Private	Option	Option
Option	Private	Private
Public	Public	Public
Option	Private	Public
Private	Public	Private
Public	Option	Option
Public	Option	Option
Private	Public	Public
Option	Private	Private
Option	Private	Public
Private	Option	Option
Public	Public	Private
Private	Public	Private
Public	Option	Public
Option	Private	Option
Public	Public	Private
Option	Private	Option
Private	Option	Public
Private	Option	Option
Option	Public	Private
Public	Private	Public
Public	Public	Option
Option	Option	Public
Private	Private	Private
Option	Private	Private
Private	Option	Public
Public	Public	Option
Private	Private	Option
Public	Public	Public
Option	Option	Private
Public	Option	Public
Option	Private	Option

Table A6: Balance Across High and Low Contamination Villages

	Public High Cont	Public Low Cont	p-value	p-val w. fe
Female	0.491	0.556	0.118	
	(0.020)	(0.026)		
Education (years)	2.210	1.024	0.000	0.418
	(0.179)	(0.152)		
Num of Household Members	7.651	8.455	0.004	0.456
	(0.152)	(0.211)		
Num of children 0-2 years	0.611	0.697	0.126	
	(0.040)	(0.044)		
Head of Household	0.689	0.750	0.110	
	(0.019)	(0.022)		
Poverty Score	25.876	21.524	0.000	0.807
	(0.604)	(0.612)		
Leader	0.148	0.125	0.383	
	(0.015)	(0.017)		
All Male meeting group	0.215	0.237	0.648	
	(0.017)	(0.022)		
All Female meeting group	0.135	0.109	0.495	
	(0.014)	(0.016)		
Mixed meeting group	0.651	0.654	0.920	
	(0.019)	(0.025)		
Village level contamination rate	2.602	6.795	0.000	
	(0.049)	(0.065)		
High Contamination village	6.572	8.984	0.000	
	(0.067)	(0.040)		
Age of community group	82.208	80.342	0.764	
	(1.532)	(2.332)		
Number of meeting members	0.191	0.184	0.946	
	(0.016)	(0.020)		
Expectation re. ave group bid	0.265	0.215	0.182	
	(0.018)	(0.021)		
No expectations re. group bid	0.000	0.886	0.000	0.347
	(0.000)	(0.016)		
Small Hhold (<=5 members)	0.604	0.609	0.590	
	(0.020)	(0.025)		
Low Know of Water Treatment	0.615	0.601	0.571	
	(0.016)	(0.016)		

Table A7: Balance Across Villages with and without Externalities Priming

	Public No Ext	Public Ext	p-value	p-val w. fe
Female	0.573	0.456	0.001	0.646
	(0.022)	(0.023)		
Education (years)	1.687	1.794	0.232	
	(0.178)	(0.176)		
Num of Household Members	7.926	7.996	0.722	
	(0.172)	(0.180)		
Num of children 0-2 years	0.630	0.658	0.340	
	(0.039)	(0.046)		
Head of Household	0.700	0.725	0.640	
	(0.021)	(0.020)		
Poverty Score	23.378	24.954	0.127	
	(0.581)	(0.671)		
Leader	0.137	0.142	0.641	
	(0.015)	(0.016)		
All Male meeting group	0.167	0.281	0.000	0.257
	(0.017)	(0.021)		
All Female meeting group	0.087	0.165	0.001	0.003
	(0.013)	(0.017)		
Mixed meeting group	0.746	0.554	0.000	0.003
	(0.020)	(0.023)		
Village level contamination rate	4.449	3.975	0.006	0.126
	(0.101)	(0.114)		
High Contamination village	7.970	7.015	0.000	0.326
	(0.075)	(0.083)		
Age of community group	81.744	81.212	0.960	
	(1.869)	(1.811)		
Number of meeting members	0.181	0.196	0.833	
	(0.017)	(0.018)		
Expectation re. ave group bid	0.256	0.235	0.614	
	(0.020)	(0.019)		
No expectations re. group bid	0.348	0.333	0.778	
	(0.021)	(0.022)		
Small Hhold (<=5 members)	0.644	0.567	0.027	0.241
	(0.022)	(0.023)		
Low Know of Water Treatment	0.615	0.601	0.571	
	(0.016)	(0.016)		

CHAPTER II

The Impact of Sequential Decision Making on the Willingness to Pay for Preventative Health Care

2.1 Abstract

Using data from a randomized field experiment in the setting of community groups in rural Pakistan, we test whether sequential decision making affects individual willingness to pay for preventative health care products by harnessing incentives to lead by example. Overall, we find little evidence of individuals demonstrating higher willingness to pay when randomized into leadership. However, when groups are primed on the externalities of individual preventative health seeking behavior, individuals randomized into first mover positions are likely to bid significantly higher relative to individuals who make public decisions in a simultaneous setting, consistent with 'leadership by example'. This suggests that leadership effects may only arise when individual behavior is perceived as having social repercussions. We further find that this effect is driven by individuals who have more positive beliefs regarding the average willingness to pay in their groups, which corroborates the literature on leadership being motivated by conditional cooperation. Contrary to the literature, however, we find that endogenous leadership does not improve overall bidding outcomes relative

This chapter is co-authored with Ghazala Mansuri.

to exogenously assigned leadership, except in a small subsample of natural leaders.

2.2 Introduction

Leaders have been found to positively influence the resolution of social dilemmas requiring coordination. Economists have evaluated leadership in the context of public goods wherein individual payoff maximization strategies deviate from the social optimum of investing in the public good, resulting in under provision of public goods in competitive equilibrium. However, in applying this theory to lab and field settings, subjects are seen to exhibit greater cooperation than predicted by theory and sufficient subsets of the population contribute their individual endowments to public goods. Moreover, introducing sequential decision making in public goods games has revealed individual willingness to demonstrate 'leadership' whereby individuals randomized into in a first mover position (leaders) make higher contributions to the public good than individuals who make similarly visible choices but in a simultaneous setting.

Though leadership effects have been frequently attributed to information asymmetries between first movers and followers, leadership has also been witnessed in setting characterized by symmetric information. Here, the emergence of leadership is attributed to the need to resolve coordination problems and social dilemmas (Arce, 2001; Foss, 2001) where leaders induce followers to adopt their behavior through their example (Hermalin, 1998).

While a substantive literature has explored the underlying theoretical motivations for exercising leadership, the majority of this work relies on public goods games in laboratory settings, leaving open the empirical question of whether and how leadership influences translate in real-world social dilemmas that are also characterized by individual under provision relative to the Pareto-efficient outcome. We analyze

the impact of sequential decision making on the willingness to pay for preventative health care products, a product domain where there are substantive private benefits to consumption, but individual demand is suboptimal.

Lack of investment in low cost preventative health care technologies is one of the leading causes of excess infant mortality in developing countries, in addition to the significant morbidity burdens that it places on poor households. However, the evidence on price elasticity of preventative health care products suggests large price sensitivity, particularly in comparison with remedial care (Dupas, 2011). Our experiment assesses whether an appeal to 'leadership by example' can assist in improving the willingness to pay for preventative health care products.

In particular, we attempt to address the problem of low willingness to invest in drinking water treatment products for diarrhea prevention. Randomized controlled trials on the take up of water treatment products provide compelling evidence for a direct relationship between Point of Use (POU) water treatment and a reduction in the incidence of diarrheal and gastrointestinal diseases - the second leading cause of under 5 mortality. However, the demand for water treatment products remains low and highly price sensitive, even amongst households with young children (Ashraf et al., 2010).

We argue that this setting is amenable to leadership influences because there are significant spillover benefits and costs of individual preventative care investments. Diarrheal diseases are highly contagious and endemic to populations that have low access to sanitation and waste disposal facilities and poor hygiene practices, resulting in high probability of diarrhea transmission at the neighborhood level. Individual behavior, however, does not incorporate the spillover costs of failure to invest in drinking water treatment on vulnerable populations at the societal level. This creates a social dilemma that leadership behavior can seek to resolve by signaling willingness to cooperate and coordinate on a socially beneficial equilibrium of higher collective

investment in preventative health care.

Our experiment therefore assesses whether an appeal to 'leadership by example' can assist in improving the willingness to pay for POU water treatment products in a setting of endogenously formed community groups. We elicit the maximum willingness to pay for one month's supply of water treatment products by using a Becker DeGroot Marschack (BDM) auction. We compare the BDM bids of randomly assigned private bidders with randomly assigned public bidders in a simultaneous game and with randomly assigned first movers in a sequential game (leaders) in order to tease out the impact of being a leader as distinct from pure social reputation effects that occur from public behavior. We find that neither public bidders nor leaders have statistically distinguishable bids from private bidders, suggesting no impact of social reputation or leadership on bidding at the conditional mean of the bid distribution.

Given that the theoretical basis for leadership derives from the need to resolve social dilemmas, we analyze if our results differ by whether the decision regarding purchase of the water treatment products is framed as a coordination problem. Hence, we randomize communities into whether or not they receive an information message that highlights the importance of externalities from individual preventative behavior. Individuals who are randomized into externalities messaging are told that their failure to invest in preventative health care has repercussions on the health outcomes of their surrounding community and vice versa, suggesting a need for coordinated take up of preventative technologies. We find that in the subgroup primed with externalities, randomized first movers are likely to bid significantly higher while no similar effect is found for randomized public bidders who bid in a simultaneous setting. This suggests that when the frame of externalities is provided, first movers engage in leadership by example as a potential means for coordination on a socially beneficial outcome. This leadership effect is fairly large, at nearly 20% of the median bid among private bidders, and is absent in groups that are not primed with externalities.

In exploring potential channels through which leadership operates, we find that having poor beliefs regarding the average willingness to pay in the community group results in first movers not demonstrating this leadership effect. This is consistent with the theory that contributors to public goods are conditional cooperators, and are more likely to contribute to the public good if they have strong beliefs about the willingness of others to reciprocate their behavior.

This paper is unique in its application of leadership principles outside of the oft-researched realm of public goods and charitable contributions. Our field experiment allows us to directly compare leadership behavior in settings requiring no coordination with behavior in settings that are framed as a coordination problem, with the result of leadership emerging only as a solution to a coordination problem. This result is crucial to understanding whether leadership behavior can be generalized to other social settings.

2.3 Theoretical Motivation

The question of leadership affecting individual behavior has been frequently explored in the setting of coordination games involving public goods where individually optimal behavior deviates from the social optimum. The classical theory of sequential contributions to public goods argues that leaders are likely to free-ride on the contributions of followers and therefore sequential order will reduce overall contributions (Varian, 1994). However, empirical evidence from laboratory experiments has demonstrated that being in a leadership position not only increases a leader's contribution to a common goal but also influences follower contributions, with high contributions by leaders increasing contributions amongst followers and vice versa. (Gachter et al. (2012), Rivas and Sutter (2011), Kumru and Vesterlund (2010))

The primary theoretical mechanism underlying the desire to engage in costly lead-

ership for public good contributions relies on information asymmetries between first movers and second movers, where leaders employ their position to signal returns from a public good investment to their uninformed followers (Vesterlund, 2003; Potters, Sefton and Vesterlund, 2001). However, recent experimental work has provided evidence in favor of a willingness to engage in leadership even in the presence of information symmetry. Hence, leaders can be motivated by their social preferences such as altruism (Andreoni, 1990) and status seeking (Glazer and Konrad, 1996). However, these motivations should operate symmetrically for followers with public actions or public behavior in a simultaneous setting. Therefore, the distinctive behavior of leaders in a sequential setting must be grounded in their ability to influence the behavior of followers. Meidinger and Villeval (2002) conclude therefore that when information is symmetric and signaling carries no informational value for the followers, leadership operates through inducing reciprocity in followers.

Gachter and Renner (2014) characterize leaders as belief-managers for groups facing coordination problems, setting beliefs which are conducive to pro-social behavior or conditional cooperation. They find that a leader's behavior in the first round of a public goods game has a strong impact on the beliefs of followers, and that there is strong path-dependency that emerges in behavior in subsequent rounds. They further find that the same beliefs trigger the same behavior, even in the absence of leadership, but that the presence of leaders affects how beliefs are shaped at the outset.

The possibility of social preferences modifying the impact of leadership allows for heterogeneity in leadership impacts by different social types. Gachter et al. (2012) find that when leadership is assigned exogenously, the most effective leaders are those that not only behave cooperatively but also have strong beliefs about the willingness of others to cooperate with them, which the authors refer to as optimism. Preget, Nguyen-van and Willinger (2015) similarly demonstrate that voluntary leaders in a

public goods experiment are more likely to be conditional cooperators, who are only willing to contribute more when they believe others will contribute more as well.

Rivas and Sutter (2011) utilize a lab setting to compare endogenously selected leaders with exogenously assigned leaders in a public goods game to find that groups with voluntary leaders have substantively higher contributions to the public good than groups with exogenously assigned leaders. Strikingly, they also find that groups with exogenously assigned leaders perform worse than control groups with simultaneous decision making. In a unique application in the field involving naturally occurring community leaders, Jack and Recalde (2015) find that both natural leaders (with exogenous leadership status) and randomly assigned leaders improve their contributions to public goods when placed in a first mover role, but only natural leaders have a subsequent impact on follower contributions.

Our survey of the literature leads us to conclude that since social preferences can motivate leadership behavior, there is room for the possibility of sequential decision making influencing individual behavior in settings beyond the traditional setting of public good contributions. However, the tendency to demonstrate leadership is itself mediated by myriad factors such as the manner in which leadership emerges, the beliefs of leaders and whether the leaders are randomly assigned or have held traditional forms of authority. Moreover, existing theory does indicate that leadership may only be relevant in setting requiring coordination on one of many possible equilibria.

2.4 Setting

Our experiment is conducted in the setting of endogenously formed community groups drawn from 69 villages in 3 districts in rural Pakistan. We organize a special meeting of these community groups to disseminate information on water contamina-

tion, provide information on our point of use water treatment product and collect information on individual willingness to pay for these products. We experimentally vary whether an individual's decision is made in s simultaneous bidding environment or a sequential bidding environment, in order to assess the impact of being made a first mover on the resulting bids.

In particular, we want to focus our attention on whether being placed in a leadership position in a sequential setting induces behavior that is distinct from public behavior in a simultaneous decision making setting. In the presence of information symmetry, leaders can be motivated by social consideration of status seeking - the desire to seek social approval- or by pro-sociality - the desire to influence the behavior of others by setting a positive example. However, the status seeking incentive should be moot in private, and identical between an individual whose behavior is public in a simultaneous or a sequential game. Therefore in comparing bids between private bidders and simultaneous public bidders we can identify pure status seeking influences and in comparing public simultaneous bidders with first movers in a sequential bidding environment we can tease out pro-sociality, or the desire to induce leadership by example.

We would also like to assess the degree to which leadership behavior is predicated on social interdependency and the need to resolve coordination problems as is typical in a public goods game where self-interested behavior is not aligned with social efficiency. In making a departure from public good settings to private consumption, the motivations of leaders can no longer derive from a desire to coordinate on better social outcomes by managing beliefs or inducing conditional cooperation, unless individual behavior has social repercussions. Therefore, we introduce an externalities treatment arm where individual behavior is vested with stronger pro-social considerations as individuals are primed on the spillover costs and benefits of their health seeking behaviors on their community. This treatment adds belief management and

conditional cooperation to the set of potential mechanisms that can explain any 'leadership by example' behavior that may emerge.

Our setting of existing community groups also has the benefit of extant natural leaders who have held leadership positions within the community. This allows us to compare naturally occurring leaders with exogenously assigned leaders, in the manner of Jack and Recalde (2015). In addition, we introduce a parallel treatment arm which explores the impact of endogenously emerging leadership relative to exogenously assigned leadership, given the evidence in existing literature of endogenous leadership being more effective.

2.5 Experimental Design

We use a Becker-DeGroot-Marschack mechanism to elicit the maximum willingness to pay for POU drinking water treatment chlorine products in the setting of community group meetings.

Meeting groups are randomized into simultaneous decision making or sequential decision making. In the simultaneous arm, individuals are randomly assigned to whether their bid is publicly revealed at the end of the bidding process, or whether it remains private.

In the sequential arm, individuals are first randomized into whether leadership is exogenously assigned or endogenously established. In the exogenous leadership arm, individuals are randomized into whether they will be first movers or second movers. First movers are told that they will place their BDM bids first, their bids will be revealed to second movers and then second movers will be allowed to bid. The bids of second movers will also be revealed publicly once the bidding process is complete, such that the only difference between leaders and followers is the sequence of decisions

making and not the publicity of their bid. In the arm with endogenous leadership, individuals are allowed to self-select into first or second mover positions and place bids accordingly.

Table A8 in the appendices evaluates randomization balance between the individuals assigned to simultaneous public bidding, exogenous leadership and endogenous leadership. We find insignificant differences across a number of demographic characteristics, assuring us that randomization was effective insofar as there are no systematic differences between the treatment arm that could spuriously drive our results.

In addition, villages are randomized into whether they are provided with the externalities priming message. Therefore, as part of their information treatment, villages randomized into externalities treatment receive information on how disease transmission vectors create strong spillover costs on the neighborhood of individual incidences of illness.

2.6 Results

Table 2.1 presents summary measures of the maximum willingness to pay across our randomization arms. Across the full sample, we find that assignment to first mover status does not distinguish bidding behavior significantly from the simultaneous private or public bidders. However, when we divide the sample by whether bidders were exposed to externalities priming, we find that first movers who are primed with externalities have significantly higher bids on average than private and public bidders. This pattern is not replicated in the sub sample that does not receive externalities priming, suggesting that the priming is crucial to eliciting first mover effects among bidders. We explore these results further using a regression framework.

2.6.1 Randomization into Leadership

We first test for whether being randomly assigned to a first mover position affects willingness to pay for the leaders. We evaluate the following specification, with community level fixed effects and clustering of standard errors at the meeting level:

$$MWTP_i = \alpha_i + \beta_1 * Public_i + \beta_2 * Leader_i + \gamma_v + \epsilon_i$$

Here, we can compare bidding in public in a simultaneous setting with bids placed in public in a sequential setting as first mover. Consequently, the difference between β_1 and β_2 provides us with the pure effect of being a first mover relative to a simultaneous decision setting. We exclude followers from this analysis, so the excluded category in our regression analysis is private bidders.

Column 1 of Table 2.2 shows the results of this specification for the full sample. We find that the effect of randomization into public bidding is virtually zero and statistically insignificant. The impact of being randomized into a first mover position is positive, but is insignificant at the 10% level. Hence, while randomization into leadership appears to drive bids up, this effect is not statistically significant at the conditional mean.

In column 2, we analyze whether this effect differs among natural leaders who are randomized into first mover positions. Here we find that while natural leaders have higher bids on average, this effect is not of statistical significance and does not translate into significantly different behavior in public or in first mover positions.

Overall, therefore, we find that randomization into a first mover position has no significant impact on the behavior of first movers in our setting of willingness to pay for water treatment products.

2.6.2 Externalities and Randomization into Leadership

In Table 2.3 we evaluate whether externalities messaging affects the propensity for first movers to demonstrate the leadership effects that have been seen in the literature on public goods.

Column 1 indicates that the overall effect of externalities priming on bids is positive but insignificant. In column 2, we assess whether externalities priming has differential effects by treatment type. We find that randomization into simultaneous public bidding is unaffected by the externalities treatment, since the interaction term $Externalities * Public$ is small and insignificant. However, bidders randomized into first mover positions are likely to bid significantly higher when they are exposed to externalities priming as evidenced by the statistically significant and large coefficient on $Externalities * FirstMover$.

This would suggest that leadership motivation is primarily driven by the need to coordinate on a socially beneficial outcome. In the absence of direct priming regarding the spillover costs and benefits of individual behavior, first movers do not demonstrate a desire to exercise 'leadership by example'.

Since externalities randomization is conducted at the level of the community, column 2 employs fixed effects at a sub-district level. Column 3 employs the same specification but with community level fixed effects and the interaction effect is robust to this change (but the un-interacted coefficient on externalities treatment cannot be estimated in this specification).

In Table 2.4, we analyze whether externalities messaging differentially impacts the behavior of natural leaders in our sample. Column 1 assess the bidding behavior of natural leaders in the absence of externalities messaging and column 2 assesses their behavior when randomized into the externalities treatment.

We find that natural leaders appear to bid higher as first movers in the absence of externalities messaging, but this effect is not statistically significant and is very imprecisely estimated. On the other hand, with externalities messaging, the overall bids of natural leaders (in private) are higher, but imprecisely estimated. When randomized into first mover positions, they behave similarly to exogenously assigned leaders, since the interaction term $FirstMover * Externalities$ is zero, but owing to their overall higher level of bids their bids a First Movers are higher than exogenously assigned first movers. This result mimics the results found in the literature on leadership in public goods contributions, in particular the results of Jack and Recalde (2015) on the contribution of natural leaders and exogenously assigned leaders in a field setting, where both varieties of first movers are likely to contribute higher. However, in our setting, the difference in bids between randomized first movers and natural leaders as first movers is not statistically distinct.

Our results lend support to the interpretation of leadership by example arising primarily in situations where first movers can signal to followers in a social coordination problem. Hence, when preventative health care behavior is deemed individual, first movers do not behave differently from private bidders or public bidders, indicating no desire to demonstrate leadership. On the other hand, when individual preventative behavior is lent a social dimension through externalities priming, leadership emerges with first movers bidding higher as first movers relative to private bidders and public bidders who bid in a simultaneous environment. This behavior can be rationalized with the 'belief management' interpretation of leadership posited by Gachter and Renner (2014), where first movers enhance coordination on socially beneficial equilibria by demonstrating socially beneficial behavior and improving beliefs and expectations at large, or engaging conditional cooperation from followers.

2.7 Channels of Leadership

2.7.1 Beliefs

In the spirit of Croson (2002), we elicit the beliefs of individuals regarding the average willingness to pay at the group level prior to their randomization. As such, we are able to validate our theory of conditional cooperation generating leadership by example. Hence, in the setting of public good games, conditional cooperators will only demonstrate leadership behavior if they have strong beliefs regarding the willingness of their group to also contribute. Similarly, if first movers have poor beliefs regarding the average willingness to pay at the group level, they will be less likely to exercise leadership by example if they are conditional cooperators.

We elicit individual beliefs regarding the willingness to pay of the average group member. We characterize an individual as having poor beliefs if their belief regarding the average WTP is below the median (or at the median) of the belief distribution. In Table 2.5 we analyze whether poor beliefs influence first mover behavior. Column 1 indicates that poor beliefs have a large negative impact on private bids. Moreover, when first movers do not have poor beliefs they demonstrate a leadership effect with higher bids but this effect is nullified for first movers with poor beliefs. This indicates that leadership is demonstrated by conditional cooperators, who have stronger beliefs regarding the willingness of the group to demonstrate some degree of reciprocity.

We evaluate this effect by whether or not individuals have received the externalities treatment and find that this effect is derived entirely from first movers in the externalities treatment (column 3) and that there is no meaningful first mover effect without externalities even among conditional cooperators. This reinforces our earlier result whereby individual actions must bear social repercussions in order to elicit leadership behavior among first movers.

Finally, we evaluate whether natural leaders are also driven by conditional cooperation. While our coefficients are imprecisely estimated for this significantly smaller subsample, we find a slightly different pattern emerging, where poor beliefs do not dampen the first mover effect, suggesting that natural leaders may not be as motivated by conditional cooperation as exogenously assigned leaders.

2.7.2 Number of Leaders

Given that the size of community groups varies, we have natural variance in the number of exogenously assigned leaders in a group. We evaluate the impact of the number of leaders in a group on the individual tendency to demonstrate leadership. We use the subsample of individuals who are exogenously assigned to first or second mover positions (hence this specification only includes individuals who are in the sequential exogenous bidding group, i.e. exogenous leaders and exogenous followers).

Table 2.6 indicates that for the smallest groups, where there is a single leader, first mover effects are fairly large. Overall, the impact of increasing numbers of leaders is positive on follower bids, after controlling for meeting size. However, the impact of increasing the number of leaders on first movers themselves is negative, with greater numbers of first movers leading to lower first mover effects. Hence, more first movers appear to crowd out individual leadership effects.

We find that this effect is driven primarily by the subsample that does not receive externalities priming, in column 2, where the reduction in bids of first movers owing to an increase in the number of first movers is large and highly significant. In the subsample with externalities priming, on the other hand, we find this effect to be smaller and insignificant. In column 4, we look at the effect of increasing the number of first movers on the propensity of natural leader to demonstrate leadership. Owing to the smaller size of this subsample, the coefficients are statistically insignificant

but the average effect of more first movers on the bids of natural leaders is not negative. This suggests that for exogenous leaders, assigning more individuals to leadership status crowds out individual motivation to demonstrate leadership but that this crowding out does not arise for natural leaders.

2.8 Endogenous Leadership

We compare the overall impact of endogenous leadership with the impact of exogenously assigned leadership in Table 2.7. In a public goods setting, endogenous leadership has been shown to increase the overall level of contributions. We find no such parallel in our setting, with the overall level of bids being virtually identical between the endogenous sample and the exogenous sample.

Evaluating the subsample of natural leaders, we again find that there is no significant difference in their bids overall when endogenous bidding is allowed. However, parsing the sample by whether or not externalities priming is received, we find that in the absence of externalities priming natural leaders in the endogenous selection subsample are bidding higher overall than in the exogenously assigned subsample. This difference disappears, however, when externalities priming is introduced. This appears to be a result of the average level of bids rising in the subsample with externalities priming, which wipes out the differential effect of being a natural leader.

2.9 Discussion

Our results indicate that first movers are only inclined to 'lead by example' in situations where there are social benefits or costs of individual behavior. Hence we find that there is no average effect on bidding of first movers when they are exogenously assigned to leadership. However, in the subsample of first movers belonging

to groups that have received priming on the externalities of individual behavior, we do find exogenously assigned leaders bidding higher that bidders who bid in public but in a simultaneous bidding environment, suggesting that their motives for bidding higher derive from the sequential nature of the decision process in their groups.

We further identify that the first movers who bid higher in leadership positions are also more likely to believe in a higher level of average bids within their groups. This is consistent with earlier literature indicating that leadership effects are motivated by conditional cooperation and therefore leaders tend to be individual who have stronger beliefs regarding the willingness of their groups to reciprocate their actions.

Finally, we find that endogenous leadership is no more beneficial to eliciting higher willingness to pay in our setting than exogenous leadership. This is in contrast with existing evidence on endogenous leadership improving overall contributions to public goods. However, we do find evidence for this trend in the actions of natural leaders, but only when they are not exposed to externalities priming.

Our results shed light on how leadership motivations translate in a unique field setting of decision making over the willingness to pay for a private good, which possesses spillover benefits for society. We demonstrate that highlighting the social repercussions of individual behavior are crucial to eliciting the leadership effects that have been found in the experimental literature on public goods contributions. Hence, the desire to demonstrate leadership is only salient in the experimental framing that creates a coordination problem and enhances scope for a coordinated push towards a solution. In our case, this is the externalities framing, which highlights the importance of individual actions on the societal level. This result speaks our ability to generalize the benefits of sequential decision making by highlighting a crucial feature of decision making environments - the need to coordinate on a social optimum - that will elicit favorable behavior from first movers.

Given our field setting, however, we are only able to evaluate these effects in a one-shot game and are not in a position to evaluate the evolution of these effects in a repeated game setting, as it the norm in the experimental literature.

2.10 References

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. The economic journal, 100(401), 464-477.

Andreoni, J. (1998). Toward a theory of charitable fund-raising. Journal of Political Economy, 106(6), 1186-1213.

Andreoni, J. (2006). Leadership giving in charitable fund-raising. Journal of Public Economic Theory, 8(1), 1-22.

Andreoni, J., & Petrie, R. (2004). Public goods experiments without confidentiality: a glimpse into fund-raising. Journal of public Economics, 88(7), 1605-1623.

Ashraf, N., Berry, J., & Shapiro, J. M. (2010). Can higher prices stimulate product use? Evidence from a field experiment in Zambia. The American economic review, 100(5), 2383-2413.

Daniel G. & Arce M. (2001). Leadership and the aggregation of international collective action. Oxford Economic Papers, 114-137.

Dupas, P. (2011). Health behavior in developing countries. Annu. Rev. Econ., 3(1), 425-449.

Foss, N. J. (2001). Leadership, beliefs and coordination: An explorative discussion. Industrial and corporate change, 10(2), 357-388.

Gächter, S., Nosenzo, D., Renner, E., & Sefton, M. (2012). Who makes a good leader? cooperativeness, optimism, and leading-by-example. Economic Inquiry, 50(4), 953-967.

Gächter, S., & Renner, E. (2014). Leaders as role models for the voluntary provision of public goods.

Glazer, A., & Konrad, K. A. (1996). A signaling explanation for charity. The American Economic Review, 86(4), 1019-1028.

Hermalin, B. E. (1998). Toward an economic theory of leadership: Leading by example. American Economic Review, 1188-1206.

Jack, B. K., & Recalde, M. P. (2015). Leadership and the voluntary provision of public goods: Field evidence from Bolivia. Journal of Public Economics, 122, 80-93.

Kumru, C. S., & Vesterlund, L. (2010). The effect of status on charitable giving. Journal of Public Economic Theory, 12(4), 709-735.

Meidinger, C., & Villeval, M. C. (2002). Leadership in teams: Signaling or reciprocating?.HAL.

Préget, R., Nguyen-Van, P., & Willinger, M. (2016). Who are the voluntary leaders? Experimental evidence from a sequential contribution game. Theory and Decision, 81(4), 581-599.

Rivas, M. F., & Sutter, M. (2011). The benefits of voluntary leadership in experimental public goods games. Economics Letters, 112(2), 176-178.

Varian, H. R. (1994). Sequential contributions to public goods. Journal of Public Economics, 53(2), 165-186.

Vesterlund, L. (2003). The informational value of sequential fundraising. Journal of Public Economics, 87(3), 627-657.

Table 2.1: Summary Statistics: Maximum Willingness to Pay by Randomization

	Maximum Willingness to Pay (Mean)		
	Full Sample	Externalities Priming	No Externalities Priming
Simultaneous Private Bidders	106.59	106.11	107.03
Simultaneous Public Bidders	107.18	110.42	104.04
Sequential First Movers	110.71	118.16	102.65
All types	107.46	111.17	103.62

Table 2.2: First Mover Impact On Max WTP - Full Sample

	(1)	(2)
	Max WTP	
Public	0.874	1.373
	(2.124)	(2.455)
First Mover	4.755	4.943
	(3.925)	(4.112)
Natural Leader		5.689
		(4.686)
Public*Natural Leader		-4.207
		(7.066)
First Mover*Natural Leader		-1.605
		(8.026)
_cons	106.3***	105.6***
	(2.445)	(2.583)
N	2641	2641
Mean Dep Var	108.0	108.0
Fixed Effects		Community

Note: The dependent variable is the individual max WTP. Standard errors are clustered at the meeting level

Table 2.3: First Mover Impact and Externalities Priming

	(1)	(2)	(3)
		Max WTP	
Externalities	4.034	-4.488	
	(4.454)	(6.285)	
Public		-2.718	-1.639
		(2.828)	(2.647)
Externalities * Public		6.300	5.217
		(4.433)	(4.288)
First Mover		-7.074	-4.667
		(6.186)	(5.733)
Externalities*First Mover		21.28**	19.18**
		(8.984)	(7.775)
_cons	106.0***	108.9***	106.1***
	(3.128)	(4.415)	(2.452)
N	2641	2641	2641
Mean Dep Var	108.0	108.0	108.0
Fixed Effects		SMT	Community

Notes: The dependent variable is the individual max WTP. SMT is a sub-district aggregation. Standard errors are clustered at meeting level

Table 2.4: Natural Leaders and Externalities Priming

	(1)	(2)
	Max WTP	
	No Externalities	Externalities
Public	-2.682	4.609
	(3.290)	(4.046)
Natural Leader	4.492	7.887
	(7.918)	(7.106)
Public*Natural Leader	-0.573	-9.891
	(11.44)	(10.65)
First Mover	-7.138	14.98**
	(6.612)	(6.624)
First Mover*Natural Leader	6.274	0.188
	(12.64)	(10.40)
_cons	106.9***	104.6***
	(4.618)	(4.528)
N	1333	1308
Mean Dep Var	104.7	111.3
Fixed Effects		Community

Note: The dependent variable is the individual max WTP. Standard errors are clustered at the meeting level

Table 2.5: Beliefs and First Mover Effects

	(1)	(2)	(3)	(4)
		Max WTP		
	Full sample	No Externalities	Externalities	Full sample
Public	0.942	-0.600	2.496	1.420
	(2.940)	(3.967)	(4.380)	(3.317)
Poor beliefs	-13.24***	-15.20***	-11.44**	-12.64***
	(3.747)	(5.141)	(5.421)	(3.859)
Public*Poor Beliefs	0.638	-1.731	3.411	0.702
	(4.260)	(6.141)	(5.981)	(4.557)
First Mover (FM)	8.239*	-2.293	18.64***	8.869*
	(4.980)	(7.663)	(6.266)	(5.161)
Poor Beliefs*FM	-7.277	-4.305	-9.295	-8.419
	(6.027)	(8.737)	(8.118)	(6.280)
Natural Leader (NL)				7.486
				(6.631)
Public*Natural Leader				-4.365
				(9.366)
Poor Beliefs*NL				-4.815
				(9.782)
Public*PoorBeliefs*NL				0.102
				(13.61)
FM*NL				-5.119
				(10.93)
FM*NL*PoorBeliefs				9.723
				(14.82)
N	2641	1333	1308	2641
Mean Dep Var	108.0	104.7	111.3	108.0
Fixed Effects		Community		

Note: The dependent variable is the individual max WTP. Standard errors are clustered at the meeting level. Constant suppressed in output

Table 2.6: Number of First Movers and First Mover Impact

	(1)	(2)	(3)	(4)
		Max WTP		
	Full sample	No Externalities	Externalities	Full sample
First Mover (FM)	14.66**	16.23*	13.19	18.07**
	(6.657)	(9.507)	(8.303)	(7.643)
# FMs	8.381**	12.41***	-4.161	8.655**
	(3.872)	(3.718)	(5.992)	(3.903)
FM* # FMs	-2.943*	-4.551**	-1.218	-3.588**
	(1.578)	(2.181)	(2.030)	(1.727)
# meeting members	-2.128**	-3.848***	1.476	-2.114**
	(0.972)	(1.086)	(1.518)	(0.974)
Natural Leader (NL)				14.21
				(12.81)
FM* NL				-29.91
				(20.86)
NL* # FMs				-2.070
				(3.058)
FM*NL*# FMs				6.422
				(4.741)
_cons	107.0***	114.3***	103.2***	104.8***
	(9.016)	(16.79)	(10.16)	(9.358)
N	1493	700	793	1493
Mean Dep Var	108.9	103.3	113.9	108.9
Fixed Effects		Community		

Notes: The dependent variable is the individual max WTP. Standard errors are the clustered at meeting level

Table 2.7: Endogenous First Movers

	(1)	(2)	(3)	(4)
		Max WTP		
	Full sample	No Externalities	Externalities	Full sample
Endogenous Sample	-0.392	-1.081	-3.472	1.005
	(1.987)	(2.137)	(3.526)	(2.584)
Natural Leader (NL)		4.773	6.463	2.651
		(3.816)	(5.756)	(5.080)
NL*Endogenous		6.966	16.24*	0.729
		(5.963)	(9.616)	(7.406)
_cons	108.9***	108.3***	102.3***	113.6***
	(2.323)	(2.451)	(3.891)	(3.140)
N	2906	2906	1354	1552
Mean Dep Var	108.7	108.7	102.2	114.4
Fixed Effects		Community		

Note: The dependent variable is the individual max WTP. Standard errors are clustered at the meeting level

2.11 Appendices

Table A8: Balance Across Treatment Arms

	Public Simultaneous	Exogenous Leadership	Endogenous Leadership	p-value (joint)
Female	0.516	0.554	0.559	0.175
	(0.016)	(0.018)	(0.013)	
Education (years)	1.740	1.567	1.549	0.505
	(0.125)	(0.141)	(0.100)	
# household(HH) members	7.960	7.866	8.024	0.833
	(0.124)	(0.133)	(0.099)	
# children 0-5years	0.644	0.673	0.664	0.748
	(0.030)	(0.031)	(0.023)	
Household Head	0.712	0.742	0.694	0.126
	(0.014)	(0.016)	(0.012)	
Poverty score at the HH level	24.150	23.990	23.828	0.761
	(0.443)	(0.515)	(0.380)	
Natural Leader	0.139	0.123	0.112	0.242
	(0.011)	(0.012)	(0.008)	
Mixed Meeting Group	0.652	0.693	0.688	0.042
	(0.015)	(0.017)	(0.012)	
Contamination at source	7.501	7.486	7.475	0.571
	(0.058)	(0.065)	(0.048)	
# meeting members	28.556	29.869	29.857	0.023
	(0.332)	(0.412)	(0.299)	
Beliefs re. Average WTP	81.485	78.487	80.097	0.516
	(1.302)	(1.421)	(1.070)	
No beliefs re. Average WTP	0.188	0.208	0.202	0.758
	(0.013)	(0.015)	(0.011)	
Small HH (<5 members)	0.246	0.244	0.231	0.508
	(0.014)	(0.016)	(0.011)	

CHAPTER III

Comparing Individual and Altruistic Subsidies for Health Technology Take Up

3.1 Abstract

Evidence from both lab and field experiments supports the theory that individuals have social preferences that incline them towards altruism in environments involving giving or sharing such as charitable contribution drives or dictator games. We test whether these social preferences can be harnessed towards improving take up of preventative health care products by designing an altruistic subsidy - a subsidy that can be shared with an anonymous partner and is only transferred to the partner if the subject commits to purchase. We find no significant difference in the probability of purchase between subjects randomized into shared subsidies and those randomized into individual subsides, in spite of subjects potentially receiving lower effective subsides through sharing. Consistent with the literature on sorting in dictator games, we find that more subjects share non-zero amounts of their subsidy when they are exogenously assigned to a shared subsidy, even though they have the option of sharing zero, relative to when subjects can choose whether to be assigned to individual versus shared subsidies. This is consistent with the presence of 'reluctant sharers'

This chapter is co-authored with Ghazala Mansuri.

who would choose to avoid sharing environments but will share if placed in such an environment. However, subjects who self-select into sharing are significantly more likely to share a larger amount of their subsidy than exogenously assigned sharers and are more likely to commit to purchasing the product. We also find that priming subjects with information on the externalities of individual health behaviors does not result in more subjects sharing but does result in more generous sharing and higher probability of purchase, consistent with subjects not changing their preferences regarding whether to share but coordinating on a higher sharing equilibrium conditional on sharing non zero amounts.

3.2 Introduction

Evidence of individual proclivity for prosocial behavior abounds in the real world, with large proportions of society contributing time and resources in the service of charitable causes or public goods. In addition, the literature on team incentives indicates that individuals will expend greater effort for team payoffs relative to individual payoffs, placing nearly as much or more value on rewards to others as to themselves (Babcock et al., 2012). In a laboratory setting, the tendency for pro-social behavior has been demonstrated by way of anonymous, one-shot dictator games where one subject is given the decision to allocate an endowment between themselves and another individual. A purely rational, self-interested outcome would entail zero sharing however this result is consistently refuted in experimental settings, with a significant proportion of individuals choosing to share their endowments with their matched partners.

However, in analyzing the motivations for these social preferences, researchers have found evidence that not all voluntary acts of sharing are purely utility improving as some individuals have a tendency to avoid sharing when given a costless option

of exiting from sharing environments (Lazear et al., 2012; Dana et al., 2006; Della Vigna et al. 2012; Andreoni et al., 2011). This is an interesting result insofar as when exogenously assigned to a sharing environment, sharing nothing is equivalent in terms of monetary payoffs with opting out of a sharing environment when given the opportunity to sort. However, on average, individuals are less likely to share nothing but more likely to opt out of sharing environments, suggesting that there are psychic costs to being placed in sharing environments and sharing nothing, which precipitate higher sharing but also create incentives to exit sharing environments when given the opportunity. This phenomenon creates a departure between the results that we would encounter in a controlled lab or field environment and a real-world sharing equilibrium where individuals have the ability to select in and out of environments.

We explore these features of individual behavior in a unique field setting involving altruistic subsidies for drinking water treatment products - subsidies that can be shared with members of your peer group - in communities experiencing a collective public health problem - high level of drinking water contamination. Lack of investment in low cost preventative health care technologies is one of the leading causes of excess infant mortality in developing countries, in spite of the demonstrable benefits of these technologies, suggesting the need for subsidies to improve individual take up. In addition, the burden of communicable diseases is very high in these settings, owing to poor sanitation and waste disposal facilities, creating spillover benefits and costs from individual preventative behavior and creating a situation requiring a co-ordinated push towards higher adoption at a community level. This creates an ideal setting for developing incentive mechanisms that harness social preferences to solve public health problems accruing at the societal level.

While monetary incentives are a tried and tested means of encouraging healthy behaviors, these incentives have typically been directed towards individuals and have failed to incorporate the social nature of public health behaviors or to harness the

power of social preferences. Our experiment's purpose is to evaluate the potential for altruistic subsidies relative to individual subsidies in improving the take up of drinking water treatment products in communities that face high levels of drinking water contamination. An altruistic subsidy, in our context, ties an individual's take up decision to their altruism which can be exercised by giving away a portion of their subsidy to their anonymous partner. Hence, while sharing a fixed subsidy may lower an individual's willingness to adopt a particular product by raising its effective price, it may also raise an individual's willingness to adopt owing to pro-social considerations whereby an individual's take up decision has repercussion on not only their own subsidy but also the subsidy that their partner receives. Therefore, how shared subsidies perform relative to individual subsidies is an empirical question similar to the question of altruistic/cooperative rewards versus individual rewards. The existing evidence on individual's exerting greater effort for teams, and exercising pro-social sharing behavior, would suggest that these altruistic subsidies could increase individual take up at a smaller cost than individual subsidies, owing to pro-social preferences.

In addition, we would like to assess the willingness of individuals to share altruistic subsidies for the take up of drinking water treatment products. However, in recognizing that allowing individuals to sort in and out of sharing environments is more representative of real world behavior, we compare outcomes between exogenous assignment to sharing and endogenous selection into sharing environments. Importantly, we would like to assess whether imposed sharing deviates from self-selected sharing and whether controlled experimental settings will deviate from self-select outcomes if joint subsidies are employed as a policy tool to encourage greater takeup of health technologies.

We find that exogenous assignment to shared subsidies results in a statistically insignificant lowering of a subject's probability of purchase relative to individual subsi-

dies. Given evidence for positive sharing overall, the subjects in this subgroup receive lower subsidies and face higher effective prices as a result of sharing their subsidies. Therefore an insignificantly lower probability of purchase indicates the presence of social preferences that are serving as a counterweight for the lower purchase probability owing to lower subsidies and higher prices of products. This also implies that we can get 'stretch the buck' of health subsidies by employing an altruistic subsidy, since the lower retained subsidy does not adversely affect take up while the shared portion of the subsidy can increase take up for the recipient. Though in our current design, we do not analyze recipient behavior, given price responsiveness of agents an increase in take up from receiving a subsidy can be reasonably assumed on the part of the recipient.

However, when subjects are permitted to choose their sharing environment and opt into either shared subsidies or individual subsidies, the average probability of purchase is statistically significantly lower than with individual subsidies. Hence, with endogenous sorting, shared subsidies lower the probability of purchase relative to individual subsidies. The departure of results between exogenous sharing and endogenous sharing indicates the presence of 'reluctant sharers' who increase their probability of purchase conditional on being placed in sharing environments but would avoid these environments when allowed to sort out of them. This result implies, therefore, that harnessing social preferences will only be effective in scenarios involving groups or teams with fixed or mandatory membership but would lapse in the presence of voluntary membership.

We further assess whether the decision to share is influenced by priming regarding the externalities of individual investment in preventative health care. We use the externalities frame to create an environment where the social optimum deviates from the purely individual (selfish) equilibrium, creating demand for mechanisms that facilitate coordination, and assess whether such framing will affect the sharing

equilibrium. We find that externalities priming does not affect the number of sharers overall, but does impact the amount of sharing insofar as subjects are more likely to share more generously when primed with externalities.

3.3 Theoretical Motivation

A slew of experiments involving dictator games have revealed that when asked to share an endowment while a significant proportion of subject share nothing this is rarely the choice made by a majority of subjects (Engel, 2011). Given that an outcome involving positive sharing deviates from a simple payoff maximizing utility formulation, it speaks to individuals deriving some measure of social utility or 'warm glow' (Andreoni, 1990) from their sharing behavior.

The literature on group incentives points towards another outcome driven by pro-social motivations, namely the desire to perform better as part of a team versus as an individual. Hence, the small body of empirical research on team incentives finds compelling evidence that individuals expend greater effort when their performance affects the rewards of their peers than when it affects only their own payoffs. Babcock et al. (2015) find that individuals value a marginal dollar of reward for their partners from two thirds to twice as much as an additional dollar of reward for themselves. Similarly, Schofield et al. (2015) find that both purely altruistic and cooperative incentive schemes perform just as well as individual incentive schemes in the short run in an experiment designed to encourage the elderly to complete more mental exercises, where altruistic incentives are individual rewards which are tied not to own performance but the performance of your partner and cooperative incentives are tied to the performance of both partners jointly. Moreover, they find that altruistic and cooperative incentive schemes outperformed individual incentives in the long run, leading to greater persistence in behavior past the receipt of the incentives.

However, the literature on dictator games has also found that when individuals are placed in environments where they can select out of the decision to share, they are less likely to share overall. Hence, Lazear et al. (2012) find that on average 33% of individuals in their sample are 'reluctant sharers' who will share when placed in the environment of a dictator game but will opt to avoid a dictator game environment in favor of keeping their endowment for themselves when provided with costless exit. This also results in the overall amount shared falling by more than 50% when people are allowed to sort out of sharing environments.

Dana et al. (2006) have similarly found that a third of their sample prefers to avoid a dictator game with an endowment of $10 in favor of receiving a private payoff of $9, suggesting that such individuals are willing to incur a cost to avoid sharing environments. Lazear et al. (2012) find that subsidizing re-entry into sharing primarily attracts those who are otherwise inclined to share the least, and that probability of reentry is inversely related to the amount shared among reluctant sharers. Broberg et al. (2007) use a BDM auction to estimate the willingness to pay for the opportunity to exit a dictator game and find that the mean reservation price is 82% of the endowment.

Such avoidance has also been witnessed in field experiments on charitable giving. Della Vigna et al. (2012) conduct a fund raising field experiment where some households are notified of the exact time of solicitation and others are allowed to request beforehand that they not be disturbed. These avoidance options lower the probability of people opening their door by 9% and 23% respectively and lower overall donations in the latter case by 28-40%. Similarly, Andreoni et al. (2011) find in a fund raising campaign for Salvation Army that while verbal solicitation significantly increases giving it also increases avoidance. They conclude that the tendency to contribute to charity is motivated by the emotional response it induces in givers and avoidance is practiced against empathetic stimuli that would incline a person to give.

Dana et al. (2006) perceive the same behavior as arising from a desire to not violate others' expectations.

The importance of psychological or belief-oriented cues in eliciting sharing is reinforced by experimental literature that highlights the impact of social framing in influencing choice. Hence, for instance, Kay and Ross (2003) show that priming prisoner's dilemma games with cooperative labels (Community game vs Wall Street game) results in higher degrees of cooperation. Ellingsen et al. (2012) further demonstrate that these framing effects primarily derive from their ability to allow for coordination in games with multiple equilibria. However, as Dreber et al. (2013) discover, framing is ineffective in a pure dictator game, which is consistent with the theory that framing does not affect stable preferences but instead affects their beliefs and serves as a coordination device in games that require coordination on a socially optimal equilibrium, such as the prisoner's dilemma.

The overall conclusion from the current literatures is that there is strong evidence for individuals behaving in a pro-social manner, whether by way of responding to incentives that reward others (altruistic rewards) or by way of engaging in acts of altruism such as charitable giving. Moreover, individual behavior is susceptible to framing effects which can allow individuals to coordinate on socially beneficial outcomes that may not be achievable in the absence of coordination. However, we also find that a significant proportion of individuals in society are reluctant altruists insofar as they share individual rewards or engage in acts of altruism conditional on being placed in sharing environments or when directly solicited but are willing to pay a cost to avoid these environments. Additionally, framing appears to not alter underlying preferences but merely assist in coordination.

3.4 Experimental Design

We use the setting of community group meetings in rural Pakistan where subjects are randomly assigned to individual subsidies, or one of two types of altruistic subsidies tied to the purchase of a one month supply of water treatment products: exogenously imposed shared subsidies and endogenously selected shared subsidies. The subsidies are directed insofar as they can only be applied to the purchase of the product and have no cash value outside of the experiment. Individual demand for the product is assessed using a Take It Or Leave It (TIOLI) mechanism where subjects draw a random price and are asked whether they would be willing to pay this price for the product. If they accept the TIOLI offer price and commit to the purchase, their effective purchase price is the randomized offer price minus any subsidies.

Subjects assigned to individual subsidies are provided with a flat subsidy associated with their purchase of the water treatment products. This subsidy is equivalent to just under 40% of the median offer price, but roughly 15% of the market price of the product. If the subjects decide to accept their TIOLI randomized offer price, their effective price is the random price minus the flat subsidy. If they choose not to purchase, they receive neither the product nor the subsidy.

Subjects assigned to exogenously imposed shared subsides (exogenous sharing) are provided with the same flat subsidy as the subjects receiving individual subsidies (Rs. 40). However, they are instructed that they have been matched with another anonymous member of their meeting group. They can share any amount of the subsidy with their anonymous partner, including zero. They first make a choice regarding how much they would like to share with their partner. Thereafter, they draw a random price as part of the TIOLI mechanism and choose whether they would purchase the product at the price drawn.

In this design every subject is both a dictator and a receiver, insofar as if they are in randomized into shared subsidies they will not only retain a portion of their subsidy but will also have a probability of receiving a portion of their partner's subsidy. Therefore, their effective purchase price is the randomized offer price minus they portion of their own subsidy that they retained minus the portion of their partner's subsidy that was shared with them. But, when making the decision to accept or reject the TIOLI offer price, subjects remain unaware of how much subsidy has been shared with them by their partner and this information is only revealed at the end of the experiment. It cannot therefore affect their own purchase decision. Therefore, the outcome of interest in our design is not the behavior as a recipient but the behavior as a sharer.

In addition, in a shared subsidy context, if the subject refuses their TIOLI offer and chooses not to purchase the product, not only do they fail to utilize their own subsidy but the subsidy portion that they have chosen to share with their anonymous partner is also wasted. Therefore, your partner does not receive any benefits from your sharing if you do not also choose to purchase the product.

Subjects assigned to endogenous sharing are told that they can choose an individual subsidy or self-select into a shared subsidy. If they select a shared subsidy, they will be matched with an anonymous partner and they can choose to transfer a portion of their subsidy to their partner. As in the case with exogenous sharing, they draw a random offer price but the effective purchase price is the random draw minus the portion of the subsidy they retain and any potential subsidy that is transferred to them by their anonymous partners. The only difference between the endogenous sharing group and exogenous sharing group is the ability of endogenous sharers to opt out of shared subsidies altogether in favor of individual subsidies.

Appendix Table A9 evaluates randomization balance between the individuals assigned to individual subsidies, exogenous sharing and endogenous sharing. We find

insignificant differences across a number of demographic characteristics. There appear to be statistically significant differences in the number of household members between groups, but the mean differences in these numbers is negligible in magnitude. Similarly, while there appear to be difference in between the randomization groups in the contamination at source, these are also of a negligible magnitude. Overall, we are therefore assured that randomization was effective insofar as there are no systematic differences between the treatment arm that could spuriously drive our results.

In addition, villages are randomized into whether they are provided with the externalities priming message. Villages that are randomized into the externalities treatment receive information on how the nature of water borne disease transmission creates strong spillover costs on the neighborhood from individual incidences of illness. As a result, individual failure to adopt preventative health care products has repercussions not just on individual health but also on health outcomes at the community level. This randomization is conducted at the village level to prevent information contamination between community groups in the same village.

3.5 Results

3.5.1 Descriptive Statistics

Our sample consists of 2701 individuals in 208 meeting groups drawn from 66 villages. The sample is roughly evenly divided between individuals randomized into individual subsidies, exogenous sharing and endogenous sharing. As indicated in Table 3.1, subjects assigned individual subsidies receive a flat subsidy of Rs. 40, equivalent to nearly 40% of the median randomized price, where the price is distributed uniformly over the interval Rs. 60- Rs. 150. The mean amount of the subsidy retained by exogenous sharers is Rs. 28 (median Rs. 30), suggesting positive amounts shared over

a significant proportion of the sample. In the subsample with endogenous sharing, the mean amount of subsidy retained is Rs. 32 (median 40), suggesting lower sharing overall and by a smaller proportion of this subsample. However, conditional on self-selecting into sharing their subsidy, subjects retain on average Rs. 23 (median Rs. 20) suggesting higher sharing among endogenous sharers who choose to share.

3.5.2 Willingness to Purchase

We first test for whether being randomly assigned to a shared subsidy affects willingness to purchase the product relative to an individual subsidy. We evaluate a conditional logit specification of the probability of purchase, controlling for the randomized offer price, with community level fixed effects and clustering of standard errors at the community level. We report the results in odds ratios, with individual subsidies as the omitted category.

Table 3.2 indicates that random assignment to exogenous sharing results in lower odds of purchase relative to individual subsidies, but this effect is imprecisely estimated with large confidence intervals which incorporate the possibility of increased odds of purchase as well as decreased odds of purchase. This result can be viewed as corroborating existing research insofar as it suggests the presence in our sample of individuals who are swayed by pro-social considerations into not lowering their propensity to purchase the product in spite of lower subsidies and therefore the decline in willingness to purchase is not statistically significant.

Interestingly, we also find that with endogenous sharing the odds of purchase are significantly lower overall. This result is suggestive of sorting in the presence of reluctant sharers who when exogenously assigned to sharing are inclined to behave prosocially and commit to purchase owing to the subsidy to others being tied to their own purchase choice, but are likely to exit this sharing environment when given the

option to do so. We explore this further by dividing the exogenous and endogenous sample into those who select into sharing and those that opt out of sharing. We find that individuals who choose to not share when exogenously assigned to sharing as well as individuals who choose to not share when they endogenously self-select into not sharing have comparably lower odds of purchase. On the other hand, when individuals are endogenously select into sharing they are significantly more likely to make the purchase relative to exogenous sharers and to subjects who receive individual subsidies. These individuals are most certainly demonstrating pro-social motivation as they are receiving a smaller effective subsidy but are significantly more likely to purchase than individuals with larger subsidies. However, this result also implies that a larger proportion of the endogenous sample is opting out of sharing and therefore the mean effect in this subsample is lowered odds of purchase.

3.5.3 Amount of Sharing

We proceed to examine the amount of sharing between exogenous assignment to sharing and endogenous selection. In column 3 we verify that when individuals can self-select their subsidy type they are significantly less likely to share their subsidy than when they are exogenously assigned to shared subsidies. Hence, our results with product subsidies mirror the dictator game literature whereby people when placed in an environment where the choice is framed as 'how much to share' are significantly less likely to share nothing than when the choice is framed as 'whether to share'.

We also find that conditional on choosing to share, the mean amount of subsidy shared is statistically significantly higher in the endogenous selection sample. The point estimate is small, at little over 5% of the mean subsidy in the exogenous sharing sample, but very precisely estimated.

We analyze how the distribution of sharing shifts between the exogenous sharers and

endogenous sharers conditional on sharing a positive amount, by creating subsidy bins for the amounts shared: a quarter of the subsidy or less ($<= 25\%$), half of the subsidy ($<= 50\%\& > 25\%$) or more than half the subsidy ($> 50\%$). Table 3.3 shows that conditional on sharing a positive amount, self-select sharers in the endogenous sharing sample are significantly less likely to share 25% or less of their subsidy. This corroborates the results from Lazear et al. (2012) and Della Vigna et al. (2012) where where willing sharers who select into sharing environments also tend to be the most generous sharers.

3.5.4 Externalities

We evaluate the effect of externalities priming on our outcomes of interest. Since this randomization is carried out at the level of the community, we switch to sub-district (SMT) fixed effects in our conditional logit specification.

As indicated in Table 3.4, being randomized into no externalities priming appears to lower the odds of purchase in the exogenous sharing sample but raise the odds of purchase if externalities priming is introduced. However, the coefficients are imprecisely estimated, with large confidence intervals and are therefore not statistically distinguishable from one another. On the other hand, in the subsample with endogenous sharing while in the absence of externalities priming there is a lower probability of purchase, as is consistent with the full sample results, we find a statistically significant higher probability of purchase when externalities priming is introduced. Therefore, it does appear that priming is inducing individuals to purchase and this effect is stronger in the endogenous sharing sample.

We parse this effect of priming further by analyzing how it affects those who choose to share and those who choose to keep individual subsidies in both the endogenous and exogenous sharing samples. Columns 2 and 3 of Table 3.4 compare the sharing

equilibrium in villages with and without externalities priming. In villages with no priming, the pattern of the full sample is replicated with individuals who do not share their subsidies having a lower propensity to purchase, but individuals who opt into sharing subsidies having a higher propensity of purchase and even more so with endogenous sharing. However, we find a departure in the pattern among those individuals in the endogenous and exogenous sharing sample who choose to share their subsidies. Hence, when individuals are allowed to sort into sharing, those that decide to share are significantly more likely to purchase in the presence of priming, and have the highest odds of purchase of any subsample. However, those who opt into sharing in the exogenous sharing subsample are (insignificantly) less likely to purchase. It would appear, therefore, that among more altruistic types who willingly choose to share, the salience of externalities creates a stronger motivation to purchase. On the other hand, among reluctant sharers the impact of externalities priming is to weaken their incentive to engage in the behavior relative to when there is no priming. This makes intuitive since insofar as reluctant sharers are less willing to engage with pro-social activity and would conceivably be less likely to engage with mechanisms requiring social coordination.

Overall, we find in column 4 that the impact of externalities priming on the probability of sharing is insignificant among both the exogenous sharing and endogenous sharing samples, suggesting that priming in this case has not increased the odds of sharing overall. Parsing results by how much is shared overall, we find that the overall effect of moderately higher subsidies being shared in the endogenous sharing sample is driven primarily by individuals exposed to the externalities priming, since the uninteracted coefficient on endogenous sharing (no priming subsample) in Table 4 column 1 is nearly zero. We further find that with externalities priming, the distribution of endogenous sharing shifts towards greater generosity, with significantly higher endogenous sharers sharing more than 50% of their subsidies, as shown in Table 3.5.

Overall, we find that priming with externalities induces a stronger incentive to commit to purchase among individuals who self-select into shared subsidies. However, it lowers the commitment to purchase among people who choose to share in the exogenous sharing subsample, which includes reluctant sharers. Therefore, imposing an additional coordination problem on reluctant sharers appears to lower their prosocial motivations overall and create greater reluctance towards purchasing in the face of lower subsidies and higher effective prices.

3.5.5 Discussion

In a simple comparison of altruistic subsidies against individual subsidies in triggering take up, we can conclude that altruistic subsidies do not outperform individual subsidies since they induce an insignificantly lower probability of purchase overall. Therefore, while there is evidence of some people responding to social incentives and not lowering their probability of purchase when induced to share, this is not the mean effect and there is significant heterogeneity in behavior as evidenced by the large confidence interval over which predicted probability of purchase is distributed for exogenous sharing. This indicates that social preferences are not strong enough to serve as a counterweight for monetary incentives such as direct subsidies.

Moreover, even in the domain of health, there is a significant class of reluctant sharers who will select out of the sharing environment when given the opportunity to sort. Therefore, barring the ability of policy practitioners penalizing exit from the sharing mechanism, the endogenous probability of purchase with sharing and sorting is likely to be strictly worse than with individual subsidies, except in the case of teams or groups with fixed membership.

Overall, we find that priming individuals with information on externalities induces a stronger incentive to commit to purchase among individuals who self-select into

shared subsidies. However, it somewhat lowers the commitment to purchase among people who choose to share in the exogenous sharing subsample, which includes reluctant sharers. Therefore, imposing an additional coordination problem on reluctant sharers appears to lower their pro-social motivations overall and create greater reluctance towards purchasing in the face of lower subsidies and higher effective prices.

Our results also indicate accord with the theory that priming does not alter underlying preferences but merely assists in coordination as we find that priming does not draw more people into sharing. However, among the sharers, there is a significantly higher likelihood of sharing more generously and purchasing the product.

Our results may be construed as a lower bound on sharing behavior, however, given that the identity of sharers and recipients is anonymous and the game is one-shot with no updating of beliefs. Moreover, the product is new and conceivably does not have strong social value associated with it at the very outset.

3.6 References

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. The economic journal, 100(401), 464-477.

Andreoni, J., Rao, J. M., & Trachtman, H. (2011). Avoiding the ask: A field experiment on altruism, empathy, and charitable giving. No. w17648. National Bureau of Economic Research.

Babcock, P., Bedard, K., Charness, G., Hartman, J., & Royer, H. (2015). Letting down the team? Social effects of team incentives. Journal of the European Economic Association, 13(5), 841-870.

Broberg, T., Ellingsen, T. & Johannesson, M. (2007). Is generosity involuntary?. Economics Letters 94.1, 32-37.

Dana, J., Cain, D. M., & Dawes, R. M.(2006). What you don't know won't hurt me: Costly (but quiet) exit in dictator games. Organizational Behavior and human decision Processes 100.2, 193-201.

DellaVigna, S., List, J. A., & Malmendier, U.(2012).Testing for altruism and social pressure in charitable giving. Quarterly Journal of Economics 127.1, 1-56.

Dreber, A., Ellingsen, T., Johannesson, M., & Rand, D. G. (2013). Do people care about social context? Framing effects in dictator games. Experimental Economics, 16(3), 349-371.

Ellingsen, T., Johannesson, M., Mollerstrom, J., & Munkhammar, S. (2012). Social framing effects: Preferences or beliefs?. Games and Economic Behavior, 76(1), 117-130.

Engel, C. (2011). Dictator games: A meta study. Experimental Economics 14(4), 583-610.

Kay, A. C., & Ross, L. (2003). The perceptual push: The interplay of implicit cues and explicit situational construals on behavioral intentions in the Prisoner's Dilemma. Journal of Experimental Social Psychology, 39(6), 634-643.

Lazear, E. P., Malmendier, U., & Weber, R. A. (2012). Sorting in experiments with application to social preferences. American Economic Journal: Applied Economics, 4(1), 136-163.

Schofield, H., Loewenstein, G., Kopsic, J., & Volpp, K. G. (2015). Comparing the effectiveness of individualistic, altruistic, and competitive incentives in motivating completion of mental exercises. Journal of health economics, 44, 286-299.

Table 3.1: Summary Statistics

	Individual Subsidy	Exogenous Sharing	Endogenous Sharing
Sample Size	942	881	878
Mean Subsidy Retained (Rs.)	40	28.02	32.15
Median Subsidy Retained (Rs.)	40	30	40
Opts to Share (%)	0	74.46	47.38

Table 3.2: Sharing with Exogenous and Endogenous Assignment

	(1)	(2)	(3)
	Prob of Purchase		Opts to Share
Exogenous Sharing	0.844	0.498**	
	(0.142)	(0.158)	
Endogenous Sharing	0.760*	0.557***	0.239***
	(0.120)	(0.118)	(0.0461)
Price draw	0.972***	0.972***	
	(0.00271)	(0.00263)	
Exogenous Sharing*Opts to Share		1.056	
		(0.303)	
Endogenous Sharing*Opts to Share		1.985**	
		(0.531)	
N	2449	2449	1735
Mean Dep Var	0.82	0.82	0.75
Fixed Effects		Community	

The dependent variable (columns 1 and 2) represent the probability of individuals accepting their TIOLI offer price. Column 3 represents the probability of sharing a positive amount conditional on being assigned to endogenous sharing. Exponentiated coefficients; Standard errors in parentheses

Table 3.3: Amount Shared with Exogenous and Endogenous Assignment

	(1)	(2)	(3)	(4)
	Subsidy Amount			
	(Rs.)	Pr(Rs. 1-10)	Pr(Rs. 11-20)	Pr(Rs. 21-40)
Endogenous Sharing	0.900*	-0.0625*	0.0497	0.0128
	(0.480)	(0.0372)	(0.0369)	(0.0146)
_cons	15.92***	0.435***	0.525***	0.0398***
	(0.186)	(0.0144)	(0.0143)	(0.00565)
N	1072	1072	1072	1072
Mean Dep Var	16.08	0.42	0.54	0.04
Fixed Effects	Community			

The dependent variable (column 1) represent the monetary amount of subsidy shared conditional on individuals selecting into sharing. Columns 2-4 represent the probability of individuals sharing a 0-25%, 25%-50%, or 50%-100% portion of their subsidy

Table 3.4: Externalities Priming and Likelihood of Sharing

	(1)	(2)	(3)	(4)
		Prob of Purchase		Opts to
		No Priming	Ext Priming	Share
Externalities Priming	1.103			0.896
	(0.336)			(0.215)
Exogenous Sharing (EXO)	0.857	0.451	0.551	
	(0.234)	(0.221)	(0.224)	
Endogenous Sharing (ENDO)	0.721**	0.505**	0.618*	0.291***
	(0.107)	(0.165)	(0.153)	(0.121)
EXO*Externalities	1.137			
	(0.279)			
ENDO*Externalities	1.361*			0.998
	(0.246)			(0.398)
EXO*Opts to Share		1.292	0.766	
		(0.506)	(0.355)	
ENDO*Opts to Share		1.564	2.959***	
		(0.567)	(1.037)	
Price Drawn	0.976***	0.972***	0.973***	
	(0.00273)	(0.00324)	(0.00440)	
N	2701	1339	1110	1759
Mean Dep Var	0.83	0.82	0.82	0.76
Fixed Effects	SMT	Community		SMT

The dependent variable (columns 1-3) represent the probability of individuals accepting their TIOLI offer price. Columns 2 & 3 divide the sample by whether individuals received externalities priming. Column 4 represents the probability of opting to share a positive amount conditional on being assigned to endogenous sharing. Exponentiated coefficients; Standard errors in parentheses

Table 3.5: Externalities and Amount Shared

	(1)	(2)	(3)	(4)
		Subsidy Amount		
	(Rs.)	Pr(Rs.1-10)	Pr(Rs.11-20)	Pr(Rs.21-40)
Endogenous Sharing (ENDO)	0.145	-0.0325	0.0459	-0.0134
	(0.562)	(0.0487)	(0.0511)	(0.0138)
Externalities Priming	0.429	-0.0389	0.0424	-0.00352
	(0.743)	(0.0576)	(0.0576)	(0.0185)
ENDO*Externalities	0.874	0.0107	-0.0717	0.0610**
	(0.883)	(0.0685)	(0.0705)	(0.0251)
_cons	15.89***	0.438***	0.520***	0.0415***
	(0.483)	(0.0389)	(0.0390)	(0.0110)
N	1072	1072	1072	1072
Mean Dep Var	15.88	0.44	0.52	0.04
Fixed Effects			SMT	

The dependent variable (column 1) represent the monetary amount of subsidy shared conditional on individuals selecting into sharing. Columns 2-4 represent the probability of individuals sharing a 0-25%, 25%-50%, or 50%-100% portion of their subsidy

3.7 Appendices

Table A9: Balance Across Treatment Arms

	Individual Subsidy	Exogenous Sharing	Endogenous Sharing	p-value (joint)
Female	0.541	0.547	0.550	0.908
	(0.016)	(0.017)	(0.017)	
Education (years)	1.423	1.505	1.619	0.533
	(0.115)	(0.124)	(0.132)	
Number of HH members	7.957	8.124	8.331	0.009
	(0.118)	(0.131)	(0.140)	
Number of children 0-5years	0.682	0.656	0.674	0.417
	(0.027)	(0.031)	(0.031)	
Household Head	0.712	0.684	0.710	0.383
	(0.015)	(0.015)	(0.015)	
Poverty score at the hhold level	23.497	23.158	23.737	0.376
	(0.428)	(0.468)	(0.450)	
Below Poverty Line	0.555	0.588	0.554	0.417
	(0.016)	(0.016)	(0.017)	
Natural Leader	0.114	0.116	0.141	0.288
	(0.010)	(0.011)	(0.012)	
Contamination at source	7.326	7.312	7.307	0.000
	(0.060)	(0.061)	(0.062)	
Contamination at storage	4.216	4.121	4.153	0.186
	(0.078)	(0.079)	(0.080)	
Number of meeting members	30.294	30.322	30.267	0.001
	(0.393)	(0.405)	(0.408)	
Beliefs re. Average WTP	78.288	78.286	81.350	0.135
	(1.347)	(1.382)	(1.530)	
No beliefs re. Average WTP	0.220	0.196	0.199	0.390
	(0.013)	(0.013)	(0.013)	
Small Household (<5 members)	0.243	0.238	0.244	0.890
	(0.014)	(0.014)	(0.014)	