The fairer sex? Women leaders and the strategic response to the social environment*

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Abstract

What are the barriers to the effectiveness of women leaders? If leaders' actions deviate from their proposals ("deception"), then trust in leaders might decrease, leading to poorer governance and welfare outcomes. Using experiments conducted in rural India, this paper examines if women leaders deceive more than men, and the role of the social environment in explaining deception by female leaders. We find that women assigned to be leaders deceive more than men, and that deception is more frequent when the gender of the leader is publicly revealed, indicating the salience of social expectations rather than ingrained differences between women and men. Further, we test whether this result holds in a setting with affirmative action, which exogenously changes the social environment. We find that women are more deceptive in villages which have had a female village head due to the affirmative action policy. Greater deception is explained by female leaders correctly anticipating different economic and social costs for their actions as compared to male leaders. Our findings suggest that the social environment imposes significant barriers to the effectiveness of female leaders.

JEL Codes: O12, O53, C93, J16.

Keywords: Gender, Leaders, Governance, Deception, Affirmative action, Lab-in-the-field experiment, India.

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1 Introduction

While the second half of the 20^{th} century has witnessed large gains for women as leaders in government, in the corporate sector and in academia, women are still far from achieving parity with men in leadership positions.[1] Gender equality in leadership positions is not only a moral imperative, but also yields several tangible benefits since women often make different policy decisions compared to men (Eagly et al., 1995, Eagly and Carli, 2003). For example, firms with a greater proportion of women on their boards put more emphasis on long term rather than short term considerations (Adams and Ferreira, 2009, Ahern and Dittmar, 2012, Matsa and Miller, 2013). Female leaders are more likely to prioritize spending on vulnerable sections of the population, as well as on public services such as health and education (Bhalotra and Clots-Figueras, 2014, Chattopadhyay and Duflo, 2004, Clots-Figueras, 2011, 2012, Lott and Kenny, 1999). Appointing more women in leadership positions is also regarded as critical to improving the quality of governance (Dollar et al., 2001, Swamy et al., 2001, Gokcekus and Mukherjee, 2002, World Bank, 2002). Women are increasingly viewed as political cleaners, less corrupt than men and more likely to act as whistle blowers when faced with unethical behavior (Goetz, 2007, Brollo and Troiano, 2016). The rationale is that women are, on average, observed to be better stewards of resources that contribute towards public goods than men, so women who hold public positions and leadership roles might also tend to exhibit these traits, leading to improved social outcomes.

Evidence from developing countries on gender differences in actual levels of corruption as well as in attitudes towards corruption by female representatives is mixed (Brollo and Troiano, 2016, Afridi et al., 2016, Alatas et al., 2009, Vijayalakshmi, 2008). The literature suggests that women are not necessarily less corrupt than men (Debski et al., 2016, Alatas et al., 2009), and instead may behave as opportunistically as men when reneging on contracts (Lambsdorff and Boehm, 2011). Data from the World Values Survey indicates that women in many parts of the world are as likely as men to report that accepting a bribe during their duties is justified.[2]

These studies suggest that gender might not be systematically related to corruption and the

[1] Women constitute only 7% of all heads of government, 4.8% of Fortune 500 company CEOs, 7% of central bank governors and 2.5% of self-made billionaires (Economist, 2015).

[2] Dube and Harish (2016) show how gender of a state's leader affects conflict, finding that queens were more likely to be aggressive in European politics (i.e., engage in more inter-state conflicts) from the 15^{th} to 20^{th} centuries compared to kings. They argue that this finding is in contrast with a large body of work (see, for example, Fukuyama, 1998, Pinker, 2011) that suggests that women leaders are less violent or engage in less conflict.

quality of governance. However, it is unclear whether these mixed findings are a result of systematic differences in preferences across gender, or based on differences in the social context, for instance, individuals' social interactions or experience with other leaders. We refer to this social context as the social environment. While a number of studies offer evidence of systematic behavioral differences between men and women towards altruism, risk, competitiveness and core values (Eckel and Grossman, 1998, 2008, Gneezy et al., 2003, Schwartz and Rubel, 2005), others suggest that gender differences are driven by social norms, institutions and different incentives and goals (Gneezy et al., 2009, Croson and Gneezy, 2009, Andersen et al., 2013, Cassar et al., 2016, Zhang, 2016).

This paper has three main objectives. First, we examine gender differences in deception by individuals in leadership positions.[3] While deception is one of many potential behavioral differences between male and female leaders, we focus on this behavior since deception can rupture trust and cooperative relationships, and therefore can potentially decrease social and economic welfare in the long run. Our second objective is to provide explanations for deceptive behavior. Our explanation centers around the social environment and we compare whether, and to what extent, the prevalent social environment in which individuals make decisions influences observed gender differences. To do this, we randomly vary the social environment in two different ways, thus obtaining causal effects of the role of the social environment on deceptive behavior. Our third objective is to investigate why these differing social environments impact behavior. We do so by examining the economic and social costs the different social environments impose on men and women.

We address these objectives using two lab-in-the-field experiments conducted in rural India. The first is called a leadership experiment, while the second is referred to as a belief elicitation experiment. In the leadership experiment, male and female residents of 40 villages participated in a four person public goods game, with one person in the group randomly assigned as the group leader.[4] Examples of such public goods could include building a community well, setting up an irrigation system or building a primary school. Before the group members decide their contributions, the leader makes a non-binding proposal indicating how much everyone, including the

[3] We define "deception" precisely in the subsequent text.

[4] Half the groups were randomly assigned female leaders and the other half had male leaders. More on this below.

leader, should contribute to the group account. All contributions are made simultaneously, after the group leader's proposal is communicated privately to the other group members. We refer to the difference between the leader's proposal and his/her actual contribution as deviation. If the deviation is negative, i.e., the leader's actual contribution is less than what he/she proposed, we define the leader as being deceptive.[5] To understand and explain the behavior of males and females in this experiment, we conduct the belief elicitation experiment in 21 villages that are similar to the original 40 villages. This allows us to elicit beliefs and investigate the role of social norms associated with contributions by male and female leaders in the leadership experiment.

To explain gender differences in deception, we focus on the impact of the surrounding social environment, specifically by examining the causal impact of changes in the social environment on behavior. The social environment is varied exogenously in two ways. First, in the context of the lab-in-the field experiment, we introduce treatment differences. In randomly chosen sessions, the gender of the group leader is privately revealed to everyone in the group. Leaders' gender whether in the household or in the community is public information and this fact may influence behavior. In the remaining sessions, the gender of the leader is not revealed. Comparing leader behavior between these treatments reveals whether gender differences can be attributed to social interaction between leaders and citizens, or whether it is due to systematic differences between men and women. The second environment utilizes the existing mandatory affirmative action policy of randomized quotas for female village heads in India. India is one of many countries that introduced quotas, mandating women in positions of authority, as a major policy response to the under-representation of female leaders. Evidence from both developed and developing countries (including India, France, Spain and Norway) suggests that while such quotas increase female representation, they may alter the structure of the social environment.[6] This change in the social environment can have direct consequences on the behavior of female leaders in our experiment. These two methods of creating randomized variation in the social environment can thus help us obtain effects of the social environment on behavior.

[5]This is akin to a leader making a proposal or a non-binding promise about how much should be invested in a public good (for example, effort in building a road or time volunteering for committee work). In such a scenario if the leaders' action deviates negatively from what they proposed, one can infer that the leader is behaving deceptively.

[6]Researchers have found mixed policy effects from exposure to female leaders as a result of these quotas in India (Afridi et al., 2016, Ban and Rao, 2008, Beaman et al., 2012, 2009, Chattopadhyay and Duflo, 2004, Gangadharan et al., 2016, Iyer et al., 2012); in Norway (Ahern and Dittmar, 2012, Matsa and Miller, 2013); in Spain (Casas-Arce and Saiz, 2015) and France (Murray, 2008)

We argue that the social environment may impact leader behaviour through changes in the economic and the social costs of acting deceptively. We test both these mechanisms. First, we investigate whether and how, the environment in which leaders make decisions changes the economic costs of acting deceptively. If female leaders strategically anticipate citizen response, then deception should be observed only in the gender revealed treatment. Conversely, if deception represents more systematic differences between men and women, then gender differences in deception should persist regardless of whether gender is revealed. Our central finding is that overall women are significantly more deceptive leaders, deceiving in 57% of cases as opposed to 43% for men. More importantly, we find that female leaders are significantly more likely to deceive when their gender is revealed (randomly due to the treatment variation) and also when they are exposed to female village heads (randomly, through the natural policy experiment). This suggests that behavior in this context is not because of systematic differences between men and women; rather it depends crucially on the social environment in which leaders make decisions. In particular, these results suggest that the economic costs of not behaving deceptively are higher for women as female leaders correctly anticipate that in the experimental set-up, men will cooperate less with them, thus imposing higher economic costs on women for being cooperative.

Second, to examine whether the social environment influences the social costs of acting deceptively, we use the data from the belief elicitation experiment. We find that the social costs of deception are lower for women. Our results therefore suggest that changes in the social environment, through resulting changes in the economic and social costs create an incentive for females to deceive and females respond strategically to these changes. Our findings are robust to alternative ways of defining deception.

This paper offers several unique contributions to the literature. To the best of our knowledge, this is the first study to examine deception between male and female leaders using an incentivized experiment. In studies relying on observational data, differences in actions by men and women could be driven by differences in selection, experience, preferences or constraints faced in policy making, rather than gender *per se*. By randomly assigning leadership among the different experimental participants, we can isolate and identify the actions of the leader without confounding selection issues.[7] Further, survey participants are less likely to truly reveal their attitudes towards

[7]Individuals who *choose* to become leaders might be systematically different from those that do not, leading to

deception or actual deceptive behavior whereas the experimental approach used in this paper allows us to examine deception and its interaction with gender, leadership and affirmative action.[8] Second, the literature examining gender differences in leaders' behavior is mostly silent on *why* such differences exist. The actions of the leader (of either gender) often cannot be separated from the social environment in which these actions occur. For instance, a leader may not be inherently deceptive, but while acting as a leader, through interactions, peer pressure or experiences in the social environment where they make decisions, they may resort to deceptive behavior. We use a novel experiment to parse apart whether gender differences arise due to the social environment or are due to more ingrained factors. Third, despite the growing use of affirmative action policies, little is known about how such a change to the social environment will impact the behavior of leaders *not* in place due to the policy (such as leaders within the household or informal leaders). These other female leaders may observe how the female village head behaves and use this leader as a role model. Additionally, individuals may observe how people especially men, behave *towards* female leaders. This could act as a norm, defining behavior towards and of female leaders. Our paper offers some insights on this behaviour.

2 Experimental Design

We designed two experiments: the first is a *leadership experiment* and the second a *belief elicitation experiment*. A total of 1223 individuals, residing in 61 villages in Bihar, India participated in these experiments.

selection bias.

[8]Participants in our experiments are not *actual* corporate or political leaders; rather village residents randomly assigned to the role of group leaders. We follow this procedure because within our context leadership can take on many forms such as leadership within the household, government or business. Thus, our set-up allows us to examine how men and women behave when randomly assigned a non-specific leadership position. Our experimental design is therefore distinct from Jack and Recalde (2014), Kosfeld and Rustagi (2015) and Jablonski and Seim (2016) who have elected political leaders as participants. We are also able to circumvent scrutiny bias or the Hawthorn effect (decisions being influenced by the leaders behaving in a way they believe is expected of them and not responding to incentives) compared to a situation in which elected politicians make decisions. This also ensures that the non-leaders are able to respond to incentives and not make decisions that they believe the leaders would expect of them.

2.1 Leadership experiment

We conduct the leadership experiment in 40 villages with 956 participating individuals. Our design extends the standard linear public goods game, widely used to study cooperation and other social dilemma problems. In the experiment, subjects are randomly allocated into groups of four. Each group member i is given an endowment of Rs. 200. Subjects have to decide how much of this endowment to allocate to a group account. The rest goes to their private account. Each rupee allocated to the private account by the individual yields a return of one, while each rupee allocated to the group account generates a return of β to each group member. β is determined as follows: the total contribution to the group account by all the group members is aggregated ($G = \sum_i g_i$, where g_i is the amount allocated to the group account by member i), doubled and then divided equally among the group members irrespective of their contribution to the group account. Since each group consists of four members, $\beta = 0.5$. The earnings of each participant is given by $\pi_i = e - g_i + 0.5G$.

We implemented a one-shot version of the game to avoid reputation and learning effects as well as subject fatigue.[9] On average participants earned Rs. 420, which is approximately two days wage for a semi-skilled laborer.[10] Participants were recruited via house-to-house advertising and using flyers with information on time, location and the average payment for one session. Participants were at least 18 years old and literate.[11]

Participants were randomly assigned to different groups that consisted of four members, two men and two women. Information on group composition was public among the participants. One participant in each group was randomly assigned as group leader. Each group therefore consisted of one leader and three non-leaders (henceforth, citizens). All participants were privately informed about their role in the experiment – leader or citizens. All decisions were made in private, and participants were never informed of the identity of the other members of their group.[12] In all

[9] Avoiding subject fatigue is important since each session, including reading the instructions and the post experiment survey, took around four hours to complete.

[10] The English version of the experimental instructions are attached. The instructions were read out in Hindi. Participants answered quiz questions after the instructions were read out to make sure that they understood the procedures. Subjects also participated in a separate trust game before the leadership experiment but were not given any feedback on this task. Subjects were paid for only one task, randomly chosen at the end of the experiment.

[11] One male and one female research assistant visited each village prior to the scheduled session and helped with recruiting participants. Research assistants were unaware of the specific research questions associated with the study.

[12] All interactions with the participants were symmetric and no participant was singled out during distribution or collection of decisions sheets.

sessions, half the groups had male leaders and the other half had female leaders.

The experimental task has two decision stages. In the first stage, the leader proposes a non-binding contribution between Rs. 0 and Rs. 200 towards the group account, which is privately communicated to the other group members. In the second stage, all group members, including the leader, simultaneously contribute to the group account. Participants are never informed of their fellow group members' actual contribution to the group account. The proposed contribution by the leader is non-binding, akin to cheap talk. Applying backward induction, the theoretical prediction for this task is that the proposed amount should have no impact on citizens' contribution decision: $\beta < 1$ and therefore citizens' dominant strategy in the second stage is to contribute zero. The leader also knows that the group members may not follow his/her proposal, and therefore has little incentive to adhere to it. We therefore expect low contributions to the group account and provision of public goods below the socially optimal level in all the treatments. Leader's proposals have been observed to increase group contributions even though theoretically they should not have any impact.[13]

The experiment consists of a gender revealed treatment (*Gender of group leader revealed*) and a gender not revealed treatment (*Gender of group leader not revealed*). In all sessions, before the leader makes his or her proposal, participants are given instructions sheets with own gender symbols on the front page in order to make gender salient. In the gender revealed sessions, citizens are also informed of the leader's gender before the leader makes his or her proposal. The gender composition of the group and the proportion of male and female led groups is the same across both treatments.[14]

In the post-experiment survey, we collected data on risk and time preference from participants. Differences in risk and time preferences might differentially affect the likelihood of deceptive behavior by male and female leaders. Each participant was given an endowment of Rs. 20 from which to choose the amount x to allocate to a risky asset that returned $3x$ with probabil-

[13]Different aspects of leadership have been explored in the experimental literature (Meidinger and Villeval, 2002, Güth et al., 2007, Levy et al., 2011, Jack and Recalde, 2014, Grossman et al., 2015). Most of this literature focuses on a first mover sending a signal to other members of the group. The first mover or the leader's effort or contribution is commonly observed prior to other members' effort.

[14]Thus, the leader's only role is to propose the contribution amount, and the only information conveyed is the proposed contribution and the leaders gender (in the gender revealed sessions). In alternative designs the leader could do other things, but then it might be difficult to isolate the effect of the gender of the leader from the effectiveness of the leader along different dimensions.

ity 0.5 or 0 with probability 0.5. They retained whatever they did not allocate to the risky asset. The proportion of the endowment assigned to the risky asset can be interpreted as a measure of the risk preference of the individual (Gneezy and Potters, 1997). We also collected data on time preference of the participants, though this specific task was not incentivized for logistical reasons. Each participant was asked whether they would prefer Rs. 100 in a month or Rs. 150 in 3 months. Those who reported preferring the first were categorized as present biased.[15]

2.2 Belief elicitation experiment

We measure the extent to which decisions in the leadership experiment were socially acceptable by conducting a second field experiment involving a coordination game and a belief elicitation task. We used an incentivized experimental methodology (Krupka and Weber, 2013, Gangadharan et al., 2016) to identify whether participants consider decisions in the original leadership experiment as socially appropriate. The belief elicitation experiment was conducted with 267 participants from 21 villages that were different but located in the same sub-districts as the original 40 villages where the leadership experiment was conducted. Approximately half the participants were women. The recruiting procedure was identical to the leadership experiment.

The belief elicitation experiment involved four tasks. Prior to the first task, the experimenter described the leadership experiment and all possible actions. Participants in the belief elicitation experiment did not make any decisions relating to the leadership experiment. They were informed that villagers, similar to them and residing in villages similar to theirs, had already participated in that experiment.

The first task (Task 1) elicited beliefs about the actions of subjects in the original leadership experiment. Specifically, subjects were asked to estimate the decisions made by both male and female citizens under both a male and female leader in the original leadership experiment. Participants were paid Rs. 200 if their decisions were within Rs. 10 of the average in the original experiment.

The next two tasks (Tasks 2 and 3) measured beliefs about how socially acceptable a certain

[15]On average, female leaders allocated 63% of their endowment to the risky asset in the risk elicitation task, compared to 68% by male leaders, although the difference is not statistically significant. On the other hand, 61% of female leaders are categorized as present biased, based on the time preference task, compared to 71% of male leaders and the difference is marginally significant ($p < 0.10$).

action was considered to be by a majority of participants. The tasks described possible decisions made by subjects in the original leadership experiment, and then required participants to rate the social appropriateness of these decisions. Specifically, participants were asked to rate the social appropriateness of a leader of gender g (where $g \in \{Male, Female\}$) contributing Rs. 50/100/150 if the same leader proposed Rs. 100. Participants were asked to rate the social appropriateness of the decisions of the leader as being very socially inappropriate, somewhat socially inappropriate, somewhat socially appropriate or very socially appropriate, which were then converted to numeric scores with very socially inappropriate = 1 and very socially appropriate = 4. The only difference between Tasks 2 and 3 was the method of payment for each task. Participants in Task 2 (3) were paid Rs. 200 if they gave the same response as that most frequently given by men (women) in a baseline village.[16] Task 2 can therefore be interpreted as what villagers think men believe is socially appropriate, whereas Task 3 is what villagers think women believe is socially appropriate. If the participant's answer did not match the majority answer, he/she received nothing for this task.

The fourth task (Task 4) elicits general measures of social norms and identity in the village context. Participants were given different vignettes on topics ranging from the role of women in the household to the importance of gender identity in occupations.[17] Again, participants were asked to rate the social appropriateness of each of these vignettes. This task was also incentivized with participants receiving Rs. 200 in accordance with the modal response of villagers in a baseline village.

The two lab-in-the-field experiments, accompanied by extensive post-experiment surveys (that collected information on attitudes towards governance and corruption and on individual and household level demographic and socio-economic characteristics) were conducted between June 2014 and March 2015. Some data from these experimental sessions are also used in Gangadharan et al. (2016), with the purpose of examining a different research question. Gangadharan et al. (2016) specifically explore male backlash towards female leaders and are silent on the behavior of leaders *per se*, which is the main focus of this paper.

[16] In addition to the 21 villages where we conducted the belief elicitation experiment, we randomly selected one village from each district, which we refer to as the baseline villages. We use the data from these villages as a reference group for payment purposes in Tasks 2, 3 and 4. In the baseline villages, participants were paid depending on decisions made by others in the same session. Subjects in the belief elicitation experiment were paid for one randomly chosen decision in each of the four tasks. The average payment was Rs. 380 including show up fees.

[17] The instructions for the Belief Elicitation experiment (attached), report the list of the questions asked.

2.3 Context

Bihar is a large state consisting of approximately 10% of India's population. Although consistently ranking as one of the poorest regions of India, Bihar experienced one of the fastest rates of economic growth among Indian states between 2003 and 2013. Panel A of Figure 1 shows the location of Bihar in India. Bihar is reflective of the wider political economy and the policy environment in the country.

Our study was conducted in Gaya, Khagaria and Madhubani districts which have a combined population of almost 11 million. As seen in Panel B of Figure 1, these districts are approximately equidistant from the capital city of Patna, and are similar in terms of socio-economic, demographic and agro-climatic conditions. Sampled villages were drawn from a population of villages receiving funds from the Bihar Rural Livelihoods Project, and matched in terms of village level observable characteristics using the 2011 census of India.

Conducting the experiment in India, which is the largest democracy in the world, allows us to utilize information from a randomized affirmative action policy that was mandated to improve the effectiveness of the country's grassroots democracy. Each village within India is governed by a village council or Gram Panchayat (GP). Council elections are held every five years. The village council is responsible for village infrastructure such as public buildings, the resolution of local disputes and for identifying government program beneficiaries. While the village councils do not have powers of taxation and the activities of the village councils are financed by state and national grants, the head of the village council (colloquially known as the Mukhiya, Pradhan or Sarpanch) exerts substantial influence on the decisions of the council and is therefore an important official.[18]

Through the 73^{rd} constitutional amendment enacted in 1992, the Indian government legislated that in each village council election, at least one third of councillor positions, including the position of the village head, must be reserved for women. The actual implementation of the legislation was however the responsibility of the states. In 2004, the Bihar government increased the quota for women in positions of village head to 50%. Bihar held its first village council election in 2001, followed by a second in 2006 and a third in 2011.

The assignment of female heads to village councils is determined randomly (Chattopadhyay

[18]Chattopadhyay and Duflo (2004) and Besley et al. (2012) present evidence that the head of the village council enjoys considerable discretionary power.

and Duflo, 2004). Prior to every election, village councils in a district are randomly assigned serial numbers across three lists: reserved for SC, reserved for ST, and unreserved. One third of all village councils in each individual list is reserved for women (as mentioned above this changed to one half after 2004 in Bihar).[19] For the next election, every third (or second as in the case of Bihar) village council starting with the second on the list was reserved for a woman. Thus, village councils can be reserved for women in sequential elections, allowing us to classify the villages in our sample as either never reserved, reserved only once or reserved at least twice. In Bihar, women are unlikely to be elected as village heads without reservation. For instance, following the 2006 elections, 50.06% of all positions of village head were occupied by women, not different from the mandated 50%, implying that the village council head's gender is indeed determined exogenously by the reservation quota.

By conducting the lab-in-the field experiments in this setting we are able to elicit behavior of participants who have been exposed to male and female leaders, assigned to villages using a random mechanism. Male and female leaders in our experiment may behave differently in an environment where they have experienced a female village head. They may observe and emulate how female leaders behave (female village heads may thus act as role models) or they may observe how others behave towards the female village head. We use our experimental design to examine these two factors.

3 Empirical analysis

3.1 Data description

Column 1 of Table 1 reports descriptive statistics for the full sample. The participants in the study are on average 27 years old, belonging to households with 7.7 members on average. Close to half the sample has completed high school. The sample is predominantly Hindu (91%), with a mix of upper caste, Scheduled Caste and Other Backward Castes. Thirty nine percent of participants report being in paid employment.

Table 1 also presents tests for sample balance in the characteristics of the participants. Col-

[19] In addition to quotas for women, seats were also reserved for the two most disadvantaged groups in the country - the Scheduled Caste (SC) and the Scheduled Tribe (ST). The two randomizations are orthogonal.

umn 4 shows no observable differences between individuals assigned to be leaders and those assigned to be citizens. Column 7 shows that individuals assigned to the gender of the group leader revealed and gender of group leader not revealed sessions have mostly similar characteristics. Importantly, the F-statistics indicate that the observable characteristics are not jointly statistically significant in both comparisons.

Table 2 presents the results of several randomization tests that check if the sample villages are matched on different dimensions in terms of observable village level characteristics. Column 3 shows that the sample is balanced across male and female-headed villages on observable characteristics. Column 7 reports the sample is balanced on observable characteristics by the number of female heads over the last three elections: the χ^2-statistic cannot reject the null hypothesis that the observable characteristics are similar on average across the different categories of villages. Column 10 shows that the sample is balanced on treatment status (gender of group leader revealed versus not revealed). The F-statistic (0.58) indicates no differences in village level characteristics across groups. From these tests, we conclude that the sample is balanced along several dimensions, permitting more confidence in claiming causal interpretations in the results section.

Finally, Table 3 shows that the 21 villages where we conducted the belief elicitation experiment were similar on observable characteristics to the 40 villages where we conducted the leadership experiment.

3.2 Do female leaders behave differently?

The next three sections investigate decisions made by female and male leaders in the experiment and explore, using our treatment variations, whether the differences can be attributed to the social environment.

In the leadership experiment, the non-binding proposal made by the group leaders ($\tilde{g}$) and the subsequent actual contributions (g) allow us to construct a number of different measures of deception on the part of the male and female leaders. These are: (1) *deception* (D), a dummy variable = 1 if $g < \tilde{g}$ i.e., the leader proposes more in the first stage than their own contribution in the second stage of the public good, and 0 otherwise; (2) *strong deception* ($\tilde{D}$), a dummy variable = 1 if $g - \tilde{g} < -10$ i.e.,the leader's proposed contribution to the group account exceeds the actual contribution by more than Rs. 10; and (3) the magnitude of deception with the variable *percent*

deviation, which is defined as percent deviation $= \frac{g-\tilde{g}}{\tilde{g}} \times 100$. If $g \geq \tilde{g}$, then percent deviation is coded as zero. Note that $D = 1$ and $\tilde{D} = 1$ are consistent with *percent deviation* < 0.

Panel A of Table 4 examines leaders' proposals and reports that while the difference is never statistically significant, the average amount proposed by the female leaders is less than that proposed by the male leaders in all the seven cases considered (rows 1–7).[20] Panel B of Table 4 shows that women are significantly more deceptive leaders: deceiving in 57% of cases as opposed to 43% for men ($p < 0.05$). The deception levels are higher for women versus men in all seven cases (rows 8–14) and is driven by the behavior in gender revealed sessions ($p < 0.10$). This indicates that female leaders may be acting opportunistically and strategically contributing less than male leaders.[21]

To understand the behavior of female leaders more precisely, we analyze group leader deception using a multivariate regression that includes village fixed effects and individual and household level controls. This approach helps control for potential individual and village level heterogeneity in the sample. We estimate the following equation:

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \tag{1}$$

In this specification, the outcomes of interest are deception (D_{jk}), strong deception ($\tilde{D}_{jk}$) and percent deviation. The variable L^f_{jk} denotes a female group leader (for group j in session k), so α_1 represents the average difference in the likelihood of deception by female versus male group leaders. We include a set of individual controls $\mathbf{Z}_{jk}$ (completed and secondary school completion, occupational status, income, age, religion, caste, household size and father's school completion) and village fixed effects (η_k) in the set of explanatory variables.

Panel A in Table 5 presents results from OLS estimates of equation (1). On average, female

[20] Figures 2–4 presents the distribution of the deviation for female and male leaders in the different scenarios. The distributions of proposals and the contributions are presented in Figures A1–A6 in the appendix.

[21] Our data permits finer gradation of the leader's decision. Specifically, the leader can choose to contribute less than, equal to, or greater than what he/she had proposed, i.e., *Deviation* can take the values < 0, $= 0$ and > 0, where *Deviation* is defined as the difference between actual contribution and the amount proposed. The proportion of male and female leaders choosing the different values of *Deviation* are presented in Figures A7–A9. The patterns are consistent with those presented in Table 4. Overall female group leaders are more likely to choose *Deviation* < 0, while male group leaders are more likely to contribute at least what they propose. This difference is particularly strong in the gender revealed treatment villages and in female headed villages. Given that this finer categorization gives qualitatively similar results to those presented in Table 4, the rest of the paper will focus on deception as defined above.

leaders are 20 percentage points more likely to deceive compared to male leaders ($p < 0.05$) and 18 percentage points more likely to deceive strongly ($p < 0.05$). In terms of magnitude of deception, female leaders contribute 18 percent less than proposed ($p < 0.05$).[22]

As mentioned before, male leaders are more likely to be present biased. While the difference is not statistically significant, on average male leaders allocate 8% more of their endowment to the risky asset suggesting greater preference for risk. This difference in risk and time preference might differentially affect the likelihood of deceptive behavior by male and female leaders. Table A1 presents results from a robustness check that includes risk and time preference of the group leaders as additional controls. Comparing results in Table A1 to those in Table 5 shows that controlling for risk and time preference does not affect key results on deceptive behavior of female leaders (relative to that of male leaders).

These results therefore show that women as leaders deceive more than men. This result holds even after controlling for a range of household characteristics and for village fixed effects. We next explore the reasons for this gender difference in more detail.

3.3 Strategic behavior or systematic differences?

We examine if the deception documented in Panel A of Table 4 is due to systematic differences between men or women or a result of the surrounding social environment in which leaders make decisions. Females may have a preference for deceptive behavior relative to males. Alternatively, female leaders may expect that men will contribute less than what they proposed to the group account when they know that the leader is a woman. Hence, a female leader's optimal decision in the second stage is to contribute less than what she proposed. To isolate which aspect of behavior is dominant, we exploit the difference between the treatments: deception by female leaders in the gender revealed versus gender not revealed sessions. As Table 4, Panel B shows, the likelihood of deception by female leaders is statistically significantly higher in the gender revealed sessions ($p < 0.10$) but not in the gender not-revealed sessions ($p > 0.10$).

We also examine whether this result holds after controlling for a range of individual and household characteristics as well as village fixed effects by estimating the following regression.

[22] A negative coefficient estimate in column 3 of Table 5 is consistent with a positive coefficient estimate in columns 1 and 2.

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \alpha_2 (L^f_{jk} \times T_k) + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \quad (2)$$

In this equation, $T_k = 1$ if the village is a gender revealed village, and 0 otherwise. α_1 denotes the additional deception by female leaders (compared to that by male leaders) in a gender not revealed village while $\alpha_1 + \alpha_2$ denotes the additional deception by female leaders in a gender revealed village. The results presented in Panel A of Table 5 show that, consistent with our hypothesis, female group leaders are 23.5 percentage points more likely to deceive than male leaders in gender revealed villages ($p < 0.05$ in column 1) but not in the gender not revealed villages (+0.163, $p > 0.10$ in column 1). The point estimate of the difference between these coefficients is positive and relatively large (+0.072), suggesting that the expected behavior of others influences the decision to act deceptively. The environment and social interactions in which leaders make decisions is therefore a vital component influencing the behavior of female leaders.

3.4 Do female leaders behave differently under affirmative action?

How does the introduction of the affirmative action policy and the consequent exposure to female heads under a quota system affect the behavior of male and female leaders? As we show above, the social environment matters in explaining the behavior of men and women in leadership positions, and the introduction of the affirmative action policy can affect the social environment in which leaders interact. We hypothesize that experience with a female village head can affect how men and women behave as leaders. This could either be because of expectations about the behavior of other participants or the role model effect.

To examine this question, we classify villages as either female-headed, i.e., which had at least one female head following the last three village council elections, or male-headed which did not. Panel B of Table 4 reports that female group leaders are deceptive in 61% of cases in female-headed villages compared to 41% in male-headed villages ($p < 0.05$). Villages that have never been exposed to a female village head show no difference in the likelihood of deception of male and female group leaders ($p > 0.10$). Panel C of Table 4 also shows that the magnitude of deception by female group leaders is greater in female-headed villages, with female group leaders contributing 26% less than what they proposed compared to 17% less for male leaders ($p < 0.05$).

Results using a multivariate regression framework that includes several individual and house-

hold level controls and village fixed effects are reported in Panel B of Table 5. The estimating equation extends equation (1) as follows.

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \alpha_2 H^f_k + \alpha_3 (L^f_{jk} \times H^f_k) + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \tag{3}$$

In this specification, H^f_k is an indicator variable that is 1 if the village has been exposed to a female head, and 0 otherwise. The coefficient α_1 represents the additional deception by a female leader (relative to a male leader) in a male-headed village, while $\alpha_1 + \alpha_3$ is the additional deception by a female leader (again compared to a male leader) in a female-headed village. Panel B of Table 5 confirms the descriptive statistics presented in Table 4. Female leaders are 25 percentage points more deceptive (column 1, $p < 0.01$), and 24 percentage points more strongly deceptive (column 2, $p < 0.01$) and deceive in larger magnitude (column 3, $p < 0.01$) than male leaders in female-headed village. Simultaneously, the likelihood of deception by male and female leaders is not statistical different in male-headed villages.

Bihar's three village council elections allow us to examine the effect of intensity of exposure to a female village head. Greater exposure to a female head may increase the intensity of social factors that effect the behavior of female and male leaders within our experiment. We categorize the villages into three groups: no female head (42.5%), one female head (40%) and two or more female heads (17.5%). We estimate an extended version of equation (3).

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \alpha_2 H^{1f}_k + \alpha_3 (L^f_{jk} \times H^{1f}_k) + \alpha_4 H^{2f}_k + \alpha_5 (L^f_{jk} \times H^{2f}_k) + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \tag{4}$$

H^{1f}_k is a dummy variable is 1 if the village has been exposed to one female head, and 0 otherwise; H^{2f}_k is a dummy variable that takes the value of 1 if the village has been exposed to two or more female heads, and 0 otherwise. The reference category is that the village has never been exposed to a female head. In this equation, α_1, $\alpha_1 + \alpha_3$ and $\alpha_1 + \alpha_5$ represent respectively the additional deception by a female leader (relative to a male leader) in a village with no female head, one female head and two or more female heads. Regardless of the measure used, regression results presented in Panel C of Table 5 show that female leaders engage in deceptive behavior

when the village has been exposed to a female head, and that the extent of deception is unchanged with an increase in the extent of exposure.

Finally, we examine whether the impact of affirmative action on behavior is stronger when gender is revealed relative to when it is not revealed. A stronger impact in the gender revealed treatment in female headed villages relative to male headed villages may suggest that female leaders expect citizens to be more deceptive. This may be due to their experience and observation about how citizens behave towards female leaders. To examine this, we estimate an extended version of equation (3).

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \alpha_2 T_k + \alpha_3 (L^f_{jk} \times T_k) + \alpha_4 H^f_k + \alpha_5 (L^f_{jk} \times H^f_k) + \alpha_6 (T_k \times H^f_k) + \alpha_7 (L^f_{jk} \times T_k \times H^f_k) + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \quad (5)$$

In equation (5), $\alpha_1 + \alpha_3$ and $\alpha_1 + \alpha_3 + \alpha_5 + \alpha_7$ represent the additional deception by female group leaders in male and female-headed gender revealed treatment villages respectively. Regression results (Panel D of Table 5) show that deception by female group leaders compared to male group leaders can be statistically distinguished from the null in female-headed treatment villages. Conversely, additional deception in male-headed treatment villages cannot be statistically distinguished from the null. This suggests that women may observe how citizens behave towards female leaders, which could encourage them to deceive more than men.

4 Mechanisms

This section discusses potential mechanisms for the greater deceptive behavior exhibited by female leaders. Specifically, we consider three possible explanations: (1) response to expectations of female leaders regarding behavior of male citizens; (2) role of social norms; and (3) role model effects. While many other reasons might explain why we observe gender differential in deceptive behavior, we focus on the three possible explanations that we believe are related to the role of the social environment on the behavior of female leaders. These mechanisms are particularly important in societies where the prevailing social norms are not as accepting of women in leadership

positions. Assigning women to these positions thus changes the social environment.

4.1 Response to expectations

Recall that in the second stage, all group members participate in a standard public goods game. The payoff π_i for subject i in the game is given by $\pi_i = e - g_i + \beta \sum_n g_j$ where g_i is the amount citizen i contributes to the group account, e is the endowment common to all participants, β denotes the returns to the amount contributed to the group account, and n is the group size. $G = \sum_n g_j$ represents the sum of the n individual contributions to the group account. While the dominant strategy Nash equilibrium contribution remains the same as the standard set-up, the leader's proposal provides a potential focal point for coordination at higher contribution amounts. The leaders thus make their proposal anticipating the citizen's response, including their own response in their contribution decision.

Consider first the case where the gender of the group leader is known. The knowledge that the leadership position is occupied by women might bias citizens' response to suggestions made by the leader. In other words, if a female leader suggests $\tilde{g} > 0$, then the probability that a citizen follows the suggestion (i.e., $g_i = \tilde{g}$) is lower than if a male leader suggests the same $\tilde{g} > 0$. So the expected contributions from other citizens to the group account are lower when the group leader is female versus male.

Now consider the leader's decision, which consists of two components. First, the leader draws utility from maximizing expected group contributions, which are achieved when all citizens contribute everything to the group account. Second, the leader might experience disutility from contributing an amount g_i that is lower than his/her own proposal $\tilde{g}$, referred to as deception in our framework. In particular, this disutility $V(.)$, could depend on social perception or appropriateness of this behavior. Hence, the leader's utility function takes the following form: $U(G) - V(\tilde{g} - g_i)$, where the standard concavity conditions apply, i.e., $U'(.) > 0$, $U''(.) < 0$, $V'(.) > 0$ and $V''(.) < 0$. The leader chooses g_i to maximise this utility function.

To determine the proposed amount of contributions and then the actual contributions to the group account, the leader would need to consider the benefits of increased contributions compared to the costs of being deceptive. Choosing a high $\tilde{g}$ might increase total contributions to the group account since citizens potentially coordinate at a higher amount, and therefore increase $U(.)$. How-

ever, the likelihood of coordination may decrease with greater $\tilde{g}$. The leader anticipates this and her contribution g_i is therefore lower, increasing deception $(\tilde{g} - g_i)$, and thereby decreasing total utility. Conversely, a low $\tilde{g}$ potentially decreases deception but also contributions to the group account. For a given $\tilde{g}$, if all other citizens are less likely to follow a woman's proposal, then female leaders should also contribute less to the group account (and therefore increase their payoff π_i).[23] If the costs of deception vary by gender, i.e., $V^m(.) > V^f(.)$, then women will also be more likely to deviate from their proposed amounts.

In the treatment where the leader's gender is not revealed, the differential behavior by leaders is less likely due to an anticipated reaction by citizens. Therefore, in this case, there is no asymmetry between men and women in terms of deceptive behavior. In contrast, in the treatment where the group leader's gender is revealed, the difference across genders suggests strategic behavior by leaders anticipating a response from citizens.

Examining citizen behavior helps corroborate the argument that deception by female leaders is driven by strategic concerns. If female leaders expect that male citizens will cooperate less with female leaders than with male leaders and more so in female headed villages, female leaders' optimal decision would be to contribute less than what she proposed in a gender revealed treatment session in a female headed village. Evidence on citizen's behavior is consistent with these kind of expectations by female leaders. Figure 5 presents the CDF of the contribution to the group account by male and female citizens when the group leader is male or female in the gender revealed sessions. For male citizens, the CDF of contributions to the group account when the group leader is male stochastically dominates that when the group leader is female and the the null hypothesis of equality of distribution of contributions to the group account is rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions ($p < 0.05$). Male citizens therefore contribute more to the group account when the group leader is male compared to when the group leader is female. For female citizens, the null hypothesis of equality of distribu-

[23] Previous studies have found that when the decision is inherently risky women tend to contribute less than men. There is also some evidence that women may be more averse to the sucker effect: The "sucker effect" occurs when individuals choose to free-ride out of fear that others will too. In prisoner dilemma experiments, Ingram and Berger (1977) find that women, in experiment debriefings, indicate that they chose the competitive strategy for fear of falling into the "sucker" role of choosing cooperation when the other player defects. This would increase the likelihood that female leaders contribute less to the group account. Similar results are found in van den Assem et al. (2012). In a punishment variant of the public goods game, Fehr and Gachter (2000) argue that subjects strongly dislike being the sucker, i.e., being those who cooperate while other group members free ride. This aversion against being the sucker might trigger a willingness to punish others.

tion of contributions to the group account, by the gender of the group leader, cannot be rejected ($p > 0.10$).

Figure 6 presents the CDF of contributions to the group account when the group leader is male or female and when the village is female or male headed. Again the sample is restricted to the gender revealed sessions. Panel A presents the CDFs for the male citizens in the different cases. The null hypothesis of equality of distribution of contributions to the group account is rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions ($p < 0.05$) in female headed villages. In contrast, the null hypothesis of equality of distribution of contributions to the group account cannot be rejected in male headed villages ($p > 0.10$). Panel B presents the CDFs for female citizens. The null hypothesis of equality of distribution of contributions to the group account can never be rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions ($p > 0.10$ in both female and male headed villages).

These findings are consistent with men exhibiting *backlash* against female leaders (male citizens contribute significantly less to the public good when the group leader is a female), and the extent of this male backlash is stronger in female headed villages (Gangadharan et al., 2016). Our results therefore show that only when leaders' gender is known (in the gender revealed treatment), female leaders expect men to behave worse under a female leader and consequently engage in deceptive behavior. These results suggest that female leaders face a smaller economic cost from acting deceptively (or a larger economic cost from acting honestly) relative to male leaders. This appears to be the result of the social environment in which leaders make decisions, and in particular a strategic response to the expectation about how others will behave.

4.2 Role of social norms

Our second possible explanation involves the role of social norms in influencing the behavior of male and female leaders. Social norms dictate behavior that is socially acceptable. To examine the social appropriateness of leaders contributing less than the amount they proposed we use the data from the belief elicitation experiment. As described in section 2.2, this approach uses an incentivized methodology to identify social norms separately from realized behavior.

Since our aim is to understand the behavior of women leaders, we focus on the responses of female participants from Task 3 of the belief elicitation experiment, i.e., what women believe

other women consider to be socially appropriate. Table 6 presents the average female beliefs on the social appropriateness of contributing Rs. 50/100/150 when the leader has proposed Rs. 100. We find that across all villages (Panel A), women believe it is significantly more socially appropriate for female leaders than for male leaders to contribute Rs. 50 to the group account even when they proposed Rs. 100 ($p < 0.01$). This appears to be driven by responses in female-headed villages (Panel B). There is no difference in perception about the social appropriateness of male and female leaders contributing Rs. 100 or Rs. 150 when they proposed Rs. 100 ($p > 0.10$). In female-headed villages, therefore, it seems more socially acceptable for female leaders to deceive relative to male leaders, i.e., the social cost to women leaders from acting deceptively is less than the corresponding cost to men.

4.3 Role model effect

The third possible explanation relates to women as role models. With the introduction of quotas, women have the opportunity to observe females in leadership positions. In particular, women might observe female heads acting deceptively, and this might change their perceptions about the appropriate behavior of female leaders. For this explanation to be valid, women in female-headed villages should expect female leaders to deceive more often compared to male leaders. Using the beliefs elicited in Task 1, we find that in female headed villages, female respondents do not believe that female leaders are more deceptive than male leaders (see Table 7), irrespective of which definition of deception we use. Women as poor role models therefore does not explain deceptive behavior by women leaders in our experiment.

4.4 Discussion

Our analysis supports two explanations for the deceptive behavior by female leaders. First, a female leader's optimal decision in the second stage is to contribute less than what she proposed, as she anticipates that men will contribute less to the group account when they know that the leader is a woman. The potential economic cost of following their own proposal therefore drives women's deceptive behavior. Second, the behavior of female leaders is consistent with women's beliefs about the social appropriateness of contribution decisions made by female leaders. The

social costs of deception are relatively lower for female leaders. Therefore, the high economic cost of not being deceptive as well as the low social cost of being deceptive together are potential explanations for the behavior of female leaders. These two explanations suggest that the social environment in which leaders make decisions influence both the economic and social costs and as a consequence impact the behavior of female leaders.

5 Conclusion

In response to demands to increase the number of women in leadership positions, many countries around the world have introduced specific policies, that often take the form of quotas for women in senior positions in business and governance. However, in many societies this very action changes the social environment in which leaders (men and women) operate. The social environment can therefore serve as a barrier to effective leadership by females. Given this context, this paper examines if women as leaders behave differently and deceive more than men, we then investigate whether the social environment in which leaders make decisions can explain behvaiour. Our experimental results show that relative to men, women are more deceptive as leaders. Using treatment variations in a lab-in-the-field experiment conducted in rural India and a nationwide natural policy experiment that assigns randomly chosen village councils to be female headed, we show that women leaders deviate more from their proposed contribution than men, and that this behavior is a result of the social environment in which leaders interact. In particular, we find evidence that female leaders may face different economic and social costs than their male counterparts which in turn requires a strategic response to these costs. The economic costs of lower deception are greater for female leaders as they (correctly) anticipate that men will cooperate less with them. We also show that the social cost to women leaders from acting deceptively is less than the corresponding cost to men. Taken together, the higher economic and the lower social cost can perhaps explain the higher incidence of deception by women. This suggests that the social environment in which individuals interact has an important influence on behavior.

While gender equality and the greater representation of women in public life results in tangible policy changes, our research suggests barriers to improving development outcomes using quota-based increases in female leadership. This is particularly important when social norms do

not support the appointment of women to positions of authority. If leaders are deceptive due to the social environment they operate in, trust and cooperative relationships might break down, hindering economic development. Greater deception by women may reinforce gender-based discrimination such as male backlash, further threatening women leaders' ability to govern. Consequently, our investigation suggests that behavioral factors can act as major barriers to the empowerment of women.

These results suggest that analysis of the behavior of female and male leaders requires a more nuanced approach. Surveys that elicit opinions of male and female leaders likely ignore the social context in which leaders make decisions. A leader may not be inherently deceptive, but while acting as a leader, through interactions and social pressure they may resort to deceptive behavior. Surveys are likely to measure the former resulting in a biased inference of the true behavior of leaders. Experiments can be a useful and complementary method to test and measure factors that may additionally influence leaders' behavior.

Our findings point to the limits of strong policy measures in changing outcomes for women. If attitudes towards women in leadership positions drive strategic deception by female leaders, then the remedy is perhaps in changing basic gender attitudes instead of mandating female leadership. Research on the formation of pro-women gender attitudes is sparse, especially in the context of attitudes towards female leaders.[24] Our research indicates the need for more investigation into the formation of attitudes towards women in leadership positions, as well as the effectiveness of policies and programs to change those attitudes positively.

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[24]For instance, parents (see Dhar et al., 2015) and schools (see Dhillon, 2017) are beginning to start influencing children's gender attitudes in India. Fernandez et al. (2004) is another example of how changes in attitudes towards female workforce participation in the United States took place as a result of increased women's employment during the Second World War.

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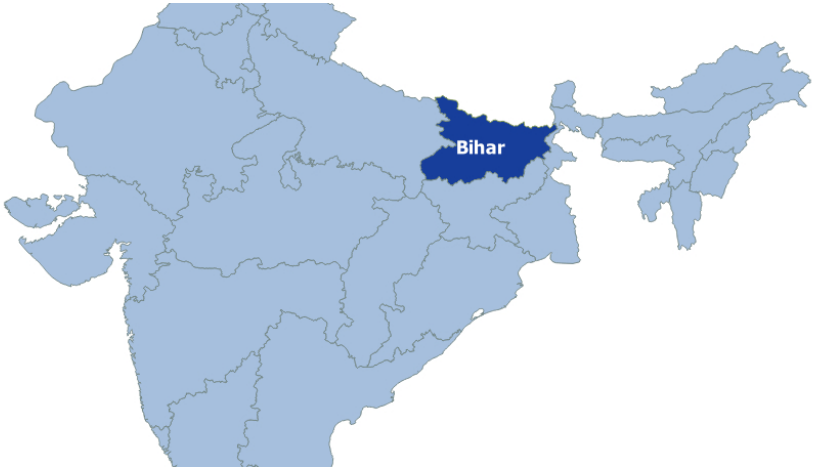
Figure 1: Location of Bihar in India

Panel A: Location of Bihar in India



Panel B: Location of study districts in Bihar

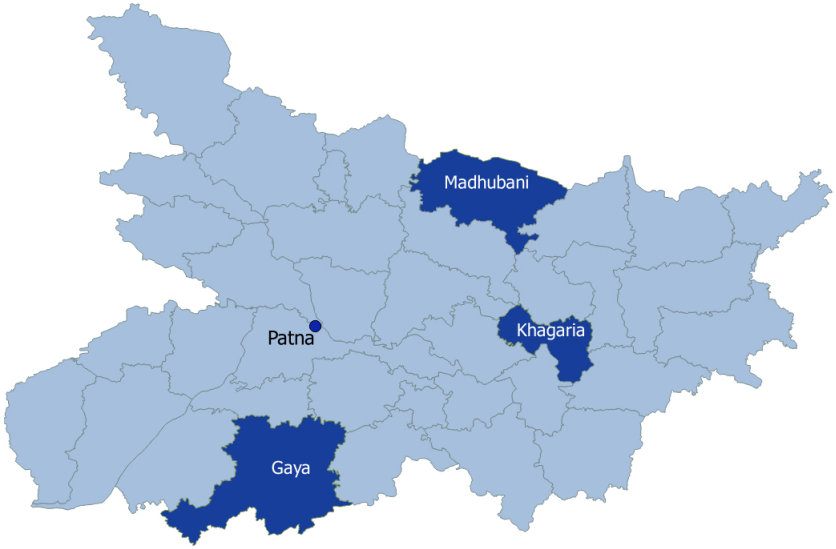
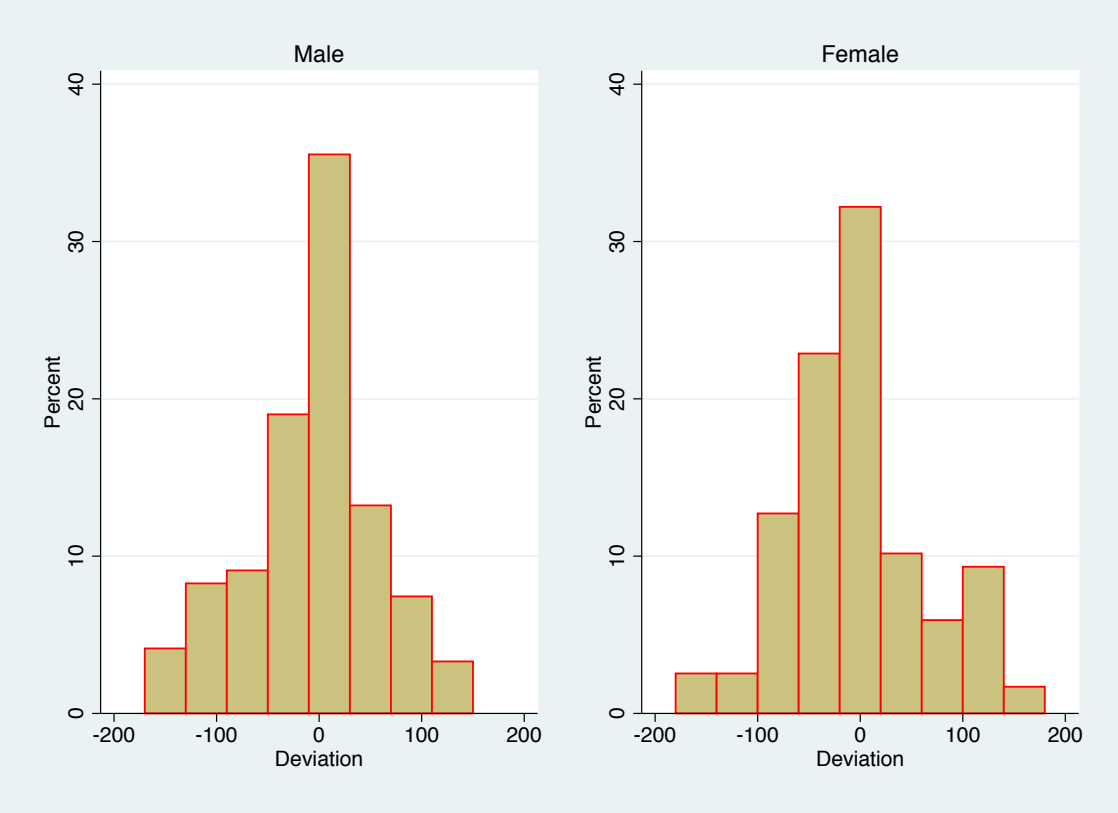


Figure 2: Distribution of Deviation. Male and Female Leaders

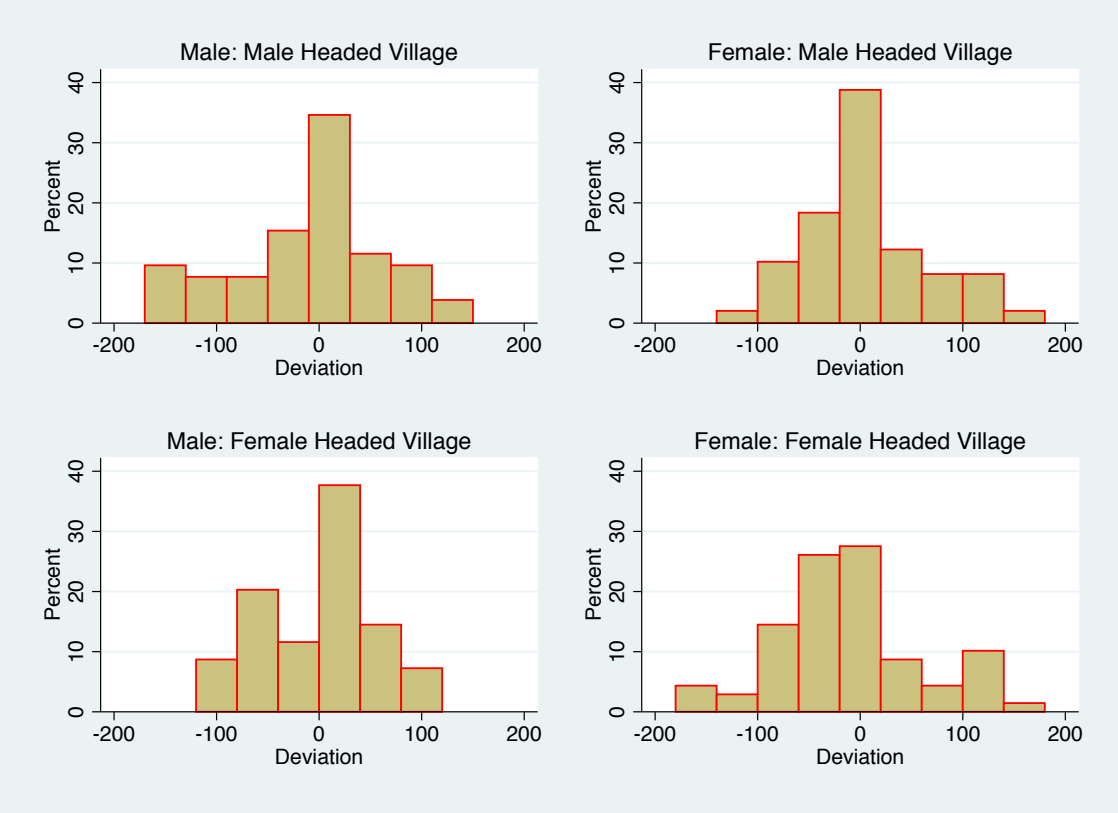


Notes: Deviation defined as the difference between amount proposed by the leader and the actual amount the same leader contributes to the group account in the leadership experiment.

Figure 3: Distribution of Deviation. Male and Female Leaders in Gender Revealed and Gender Not Revealed Treatment Villages

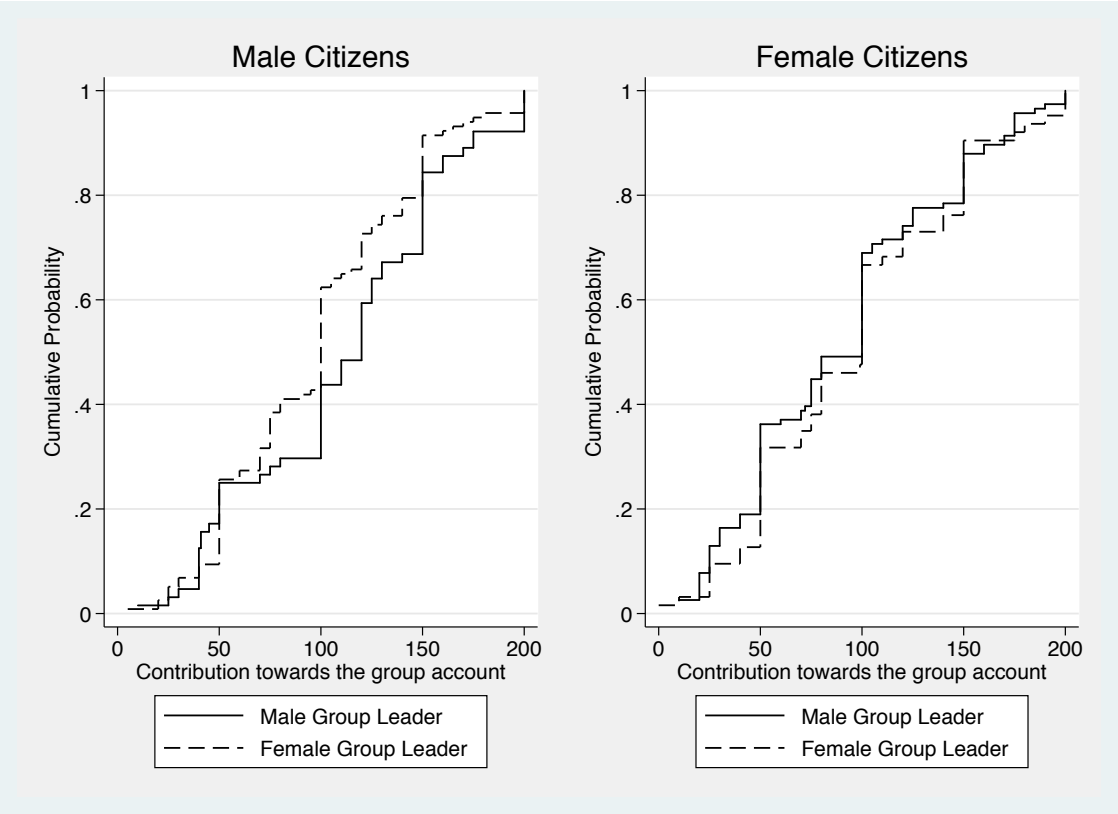
Notes: Deviation defined as the difference between amount proposed by the leader and the actual amount the same leader contributes to the group account in the leadership experiment. In Gender Revealed Treatment Village sessions, the gender of the group leader is revealed to the citizens of the group. In the Gender Not Revealed Treatment Village sessions, the gender of the group leader is not revealed to the citizens of the group.

Figure 4: Distribution of Deviation. Male and Female Leaders in Male and Female headed Villages



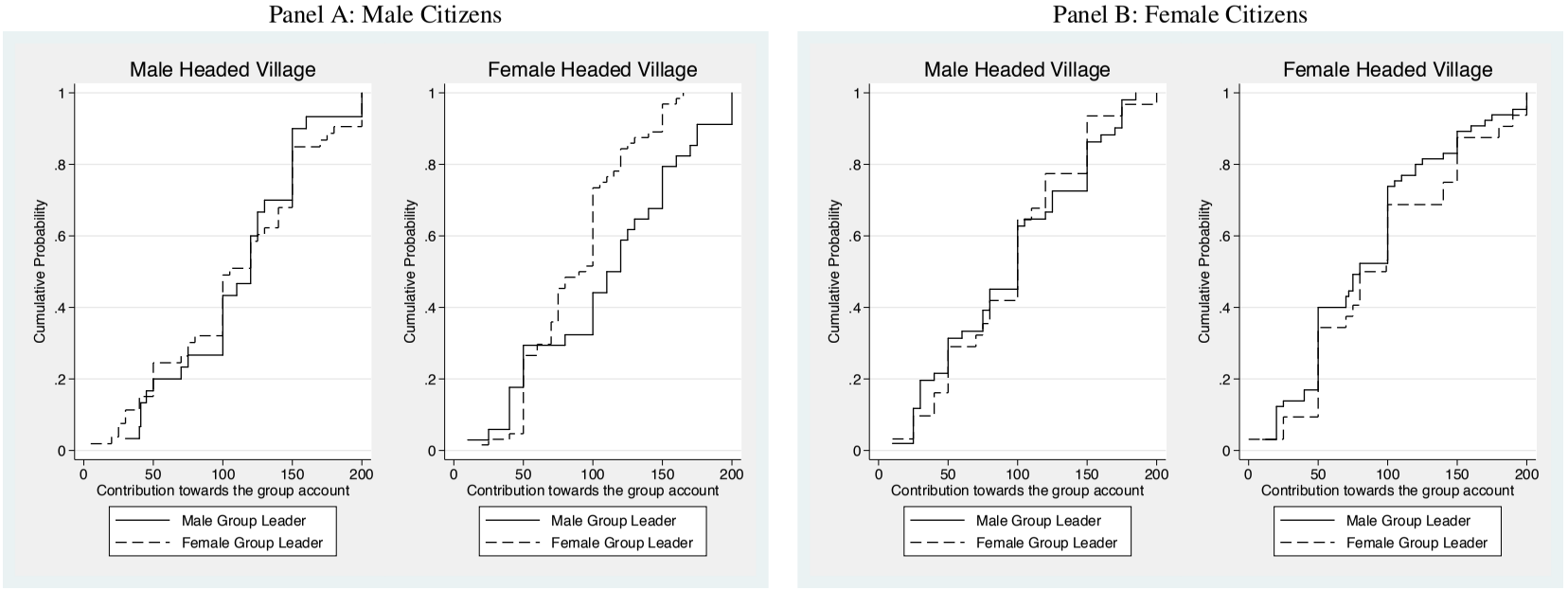
Notes: Deviation defined as the difference between amount proposed by the leader and the actual amount the same leader contributes to the group account in the leadership experiment. Villages with at least one female head in the last three village council elections are categorized as female headed villages. Those that have had no female head are categorized as male headed villages.

Figure 5: CDF of contribution by male and female citizens in male and female led groups



Notes: Sample restricted to treatment (gender revealed) sessions only. For male citizens, the null hypothesis of equality of distribution of contributions to the group account is rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions (p-value = 0.045). For female citizens, the null hypothesis of equality of distribution of contributions to the group account cannot be rejected (p-value = 0.99).

Figure 6: CDF of contribution by male and female citizens in male and female led groups in male and female headed villages



Notes: Sample restricted to treatment (gender revealed) sessions only.
Panel A: The null hypothesis of equality of distribution of contributions to the group account is rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions (p-value = 0.017) in female headed villages. The null hypothesis of equality of distribution of contributions to the group account cannot be rejected (p-value = 0.99) in male headed villages (p-value = 0.999).
Panel B: The null hypothesis of equality of distribution of contributions to the group account can never be rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions (p-value = 0.964 in female headed villages and 0.821 in male headed villages). Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head.

Table 1: Randomization at individual level

	Full Sample	Role in Experiment			Gender of Group Leader		
		Citizen	Leader	Diff.	Revealed	Not Revealed	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No Schooling	0.295	0.300	0.280	0.020	0.309	0.282	0.027
	(0.456)	(0.459)	(0.450)		(0.463)	(0.45)	-0.03
Primary Schooling	0.228	0.226	0.234	-0.008	0.228	0.229	-0.001
	(0.420)	(0.419)	(0.424)		(0.42)	(0.421)	-0.027
Secondary Schooling	0.150	0.149	0.151	-0.001	0.173	0.126	0.047**
	(0.357)	(0.357)	(0.358)		(0.379)	(0.332)	-0.023
Higher Secondary Schooling	0.277	0.281	0.268	0.013	0.246	0.309	-0.062**
	(0.448)	(0.450)	(0.444)		(0.431)	(0.462)	-0.029
Father: No Schooling	0.381	0.378	0.389	-0.011	0.361	0.401	-0.04
	(0.486)	(0.485)	(0.489)		(0.481)	(0.491)	-0.031
Father: Primary Schooling	0.238	0.243	0.222	0.021	0.255	0.221	0.034
	(0.426)	(0.429)	(0.416)		(0.436)	(0.415)	-0.028
Age	27.024	27.122	26.732	0.389	27.303	26.743	0.56
	(10.812)	(10.807)	(10.844)		(10.771)	(10.857)	-0.7
Household Size	7.770	7.862	7.494	0.368	7.263	8.279	-1.016***
	(3.661)	(3.714)	(3.493)		(3.038)	(4.138)	-0.235
Hindu	0.907	0.904	0.916	-0.013	0.887	0.926	-0.039**
	(0.291)	(0.295)	(0.277)		(0.317)	(0.261)	-0.019
General Caste	0.257	0.268	0.223	0.045	0.241	0.273	-0.033
	(0.437)	(0.443)	(0.417)		(0.428)	(0.446)	-0.028
Scheduled Caste	0.240	0.240	0.239	0.001	0.215	0.265	-0.049*
	(0.427)	(0.428)	(0.428)		(0.412)	(0.442)	-0.028
Other Backward Caste	0.425	0.409	0.471	-0.061*	0.448	0.401	0.046
	(0.495)	(0.492)	(0.500)		(0.498)	(0.491)	-0.032
Currently Working	0.387	0.378	0.414	-0.036	0.407	0.368	0.039
	(0.487)	(0.485)	(0.494)		(0.492)	(0.483)	-0.032
No income in past 30 years	0.631	0.634	0.623	0.010	0.603	0.66	-0.057*
	(0.483)	(0.482)	(0.486)		(0.49)	(0.474)	-0.031
F-Test of Joint Significance			1.11			0.42	

Notes: This table shows the *ex post* balance in the characteristics of participants in the experiments. The F-test for joint significance indicates that the samples are balanced overall. $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$.

Table 2: Randomization at village level

	Gender of Village Head			Number of Female Heads				Gender of Group Leader		
	Male	Female	Diff.	0	1	2	K-W Stat.†	Revealed	Not Revealed	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of households	614.13	501.06	113.07	501.05	629.06	580	0.125	580.55	551.6	28.95
Total population	3250	2481.30	769.14	3250	3332.44	3063	0.154	3133.9	2713.2	420.7
Male to female ratio	1.05	1.06	-0.015	1.06	1.04	1.06	0.535	1.06	1.04	0.02
Fraction Scheduled Caste	0.36	0.29	0.07	0.29	0.36	0.34	1.412	0.33	0.32	0.01
Fraction Scheduled Tribe	0.00	0.00	0.00	0.00	0.00	0.00	0.141	0.00	0.00	0.00
Fraction literate	0.44	0.43	0.01	0.43	0.46	0.39	1.642	0.44	0.43	0.01
Fraction male literate	0.50	0.52	-0.02	0.51	0.54	0.48	1.00	0.49	0.55	0.06
Fraction female literate	0.35	0.35	0.00	0.35	0.37	0.30	3.228	0.32	0.38	0.06**
Fraction workers	0.40	0.35	0.05*	0.35	0.40	0.40	3.722	0.38	0.38	0.00
F-Test of Joint Significance		0.99							0.58	

Notes: This table shows the *ex ante* balance in the characteristics of villages chosen for experiments. †: Kruskal-Wallis (K-W) Statistic is distributed as $\chi^2(2)$. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. No female head consists of villages, which have had no female head following the last three village council elections. One female head consists of villages, which have had one female head following the last three village council elections. Two or more female heads consists of villages, which have had two or three female heads following the last three village council elections. The gender revealed (treatment) village is one where the gender of the group leader is revealed to the citizens. The F-test for joint significance indicates that the samples are balanced overall. $^{***}p < 0.01$,** $p < 0.05$,* $p < 0.10$. Data source: Census of India, 2011.

Table 3: Village level balance between leadership and belief elicitation experiment villages

	Pooled			Village Head Gender					
				Female			Male		
	Belief Elicit. Exp.	**Leadership Exp.**	**Diff.**	**Belief Elicit. Exp.**	**Leadership Exp.**	**Diff.**	**Belief Elicit. Exp.**	**Leadership Exp.**	**Diff.**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of Households	836.71	566.07	270.6	919.64	614.13	305.4	702.12	501.05	201.06
Total Population	4405.5	2923.5	1482	4749.2	3250.4	1498.79	3847.12	2481.29	1365.83
Male to female ratio	1.06	1.05	0.006	1.07	1.04	0.02	1.04	1.06	0.02
Fraction Scheduled Caste	0.248	0.328	0.08	0.261	0.356	0.095	0.226	0.29	0.064
Fraction literates	0.481	0.435	0.046*	0.472	0.438	0.035	0.497	0.431	0.066
Fraction male literates	0.566	0.517	0.049	0.553	0.523	0.029	0.588	0.509	0.079
Fraction female literates	0.392	0.349	0.043	0.385	0.349	0.036	0.403	0.349	0.054
Fraction workers	0.365	0.38	0.01	0.372	0.404	0.031	0.353	0.347	0.006
F-Test of Joint Significance		0.93			0.54			1.49	

Notes: This table shows the *ex ante* balance in the characteristics of villages chosen for the different sets of experiments. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. Data source: Census of India, 2011. The F-test for joint significance indicates that the samples are balanced overall. $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$.

Table 4: Amount proposed and deception by leaders

		Female (1)	Male (2)	Difference (3)
Panel A: Proposed contribution to the group account				
1.	All	111.70	118.74	-7.03
2.	Female-headed village	116.25	117.86	-1.61
3.	Male-headed village	105.31	119.90	-14.60
4.	Gender Revealed	108.41	117.62	-9.22
5.	Gender not revealed	115.00	119.87	-4.87
6.	Gender Revealed, Female-headed village	109.41	114.55	-5.14
7.	Gender Revealed, Male-headed village	107.22	121.25	-14.03
Panel B: Deception				
8.	All	0.57	0.43	0.14**
9.	Female-headed village	0.61	0.41	0.20**
10.	Male-headed village	0.51	0.45	0.06
11.	Gender Revealed	0.58	0.41	0.17*
12.	Gender not revealed	0.56	0.44	0.12
13.	Gender Revealed, Female-headed village	0.59	0.39	0.20
14.	Gender Revealed, Male-headed village	0.55	0.43	0.13
Panel C: Percent deviation				
15.	All	-21.75	-18.16	-3.58
16.	Female-headed village	-26.00	-16.61	-9.39**
17.	Male-headed village	-19.80	-18.71	-1.09
18.	Gender Revealed	-21.76	-19.35	-2.42
19.	Gender not revealed	-22.57	-18.49	-4.08
20.	Gender Revealed, Female-headed village	-25.24	-16.74	-8.50
21.	Gender Revealed, Male-headed village	-17.64	-22.41	4.77

Notes: In Panel A, columns 1 and 2 show the average proposal by female and male leaders, respectively. Column 3 shows the difference in means (3 = 1 − 2) using a t-test. In Panel B, columns 1 and 2, show the average likelihood of the leader contributing less than what she/he proposed (deception). Column 3 shows the difference in means in deception by female and male leaders (3 = 1 − 2). In Panel C columns 1 and 2 show the average difference between actual and proposed contributions by female and male leaders if the leaders choose to deceive. Column 3 presents the corresponding difference in means in this magnitude of deception (3 = 1 − 2). Statistical significance computed using a two-sided t-test. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. The gender revealed (treatment) village is one where the gender of the group leader is revealed to the citizens. Significance: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$.

Table 5: Deceptive behavior by leaders.

	Deception (D_{jk}) (1)	**Strong Deception** ($\tilde{D}_{jk}$) (2)	**Percent Deviation** (3)
Panel A: All Villages			
Female Leader – Male Leader	0.200**	0.183**	-18.277**
	(0.085)	(0.087)	(8.616)
Female Leader – Male Leader	0.163	0.156	-17.341
(Gender not revealed)	(0.094)	(0.106)	(10.212)
Female Leader – Male Leader	0.235**	0.209*	-19.18*
(Gender revealed)	(0.109)	(0.109)	(10.79)
Female Leader: Gender revealed – Gender not revealed	0.072	0.053	-1.841
	(0.116)	(0.130)	(12.059)
Panel B: Gender of village head and group leader behavior			
Female Leader – Male Leader	0.129	0.107	-5.116
(Male headed village)	(0.133)	(0.141)	(13.514)
Female Leader – Male Leader	0.251***	0.238***	-27.15***
(Female headed village)	(0.080)	(0.080)	(7.788)
Female Leader: Female headed v Male headed village	0.122	0.131	-10.79
	(0.132)	(0.141)	(15.45)
Panel C: Intensity of exposure to female village head and group leader behavior			
Female Leader – Male Leader	0.099	0.076	1.705
(0 Female head)	(0.140)	(0.147)	(12.895)
Female Leader – Male Leader	0.261**	0.237*	-20.31**
(1 Female head)	(0.124)	(0.124)	(10.30)
Female Leader – Male Leader	0.327**	0.334**	-31.19**
(2 or more Female heads)	(0.149)	(0.148)	(13.83)
Panel D: Gender of village head in Gender Revealed Treatment Village			
Female Leader – Male Leader	0.250	0.274	-15.859
(Male headed village)	(0.196)	(0.198)	(19.158)
Female Leader – Male Leader	0.292**	0.261*	-29.27**
(Female headed village)	(0.127)	(0.133)	(11.75)
Female Leader: Female headed v Male headed village	0.0421	-0.0136	-3.183
	(0.207)	(0.220)	(15.45)
Sample Size[‡]	238	238	238

Notes: Difference estimates from OLS (Linear Probability) regression presented in columns 1 and 2 and estimates from Tobit regressions presented in column 3. All regressions include dummies for gender of the leader, set of individual and household characteristics (age, own educational attainment, father's educational attainment, current work status, income earned in the last month, caste and religion, household size), amount proposed by the leader and for village fixed effects. Regressions in Panel B also include the interaction of the gender of the group leader and the gender of the village head. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. Regressions in Panel C include the interaction of the number of female village heads following the last 3 elections. Sample restricted to group leaders. [‡]: In Panel D, sample restricted to gender revealed treatment villages. Standard errors clustered at the session (village) level in parenthesis. Significance: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$.

Table 6: Female beliefs on social appropriateness of contributions of male and female leaders when leader proposed Rs. 100

Contribute	Female Leader (1)	Male Leader (2)	Difference (3)
Panel A: All villages			
50	1.85	1.61	0.23***
100	3.62	3.58	0.04
150	3.34	3.31	0.03
Panel B: Female headed villages			
50	1.84	1.56	0.28***
100	3.58	3.53	0.05
150	3.26	3.21	0.05
Panel C: Male headed villages			
50	1.86	1.70	0.16
100	3.68	3.67	0.01
150	3.45	3.47	-0.02

Notes: The cell values denote the average social appropriateness score based on female beliefs (Task 3). The sample is restricted to female participants. A higher score denotes that females believe other females consider that a particular contribution decision is more socially appropriate. Sample in Panel A is taken from all villages, Panel B is from female-headed villages and that in Panel C is from male-headed villages. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. Statistical significance of difference in means presented in column 4 computed using a Wilcoxon sign rank test. Significance: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$. Sample Sizes: 86 in Panel A and 51 in Panel B.

Table 7: Beliefs about deceptive behavior by male and female leaders (Female respondents in female headed villages)

	Average belief (1)	**Difference**† (2)	**p-value**‡ (3)
Deviation from Proposal			
Female leader	-8.55		
Male leader	-7.88	-0.66	0.58
Percent Deviation			
Female leader	-14.99		
Male leader	-15.07	0.08	0.42
Deception			
Female leader	0.53		
Male leader	0.45	-.08	0.27

Notes: † denotes difference between female leaders and male leaders. ‡ denotes p-values using a Signed-rank test. Sample restricted to female headed villages and female respondents.

Table A1: Deceptive behavior by leaders

	Deception (D_{jk}) (1)	**Strong Deception** ($\tilde{D}_{jk}$) (2)	**Percent Deviation** (3)
Panel A: All Villages			
Female Leader – Male Leader	0.203**	0.188**	-18.325**
	(0.085)	(0.088)	(8.804)
Female Leader – Male Leader	0.174*	0.148	-16.25
(Gender not revealed)	(0.099)	(0.111)	(10.883)
Female Leader – Male Leader	0.231*	0.226*	-28.48*
(Gender revealed)	(0.115)	(0.113)	(-11.385)
Panel B: Gender of village head and group leader behavior			
Female Leader – Male Leader	0.146	0.152	-8.703
(Male headed village)	(0.1321	(0.144)	(11.855)
Female Leader – Male Leader	0.264***	0.2512***	-27.700***
(Female headed village)	(0.080)	(0.081)	(7.775)
Panel C: Intensity of exposure to female village head and group leader behavior			
Female Leader – Male Leader	-0.053	-0.027	9.810
(0 Female head)	(0.150)	(0.154)	(15.638)
Female Leader – Male Leader	0.281***	0.262**	-31.101***
(1 Female head)	(0.099)	(0.104)	(9.195)
Female Leader – Male Leader	0.227*	0.235**	-21.291*
(2 or more Female heads)	(0.119)	(0.115)	(12.875)
Panel D: Gender of village head in Gender Revealed Treatment Village			
Female Leader – Male Leader	0.101	0.046	-10.26
(Male headed village)	(0.222)	(0.234)	(23.62)
Female Leader – Male Leader	0.319***	0.287**	-30.06***
(Female headed village)	(0.119)	(0.125)	(11.09)
Sample Size	238	238	238

Notes: Difference estimates from OLS (Linear Probability) regression presented in columns 1 and 2 and estimates from Tobit regressions presented in column 3. All regressions include dummies for gender of the leader, a treatment dummy on treatment, set of individual and household characteristics (age, own educational attainment, father's educational attainment, current work status, income earned in the last month, caste and religion, household size), proportion allocated to the risky investment option in the risk game, dummy for patient, amount proposed by the leader and for village fixed effects. Regressions in Panel B also include the interaction of the gender of the group leader and the gender of the village head. Gender of village head is female if the village has had at least one female head following the last three village council elections. Gender of village head is male if the village has never been exposed to a female head. Regressions in Panel C include the interaction of the number of female village heads following the last 3 elections. Sample restricted to group leaders. Standard errors clustered at the session (village) level in parenthesis. Significance: $^{***}p < 0.01$,** $p < 0.05$,* $p < 0.10$.

Figure A1: Distribution of Amount Proposed. Male and Female Leaders

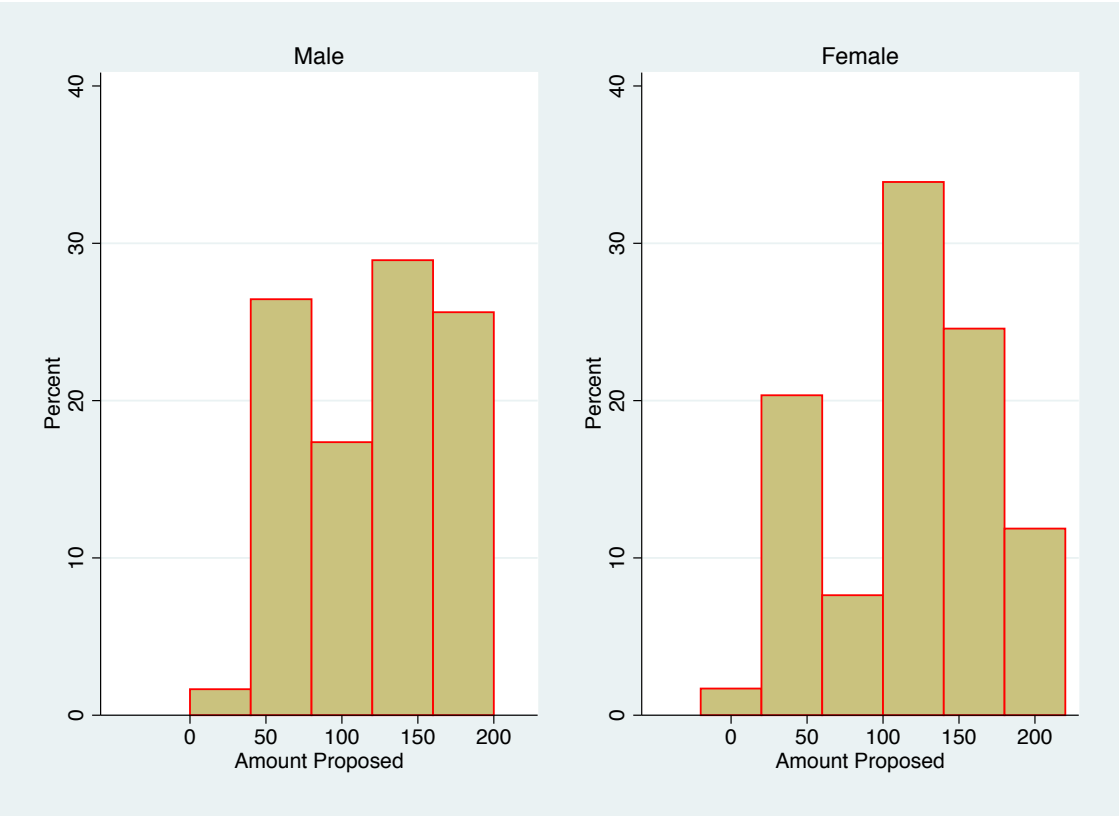
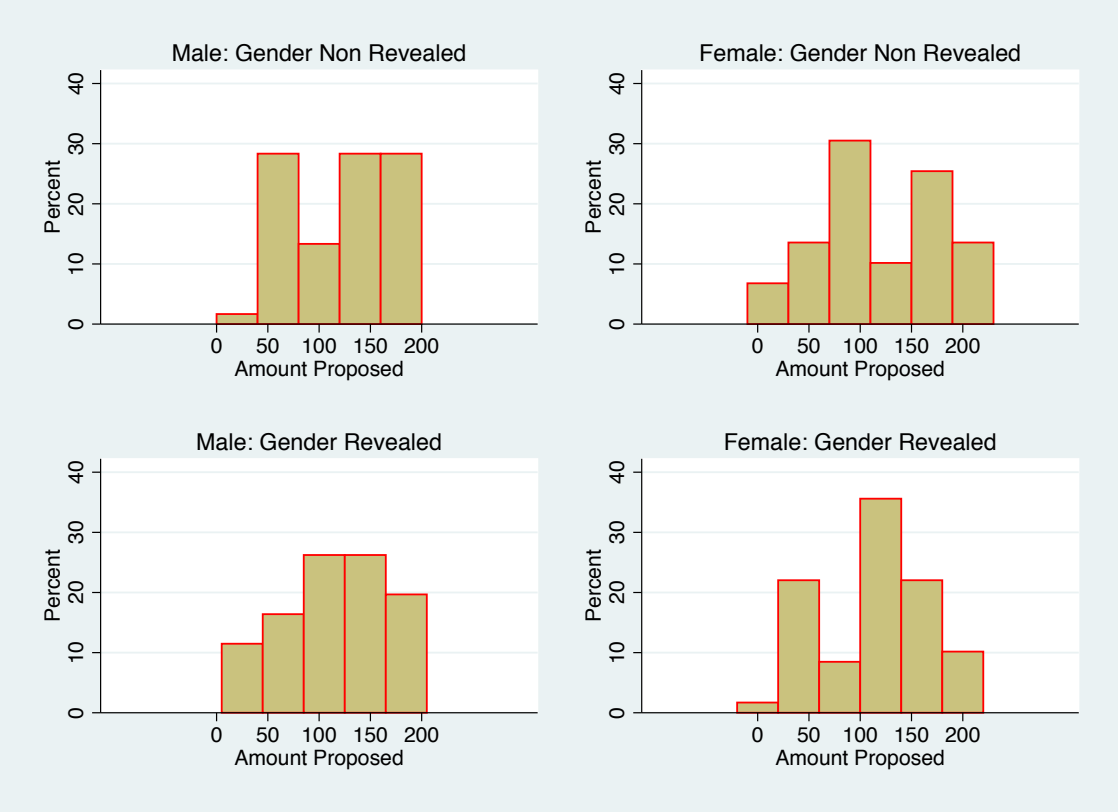
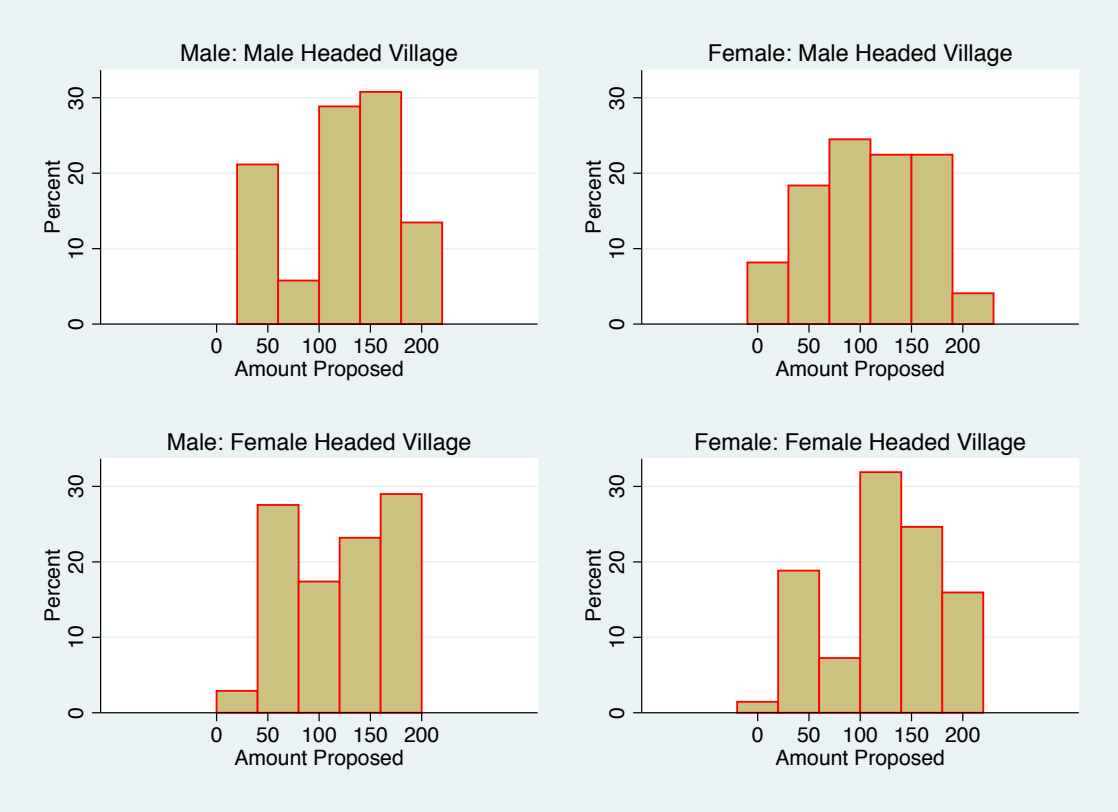


Figure A2: Distribution of Amount Proposed. Male and Female Leaders in Gender Revealed and Gender Not Revealed Treatment Villages



Notes: In Gender Revealed Treatment Village sessions, the gender of the group leader is revealed to the citizens of the group. In the Gender Not Revealed Treatment Village sessions, the gender of the group leader is not revealed to the citizens of the group.

Figure A3: Distribution of Amount Proposed. Male and Female Leaders in Male and Female headed Villages



Notes: Villages with at least one female head in the last three village council elections are categorized as female headed villages. Those that have had no female head are categorized as male headed villages.

Figure A4: Distribution of Amount Contributed to the Group Account. Male and Female Leaders

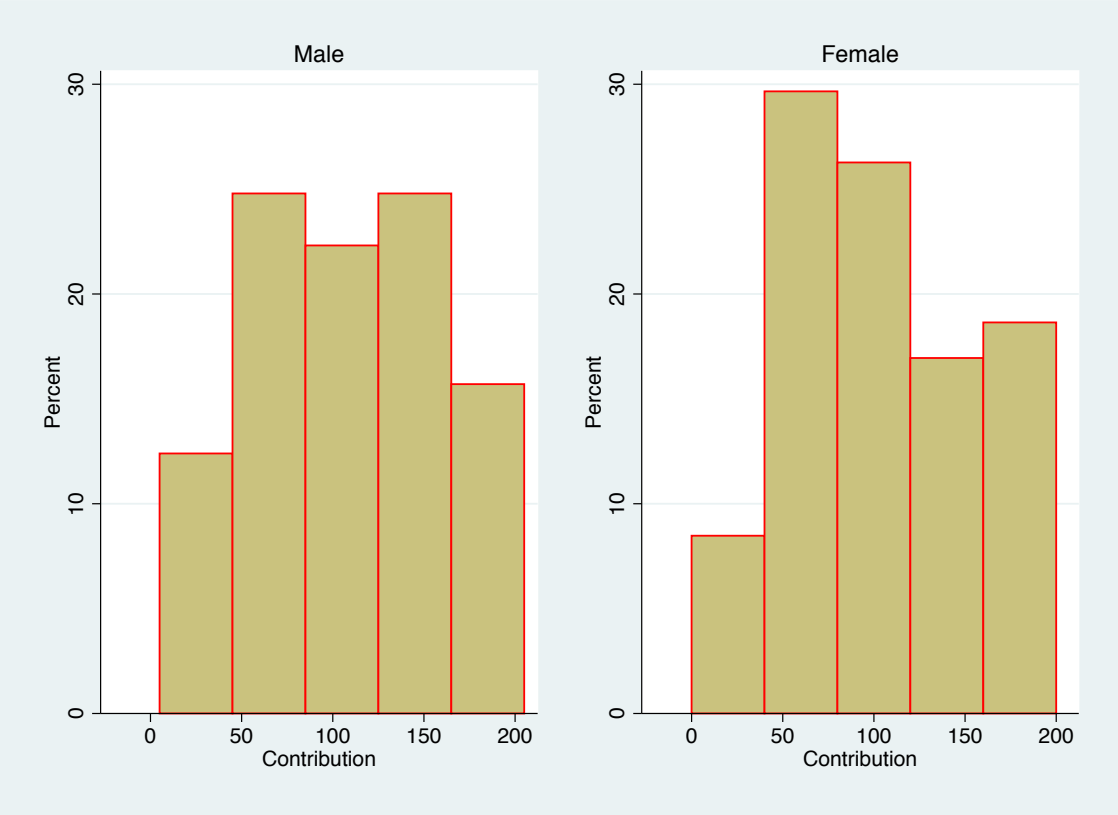
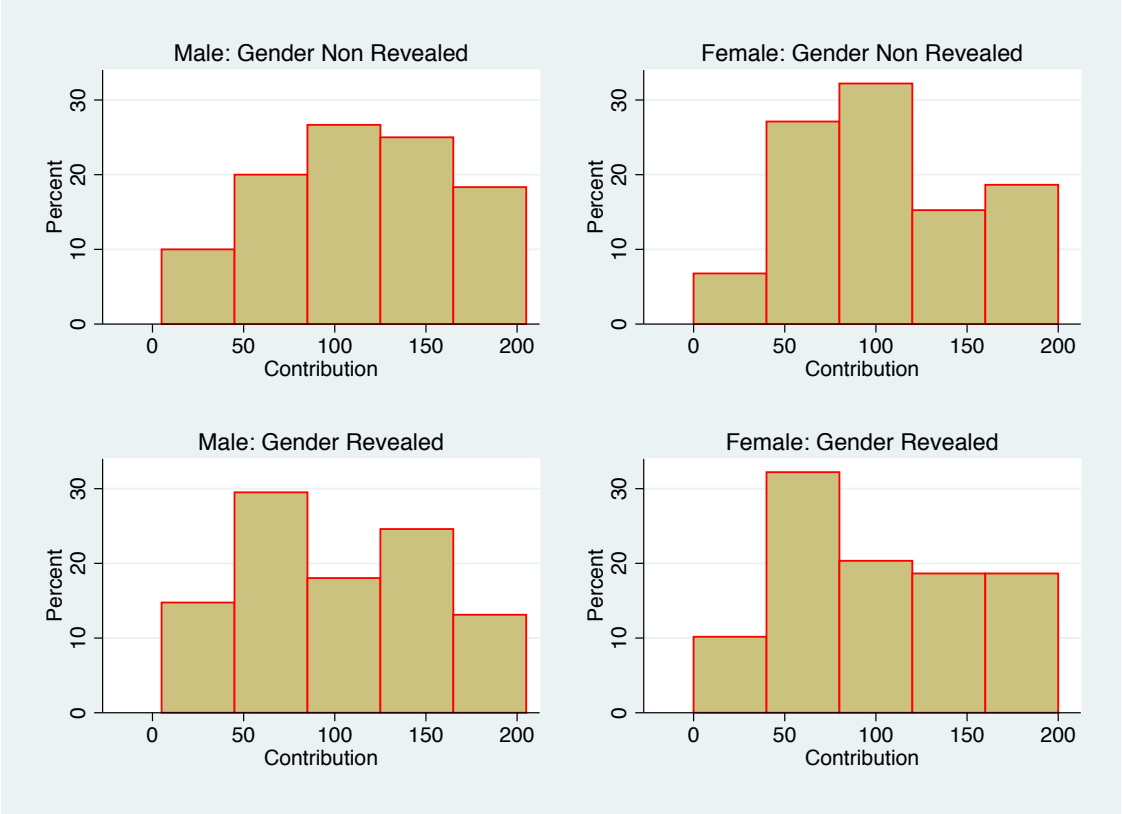
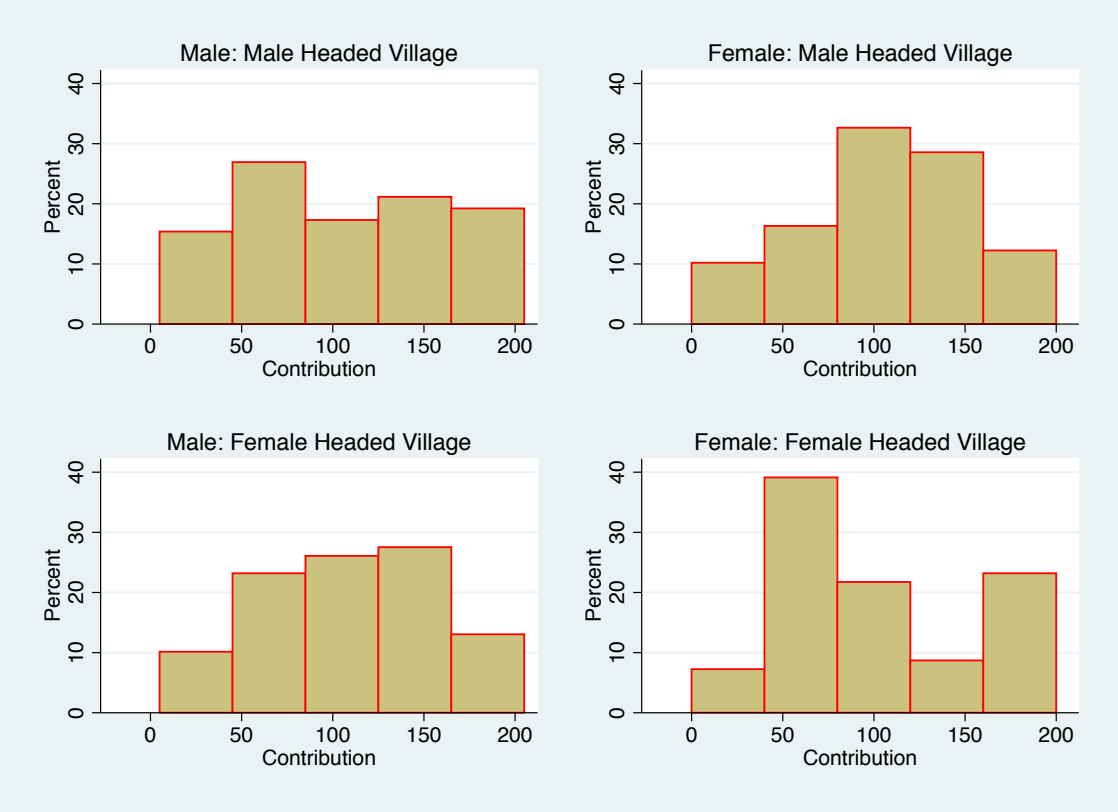


Figure A5: Distribution of Amount Contributed to the Group Account. Male and Female Leaders in Gender Revealed and Gender Not Revealed Treatment Villages



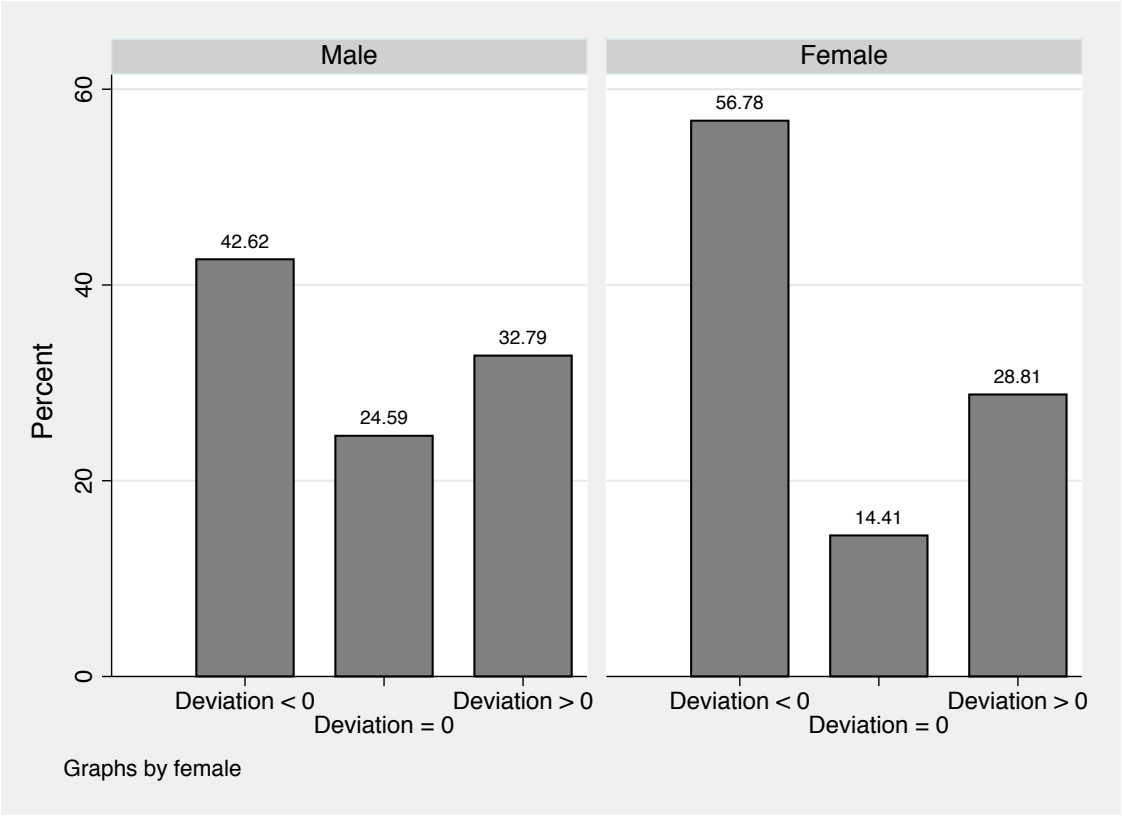
Notes: In Gender Revealed Treatment Village sessions, the gender of the group leader is revealed to the citizens of the group. In the Gender Not Revealed Treatment Village sessions, the gender of the group leader is not revealed to the citizens of the group.

Figure A6: Distribution of Amount Contributed to the Group Account. Male and Female Leaders in Male and Female headed Villages



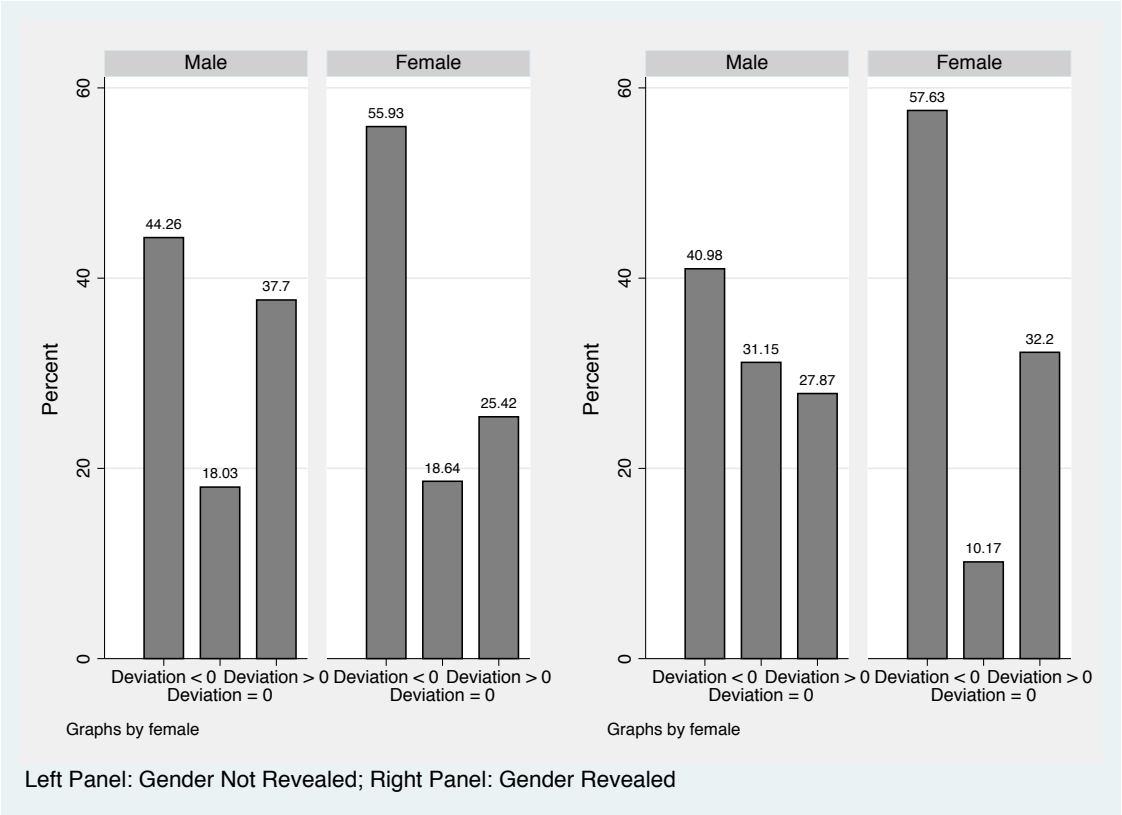
Notes: Villages with at least one female head in the last three village council elections are categorized as female headed villages. Those that have had no female head are categorized as male headed villages.

Figure A7: Contribution relative to Proposal. All Villages



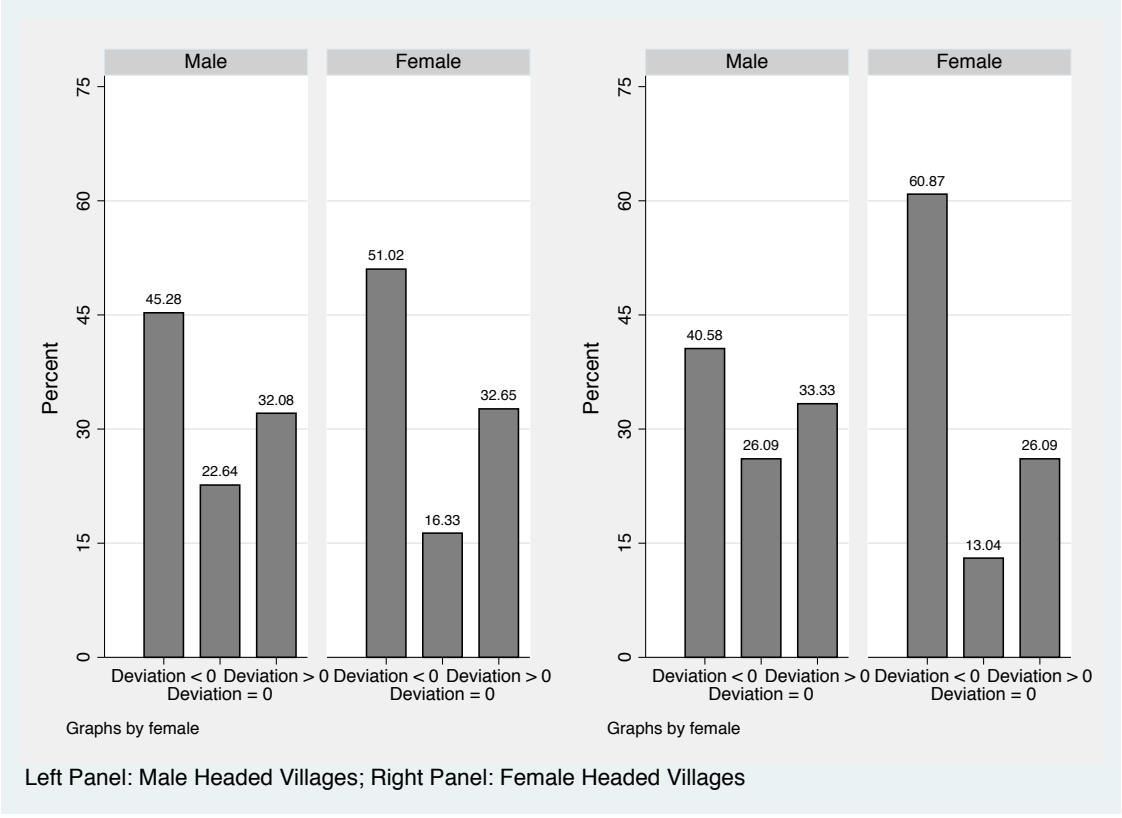
Notes: Sample includes all sample villages. Deviation defined as Contribution – Amount Proposed.

Figure A8: Contribution relative to Proposal. Gender Not Revealed and Gender Revealed Villages



Notes: Sample includes all sample villages. Gender Revealed Villages are those where the gender of the group leader was revealed to the respective citizens. Deviation defined as Contribution – Amount Proposed.

Figure A9: Contribution relative to Proposal. Male and Female Headed Villages



Notes: Sample includes all sample villages. Female Headed Villages are those that have had at least one female head (as a result of the reservation policy) in the last 3 elections. Deviation defined as Contribution – Amount Proposed.