The fairer sex? Women leaders, strategic deception and affirmative action*

Lata Gangadharan† Monash University
Tarun Jain‡ Indian School of Business
Pushkar Maitra§ Monash University
Joseph Vecci¶ University of Gothenburg

January 26, 2017

Abstract

Do women as leaders behave differently from men? Using field experiments conducted in rural India, we find that women participants assigned as leaders are more deceptive compared to men. The rate of deception is greater in treatments where the gender of the leader is revealed to the group and in villages with a past female village head as a result of an affirmative action policy designed to increase female political leadership. Greater deception can be explained by female leaders correctly anticipating different economic and social costs for their actions as compared to male leaders. Our findings suggest significant behavioral challenges to the effectiveness of women as leaders.

JEL Codes: O12, O53, C93, J16.

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

*Funding provided by IGC-Bihar, Monash University, the Indian School of Business and the Australian Research Council (Grant number DP1411900). Vecci acknowledges support from the Australian Government's Endeavour Research Fellowship. Manvendra Singh and Priyanka Sarda provided outstanding management of the research project. We thank Aishwarya Turlapati, Ankita Kumari, Aprajita Choudhary, Divya Bhagia, Mrityunjay Pandey, Narasimha Banavath, Ranjeet Kumar, Surbhi Kumari, Tapojay Pandey, Upasana Pattanayak and Vijaya Shalley for excellent research assistance, Chinmaya Kumar for support in Patna and Markus Schaffner for his assistance with programming using CORAL. We would like to thank seminar and conference participants at Monash University and the European ESA for their comments and suggestions. IRB clearance obtained from the Indian School of Business and Monash University.

†lata.gangadharan@monash.edu
‡tarun_jain@isb.edu
§pushkar.maitra@monash.edu
¶joseph.vecci@gu.se

1 Introduction

While the second half of the 20^{th} century has witnessed large gains for women as leaders in government, firms and academia, women are still far from achieving parity with men in leadership positions, constituting 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). 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). It is argued that 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).

More women in leadership positions is 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 more altruistic and cooperative, so women who hold public positions and leadership roles will also exhibit these traits, leading to improved outcomes.

Recent evidence from developing countries however finds mixed evidence on gender differences in attitudes towards corruption as well as actual levels of corruption by female representatives (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), and instead may behave as opportunistically as men when reneging on contracts (Alatas et al., 2009, 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 in the course of their duties is justified.

These studies suggest that gender might not be systematically related to the quality of governance and corruption. As such the examination of gender differences requires a more nauseated anal-

ysis. It is unclear whether this behaviour is a result of systematic differences in preferences across genders or based on differences in the social environment such as individuals' social interactions or experience with other leaders. While a number of studies offer evidence of systematic behavioural 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 and institutions (Gneezy et al., 2009, Croson and Gneezy, 2009, Andersen et al., 2013).

This paper has three main objectives. First, we examine whether women are more deceptive compared to men in leadership positions. While deception is one of many potential behavioral differences between male and female leaders, we focus on this variable since deceptive behavior can rupture trust and cooperative relationships, while encouraging fraud and corruption, that can potentially decrease social and economic welfare in the long run.

Our second objective is to investigate explanations for deceptive behaviour, comparing whether observed gender differences are influenced by the prevalent social environment and in particular, differences in economic costs and social costs faced by women, or represent systematic differences between men and women.

Third, we examine what happens when women become leaders as the result of affirmative action policies, which is important from the perspective of policy. The primary policy response to the under-representation of women as leaders is to introduce quotas mandating women in positions of authority. Evidence (from France, Spain, Norway and India) suggests that quotas increase female representation, this may directly alter the structure of the social environment and have direct behavioural consequences on the behaviour of female leaders. First, female leaders may observe how other female leaders behave and thus use these leaders as role models. Second, female leaders may observe how others especially men, behave *towards* female leaders. Insofar that women leaders may exhibit a strategic response to the altered environment. In this paper we examine both these factors to improve our understanding of how affirmative action policies influence the behaviour of leaders.

We address these questions using a lab-in-the-field experiment conducted in rural India. 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. Examples of such public goods could include building a community well, setting up an irrigation system or building a primary school.[1] However, before the group members decide their contributions, the leader makes a non-binding proposal how much everyone, including the leader, should contribute to the group account. All contributions are made simultaneously. The difference between the leader's proposal and their own contribution is defined as deception. Examining sub-samples of groups with women and men assigned as leaders allows examination of gender differences in deception.

To examine whether quotas for women in leadership positions affect the behavior of male and female leaders, we exploit a policy experiment in India where the position of the elected village head is randomly reserved for women based on a quota.[2] This design allows us to examine deception in a social environment when women's leadership is imposed by affirmative action rather than an open election that could include men.

To explain gender differences in deception we focus on the impact of the surrounding social environment. A leader may not be inherently deceptive, but while acting as a leader, through interactions and social pressure in the social environment where they make decisions, they may resort to deceptive behaviour. We use two separate methods to isolate the impact of the social environment on behaviour. First, we attempt to understand whether the environment in which leaders make decisions changes the economic costs of acting deceptively. In the experiment the leader's gender is revealed to other group members in half the sessions chosen at random, with gender not revealed in the remaining sessions. Comparing leader behavior across treatments reveals whether gender differences can be attributed to social interaction between leaders and citizens, or due to systematic differences between men and women. If female leaders strategically anticipate citizen response, then deception should be observed only in the gender revealed sessions. Conversely, if deception represents more systematic differences between men and women, then gender differences in deception should persist regardless of whether gender is revealed. Second, to examine whether the surrounding social environment influences the

[1] Half the groups randomly have female leaders and the other half have female leaders

[2] Researchers find 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., 2016a, Iyer et al., 2012).

social costs of acting deceptively, we conduct a second lab-in-field experiment in 21 villages that are similar to the original 40 villages that elicits beliefs and social norms associated with contributions by male and female leaders in the first experiment.

Our main finding is that women are significantly more deceptive leaders, deceiving in 57% of cases as opposed to 43% for men. However, the evidence suggests that deceptive behaviour is a result of the social environment in which leaders make decisions since female leaders are significantly more likely to engage in deception when their gender is revealed. The absence of observed differences in deception when the leader's gender is not revealed suggests that deception is not driven by systematic differences between men and women. We provide two possible explanations for this behavior. First female leaders expect that men will cooperate less with women, thus imposing higher economic costs on women for being truthful. Second, we find that the social costs of deceptive behavior is lower for female leaders. Our results therefore suggest that the social environment through changes in the economic and social cost create an incentive for females to deceive. Finally, we find that female leaders are significantly more likely to deceive in villages where headship was reserved for women due to affirmative action policies, with no difference in deception by gender in male-headed villages. The extent of deception is unchanged with increase in the intensity of exposure to female village leaders.

This paper offers several unique contributions to the literature. First, this is the first study to examine deception between male and female leaders using an incentivised experiment. In studies relying on observational data, differences in actions by men and women could be driven by differences in experience, preferences or constraints faced in policy making, rather than gender as such. By randomly assigning leadership to different experimental participants, we can isolate and identify the actions of the leader without confounding selection issues. Further, survey participants are unlikely to truly reveal their attitudes towards deception or actual deceptive behavior whereas the experimental approach that we use in this paper allows us to examine deception and its interaction with gender, leadership and affirmative action.[3] Second, the literature examining gender differences in leaders'

[3]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 males and

behavior focuses on identifying whether differences exist and 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 and social pressure they may resort to deceptive behaviour. We use a novel experiment to parse apart whether gender differences arise due to social factors or are due to more systematic factors. Third, despite the growing use of affirmative action policies, little is known about how such a shock to the social environment will impact the behaviour of leaders *not* in place due to the policy. The policy may influence the behaviour of other female leaders (outsiders to the policy) either by providing a role model to emulate or showing how others especially men, behave towards female leaders.

2 Experimental Design

We designed two experiments: the first is a *leadership experiment* and the second a *belief elicitation experiment* conducted with 1223 residents in 61 villages in Bihar, India.

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

females 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 leaders as participants. We are also able to circumvent scrutiny bias or experimenter demand effect compared to a situation in which elected politicians make decisions.

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.[4] On average participants earned Rs. 420, which is approximately two days wage for a semi-skilled laborer.[5] 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.[6]

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.[7] In all 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 there-

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

[5]The experimental instructions were read out in Hindi; the Appendix presents the English version. 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.

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

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

fore 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.[8]

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.

In the post-experiment survey, we collected data on risk and time preference from participants. 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 probability 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.[9]

2.2 Belief elicitation experiment

We measure the extent to which decisions were socially acceptable by conducting a second field experiment involving a coordination game and a belief elicitation task. We used an incentivized

[8]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.

[9]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 ($p < 0.10$).

experimental methodology (Krupka and Weber, 2013, Gangadharan et al., 2016a) to identify whether participants consider decisions in the original leadership experiment as socially appropriate. The belief elicitation experiment was conducted in 21 villages that were different but located in the same sub-districts as the original 40 villages where the leadership experiment was conducted. The belief elicitation experiment was conducted approximately seven months after the leadership experiment and collected data from 267 participants. Approximately half the participants were women. The recruiting procedure was identical to that used for 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 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.[10] Task 2 can

[10]In addition to the 21 villages where we conducted the belief elicitation experiment, we randomly selected one village

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) differs from the other three tasks by eliciting 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 (the Belief Elicitation Instructions in the Appendix report the list of the questions asked). 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.[11]

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.

Our study was conducted in the districts of Gaya, Khagaria and Madhubani, 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. These districts are similar in terms of socio-

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.

[11] Some data from these experimental sessions are also used in Gangadharan et al. (2016a) and Gangadharan et al. (2016b), with the purpose of examining different research questions. Gangadharan et al. (2016a) explore male backlash towards female leaders and are silent on the behaviour of leaders *per se*, which is the main focus of this paper. The goal of Gangadharan et al. (2016b) is to use a trust task to examine trust and trustworthiness amongst this population in the context of a community led development program.

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.

Each village within Bihar (and 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.[12]

Through the 73^{rd} constitutional amendment enacted in 1992, the Indian government legislated that at least one third of councillor positions including the position of the village head must be reserved for women in each village council election. 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 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 serial numbers in each individual list is reserved for women (as mentioned above this changed to one half after 2004 in Bihar). Serial numbers are randomly reassigned prior to every election. 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

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

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 model) 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, from an average household size of 7.7 and 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. Column 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?

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 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 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 100 × (Amount contributed to the group account – Amount proposed)/Amount proposed. If the leader's actual contribution to the group account is greater than his/her proposed contribution, percent deviation is coded as zero.

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). Panel B of Table 4 shows that women are significantly more deceptive leaders: deceiving in 57% of cases as opposed to 43% for men ($p - value = 0.028$). 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 ($p - value = 0.069$). This indicates that female leaders may be acting opportunistically and strategically contributing less than male leaders.

To understand the behavior of female leaders more precisely, we analyze group leader deception in 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 the results from OLS estimates of equation (1). On average, female leaders are 20 percentage points more likely to deceive compared to male leaders ($p - value = 0.02$) and 18 percentage points more likely to deceive strongly ($p - value = 0.04$). In terms of magnitude of deception, female leaders contribute 18 percent less than proposed ($p - value = 0.04$).[13]

These results therefore show that as leaders females are more deceptive than males. This result holds even after controlling for a range of household charasteristics 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 relative to males. Alternatively, female

[13] As mentioned before, male leaders are more likely to be present biased and 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).

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. Evidence that female leaders expect negative male behavior is obtained by exploiting the difference between the treatments: deception by female leaders in the gender revealed versus gender not revealed sessions. As Table 4 shows, the likelihood of deception by female leaders is statistically significantly higher in the gender revealed sessions ($p - value = 0.06$) but not in the gender not-revealed sessions ($p - value = 0.20$).

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.

$$D_{jk} = \alpha_0 + \alpha_1 L^f_{jk} + \alpha_2 T_k + \alpha_3 (L^f_{jk} \times T_k) + \gamma \mathbf{Z}_{jk} + \eta_k + \varepsilon_{jk} \tag{2}$$

Here, $T_k = 1$ if the village is a gender revealed village, and 0 otherwise. In this equation, α_1 denotes the additional deception by female leaders (compared to that by male leaders) in a gender not revealed village while $\alpha_1 + \alpha_3$ denotes the additional deception by female leaders in a gender revealed village. The results presented in the last two rows of Panel A of Table 5 show that, consistent with our hypothesis, female group leaders are significantly more likely to deceive than male leaders in gender revealed villages but not in the gender not revealed villages. This suggests that the expected behaviour of others influences the economic cost of acting deceptively. The environment and social interactions in which leaders make decisions is a vital component influencing the behaviour 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 males and females in leadership positions and the introduction of the affirmative action policy can affect the social environment in which leaders interact. 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 ($p = 0.02$). 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 ($p = 0.57$). In Panel C we also find that the magnitude of deception by female group leaders is greater in female-headed villages, with female group leaders contributing 26 percent less than what they proposed compared to a difference of 17 percent for male leaders ($p = 0.03$).

Results using a multivariate regression framework that includes several individual and household level controls and village fixed effects are reported in 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 estimated 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 significantly more deceptive (column 1, $p < 0.01$), 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. There is no difference in the likelihood of deception by male and female leaders in a male-headed village.

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 behaviour of female and male leaders within our expeirment. 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)

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

Here, H_k^{1f} is a dummy variable that takes the value of 1 if the village has been exposed to one female head and 0 otherwise; H_k^{2f} 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 $\alpha_1 + \alpha_5$ denote 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 behaviour 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). Panel D of Table 5 presents regression results.

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

Here $\alpha_1 + \alpha_3$ and $\alpha_1 + \alpha_3 + \alpha_5 + \alpha_7$, which give the additional deception by female group leaders in male and female-headed gender revealed treatment villages respectively. The regression results show that female group leaders are significantly more likely to deceive than male group leaders in female-headed treatment villages. There is no evidence of this additional deception in male-headed gender revealed villages. This suggests that females may observe how citizens behave towards female leaders, this encourages them to deceive more than males.

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 effect.

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 a women is in a leadership position 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 $\tilde{g} > 0$. 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. This disutility could in particular depend on social perception or appropriateness of this behaviour: $\max_{g_i} U(G) - V(\tilde{g} - g_i)$, where the standard concavity conditions apply, i.e., $U'(.) > 0$, $U''(.) < 0$, $V'(.) > 0$ and $V''(.) < 0$.

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 and 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 $U(.)$. However, 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 decreasing $V(.)$. 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).[14] If the social 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. These are two possible mechanisms consistent with female leaders more likely to deviate from their proposed amount, which is the key result discussed in the previous section.

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 this kind of expectations by female leaders. Figure 2 presents the CDF of the total contribution by the citizens (recall that in each four person group, one group member was randomly chosen to be the leader, while the other three

[14]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 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 Gchter (2000) argue that subjects strongly dislike being the sucker, that is, being those who cooperate while other group members free ride. This aversion against being the sucker might trigger a willingness to punish others.

are citizens). Restricting the sample to the gender of group leader revealed sessions, Figure 2 shows that the CDF of total contribution by all citizens when the group leader is female is to the right of that when the group leader is male. A Kolmogorov-Smirnov test confirms the difference in distributions ($p - value = 0.09$).

Figure 3 separates these by gender of the citizens and 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 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 ($p - value = 0.045$), this suggests that males contribute more towards male group leaders relative to female group leaders. For female citizens, the null hypothesis of equality of distribution of contributions to the group account cannot be rejected ($p - value = 0.99$). Hence, the lower overall contributions towards female leaders reported in Figure 2 are mainly due to the lower expected contributions by male citizens when the group leader is revealed as female.

Figure 4 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 ($p - value = 0.017$) in female headed villages. In contrast, 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 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 ($p - value = 0.964$ in female headed villages and 0.821 in 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., 2016a). Our results therefore show that only when leaders' gender is known (in the gender revealed treatment), female leaders expect males to behave worse under a female leader and 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 behaviour 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 from Task 3 of the belief elicitation experiment, i.e., what villagers think women believe is 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 that 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 to contribute Rs. 100 ($p < 0.01$). This appears to be driven by women in female-headed villages (panel B). There is no difference in female beliefs on 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 no statistical difference in women's beliefs in female-headed villages about the relative deceptive behavior by male and female leaders ($p - value = 0.27$). Women as poor role models therefore cannot explain deceptive behavior by women leaders in this experimental set-up.

4.4 Discussion

Our data thus 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 behaviour. 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 cots and as a consequence impact the behaviour of female leaders.

5 Conclusion

Using lab-in-the-field experiments conducted in rural India, we show that women leaders deviate more from their proposed contribution than men. We find that this behaviour is a result of the social environment in which leaders interaction. 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 not being deceptive are higher 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 with has an important influence on behaviour.

While gender equality and the greater representation of women in public life results in tangible policy changes, our research suggests that increasing the representation of women in leadership positions through quotas might not necessarily improve development outcomes. This is particularly important when social norms do not support the appointment of women to positions of authority. If leaders are deceptive due to their experience with other female leaders, trust and cooperative relationships might break down, hindering economic development. Greater deception by women may also reinforce gender-based discrimination such as male backlash leading to deterioration in trust, further threatening women leaders' ability to govern. Thus, our investigation suggests that behavioral factors can act as major barriers to the empowerment of women. While other factors may influence behavioral differences between men and women, our aim is not to investigate all factors, but rather provide a first step in identifying the influence of the social factors; a prime factor influencing the behaviour of male and female leaders.

These results suggest future analysis of the behaviour 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 behaviour. Surveys are likely to measure the former resulting in a biased inference of the true behaviour of leaders. Experiments are a useful method to test and measure factors that may additionally influence leaders behaviour.

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.[15] Our paper indicates the need for more investigation into the formation of

[15]For instance, see Dhar et al. (2015) on how parents influence children's gender attitudes in India, and Fernandez et al.

attitudes towards women in leadership positions, as well as the effectiveness of policies and programs to change those attitudes positively.

(2004) on the changes in attitudes towards female workforce participation in the United States as a result of increased women's employment during the Second World War.

References

Adams, R. and D. Ferreira (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics 94*(2), 291 – 309.

Afridi, F., V. Iversen, and M. Sharan (2016). Women political leaders, corruption and learning: Evidence from a large public program in India. *Economic Development and Cultural Change forthcoming*.

Ahern, K. and A. Dittmar (2012). The changing of the boards: The impact on firm valuation of mandated female board representation. *Quarterly Journal of Economics 127*(1), 137 – 197.

Alatas, V., L. Cameron, A. Chaudhuri, N. Erkal, and L. Gangadharan (2009). Gender, culture and corruption: Insights from an experimental analysis. *Southern Economic Journal 75*(3), 663 – 680.

Andersen, S., S. Ertac, U. Gneezy, J. List, and S. Maximiano (2013). Gender, competitiveness and socialization at a young age: Evidence from a matrilineal and a patriarchal society. *Review of Economics and Statistics 95*(4), 24 – 30.

Ban, R. and V. Rao (2008). Tokenism or agency? The impact of women's reservations on village democracies in South India. *Economic Development and Cultural Change 56*(3), 501 – 530.

Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topalova (2009). Powerful women: Does exposure reduce bias? *Quarterly Journal of Economics 124*(4), 1497–1540.

Beaman, L., E. Duflo, R. Pande, and P. Topalova (2012). Female leadership raises aspirations and educational attainment for girls: A policy experiment in India. *Science 335*(6068), 582 – 586.

Besley, T., R. Pande, and V. Rao (2012). Just rewards? Local politics and public resource allocation in South India. *World Bank Economic Review 26*(2), 191 – 216.

Bhalotra, S. and I. Clots-Figueras (2014). Health and the political agency of women. *American Economic Journal: Economic Policy 6*(2), 164–197.

Brollo, F. and U. Troiano (2016). What happens when a woman wins an election? Evidence from close races in Brazil. *Journal of Development Economics 122*, 28–45.

Chattopadhyay, R. and E. Duflo (2004). Women as policy makers: Evidence from a randomized policy experiment in India. *Econometrica 72*(5), 1409 – 1443.

Clots-Figueras, I. (2011). Women in politics: Evidence from the Indian States. *Journal of Public Economics 95*(7 – 8), 664 – 690.

Clots-Figueras, I. (2012). Are female leaders good for education? Evidence from India. *American Economic Journal: Applied Economics 4*(1), 212 – 244.

Croson, R. and U. Gneezy (2009). Gender differences in preferences. *Journal of Economic Literature 47*(2), 448–74.

Debski, J., M. Jetter, S. Mosle, and D. Stadelmann (2016). Gender and corruption: The neglected role of culture. CREMA working paper 2016-05.

Dhar, D., T. Jain, and S. Jayachandran (2015). Intergenerational transmission of gender attitudes: Evidence from India. NBER Working Paper No. 21429.

Dollar, D., R. Fisman, and R. Gatti (2001). Are women really the "fairer" sex? Corruption and women in government. *Journal of Economic Behavior & Organization 46*(4), 423 – 429.

Eagly, A. and L. Carli (2003). The female leadership advantage: An evaluation of the evidence. *The Leadership Quarterly 14*, 807 – 834.

Eagly, A., S. Karau, and M. Makhijani (1995). Gender and the effectiveness of leaders: A meta-analysis. *Psychological Bulletin 117*(1), 125 – 145.

Eckel, C. and P. Grossman (1998). Are women less selfish than men?: Evidence from dictator experiments. *The Economic Journal 108*(448), 726 – 735.

Eckel, C. and P. Grossman (2008). Men, women, and risk aversion: Experimental evidence. In C. Plott and V. Smith (Eds.), *Handbook of Experimental Results*, pp. 1061 – 1073. Amsterdam: Elsevier.

Economist (2015). *Men Adrift*.

Fehr, E. and S. Gchter (2000). Cooperation and punishment in public goods experiments. *The American Economic Review 90*(4), 980–994.

Fernandez, R., A. Fogli, and C. Olivetti (2004). Mothers and sons: Preference formation and female labor force dynamics. *Quarterly Journal of Economics 119*(4), 1249–1299.

Gangadharan, L., T. Jain, P. Maitra, and J. Vecci (2016a). Social identity and governance: The behavioral response to female leaders. *European Economic Review 90*, 302 – 325.

Gangadharan, L., T. Jain, P. Maitra, and J. Vecci (2016b). The behavioral implications of women's empowerment programs. UNU WIDER Working Paper 2016/64.

Gneezy, U., K. L. Leonard, and J. List (2009). Gender differences in competition: Evidence from a matrilineal and patriarchal society. *Econometrica 77*(5), 1637 – 1664.

Gneezy, U., M. Niederle, and A. Rustichini (2003). Performance in competitive environments: Gender differences. *Quarterly Journal of Economics 118*(3), 1049 – 1074.

Gneezy, U. and J. Potters (1997). An experiment on risk taking and evaluation periods. *Quarterly Journal of Economics 112*(2), 631 – 645.

Goetz, A. (2007). Political cleaners: Women as the new anti-corruption force? *Development and Change 38*(1), 87 – 105.

Gokcekus, O. and R. Mukherjee (2002). Public sector corruption and gender: Perception of public officials from six developing and transition countries. Technical report, World Bank.

Grossman, P., M. Komai, and J. Jensen (2015). Leadership and gender in groups: An experiment. *Canadian Journal of Economics 48*(1), 368 – 388.

Güth, W., V. Levati, M. Sutter, and E. van der Heijden (2007). Leading by example with and without exclusion power in voluntary contribution experiments. *Journal of Public Economics 91*(5-6), 1023 – 1042.

Ingram, B. and S. Berger (1977). Sex-role orientation, defensiveness, and competitiveness in women. *Journal of Conflict Resolution 21*(3), 501–518.

Iyer, L., A. Mani, P. Mishra, and P. Topalova (2012). The power of political voice: Women's political representation and crime in India. *American Economic Journal: Applied Economics 4*(4), 165–193.

Jablonski, R. and B. Seim (2016). How transparency affects distributional politics: A field experiment among elected politicians in Malawi. London School of Economics working paper.

Jack, B. and M. Recalde (2014). Leadership and the voluntary provision of public goods: Field evidence from Bolivia. *Journal of Public Economics 122*, 80 – 93.

Kosfeld, M. and D. Rustagi (2015). Leader punishment and cooperation in groups: Experimental field evidence from commons management in ethiopia. *American Economic Review 105*(2), 747–783.

Krupka, E. and R. Weber (2013). Identifying social norms using coordination games: Why does dictator game sharing vary? *Journal of the European Economic Association 11*(3), 495 – 524.

Lambsdorff, F. and F. Boehm (2011). Gender and corruption: Lessons from laboratory corruption experiments. *European Journal of Development Research 23*(1), 59 – 71.

Levy, D., K. Padgitt, S. Peart, D. Houser, and E. Xiao (2011). Leadership, cheap talk, real cheap talk. *Journal of Economic Behavior and Organization 77*, 40 – 52.

Lott, J. and L. Kenny (1999). Did women's suffrage change the size and scope of government? *Journal of Political Economy 107*(6), 1163 – 1198.

Matsa, D. and A. Miller (2013). A female style in corporate leadership? Evidence from quotas. *American Economic Journal: Applied Economics 5*(3), 136 – 169.

Meidinger, C. and M.-C. Villeval (2002). Leadership in teams: Signaling or reciprocating? Working Paper 02-13, GATE, University of Lyon.

Schwartz, S. and T. Rubel (2005). Sex differences in value priorities: Cross-cultural and multimethod studies. *Journal of Personality and Social Psychology 89*(6), 1010 – 1028.

Swamy, A., Y. Knack, Y. Lee, and O. Azfar (2001). Gender and corruption. *Journal of Development Economics 64*(1), 25 – 55.

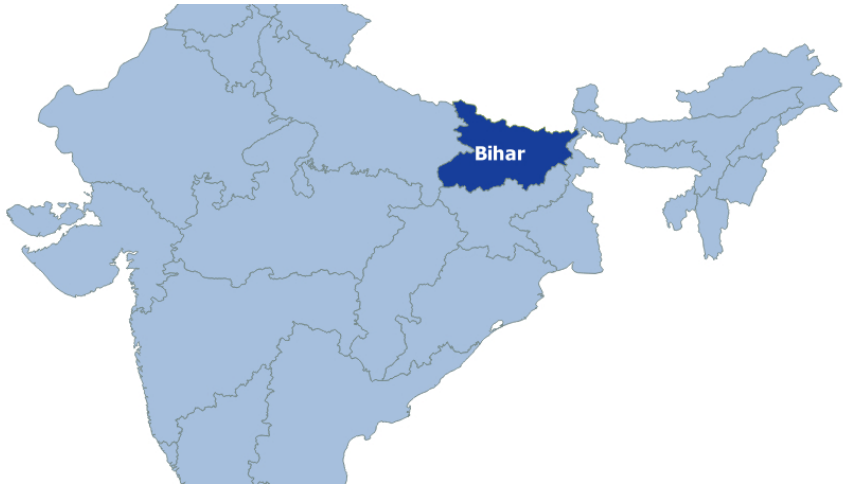
van den Assem, M. J., D. van Dolder, and R. H. Thaler (2012). Split or steal? cooperative behavior when the stakes are large. *Management Science 58*(1), 2–20.

Vijayalakshmi, V. (2008). Rent-seeking and gender in local governance. *The Journal of Development Studies 44*(9), 1262–1288.

World Bank (2002). Integrating gender into the world banks work: A strategy for action. Technical report, World Bank.

Figure 1: Location of Bihar in India

Panel A: Location of Bihar in India



Panel B: Location of study districts in Bihar

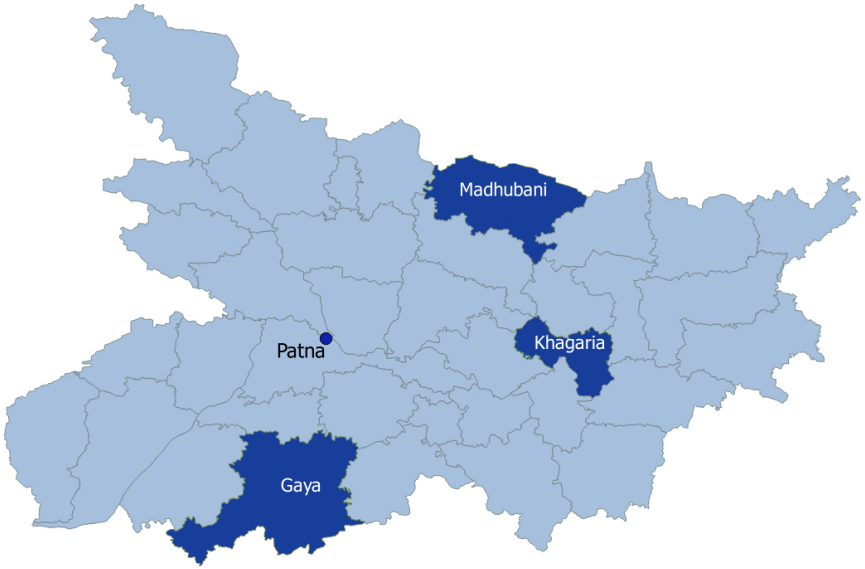
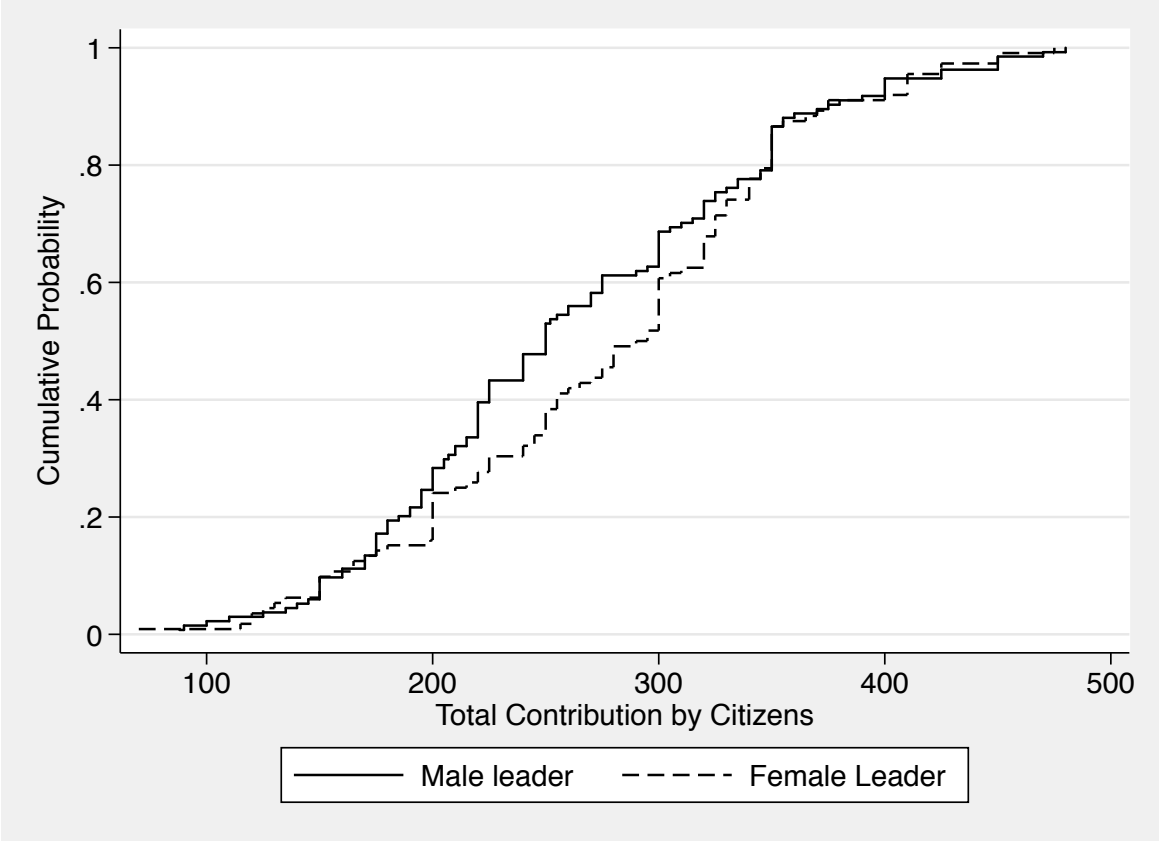
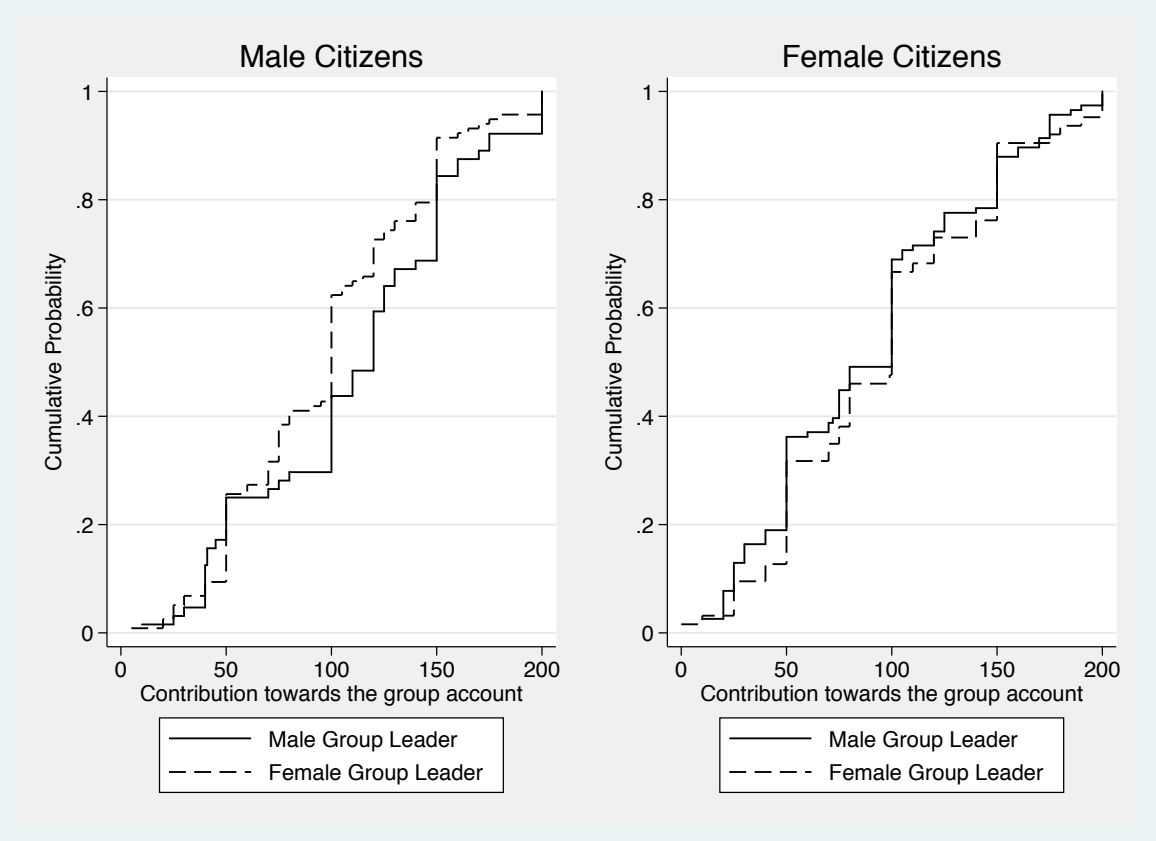


Figure 2: CDF of contribution to group account by citizens



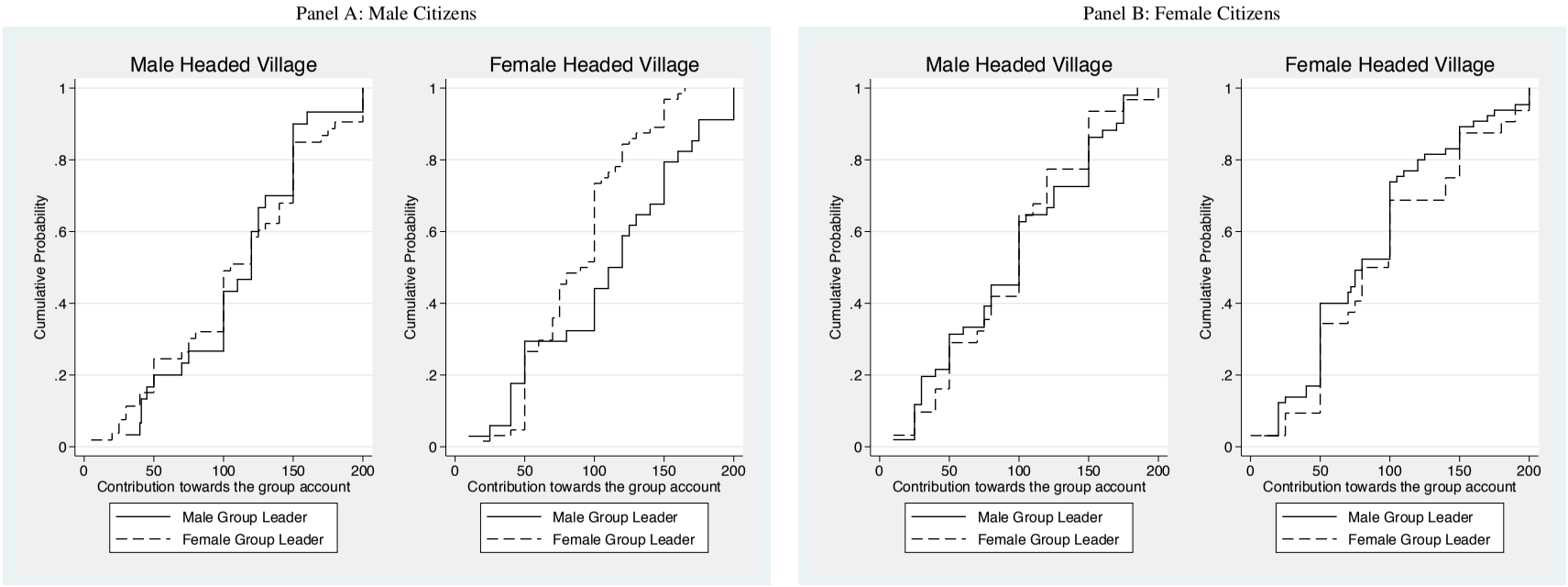
Notes: Sample restricted to treatment (gender revealed) sessions only. The null hypothesis of equality of distribution of contributions to the group account is rejected using a two-sample Kolmogorov-Smirnov test of equality of distributions (p-value = 0.09).

Figure 3: 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 4: 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	0.199**	0.184**	-18.229**
	(0.085)	(0.087)	(8.655)
Female Leader – Male Leader	0.168	0.141	-15.901
(Gender not revealed)	(0.100)	(0.111)	(10.724)
Female Leader – Male Leader	0.230**	0.226**	-20.487*
(Gender revealed)	(0.112)	(0.110)	(11.266)
Panel B: Gender of village head and group leader behavior			
Female Leader – Male Leader	0.125	0.110	-5.527
(Male headed village)	(0.132)	(0.142)	(13.655)
Female Leader – Male Leader	0.252***	0.236***	-26.780***
(Female headed village)	(0.081)	(0.081)	(7.801)
Panel C: Intensity of exposure to female village head and group leader behavior			
Female Leader – Male Leader	0.126	0.110	-5.618
(0 Female head)	(0.132)	(0.142)	(13.637)
Female Leader – Male Leader	0.266**	0.238**	-29.544***
(1 Female head)	(0.100)	(0.104)	(9.336)
Female Leader – Male Leader	0.225*	0.233*	-21.112
(2 or more Female heads)	(0.120)	(0.118)	(15.725)
Panel D: Gender of village head in Gender Revealed Treatment Village			
Female Leader – Male Leader	0.242	0.267	-15.425
(Male headed village)	(0.201)	(0.202)	(18.926)
Female Leader – Male Leader	0.298**	0.263*	-27.700**
(Female headed village)	(0.126)	(0.133)	(12.171)
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, fathers 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. 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). A higher score denotes that females believe 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 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: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.10$.